



## REGION I PLANT STATUS REPORT

FACILITY: Salem Nuclear Generating Station  
Units 1 and 2

- I. BACKGROUND
- II. PLANT PERFORMANCE DATA
- III. ANALYSIS/ASSESSMENT
- IV. INSPECTION PROGRAM STATUS
- V. ATTACHMENTS

Last Update: October 11, 1995

ORIGINAL SIGNED BY  
LARRY NICHOLSON

Update Approval: \_\_\_\_\_

Branch Chief

CHANGES SINCE THE LAST UPDATE ARE DEMARCATED IN THE BORDER

The attached status report has not been made public. Do not disseminate or discuss its contents outside NRC. Treat as "OFFICIAL USE ONLY".

## CONTENTS

## I. BACKGROUND

1. Licensee Parameters
2. NRC Organization
3. Licensee Organization
4. Operator Licensing

## II. PLANT PERFORMANCE DATA

1. Current Operating Status (last 6 months)
2. Recent Significant Operating Events and Identified Safety Concerns (of last 12 months)
3. Escalated Enforcement Activities (of last 2 years)
4. IPE Insights

## III. ANALYSIS/ASSESSMENT

1. Previous SALP Ratings and Overview
2. Licensee Response to Previous SALP Functional Area Weaknesses/Recent Licensee Performance Trends (in the last year)
3. Licensee Performance Strengths and Weaknesses
4. NRC Team Inspections Within the Last Year
5. Planned Team Inspections

## IV. INSPECTION PROGRAM STATUS

1. Status of Inspections (see attached MIPS Report #2)
2. Proposed Changes to MIP
3. Significant Allegations and Investigations
4. Open Item Status
5. Outstanding Licensing Issues
6. Local State/External Issues

## V. ATTACHMENTS (NOTE: To be determined based on intended audience)

1. AEOD Performance Indicators/LER Summary ☐
2. Allegations Status ☐
3. Most recent SALP Report ☐
4. MIPS Report Nos. 2 & 22 ☐
5. Principal Staff Resumes (NRC and Licensee) ☐
6. Planned vs. Completed Inspection Hours ☐

# I. BACKGROUND

## 1. LICENSEE PARAMETERS

Utility:	Public Service Electric & Gas Company (PSE&G)	
Company Location:	Hancocks Bridge, NJ (18 miles Southeast of Wilmington, DE)	
County:	Salem	
	UNIT 1	UNIT 2
Docket No:	50-272	50-311
CP Issued:	September 25, 1968	September 25, 1968
Operating License Issued:	April 6, 1977	May 19, 1981
Initial Criticality:	December 11, 1976	August 2, 1980
Elec. Ener. 1st Gener:	December 19, 1976	May 29, 1981
Commercial Operation:	June 30, 1977	October 13, 1981
Reactor Type:	PWR 4-Loop	Same
Containment Type:	Large dry	Same
Power Level:	3411 MWt	Same
Architect/Engineer:	PSE&G/UE&C	Same
NSSS Vendor:	Westinghouse	Same
Constructor:	PSE&G/UE&C	Same
Turbine Supplier:	Westinghouse	Westinghouse (GE Generator)
Condenser Cooling Method:	Once-through	Same
Condenser Cooling Water:	Delaware River	Same

## 2. NRC ORGANIZATION

NRC Regional Administrator:	Thomas T. Martin (Tel: 610-337-5000) (Region I, King of Prussia, PA)
Division of Reactor Projects:	Richard Cooper, II, Division Director (Region I) (Tel: 610-337-5229) Wayne Lanning, Deputy Director (Tel: 610-337-5126) Larry E. Nicholson, Branch Chief (Tel: 610-337-5128)
Senior Resident Inspector:	Charles S. Marschall (Tel: 609-935-3850)
Resident Inspector:	Joseph G. Schoppy, Jr. (Tel: 609-935-3850)
Resident Inspector:	Todd H. Fish (Tel: 609-935-3850)
Project Engineer:	G. Scott Barber (Tel: 610-337-5232)
Project Manager:	Leonard Olshan, NRR (Tel: 301-415-1419)

