Public Service
Electric and Gas
Company

Stanley LaBruna
Vice President - Nuclear Operations

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038 609-339-4800

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United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

NINETY DAY REPORT FOR INSERVICE INSPECTION ACTIVITIES
PERFORMED DURING THE FIFTH REFUELING OUTAGE
SALEM GENERATING STATION - UNIT NO. 2
DOCKET NO. 50-311

Public Service Electric & Gas Company (PSE&G) hereby provides in the enclosures to this letter, the Ninety (90) Day Report for Inservice Inspection (ISI) activities conducted at Salem Unit 2 during the fifth refueling outage. This report is submitted in accordance with Section 4.0.5 of Appendix A to the Technical Specifications for Salem unit 2 and Article IWA-6220(b) of Section XI of the ASME Boiler and Pressure Vessel Code.

This submittal consists of Form NIS-1, "Owners Data Report for Inservice Inspection" and Volume 1 of the "1990 Inservice Examination of Selected Components at Salem Generating Station, Unit 2", prepared by Southwest Research Institute.

Should there be any questions with regard to this submittal, please do not hesitate to contact us.

Sincerely,

S LaBruna

Enclosures

C Mr. J. C. Stone
Licensing Project Manager

Mr. T. Johnson
Senior Resident Inspector

Mr. T. Martin, Administrator
Region I

Mr. Kent Tosch, Chief
New Jersey Department of Environmental Protection
Division of Environmental Quality
Bureau of Nuclear Engineering
CN 415
Trenton, NJ 08625

Mr. Emanuel J. Mossa
New Jersey Department of Labor and Industry
PO Box 1503, Labor & Industry Building
Trenton, NJ 08625

ENCLOSURE 1

OWNERS DATA REPORT FOR INSERVICE INSPECTION

FORM NIS-1 OWNER'S DATA REPORT FOR INSERVICE INSPECTORS
AS REQUIRED BY THE PROVISIONS OF THE ASME CODE RULES

1. Owner: Public Service Electric & Gas Co., 80 Park Plaza Newark, N.J. 07101
2. Plant: Salem Generating Station P.O. Box E Hancock's Bridge, N.J. 08038
3. Plant Unit 2
4. Owner's Certificate of Authorization (if required) N/A.
5. Commercial Service Date 10/13/81.
6. National Board Number for Unit N/A.
7. Examination Dates: 4/1/90 through 6/24/90.
8. This report is for the first examination conducted in the third inspection period which ends October 13, 1991. The first inspection interval is from October 13, 1981, to October 13, 1991.
9. Components inspected:

COMPONENTS OR APPURTENANCE	MANUFACTURER OR INSTALLER	MANUFACTURER OR INSTALLER SER. NO.	STATION OR PROVINCE NUMBER	NATIONAL BOARD NO.
#2 Reactor Vessel	Combustion Engineering	67201 Head 67101 Vessel	N/A	20765
#21 Steam Generator	Westinghouse Tampa Div. P.O. Box 19218 Tampa, FL 33616	1201	N/A	68-43
#22 Steam Generator	" "	1202	N/A	68-44
#23 Steam Generator	" "	1004	N/A	68-11
#24 Steam Generator	" "	1204	N/A	68-52
Pressurizer	Delta Southern	1211	N/A	68-48

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9. Components Inspected (cont'd).

COMPONENTS OR APPURTENANCE	MANUFACTURER OR INSTALLER	MANUFACTURER OR INSTALLER SER. NO.	STATION OR PROVINCE NUMBER	NATIONAL BOARD NO.
Chemical Volume & Control Piping System	United Engineers & Constructors (UE&C) 30 South 17th St., Phila. PA 19101	N/A	N/A	N/A
Containment Spray Piping System	UE&C	N/A	N/A	N/A
Mainsteam Piping Sys.	UE&C	N/A	N/A	N/A
Pressurizer Relief Piping Sys.	UE&C	N/A	N/A	N/A
Reactor Coolant Piping Sys.	UE&C	N/A	N/A	N/A
Residual Heat Removal Piping Sys.	UE&C	N/A	N/A	N/A
Steam Gen. Feed Piping System	UE&C	N/A	N/A	N/A
Safety Injection Piping Sys.	UE&C	N/A	N/A	N/A

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10. Abstracts of Examinations:

1.0 This report also contains augmented examinations required by Salem Technical Specifications and Regulatory Guides, Circulars, and bulletins issued by the United States Nuclear Regulatory Commission.

Examinations were conducted by PSE&G as well as companies under contract to PSE&G. The following is a brief summary with further details found in the attached report and on file at the Salem Generating Station.

