PSE&G

Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038

Nuclear Department

50-311

MAR 18 1987
NLR-I87091

Mr. Frank G. Dolan, Assistant Director
State of New Jersey
Department of Labor and Industry
P.O. Box 1503, Labor and Industry Building
Trenton, New Jersey 08625

Gentlemen:

INSERVICE INSPECTION REPORT
UNIT NO. 2
SALEM GENERATING STATION

This report is being submitted in accordance with Article IWA-6220(b), Section XI of the ASME Boiler and Pressure Code and the Salem Unit 2 Technical Specifications issued to PSE&G by the Nuclear Regulatory Commission.

The submittal is composed of Form NIS-1 "Owners Data Report for Inservice Inspection" and Volume 1 of the "1986 Inservice Examination of Selected Components at Salem Generating Station Unit No. 2," prepared for PSE&G by Southwest Research Institute.

Field data to support this report is on file at the plant site. If additional information is required, please do not hesitate to contact us.

Sincerely,

B. A. Preston
Manager - Licensing & Regulation

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

Dr. Thomas E. Murley, Regional Administrator
USNRC Region I

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 Ceritificate of Authorization (if required) N/A.
5. Commercial Service Date 10/13/81.
6. National Board Number for Unit N/A.
7. Examination Dates: 10/4/86 through 12/23/86.
8. This examination report is for the first examination conducted in the second inspection period which ends June 13, 1988. 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

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6. National Board Number for Unit N/A.
7. Examination Dates: October 4, 1986, through December 23, 1986.

9. Components Inspected (cont'd).

COMPONENTS OR APPURTENANCE	MANUFACTURER OR INSTALLER	MANUFACTURER OR INSTALLER SER. NO.	STATION OR PROVINCE NUMBER	NATIONAL BOARD NO.
#2 Pressur-izer	Delta Southern	1211	N/A	68-48
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

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7. Examination Dates: October 4, 1986, through
   December 23, 1986

9. Components Inspected (cont'd).

COMPONENTS OR APPURTENANCE	MANUFACTURER OR INSTALLER	MANUFACTURER OR INSTALLER SER. NO.	STATION OR PROVINCE NUMBER	NATIONAL BOARD NO.
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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6. National Board Number for Unit N/A.
7. Examination Dates: October 14, 1986 through December 23, 1986

10. Abstracts of Examinations:

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.

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 second inspection period as shown in the 10 year long term inspection plan.

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7. Examination Dates: October 4, 1986, through December 23, 1986

10. Examination Summary (Cont'd)

1.1 ISI Examination

Southwest Research Institute (SWRI) under the direction of the Salem ISI Group conducted one hundred (100) ultrasonic, fifty three (53) liquid penetrant, two (2) magnetic particle, and thirty eight (38) 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 During the VT examination of valve 22-MS-13, a missing nut was discovered on the flange bolting below the valve (not in examination area) and reported to PSE&G on Customer Notification Form (CNF) SAM 2-2. The nut was installed and examined on Work Order No. 86-10-20-097-3.

1.1.2 Visual examination of 2-SJ-1218-5 flange bolting revealed heavy rust on the studs and nuts and was reported on CNF SAM 2-8. The rust was removed on Work Order No. 86-10-30-001-3, and the nuts and studs were visually reexamined with no recordable indications noted and accepted by PSE&G personnel.

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10. Examination Summary (Cont'd)

1.1.3 Tool marks on the outer faces of 23-CHR-PMP-NUTS Nos. 9, 19, and 40 were also found during the VT examinations. These were reported to PSE&G on CNF SAM 2-9. A UT examination of these nuts revealed no recordable indications. The VT indications were found to be acceptable in accordance with 1974 Section III, Paragraph NB-2582 and were accepted as is by PSE&G personnel.

1.1.4 During the PT examinations of 31-RC-1210-1, multiple linear indications were encountered. These indications were reported to PSE&G on CNF SAM 2-3. Approximately one-half of the indications were removed by buffing. Reexamination showed that the remaining indications were nonrelevant in accordance with PSE&G Procedure M9-IAP-5 and were accepted as is by PSE&G personnel.