### 3. LICENSEE ORGANIZATION

#### Management Personnel:

E. James Ferland:	Chairman and Chief Executive Officer	
Leon R. Eliason:	Chief Nuclear Officer and President Nuclear Business Unit	
Elbert Simpson:	Senior Vice President, Nuclear Engineering	
Louis Storz:	Senior Vice President, Nuclear Operations	
Joseph Hagan:	Vice President, Business Support	
Jeffrey Benjamin:	Director, Quality Assurance & Nuclear Safety	Review
Gary Overbeck:	Director, Nuclear Design Engineering	
Dave Garchow:	Director, System Engineering	
Mark McGough:	Director, Plant Engineering and Projects	
Chuck Johnson:	Director, Human Resources & Administration	
Charles Munzenmaier:	General Manager, Operations Services	
Clay Warren:	General Manager - Salem Operations	
Nick Conicella:	Manager, Salem Projects	
Vacant:	Manager, Nuclear Licensing & Regulation	
Chris Bakken:	Manager, Salem Operations	
Jay Laughlin:	Manager, Salem Maintenance	
Leonard Rajkowski:	Manager, Controls Maintenance	
Michael Metcalf:	Manager, Mechanical Maintenance	
Michael Rencheck:	Manager, System Engineering	
Jerome Ranalli:	Manager, Salem Restart Engineering	
Eric Katzman:	Manager, Radiation Protection	
Greg Suey:	Manager, Chemistry	
Dennis Tauber:	Manager, Salem QA	
Ernest Harkness:	Manager, Station Planning	
Jerry McMahon:	Manager, Nuclear Training Center	
Charles Smith:	Manager, Site Planning	

### Workshifts

5 operations shifts, 2 working 12 hour shifts/day, 1 relief crew, 1 crew in training, 1 crew off.

<u>Shift Complement:</u>	<u>TS minimum</u>	<u>Actual</u>
	3 SRO	3 SRO
	4 RO	4 RO
	1 STA	1 STA (dual role SRO)
Non-licensed Operators	5	7 or 8
Maintenance Electrician/I&C	1	2
Chemistry/Rad. Prot.	1	2
Fire Brigade	5	6 (site fire brigade shared with Hope Creek)

### 4. OPERATOR LICENSING

#### a. Licensed Reactor Operators (Licenses Cover Both Units):

- Total number of active SROs: 26
- Total number of active ROs: 25
- Total number of certified instructors: 13
- All 10 Operator training programs are on probation
- New training manager appointed 9/95

## II. PLANT PERFORMANCE DATA

### 1. CURRENT OPERATING STATUS (for period 5/95 to 10/95)

#### Salem Unit 1

- On May 16, Unit 1 entered Technical Specification 3.0.3 and began a shutdown due to inoperable switchgear supply fans. The unit reached Mode 5 on May 17. Plant staff began core off-load on July 25, and completed it August 5. Unit 1 is currently defueled, Mode undefined.

#### Salem Unit 2

- On June 7, Unit 2 entered Technical Specification 3.0.3 and began a shutdown due to inoperable trains of RHR. During the shutdown, a 500 KV breaker failure and subsequent loss of 2 of 4 operating reactor coolant pumps caused a reactor trip from 10% power. The unit reached Mode 5 on June 8, and remained in Mode 5 as of mid-October.

Both Salem units must satisfy the conditions specified in a Confirmatory Action Letter, (CAL), dated June 9, 1995, prior to restart.