Since nearly all inservice examination requirements can be found in Salem's Technical Specifications, this summary lists these requirements first arranged according to Tech. Spec. paragraph number followed by applicable NRC circulars and bulletins.

11. Examination Summary

1.0 Technical Specification 4.0.5 - ASME XI

The examinations conducted during this outage completed the required number of examinations for the first examination of the third inspection period as shown in the 10 year long term inspection plan.

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11. Examination Summary (Cont'd)

1.1 ISI Examination

Southwest Research Institute (SwRI) under the direction of the Salem ISI Group conducted seventy- three (73) ultrasonic, fifty-nine (59) liquid penetrant, nine (9) magnetic particle, and four (4) visual examinations on the Main Steam, Residual Heat Removal, Reactor Coolant, Chemical and Volume Control, Steam Generator Feedwater, Safety Injection, and Containment Spray Systems.

The following nonconformances were reported by SWRI:

1.1.1 Remote visual (VT) of the RPV with the core barrel in place, ASME Section XI examination category B-N-1, revealed numerous linear and irregular indications. An attempt to confirm the most significant indication with UT yielded inconclusive results. Fracture mechanics analysis was performed by PSE&G and Westinghouse assuming the worst case (through-wall) and the core barrel was allowed to operate through another refueling cycle. The areas will be reexamined during the 6th refueling/10 year ISI outage.

1.1.2 During the UT examination of 24MS167 valve bolting, ASME Section XI examination category C-D, a heavy deposit of yellow plastic like substance was noted on the valve body. PSE&G will correct this problem during a subsequent refueling outage.

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11. Examination Summary (Cont'd)

1.1.3 PT examination of 22 RCP Flywheel in accordance with Reg. Guide 1.14 revealed numerous indications in the keyway areas. An evaluation was performed by Westinghouse Engineering and the indications were determined to be nonrelevant and conditions of original manufacture (See section 7.0 for more detail).

No other reportable indications were observed during the examinations.

1.2 Visual Examinations of Supports

1.2.1 Contract personnel under the direction of the Salem ISI Group conducted visual examinations on two (2) Nuclear Class 0, forty (40) Nuclear Class I, thirty-three (33) Nuclear Class II and two hundred and fifty-two (252) Nuclear Class III supports.

Several discrepancies were found, i.e. wrong spring settings, rust, loose bolts, etc. Deficiency report and/or work orders were generated to document and correct all discrepancies noted.

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11. Examination Summary (Cont'd)

1.3 Ten Year ISI Hydrostatic Test Program

During the 5th Refueling outage of Salem Unit 2 a total of forty-three (43) hydrostatic tests were performed. These tests were required as per ASME Section XI Ten Year Hydrostatic Testing. These tests were performed on the Auxiliary Feed, Component Cooling, Charging and Volume Control, Demineralized Water, Fire Protection, Main Steam, Station Air, Spent Fuel, Safety Injection, Sampling and Ventilation systems. This brings the total number of Ten Year Hydrostatic Tests to sixty-three (63) out of a predicted 125.

1.4 Service Pressure Leak Exams

1.4.1 As required by ASME Section XI, service pressure leak exams were performed by the Salem ISI Group on the following systems:

Reactor Coolant, Containment Spray, Residual Heat Removal, Safety Injection, Reactor Coolant Sample, Waste Drain Liquid, Chemical and Volume Control (Operations), Pressurizer Relief Piping, Spent Fuel Cooling, Service Water, Fire Protection, Component Cooling, Auxiliary Feed, Demineralized Water (Restricted), Steam Generator Blowdown, and Chemical and Volume Control (water recovery).

None of the above listed systems exhibited any excessive leakage. Their was however, some minor mechanical leakage (eg. valve packing, etc.) for which work orders were written to correct.

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11. Examination Summary (Cont'd)

2.0 Technical Specification 4.4.6.0 - Steam Generator Tube Eddy Current Inspection.

2.1 The original eddy current examination scope is detailed below:

2.1.1 Twelve (12%) percent Tech. Spec. examination in #23 Steam Generator.

2.1.2 A non-tech spec. sample of eight hundred and eleven (811) tubes conducted in #23 S/G to try and comply with EPRI's recommended guidelines of conducting 100% examination of all the steam generator tubes over a period of six (6) years. This sample represented an additional 25% of this generator.

2.1.3 Examine all previous indications in the remaining steam generators (#'s 21, 22 and 24).

2.1.4 Perform a 10% sample (330 tubes) of the tube-sheet region of #24 Steam Generator using a motorized rotating pancake probe to look for industry concerns from tube expansion by the WESTEX method. This sample was concentrated in the kidney region because of the high probability of indications due to sludge buildup.

