U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-387/92-11
50-388/92-11

Docket Nos. 50-387
50-388

Licensee: Pennsylvania Power & Light Company
2 North Ninth Street
Allentown, PA 18101

Facility Name: Susquehanna Steam Electric Station Units 1&2

Inspected Conducted: March 9-13, 1992

Inspection At: Berwick, Pennsylvania

Inspectors: Robert A. McBrearty 4/21/92
R. McBrearty, Reactor Engineer, date
MS, EB, Division of Reactor Safety

H J Kaplan 4/21/92
H. J. Kaplan, Sr. Reactor Engineer, date
MS, EB, Division of Reactor Safety

Approved By: E H Gray 4/21/92
E. Harold Gray, Chief, Materials Section, date
EB, Division of Reactor Safety

Inspection Summary: Areas inspected included an assessment of the welding program for Units 1 and 2,, and the inservice inspection (ISI) program at Unit 1. The welding program was found to be well organized and effectively controlled by competent welding personnel, and closely supported by an active corporate engineering group. The ISI program that describes the timing and extent of ISI activities, including non-destructive examinations (NDE) for the present Unit 1 outage was found to be in accordance with the NRC requirements and ASME Code.

1.0 Welding Program (55050)

1.1 Scope

The purpose of this inspection was to assess the site welding program in order to ensure that welds which are made at the site are metallurgically sound and meet code requirements.

1.2 Findings

The inspector reviewed PP&L's recently reorganized welding organization. The responsibility of the welding activities rests with the nuclear engineering department located in the Allentown corporate office. The site welding activities are channeled through an experienced and knowledgeable station welding engineer who provides technical direction to the maintenance and construction groups. Included in his various responsibilities are welder and procedure qualification, training of welders, review of weld travelers, and monitoring of welding trends. The station welding engineer receives technical support from an experienced and professional corporate welding/metallurgical group with excellent academic credentials. The inspector reviewed the following key procedures that describe the site welding activities: (a) Control of Welding, AB-QA-923, Rev. 4; (b) Control, Storage and Issue of Welding Filler Material M-1065, Rev. 3, and (c) Weld Procedure and Performance Qualification, AD-QA-921, Rev. 3.

In order to verify the implementation of the subject procedures the pre-installation activities covering the field fabrication of certain carbon steel spool pieces were reviewed. The pieces are intended for the replacement of certain portions of the reactor water cleanup system (RWCU). The work requirements were described in Work Package, C14072. The spool piece(s) were being replaced to reduce the crud buildup in the existing system. The system was designed to ASME 3 Class C requirements. The inspector visually examined several completed welds (identified as 66, 67, 68 & 69) for the spool piece shown on drawing DBC-101-1. The spool included valve 144F005A. Visual examination of the weld surfaces, including the internal diameter (I.D.) of weld #68, revealed no apparent defects. The I.D. in weld #68 showed good penetration. The supporting non-destructive examination (NDE) documents, including the weld travelers, indicated that the subject welds had been visually examined and inspected by radiography and/or magnetic particle examination. NDE inspection was performed by Siemens, a subcontractor. A review of Siemens inspector credentials, including eye examinations and SNTC-1 examination results disclosed no deficiencies. The weld travelers indicated that the welding procedure N-A-1A-MA used by welder #006 consisted of a combination of Tungsten Inert Gas and manual

metal arc processes. The specified materials were ER-70S-2 wire and E7018 electrodes. The supporting procedure and welder qualification records were reviewed and found to be in accordance with ASME Section IX requirements.

The inspector accessed the activities in the weld laboratory which currently involved the qualification of craft welders for the present outage. Bend testing of specimens from welder's qualification "90-344." was witnessed. The side bend specimens and jig conformed to ASME IX requirements. The inspector concurred with the PP&L welding supervisor's evaluation that the specimens were free of defects.

It is noted that PP&L employs a computerized listing of current welder qualifications using filler metal withdrawal slips as a basis for maintaining the welders accreditation. In addition, the material certifications for the replacement material were found to conform to the ASME specifications (SA-106, SA-234-WPB, SA-105 and SA-216-WCB) and that the materials were procured from approved vendors as shown in a detailed listing dated March 11, 1992.