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10. Examination Summary (Cont'd)

1.1.5 MT examination of RPV Nut No. 23 revealed a 3/8-inch-long axial linear indication which was reported to PSE&G on CNF SAM 2-10. The area containing the indication was blended, and the subsequent MT reexamination revealed no recordable indications, and the nut was accepted by PSE&G personnel.

1.1.6 During the UT surface wave examinations of Reactor Coolant Pump No. 23 bolting, linear machining marks were found on the inner bores of Bolts 7077 and 6907. These marks covered 360 degrees of the bore perimeter and were reported to PSE&G on CNF SAM 2-5. These marks were confirmed visually with a borescope and accepted as is by PSE&G personnel.

1.1.7 Visual examination of 22 RHR pump nuts revealed one nut corroded and water leaking between the thread and nut. This was reported to PSE&G on CNF SAM 2-4. Work Order No. 86-10-24-015-1 was generated to rework pump bolting and reexamine for leaks. Accepted as is by PSE&G personnel.

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10. Examination Summary (Cont'd)

1.1.8 Visual examinations of 1.5-SJ-1222-13FB and 1.5-SJ-1242-8FB revealed loose nuts and studs on each of these sets of flange bolting. These were reported to PSE&G on CNF's SAM 2-6 and SAM 2-7. Additional flange bolting was examined on these systems to ensure that no other bolts were loose. No other loose bolting was found on the system. Bolting was retorqued on PSE&G work order and visual reexaminations were performed by PSE&G personnel. They were accepted after retorquing by PSE&G personnel.

1.1.9 CNF SAM 2-1 was issued to notify PSE&G personnel of any examination area where the limitations encountered during ISI differed from the limitations encountered during PSI. Ten areas where limitation changes had occurred were included in this CNF.

No other reportable indications were observed during the examinations.

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10. Examination Summary (Cont'd)

1.2 Visual Examinations of Supports

1.2.1 Catalytic, Inc. - Quality Control Group Conducted visual examinations on (80) Nuclear Class I, (82) Nuclear Class II and (399) Nuclear Class III supports.

Several discrepancies were found, i.e. wrong spring settings, rust, loose bolts, etc. Of those discrepancies that rendered the support inoperable, a deficiency report was generated and subsequently the discrepancy corrected.

NOTE: Work orders were written to correct all other discrepancies not rendering the support inoperable.

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10. Examination Summary (Cont'd)

1.3 Safety/Relief Valve Testing

1.3.1 The PSE&G Salem Maintenance Department conducted twenty nine (29) Lift set tests on various system Relief valves. Three (3) of the valves tested exceeded the acceptance criteria - 25 lbs. low, 12 lbs. high and 15 lbs. low - also due to a procedural problem, which has been corrected, several new valves in the program exhibited seat leakage and were reworked and properly set without performing an "as found" lift set test. All valves were reset to their proper limits. Also, all valves that failed are scheduled to be tested again next outage in addition to the regular ASME Section XI sample.

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10. Examination Summary (Cont'd)

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 with assistance from the PSE&G Maintenance Department and Catalytic 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).

The previously listed systems did not exhibit any excessive leakage. Of the leaks noted on the examinations, work orders were written to the Maintenance Department.

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10. Examination Summary (Cont'd)

2.0 Technical Specification 4.4.6.0 - Steam Generator Tube eddy current inspection.

2.1 Examinations were limited to the No. 21 Steam Generator and were performed by Westinghouse NSID, coordinated by the Salem ISI Group. Results of the examinations are as follows:

Extent of Exam.	No. of Tubes Inspected	Tubes with Indications (3)		
		< 20%	20-39%	> 40%
Full Length (1)	372	3	0	0
"U" Bend (2)	60	0	0	0
Total	432	3	0	0

(1) From tube sheet, hot leg side, to tube sheet, cold leg side.
(2) From tube sheet, hot leg side, to top support plate, cold leg side.
(3) Estimated depth of indication in % of tube wall.

