U.S. NUCLEAR REGULATORY COMMISSION
REGION I

REPORT/DOCKET NOS.	50-272/93-25
LICENSE NO.	DPR-70
LICENSEE:	Public Service Electric and Gas Company
INSPECTION AT:	Hancocks Bridge, New Jersey
FACILITY NAME:	Salem Nuclear Generating Station, Unit 1
INSPECTION DATES:	October 25 - October 29, 1993

INSPECTOR: P. Patnaik — NOV 23. '93
Prakash Patnaik, Reactor Engineer — Date
Materials Section, EB, DRS

APPROVED BY: Michael C. Modes — 11/23/93
Michael C. Modes, Chief — Date
Materials Section, EB, DRS

Areas Inspected: The review of inservice inspection (ISI) program, scope of ISI work, eddy current examination program for steam generator tubes, erosion/corrosion monitoring program for high energy systems, and steam generator leakage monitoring program were reviewed.

Results: The licensee's ISI program, and the scope of ISI work, for the eleventh refueling outage complied with the 1983 edition of the ASME Code, Section XI, including the summer '83 addenda. The steam generator tube examination met the requirements of the technical specification. For those areas reviewed, in the long-term erosion/corrosion program, the estimates of wear rates and remaining life of components, examined during the outage, were conservative. The steam generator leakage monitoring is comprehensive, and the procedures for detection of primary to secondary leakage and the actions to be taken in the event of a leak are systematically presented. However, the operation's procedure does not address operator's actions against step increases in leak rate below the shutdown margin, as seen in some of the recent tube failures at other plants. The administrative limit for power reduction for shutdown is acceptable.

DETAILS

1.0 INSERVICE INSPECTION (ISI) (73753)

1.1 Scope

The conduct of inservice inspection using ultrasonic, magnetic particle and liquid penetrant examination ensures integrity of the pressure boundary. During this inspection, reviews of the ten-year ISI plan, the scope of work for the outage, a sampling of inservice inspection data, and observation of work activities were performed to ascertain if the requirements of the applicable ASME Code, Section XI, and the technical specifications were met.

1.2 Findings

Public Service Electric and Gas Company (PSE&G), the licensee for Salem Unit 1, conducted an inservice inspection during the eleventh outage (1R11) of the unit, in accordance with the ASME Code, Section XI, 1983 edition, including the summer 1983 addendum. The unit is in the second inspection period of the second inspection interval, and the ongoing outage is the second outage of the inspection period. The unit will have another refueling outage during the second inspection period. The inspector reviewed the ten-year ISI plan and the relief requests to the NRC on welds which are impractical to examine in accordance with the applicable code. Within the scope of the review, the inspector did not find any discrepancy.

The inspector reviewed the scope of inservice inspection work for the outage. The components listed in the work scope were identifiable from the ten-year plan. The examination requirement for each component complied with that of the applicable ASME Code, Section XI.

The inspector performed surveillance of the storage area for the ultrasonic calibration blocks. The storage facility appeared to be adequate. The general condition of the calibration blocks, with regard to corrosion, is good. The station quality assurance personnel performed routine surveillance of ISI activities during the outage. The level of staffing to implement the inservice inspection program was found to be adequate.

The inspector witnessed ultrasonic examination of the following welds in the chemical and volume control system piping:

3-CV-2163-6
3-CV-2163-7
3-CV-2163-8
3-CV-2160-42
3-CV-2160-43
3-CV-2160-44

The examiners used the calibration block No. 30-SAM, designated for use on the piping and listed in the program plan. The examination was performed in accordance with licensee's procedures. The inspector verified from the certifications of personnel performing the examination that the personnel were appropriately qualified.

The following data sheets on ultrasonic examinations, conducted during the outage, were reviewed to verify the licensee's resolution of indications. The inspector did not find any discrepancy.

Line No.	Weld No.	Scan	Indication	Disposition
12-CV-1143	3	Profile UT 45°, 45°T 45° Tangential	Geometric indication from weld root and counterbore	Acceptable
2-CV-1175	35	UT 45°, 45° T, 70°	No	Acceptable
8-SJ-1162	5	Profile, UT 45°, 45°T, and 45° Tangential	Two indications due to root geometry	Acceptable
8-SJ-1152	6	Profile, UT 45°, 45°T, and 45° Tangential	Geometric indications	Acceptable
4-SJ-1172	28	Profile, UT, 0°, 45°, 45° T, 45° Tan	Geometric indications	Acceptable

The inspector reviewed data sheets on VT-3 visual examination of all supports on the pressurizer surge line. There was no discrepancy noted in the review of data. All personnel conducting visual examinations were appropriately qualified.

1.3 Conclusion

The licensee exercised adequate control over inservice inspection activities during the eleventh refueling outage of Salem Unit 1. The inservice inspection program during the outage was found to be in compliance with the applicable ASME Code, Section XI, and the regulatory requirements.