2.1.5 Examine five (5) tubes with previous indications in the hot leg support plate region using both a bobbin and motorized pancake probe. This was performed to address an industry concern with through wall cracking occurring at the support plate that may not be identified with the bobbin probe inspection.

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11. Examination Summary (Cont'd)

2.2 Tech. Spec. examinations in No. 23 Steam Generator revealed no pluggable indications. In the non-tech. spec. sample there were tubes with indications of cold leg thinning and/or anti-vibration bar wear which exceeded the Tech Spec. plugging limit. Based on these examination results and in complying with EPRI guidelines of examining the area's of concern, the inspection plan was expanded to include 100% of all the tubes in #23 Steam Generator between Rows 20 and 46. This expansion program showed more evidence of cold leg thinning and/or AVB wear therefore additional examinations were performed to include all the tubes down through row 6 to ensure the indications were only occurring in the higher row tubes. Examinations of the lower row tubes showed no evidence of these indications. The examinations were also expanded into #21 S/G to include all the tubes between Rows 30 and 46 and the tubes between Columns 30 through 70 on Rows 28 and 29. The same type of indications were also being found in the higher row tubes of #21 S/G, so the decision was made to examine all the tubes in #22 S/G between Rows 28 through 46 (except for the periphery tubes which were inspected during the previous outage) and in #24 S/G all the tubes between rows 28 through 46 and the periphery tubes, three columns deep, between rows 6 through 19. The examinations in #22 and #24 Steam Generators showed that this same condition was also occurring in the higher row tubes.

All tubes exceeding the tech. spec. limit of $\geq$ 40% degradation of nominal tube thickness were mechanically plugged with verification performed by PSE&G personnel.

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11. Examination Summary (Cont'd)

2.3 In addition to the eddy current inspections, the Row 2 tubes in all four (4) Steam Generators were U-bend heat treated. Eddy current was performed in the U-bend region to verify the proper heat affected zone had been achieved.

NOTE: All the row one (1) tubes in all four (4) Steam Generators are currently plugged.

2.4 Results of the examinations are as follows:

Steam Generator	Extent of Exam.	No. of Tubes Inspected	Tubes with Indications (3) < 20%	20-39%	> 40%
21	Full Length	940	20	19	6
	U-Bend Verify	95 (*)	N/A	N/A	N/A
22	Full Length	896	6	10	3
	U-Bend Verify	94	N/A	N/A	N/A
23	Full Length	2801	46	40	11
	U-Bend Verify	94	N/A	N/A	N/A
24	Full Length	1142	14	15	20
	U-Bend Verify	94	N/A	N/A	N/A
	Tubesheet	330	0	0	0
	Support Plate	5	0	0	0
Sub-Total	Full Length	5779	86	84	40
	U-Bend Verify	377	N/A	N/A	N/A
	Tubesheet	330	0	0	0
	Support Plate	5	0	0	0
	Total	6491	86	84	40

* One tube in Row 3 was heat treated inadvertently.

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11. Examination Summary (Cont'd)

2.5 Some of the other S/G work for this outage included installing a plug-in-plug (PIP) fix for the Inconel 600 plug material which was identified as having a bad heat number. This fix was applied to all the Row 1 hot leg plugs between columns 6 and 90 in all four (4) steam generators, except for eight (8) tubes previously identified as leaking or having a high potential to leak in #24 S/G. These plugs were manually pulled and a new Inconel 690 plug installed. Some of the Row 1 tubes were unable to have a PIP installed so the existing plugs were removed and replaced with new Inconel 690 plugs.

2.6 Current Status of the Steam Generators

At this time the total number of tubes plugged in the Salem Unit 2 Steam Generators are as follows:

Generator #	21	22	23	24
Tubes Plugged	102	100	111	111

NOTE: In the Steam Generator's 21-24, the first five (5) and the last Five (5) tubes in row 1 were mechanically plugged because of a generic wearing problem on the tubes, due to the vibration of the tube lane blocking device. The remaining tubes in Row 1 were plugged because there was evidence in two (2) of the steam generators of the onset of stress corrosion cracking in the u-bend area.

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11. Examination Summary (Cont'd)

3.0 Technical Specification 4.6.1.2d, Containment Type "B" (Penetrations) and Type "C" (Valves) Leak Rate Testing.

3.1 Summary

The PSE&G Research Corp. under the field supervision of the Salem ISI group, conducted seventy (70) Type "B" tests and one hundred thirteen (113) type "C" tests.