No tubes were plugged as a results of the examinations.

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10. Examination Summary (Cont'd)

2.2 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	10	12	12	11

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.

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10. Examination Summary (Cont'd)

3.0 Technical Specification 4.4.11.1 Reactor Coolant Pump Flywheel Examination

3.1 Summary

Southwest Research Institute (SwRI) performed surface examinations (PT & MT) of all exposed surfaces and a complete ultrasonic examination of 24 reactor coolant pump (RCP) flywheel as specified in U.S. NRC Reg. Guide 1.14 Article C. The lamination observed on the top surface of the flywheel noted in the 1984 ISI inspection was reexamined. No change was recorded. No new reportable indications were observed.

4.0 Technical Specification 4.4.11.2 Ultrasonic Examination of 21 Steam Generator Channel Head Cladding

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10. Examination Summary (Cont'd)

4.1 Summary

Westinghouse Electric Corporation along with Nuclear Energy Services, conducted the third and final surveillance on steam generator #21 channel head cladding. Comparison of the data obtained during the baseline, first, second and third surveillance does not indicate any change in the cladding areas being monitored.

5.0 Technical Specification 4.6.1.2a, Reactor Containment type "A" Test.

5.1 Summary

The second Inservice Reactor Containment Type "A" Test was performed during the 24 hour period ending November 27, 1986 @ 0453. The test was coordinated and directed by the Salem ISI Group.

The results revealed that containment leakage rate with corrections, is .32%/day (percent leakage total time) of the containment volume, with a 95% upper confidence level of .043%/day, which meets the acceptance criteria of .075%/day (.75% (La)) permitted by 10CFR50, Appendix J, and Technical Specification 4.6.1.2.d.

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10. Examination Summary (Cont'd)

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

6.1 Summary

PSE&G Research Corp. under the field supervision of the Salem ISI group, conducted seventy two (72) Type "B" tests and one hundred twenty two (122) type "C" tests.

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10. Examination Summary (Cont'd)

The results of these tests revealed several Type "C" valves exceeding leak rate acceptance criteria, which were reworked to an acceptable condition, and one unique failure on an Electrical Penetration. Disassembly of Electrical Penetration #2-9 revealed a cracked bushing on the conax connector. The bushing was replaced and tested satisfactorily.

A total as found leakage rate of greater than 225,157 SCCM was measured through all containment penetrations. Valve 2PR25 (check valve) was found leaking in excess of 200,000 SCCM. This valve was tested for the first time, due to the addition through our IST Program Revision. We technically failed our as-found type "A" test (Ref. LER 86-012-00). After corrective maintenance, a total as left leakage rate of 66,392 SCCM was measured through all valves individually (type C tests) and Mechanical penetrations with resilent seals (type B tests).

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

7.1 Summary

The PSE&G Research Corporation under the supervision of the Salem ISI Group performed

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10. Examination Summary (Cont'd)

leak rate tests on the 100' and 130' personnel airlocks. At this time the total leakage through the airlocks is 7,632 SCCM.

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

8.1 Summary

Catalytic, Inc. QC Department with assistance from the Salem ISI Group conducted visual examinations on all hydraulic and mechanical snubbers.
No discrepancies were found that would effect

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10. Examination Summary (Cont'd)

operability. However, several minor indications were found such as minor rust and attachment ends having washers missing, and union leaks (hydraulic snubbers).

Work orders were issued, and deficient conditions were corrected by Catalytic, Inc. under the direction of the Salem ISI Group.

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

9.1 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.

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10. Examination Summary (Cont'd)

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.
- All eight (8) 200 kip main steam isolation valve (MSIV) snubbers tested acceptable after being rebuilt.
- Six (6) 1000 kip steam generator (S/G) hydraulic snubbers "as-found" tests all acceptable.
- One (1) 1000 kip steam generator (S/G) snubber failed due to the bleed rate in tension exceeding the acceptance criteria. A spare snubber was installed.

  The failed snubber was repaired and retested satisfactorily on site by WYLE Laboratories.