### 2. RECENT SIGNIFICANT OPERATING EVENTS AND IDENTIFIED SAFETY CONCERNS

#### a. Significant Events (since November 1994)

- Most of the managers from the President of the Nuclear Business Unit to the direct reports to the Salem General Manager have been replaced within the past year. A number of the new managers have experience at plants that have recovered from problem performance. The new management has implemented a recovery plan similar to that used at Brunswick.
- In response to a loss of all overhead annunciators for one hour at Salem Unit 1 on October 5, operators failed to implement their Emergency Classification Guide. Since Unit 1 was defueled, they decided that the ECG inappropriately concluded that an Alert should be declared. They initially made a 1 hour report. Subsequently, the Operations Manager concluded that the ECG plainly required declaring an Alert, and the operators declared the Alert two and one-half hours after discovering the loss of annunciators.
- Ineffective corrective action in response to failures of Residual Heat Removal (RHR) pump minimum recirculation flow valves resulted in operation of Salem Unit 2 from February 9, 1995 until June 7, 1995 with both trains of RHR inoperable. In addition, when plant staff recognized the degraded conditions on June 6, they performed an incomplete and incorrect operability determination for the valve associated with the no. 22 RHR pump. The incorrect operability determination, endorsed by plant management personnel (since replaced), demonstrated weaknesses in the plant staff's ability to perform operability determinations.



- Unit 1 operated from December 1994 until the shutdown in May 1995 with a failed no. 12 switchgear supply fan. Plant staff did not evaluate the effect of the failed fan on operability of the switchgear, or in terms of deviation from the assumptions in the UFSAR for meeting single failure requirements for the fans. When the no. 13 switchgear supply fan failed on May 12, plant staff could not defend operability, found that it constituted an unreviewed safety question, and then pursued an abortive attempt to justify continued operation prior to commencing a plant shutdown on May 16, more than 72 hours after the no. 13 fan failed.
- Senior Nuclear Business Unit management decided to hold both units off line until sufficient improvements in equipment condition and staff performance assured safe and reliable plant performance. Specifically, PSE&G agreed to: 1) Initiate a Significant Event Response Team (SERT) to evaluate the Salem Unit 2 trip during the shutdown on June 7; 2) Perform a special team review of long standing equipment, operability, management oversight effectiveness; 3) Meet with the NRC to describe and gain NRC agreement on the plan for the performance of an operational readiness review; 4) Perform the operational readiness review; and 5) Meet with the NRC to review the outcome of the readiness review and gain NRC agreement that each Salem unit is ready for restart. Those items are included in the CAL, dated June 9, 1995.
- PSE&G worked to resolve nonconservatism in the Pressurizer Overpressure Protection System set point calculations for approximately two years (March 1993 through February 1995). The licensee relied on ASME Code Case N-514 without NRC approval, failed to report a condition outside the Salem design basis, and failed to perform an adequate safety evaluation of the revised POPS design-basis transient. Further, the process used to address the issue (memorandum superseding memorandums) was considered to be fragmented and not appropriate for potentially safety-significant issues. The corrective action processes that were engaged (a year late) did not appropriately resolve a condition outside the plant's design basis.

On February 3, 1995, a unit 1 main steam atmospheric relief (13MS10) valve would not open in response to manipulation of controls. On February 10, 1995, 22MS10 would not respond in automatic to steam pressure above the pressure setpoint. These problems were the latest in a long history of events with MS10 (and Hagan module) performance problems (including April 7, 1994 event). The licensee did not initiate a thorough root cause until prompted by the residents and Regional management. A thorough root cause, performed by a multi-disciplinary team, concluded that contributing factors included inadequate maintenance, vendor refurbishment, design, control of parts, and operator understanding of design contributed to the performance problems. (IR 95-02)

During late January 1995, Salem sought and was granted a Notice of Enforcement Discretion to address design deficiencies with the Solid State Protection System (SSPS). Electrical components (e.g. limit switches and pressure sensors) associated with main steam, turbine controls, and feedwater were susceptible to rendering all or most of SSPS inoperable based on a single high energy line break. When unexpected power supply trips occurred during the modifications, Region I withdrew enforcement discretion.