A review of PP&L's QA audit reports, 90-012 covering welding and NDE, and 91-020 covering ASME XI replacement activities indicated that in general a sound welding program was in place. A few deficiencies involving electrode control were identified in audit 90-012 which were subsequently corrected as noted in memo PL15-35508 dated June 15, 1990.

The storage and issuance of filler material as it pertained to the RWCU modification was inspected. Electrodes and bare wire were found to be stored in accordance with the identification requirements of Procedure AD-QA-922 in regard to color, type and size. The inspector noted that the calibrated oven temperatures for the coated electrodes ranged around 300°F compared to PP&L's procedural requirements of 250°F minimum. Even though a review of past temperature records showed temperatures for twelve furnaces ranging from 270°F - 320°F, PP&L agreed after checking with their electrode suppliers that a maximum temperature should be stated in the procedure. PP&L immediately initiated a procedural change to include a maximum temperature 300°F for stainless steel and nickel alloys and 400°F for carbon steel. Control of withdrawal and issuance of electrodes was verified by a review of withdrawal slips attached to the modification package. The attached travelers provided essential welding, material and inspection information.

Several welding procedures identified as N-A-1A-MA, P45 to P45; N-B-IA-MA-18-3, P8 TO P8, NA-1A-MA-8-2, P8 to P8 and N-A-IA-MA-11, P1 to P1 were reviewed. These procedures, which represented various processes and combinations of materials, were found to be in accordance with

ASME Section IX requirements and supported by detailed qualification records. The inspector noted that Procedure N-A-1A-MA, P45 to P45 for welding 6X-N stainless steel specified a relatively high maximum interpass temperature of 500°F. After an independent review, PP&L reduced the interpass temperature to 300°F. A review of Welding Trend Analysis Report PL15-38846, dated January 30, 1992, (required by AD-QA-925) was reviewed. It covered the period between August 1, 1991 and December 31, 1991. The report concluded that significant improvement had been achieved compared to previous base line data. Training and welders' report cards have apparently contributed to this improvement.

2.0 Inservice Inspection (ISI) Program (73753)

2.1 Scope

A nuclear generating facility depends on numerous systems and components for the safe operation and shutdown of the facility. To assure that those systems and components will operate when required, the NRC requires that an ISI program be established. Specific inspection requirements regarding method and frequency are contained in the ASME Boiler and Pressure Vessel Code, Section XI.

2.1 Background

Susquehanna Unit 1 and Unit 2 are each in the first 10-year inspection interval. The Unit 1 interval commenced on June 8, 1983. The Unit 2 interval commenced on February 12, 1985. The licensee intends to put the inspection interval on the same schedule at each unit. The method proposed to accomplish that involves extending by one year the present Unit 1 interval, and shortening the Unit 2 interval by a similar amount. The licensee intends to discuss its options in that regard with the NRC.

2.2 Findings

The ISI program at each unit is approved by the NRC. Additionally, requests for relief from code requirements that were justified by the licensee were granted by the NRC. The safety evaluation reports issued by the NRC to the licensee document the NRC approval of the ten-year ISI programs, and the accompanying requests for relief from code requirements.

The examinations scheduled during the ongoing 1992 refueling outage at Unit 1 will complete the 10-year program. The program tracking system established by the licensee confirmed that the examinations completed to date agree with the percentages specified by ASME Section XI for each inspection.

Relief Request No. 1RR-6 documented that the code required ultrasonic examination of the Unit 1 recirculation system sweepolet to riser welds was impractical. As an alternative examination, the licensee proposed to perform a visual examination during system pressure tests. Additionally, the licensee proposed to perform ultrasonic examination to the extent practical. The NRC granted the request based on the licensee performing the proposed alternative examinations.