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10. Examination Summary (Cont'd)

9.2 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.
Wyle Laboratories was brought on site with their mobile snubber testing trailer to perform the tests. The first (10%) sample of mechanical snubbers consisted of : 2 PSA 1/4's, 1 PSA 1/2, 1 PSA 1, 5 PSA 3's and 3 PSA 10's for a total of 12 snubbers. In addition to the initial sample, all snubbers located in positions where failures occurred during the Unit II Second Refueling Outage were tested, consisting of: 6 PSA 1/4's, 1 PSA 1/2, and 2 PSA 3's. There were two failures, both PSA-1/4's, one from the first sample and one from a position where a failure occurred during the Unit II Second Refueling Outage. Based on the two failures and the poor performeances of PSA 1/4's and PSA 1/2's in the past, it was decided that all PSA 1/4's and PSA 1/2's would be functionally

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7. Examination Dates: October 4, 1986, through December 23, 1986

10. Examination Summary (Cont'd)

tested. Twelve additional snubbers (11 PSA 1/4's and 1 PSA 1/2) were functionally tested with three failures (2 PSA 1/4's and 1 PSA 1/2).

Due to the failures in our first sample a second (10%) sample was tested consisting of: 2 PSA 1's, 6 PSA 3's and 4 PSA 10's. As there were no failures in our second sample our mechanical snubber testing was complete.

Below is a summary of the functional testing of Unit 2's mechanical snubbers:

- Snubbers tested = 45
- Snubbers failed = 5
- Model #'s of failures: PSA 1/4 = 4
  PSA 1/2 = 1
  PSA 1 = 0
  PSA 3 = 0
  PSA 10 = 0

FORM NIS-1 OWNER'S DATA REPORT FOR INSERVICE INSPECTION
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 Data 10/13/81.
6. National Board Number for Unit N/A.
7. Examination Dates: October 4, 1986, through December 23, 1986

10. Examination Summary (Cont'd)

PSE&G Engineering performed a safety evaluation on all failed snubbers, and it was concluded that the piping and components to which the snubbers were attached were not impaired due to inoperability of the snubbers.

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

10.1 Summary

As part of the ISI program, SwRI performed ultrasonic examinations on thirty seven (37) piping welds covered by this circular.

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.

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10. Examination Summary (Cont'd)

There were no adverse findings in the examinations or tests conducted relative to the reporting requirement of this circular.

11.0 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.

11.1 Summary

The Salem ISI Group along with the members of Catalytic QC Group and the PSE&G Maintenamce Department performed Service Pressure Leak Exams on the Safety Injection, Chemical Volume and Control, Residual Heat Removal and Containment Spray Systems.

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10. Examination Summary (Cont'd)

In addition, PSE&G Reasearch 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.

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

12.1 Summary

Since only one primary steam generator manway was removed this outage, and the bolts were replaced with new ones, there were no surface examinations performed. However, all S/G primary manway bolts were visually examined in place. None were found to have been degraded or have any boron buildup. All Reactor Coolant Pump Main flange bolting was visually examined in place. Moderate corrosion was noted. All flange bolts were hand wire brushed and reexamined with no apparent degradation. All bolts were then lubricated with a thin coating of Felpro N5000 lubricant.

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6. National Board Number for Unit N/A.
7. Examination Dates: October 4, 1986, through December 23, 1986

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

Date 3/17, 19 87 Signed PSE&G Owner By Louis H. Leke

Certificatate of Authorization No. (if applicable) ~~N/A~~ NR-36

Expiration Date 10/3/88

CERIFICATE 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 Lumbermen's Mutual Casualty Company, Long Grove, Illinois, have inspected the components described in this Owner's Data Report during the period 10/4/86 to 12/23/86 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 Data Report in accordance with the rewuirements of the ASME Cose, Section XI.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed of implied, concerning the examinations and corrective measures described in this Owner's Data Report. Futhermore, 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 March 17, 19 87

James E. Cook
Inspector's Signature

Commissions N.J. 373 "I"
National Board, State, Province and No.