- On January 11, 1995, with Salem Unit 2 in Mode 4, the no. 23 RCP seal water return valve for the no. 1 seal closed, isolating seal flow. The licensee determined that the pressure diaphragm of the ASCO solenoid valve failed because of its extensive time-in-service (about 20 years) coupled with the continuous air pressure applied at the diaphragm (about 80 psig). Plant staff planned to establish a periodic replacement schedule for the diaphragms. Westinghouse recommended that PSE&G inspect the no. 1 seal. For safety considerations (avoiding reduced inventory) Salem management, after consulting with Westinghouse and other licensees, elected to perform the maintenance by lowering the RCP onto the "backseat" formed by resting the radial bearing on the thermal barrier heat exchanger. Salem maintenance completed the maintenance activity safely. Although they found no seal damage the licensee replaced the no. 1 seal package.
- In January 1995, the inspectors learned that Unit 2 operated the entire previous cycle (5/93 to 10/94) with a closed drain valve in a common drain line for the Pressurizer Safety Valve loop seals. The valve should have been opened, but the licensee had not done an adequate post-modification lineup or adequate post-modification testing. The 10 gallons of water in the loop seals would create thrust loading on the safety valve discharge piping with the potential to deform the pipe, restricting flow. As a result, the loop seals could render the safety valves incapable of protecting the RCS from overpressurization. This issue is a candidate for escalated enforcement. (IR 95-02.)
- Unit 1 operators commenced a forced shutdown on January 6, 1995, due to inoperable 1A Safeguards Equipment Controls (SEC). The power supply failed. Although the Alternate Test Insertion (ATI) circuit had been turned on (see below) and had produced periodic alarms, the techs and operators did not pursue the alarms (due to previous experience) and apparently took a power reduction that could have been avoided. The licensee contracted an EMI specialist in mid-February to investigate the frequent ATI test faults. Engineering, supported by the EMI specialist, determined that EMI levels in the SEC cabinet, although high enough to cause ATI alarms, do not impact the ability of the SEC to perform its designed safety function. Engineering is actively pursuing the EMI specialist's recommendations to improve the immunity of the ATI to EMI and to prevent future spurious ATI alarms. (IR 94-31)
- In December 1994 and January 1995, during startup from the refueling outage, Salem Unit 2 pressurizer code safeties leaked past the seats due (apparently) to dead weight and thermal loading on the discharge piping. As a result, Salem spent the period from



December 25, 1994 to January 10, 1995, determining the cause of the leakage. Salem replaced the code safeties, adjusted the piping, and, as of January 31, 1995, had successfully reached normal operating pressure with no code safety seat leakage. (IR 94-35)

- A stuck trash rake affecting Unit 1 occurred several times. On November 15, 1994, the new rake stuck on the old trash racks in front of the 13B CW pump intake, forcing a power reduction to 850 MWe. On December 7, 1994, the new rake again stuck on the old trash racks in front of the 13B CW pump intake, forcing a power reduction to 850 Mwe. On January 3, 1995, the new rake stuck in front of 12B CW pump. On January 9, 1995, the old rake stuck in front of the newly replaced racks in front of 13B CW pump intake. PSE&G replaced the racks in front of 13B CW pump, and plans to replace the racks in front of 12B and 11A by the end of February. All other racks have been replaced at least once. (IR 94-31)
- A grass intrusion into unit 1 Circ Water occurred on December 11, 1994. Operators took 13B out of service to clean the water box. 13A tripped on high d/p. Operators reduced power at 5% per minute. The 12B and 12A emergency tripped. Operators reduced power to 51% while restoring the 12A and 12B CW pumps to service. (IR 94-31)
- Unit 1 operators initiated an unplanned shutdown on December 9, 1994, for inoperable Safeguards Equipment Control (SEC) cabinets. The three SEC cabinets for each unit control sequencing of safety related loads onto the 4kV vital busses. A stuck test switch (not immediately identified) caused a fault indication in the test circuit. Technicians took the test switch panel from the 1B SEC to aid in trouble-shooting 1A, and inadvertently caused a stuck switch in 1B SEC. Operations and maintenance staff concluded that a common mode failure might exist, declared the SECs inoperable, and started the shutdown. The stuck switch in 1A SEC existed from the previous surveillance on November 23, but operators did not detect the fault since they had taken the Automatic Test Insertion circuit out of service due to "nuisance" alarms. (IR 94-31)
- On November 28, 1994, no. 2 Station Power Transformer lost power as a result of a modification in the unit 2 control room actuating ground fault protective relaying. The worker performing the mod introduced a ground fault on the relay, in conjunction with an existing ground elsewhere on the ungrounded system (by design).
- Also on November 28, 1994, the no. 5 substation in the 13 kV ringbus lost power, causing the Technical Support Center (TSC) to lose power. The cause was insulators arcing over. The TSC diesel started, but the TSC ventilation failed to start as a result of a blown fuse. Fast transfers occurred successfully on both units.
- Breakdown of insulation on 4kV supply cable to the unit 1 vital buses (November 21, 1994); caused by liquefied pulling compound dripping down onto the cable end between the dust boot and the heat shrink, providing a lowered resistance from the terminal lug to the ground strap.