The results of this testing revealed several Type "C" valves exceeding the recommended leak rate acceptance criteria, which were reworked to an acceptable condition.

A total as found leakage rate of 29,796.0 SCCM was measured through all type "B" and "C" containment penetrations. After corrective maintenance, a total as left leakage of 25,258.4 SCCM was measured through all type "B" and "C" penetrations.

In addition to the above tests the Leak Rate Test for 21, 22, 23 and 24GB4's was performed to satisfy the Field Directive S-C-R700-MFD-288, Leak Rate Test Program for the Steam Generator Blowdown Isolation Valves (GB4) Units 1 and 2, Salem Station. Results of the test were satisfactory.

4.0 Technical Specification 4.6.1.3b Elevation 100' and 130' Airlock Leak Rate Tests

4.1 Summary

The PSE&G Research Corporation under the supervision of the Salem ISI performed leak rate tests and door interlock checks on the 100' and 130' Airlocks. The present leakage is 2618 SCCM.

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11. Examination Summary (Cont'd)

5.0 Technical Specification 4.7.9.(a) "Visual Inspection of Hydraulic and Mechanical Snubbers"

5.1 Summary

Contract personnel under the direction of the Salem ISI Group conducted visual examinations on twenty four (24) hydraulic and one hundred twelve (112) mechanical snubbers. No discrepancies were found that would effect operability. However, several minor indications were found such as minor rust and attachment ends having washers missing, and union leaks (hydraulic snubbers). All discrepancies were corrected.

6.0 Technical Specification 4.7.9 (c) "Functional Testing of Selected Hydraulic and Mechanical Snubbers"

6.1 Summary - Hydraulic Snubbers

Technical Specification 4.7.9 requires functional testing on 10% of the total number of installed hydraulic snubbers, during each plant refueling outage. In addition, all snubbers which failed their previous functional test shall also be functionally tested.

Hydraulic snubber in-place functional testing was performed by WYLE Laboratories using the WYLE API Hydraulic Snubber Test System. The results of these tests revealed the following:

- One (1) 200 kip main steam isolation valve (MSIV) hydraulic snubber "as-found" test acceptable.

- Four (4) 1000 kip steam generator (S/G) hydraulic snubbers (two (2) from required sample and two (2) from a previous failures) were "as-found" tested. The test results were acceptable.

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11. Examination Summary (Cont'd)

6.2 Summary - Mechanical Snubbers

Technical Specification 4.7.9 requires functional testing on 10% of the total number of installed mechanical snubbers, during each Plant Refueling Outage. In addition, for each snubber that does not meet the acceptance criteria an additional 10% of the mechanical snubbers shall be functionally tested.

The mechanical snubber tests were performed on-site by PSE&G personnel utilizing the WYLE Model 150 Snubber Testing Machine.

- The initial (10%) sample of mechanical snubbers functionally tested consisted of: two (2) PSA-1, five (5) PSA-3, and two (2) PSA-10 for a total of nine (9) snubbers. In addition to the initial sample all the PSA-1/4's (nineteen (19)) and PSA-1/2's (three (3)) were functionally tested.

NOTE: All PSA-1/4's and the 1/2's are tested each refueling outage due to their failure rate from previous outages. Due to the fact that they are tested each refueling outage, they are not considered in the count for the 10% Technical Specifications' sample.

Due to a test failure identified on a PSA-10 snubber during the initial sample, a Second 10% sample was selected for testing.

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11. Examination Summary (Cont'd)

- The Second (10%) sample of mechanical snubbers consisted of two (2) PSA-1, four (4) PSA-3 and three (3)PSA-10 for a total number of nine (9) snubbers.

  Due to a test failure identified on a PSA-3 snubber during the Second sample, a Third 10% sample was selected for testing.

- The Third (10%) sample of mechanical snubbers consisted of: one (1) PSA-1, four (4) PSA-3 and four (4) Psa-10 for a total of nine (9) snubbers. All snubbers from the third sample were tested satisfactory, thus no additional testing was required.

- The mechanical snubbers which failed functional testing were removed from service and replaced in kind. An engineering evaluation was performed on the failed mechanical snubbers and it was determined that the degraded components would not have adversely affected system operation.

7.0 Technical Specification 4.4.11.1 Reactor Coolant Pump Flywheel Examination

7.1 Summary

Southwest Research Institute (SwRI) performed ultrasonic examinations (UT) of the top sides only on 12 Reactor Coolant Pump flywheel (#12 RCP motor is currently installed in #22 RCP location) and the Spare Reactor Coolant Pump Flywheel, serial no.# 01, which is currently installed in #23 Reactor Coolant Pump location. No reportable indications were observed.