2.0 STEAM GENERATOR EDDY CURRENT EXAMINATION AND SHOT PEENING

During the eleventh refueling outage, the licensee applied shot peening to the hot leg side of the steam generator tube bundle to increase the margin of resistance in areas of the tubes within the tubesheet and transition region that are susceptible to primary water stress corrosion cracking (PWSCC). The inspector witnessed the shot peening operation in progress on No. 12 and No. 14 steam generators. The following critical parameters, identified in the PSE&G procedure, were verified:

- Mass flow rate of shot peening material
- Speed of travel of the nozzle within the tube sheet

The material certification and the heat treatment charts of the shot material was reviewed and found to conform to the engineering specification.

During the inspection, the inspector also reviewed a detailed 50.59 safety evaluation of the shot peening operation and a technical description of the process. The safety evaluation did not identify any unreviewed safety questions.

The steam generator eddy current examination of Salem Unit 1 was in progress during the inspection. The licensee performed a twenty percent bobbin coil examination for the full length of tubes and also twenty percent rotating pancake coil (RPC) on the hot leg side Westinghouse Explosive Tube Expansion (WEXTEX) transitions for all four steam generators. The RPC was performed on tube expansions located in the region which had a greater potential for an active degradation mechanism. In addition, an inspection was also performed on previous indications greater than twenty percent throughwall. The licensee expanded the sample of tubes examined in accordance with the requirements of Section 4.4.5.2 of the Salem Unit 1 technical specification. As a result of sample expansion, the licensee performed one hundred percent bobbin coil examination of all four steam generators, and one hundred percent RPC examination of No. 13 steam generator. The inspector witnessed data acquisition for No. 11 and No. 13 steam generators and did not find any discrepancy.

2.1 Conclusion

The shot peening operation and the eddy current examination of Salem Unit 1 were well planned and controlled. For those areas inspected, the eddy current examination program met the industry standards and the regulatory requirements.

3.0 LONG-TERM EROSION/CORROSION (E/C) MONITORING OF HIGH ENERGY PIPING (49001)

The inspector reviewed the scope of work during the eleventh refueling outage as regards E/C monitoring of components in the high energy systems. The licensee selected 147 components initially from the following systems and expanded the scope by 9 additional components:

- Heater Drains
- Gland Seal Steam
- Moisture Separator Reheater Drains
- Miscellaneous Drains
- Auxiliary Feedwater
- Heating Water
- Condensate System
- Bleed Steam
- Cold Reheat
- Steam Generator Blowdown
- Heater Vents
- Turbine Drains
- Feedwater Recirculation
- Feedwater System

The selection of components was based on predictive methodology using CHECMATE computer model, industry experience, station experience, past ultrasonic test data, Salem Unit 2 E/C results, and engineering judgment. The inspector reviewed the licensee's evaluation of components based on the thickness data obtained during the outage. It was concluded that the licensee's estimates of the wear rate, the remaining life, and the predicted remaining wall thickness at the end of the next operating cycle were generally conservative.

4.0 STEAM GENERATOR LEAKAGE MONITORING PROGRAM

The licensee's primary-to-secondary leakage monitoring, as outlined in Salem Chemistry Procedure SC.CH-AB.ZZ-1101(Q), Rev. 0, dated June 26, 1992, "Detection and Determination of Primary to Secondary Leakage," was reviewed. This procedure provides necessary sampling, analysis and reporting requirements, along with methods for calculating and projecting primary-to-secondary leak rates. Radioactivity in the secondary system is usually detected initially by a continuous monitoring system at the condensate air ejector, and then by the steam generator blowdown monitor. A large leak rate may be detected initially by the blowdown monitor as well as the air ejector monitors. The leak rate is estimated by measuring the activity level of a selected nuclide in primary and secondary systems. The inspector reviewed logs pertaining to radiochemical analysis for gross beta and gamma of steam generator blowdown sample taken three times a week for September 1993. The logs were up to date and contained pertinent data. The inspector subsequently reviewed the

channel calibration check, the channel functional test and the source check of the steam generator blow down monitors (R-19), and the condenser air ejector monitors (R-15) performed in accordance with the surveillance requirements of the technical specification. The logs were up to date and the surveillance was performed in a timely manner.

The inspector also reviewed the Abnormal Operating Procedure (S2.OP-AB.SG-0001 Q) on the steam generator tube leak to determine the operator's action in the event of an indication of steam generator tube leakage. This procedure clearly addresses the entry conditions and the subsequent actions systematically. Further, the administrative limit to initiate a power reduction (if at anytime a 24-hour projected leak rate reaches or exceeds 140 gallons per day) or shut down (when the leak rate reaches 140 gallons per day) is within Technical Specification limits. Notwithstanding the limits on power reduction and/or shutdown, the operations procedure does not address appropriate actions against step increases in primary-to-secondary leak rate below the shut down margin, which have been experienced in case of some of the recent tube failures at other plants.

5.0 EXIT MEETING

The findings of the inspection were presented to and discussed with members of the licensee's management at the exit meeting on October 29, 1993. The licensee concurred with the findings of the inspection and did not voice any objections. A list of attendees of the exit meeting on October 29, 1993, is attached to this report as Attachment 1.

ATTACHMENT 1

Public Service Electric and Gas Company

M. Alpaugh	Licensing
C. Connor	Supervising Engineer
M. Morroni	Technical Dept. Manager
J. Nichols	Reliability and Assessment Manager

U. S. Nuclear Regulatory Commission

C. Marschall	Sr. Resident Inspector
P. Patnaik	Reactor Inspector