On November 18, 1994, a 4T60 disconnect opened causing the no. 4 station power transform (SPT) to de-energize, interrupting one source of offsite power to each unit. Loads fast transferred at Unit 1, but 3 of 5 running circ water pumps lost power, requiring operators to reduce power. Unit 2 lost spent fuel pool cooling for 17 minutes since the other source of power was out due to the outage work. No apparent increase was noted in SFP temp. No apparent cause for the disconnect opening. Power was restored five days later using no.2 SPT.

b. Assessment

- The new management team has implemented a number of measures designed to improve the standards of performance for Salem and NBU employees. Some of the results include a large increase in the numbers of documented degraded plant conditions, a graded approach to performing root cause determinations, management accountability for the quality and timeliness of root cause determinations, and implementation of a departmental self-assessment program. The new management team has demonstrated a significantly improved grasp of safety perspective during daily meetings and SORC meetings. The process to identify equipment deficiencies and determine which must be addressed prior to restart has largely been completed. The action plans to address people and process problems have been reviewed, and plant management has just begun implementation of these resulting actions.
- Implementation of the Operations Action plan will likely delay restart of Salem Unit 1 until mid-1996 as a result, in part, of the need to revise EOPs, AOPs, and Technical Specification surveillance procedures.
- The Quality Assurance organization has recently performed several performance based inspections of Salem activities with substantive findings. The IST audit, for example, resulted in QA issuing a stop work for program deficiencies such as IST procedures that incorporated incorrect acceptance criteria. Although QA performance significantly improved at Salem, the recent problems in the QA pursuit of the loss of shutdown cooling at Hope Creek results in mixed QA performance for Artificial Island, overall.
- Numerous examples of PSEG's failure to properly respond to and effectively correct degraded safety-related system performance, and the inadequacy of their actions to promptly resolve known technical issues associated with the pressurizer overpressure protection system led the NRC to question Salem's willingness and ability to promptly and critically assess questionable or degraded equipment conditions. The NRC concluded that Salem personnel avoided prompt problem resolution and operability and corrective action decision making, failed to address issues in a timely manner, conducted lengthy analyses and indeterminate conclusions, and attempted to justify continued operation with insufficient basis. The NRC further concluded that Salem's approach to operability was often biased toward a positive determination without consideration of the applicable design basis.

- Inspectors detected that performance standards and expectations for the Salem Station Operating Review Committee (SORC) were not well developed or communicated. Consequently, the SORC did not demonstrate a systematic approach or questioning attitude relative to the review and evaluation of matters, such as safety assessments required by 10 CFR 50.59 and operability determinations involving the safety impact of certain degraded plant conditions. This weakness compounds previous NRC concerns involving the continuing challenge to operators from degraded conditions that constitute "workarounds," the quality of operability determinations, root cause determination and corrective action effectiveness, plant equipment reliability, and work planning and control effectiveness.