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11. Examination Summary (Cont'd)

SwRI also performed surface examinations (PT & MT) of all exposed surfaces and a complete ultrasonic examinations (UT) of 22 Reactor Coolant Pump Flywheel at the Westinghouse facility in Cheswick, Pennsylvania. The PT examinations revealed twenty (21) groups of recordable indications in the three (3) keyway areas. A deficiency report was generated to document the examination results. An evaluation report was performed by Westinghouse Engineering and it was determined the indications were nonrelevant and were conditions of original manufacture. No additional indications were noted.

NOTE: These indications were also observed during the 1983 examination of this flywheel. Per disposition of the 1983 deficiency report the indications were determined to nonrelevant. Exploratory grinding revealed depth of no more than 1/16" and the indications were not detected by UT.

8.0 Special Examinations

8.1 NRC Circular 76-06 and NRC Bulletin 79-17 commitment to examine and/or flush stainless steel lines containing stagnant borated water.

As part of the ISI program, SwRI performed ultrasonic examinations on eleven (11) piping welds covered by this circular. There were no adverse findings in the examinations.

Quarterly chemistry samples were taken by the PSE&G Chemistry Department and the results transmitted to the Salem ISI Group as required by Chemistry Procedure CH-3.5.060. During the past 18 months, this program identified a few nonconformances. The nonconforming piping was flushed and the situation corrected. This was verified by additional sample analysis.

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11. Examination Summary (Cont'd)

8.2 NRC Bulletin 82-02 "Degradation of Threaded Fasteners in the Reactor Coolant Pressure Boundary of Power Plants.

Visual (VT) and Magnetic Particle (MT) exams were performed on all four (4) Steam Generator primary manway bolts. No reportable indications were observed. All bolts were then lubricated with a thin coating of Felpro N5000 lubricant and reinstalled. The Reactor Coolant Pump Main flange bolting was visually examined in place. No reportable indications were observed.

8.3 NRC Bulletin No. 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems", sixteen (16) 1.5-inch Safety Injection, and two (2) 2-inch and two (2) 3-inch Chemical and Volume Control welds were examined with UT and PT. No reportable indications were noted.

8.4 NRC Bulletin 88-11 "Pressurizer Surge Line Thermal Stratification", all four (4) welds on the 14 inch pressurizer surge line were examined with UT. No recordable indications were noted.

8.5 NRC Bulletin 87-01, "Thinning of Pipe Walls in Nuclear Power Plants", measurements were taken at seventy three (73) locations to identify possible pipe corrosion/erosion. Other than insignificant thinning noted in a few areas, no other conditions were observed.

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11. Examination Summary (Cont'd)

9.0 Summary NuReg 0578 - TMI Lessons Learned -

Perform Service Pressure Leak Exams on systems outside Containment, and take Corrective Actions necessary to reduce leakage as low as possible on systems likely to contain Radioactive liquids in the event of an incident.

The Salem ISI Group performed Service Pressure Leak Exams on the Safety Injection, Chemical Volume and Control, Residual Heat Removal and Containment Spray Systems.

In addition, PSE&G Research Corp. under the direction of the Salem ISI Group conducted the Waste Gas System Integrated Leak Rate test in accordance with ISI Procedure M9-ILP-WG-1. There were no adverse findings in the examinations or tests conducted relative to this bulletin.

We certify that the statements made in this report are correct and the examinations and corrective measures taken conform to the rules of the ASME Code, Section XI.

Certificate of Authorization No. (if applicable) NR-36

Expiration Date 10-03-91

Date 17 Sept, 19 90 Signed PSE&G Owner By [signature] FOR P.J. Kudless

CERTIFICATE OF INSERVICE INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of New Jersey and employed by Arkwright Mutual Insurance Company, Norwood, Massachusetts, have inspected the components described in this Owner's Report during the period 4/1/90 to 6/24/90 and state that to the best of my knowledge and belief the Owner has performed examinations and taken corrective measures described in this Owner's Report in accordance with the requirements of the ASME Code, Section XI.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the examinations and corrective measures described in this Owner's Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 9-17, 19 90

Factory Mutual System

James E. Cosh — Inspector's Signature

Commissions NJ 373 "I" — National Board, State, Province and No.

ENCLOSURE 2

1990 INSERVICE EXAMINATION OF SELECTED COMPONENTS
AT SALEM GENERATING STATION - UNIT 2