Licensee actions regarding relief request 1RR-6 were examined to ascertain that the alternative examinations were performed. Visual examinations are scheduled at the appropriate time and, additionally, the licensee's ISI contractor, General Electric, is scheduled to perform the ultrasonic examination of a riser weld using its automated equipment, including a computerized data acquisition and processing system. The results will be evaluated and, if the method is proven viable and the results are determined to be reproducible, the licensee intends to use the method during the second inspection interval, thereby, complying with the code required volumetric examination.

The use of the latest automated ultrasonic examination equipment for the recirculation system sweepolet to riser weld demonstrates that the licensee is seriously attempting to find a way to eliminate the need for relief from the requirement to perform a volumetric examination of the riser welds in Unit 1.

The "A" core spray pump elbow to flange weld 1P-206A-361-4-6 was nondestructively examined using the magnetic particle examination method. The technique used included the use of an adjustable leg magnetic yoke. Data associated with the examination were inspected and the method for achieving complete examination coverage was discussed with the licensee and with the ISI vendor examiners who performed the examination. The data and discussions confirmed that the examination was properly performed, the data were accurately recorded, and 100% coverage was achieved. Additionally, the examiners were determined to be qualified and certified in accordance with SNT-TC-1A, the governing document.

Stainless steel piping welds susceptible to intergranular stress corrosion cracking (IGSCC) that are discussed in NUREG-0313, Revision 2, and Generic Letter (GL) 88-01 are included in an augmented inspection program that is tracked with the ISI program. Seven weld categories, "A: through "G", are defined in NUREG 0313, Revision 2 and the GL based on material, susceptibility to IGSCC, IGSCC mitigating processes and examinations performed on the welds. Inspection extent and schedule are included for each category. Susquehanna Unit 1 has welds in 3 of the 7 categories as follows:

- Category "A" - Welds with no known cracks that are fabricated of IGSCC resistant materials or have been solution heat treated after welding.

- Category "B" - Welds not made of resistant materials, but have had a stress improvement (SI) performed either before service or within two years of operation. If the SI is performed after plant operation, an ultrasonic examination was performed after the SI process.

- Category "C" - Welds not made of resistant materials, and have been given a stress improvement process after more than two years of operation. An ultrasonic examination should be performed after the SI process.

The licensee has accurately categorized the applicable welds in the plant, and each weld in the program is appropriately scheduled for examination based on its category and the inspection schedule defined by the GL.

Personnel qualification/certification records showed that, in addition to being qualified and certified in accordance with SNT-TC-1A, those personnel responsible for the ultrasonic examination of welds in the Generic Letter 88-01 program were listed on the latest edition of the EPRI Registry of Qualified Personnel for UT of IGSCC.

Conclusion

The augmented Generic Letter 88-01 examination program complies with provisions of NUREG-0313, Revision 2 regarding weld categorization, examination extent and schedule, and the qualification of examination personnel. Examinations required by the program are capable of being used to assess the acceptability for continued service of the included piping welds and systems.

Personnel responsible for performing nondestructive examinations in the plant are qualified to the level of competency commensurate with their assigned responsibility. Those individuals participating in IGSCC examinations are listed on the EPRI Registry of Qualified Personnel for UT of IGSCC.

The NRC approved ISI program is tracked by the licensee using a computer based system that is capable of identifying up to date program status. Requests for relief from code requirements are clearly documented and licensee proposed alternative examinations are appropriately scheduled.

3.0 Exit Meeting

An exit meeting was conducted on March 13, 1992 with the attendees listed in Attachment 1, at which time the findings were presented to the licensee. No violations or deviations were identified.

ATTACHMENT 1

Persons Contacted

Pennsylvania Power & Light Company

R. Baker, NDE Level III
N. Fedder, ISI Specialist
J. F. Fritzen, MIG Supervisor
D. J. Gandenbezes, Supervisor, Production Support
E. B. Gerlach, Station Welding Engineer
J. Graham, Supervisor, Quality Control
J. T. Lindberg, Project Scientist, ISI
R. Prego, Supervisor, Site Quality Verification
G. Stanley, Supervisor of Plant
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U.S. Nuclear Regulatory Commission

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