- Prior to the Salem unit shutdowns, unanticipated equipment deficiencies continued to dominate performance of the Salem units. In February, both units shut down to correct design inadequacies with the Solid State Protection System. Problems with main steam atmospheric relief valve controls delayed Unit 1 startup until February 27. Although operators restarted Unit 2 on February 11, low seal leakoff flow from the no. 21 Reactor Coolant Pump seal required a shutdown on February 19. As of January 31, Salem Unit 1 had continuously operated for more than 150 days, although Unit 1 operators had to reduce power six times in six weeks due to equipment problems from November 6, 1994 to December 17, 1994. On the other hand, the Salem units have experienced only one reactor trip in the six months beginning August 1, 1994, as compared with five trips in the period from February 1, 1994 to August 1, 1994. Operators have begun to take significantly increased ownership for plant performance and safety. Their involvement in insuring nuclear and personnel safety during the inspection of the no. 23 Reactor Coolant Pump seal illustrates their leadership in identifying and preventing pitfalls in plant activities. Maintenance management identified that lack of supervisory oversight of job briefings had resulted in ineffective worker preparation for maintenance activities. Steps have been taken to improve the job briefings. System engineering support for daily operations and maintenance activities continues to require significant improvement. While some improvement has been noted in design engineering support for daily activities, plant and design engineering senior management involvement was frequently required to force communication between the organizations. Plant support organizations continued to demonstrate excellence in their activities.

c. Performance Indicator Data

FOR AEOD TO UPDATE

d. Recently Identified Technical Safety and Managerial Challenges (of last 12 months)

- Operations procedures (EOPs, AOPs, and surveillances) require substantial revision. In addition, plant management intends to significantly raise the standards for acceptable operator performance. They plan to accomplish this through infusion of

standards brought to Salem by hiring approximately 20 new SROs and STAs.

- The Operating Experience Feedback process is ineffective at Salem.
- Approximately 10,000 open work orders (both units) and 450 Unit 1 modifications existed in mid-October, 1995.
- Salem staff had not implemented an effective planning and scheduling process as of mid-October. The rate of completion of scheduled work averaged 25 to 50 percent.
- Work control continues to pose problems in terms of inappropriate tagging practices and ineffective maintenance activities resulting in the need for rework. These failures, however, have been identified more frequently than in the past, and in one case the SROs stopped all Salem work through their own initiative.
- The Salem unit 2 refueling outage, scheduled for 77 days, extended to 110 days as a result of equipment problems, including pressurizer code safety valves leaking past the seat.
- Both Salem units shutdown in early February 1995 due to inadequate design of the Solid State Protection System. A single steam line failure in the turbine building could have rendered both trains of SSPS inoperable with the result that operators would have been required to manually initiate Safety Injection.
- Both Salem units suffered performance failures in the controls for the main steam safety atmospheric relief valves. These controls have a long history of inadequate control and maintenance. In the most recent problems, the licensee again discovered unexpected components in the control circuits, demonstrating ineffective corrective action for the level IV violation after the April 7, 1994, event.
- A number of allegations with potential safety significance have been substantiated, including:
  - inadequate PORV design, with the result that redundant capability to limit RCS pressure under low temperature conditions had not been assured (an USQ with the potential for escalated enforcement);
  - installation of non-Q limit switches in safety-related applications, two of the eight (for both units) head vent valves, with the result that repeat problems with safety related part controls raise programmatic questions about the Salem ability to control safety related maintenance (currently being reviewed for escalated enforcement); and
  - incorrect Technical Specification definition of controlled leakage, with the result that Safety Injection flow supplied to the core, in the event of a RCP seal supply line failure during an accident, could have (and at times would have) been less than assumed in the accident analysis (no



violation was issued, since Salem was always in compliance with the Technical Specification requirements).

The Senior Resident Inspector has personally seen evidence that the alleged made the concerns known to the licensee and that the licensee did not respond in a timely, conservative fashion. Although some of the allegations from the same source were unsubstantiated, several more have yet to be addressed.

- The licensee discovered on October 15, 1994, 2 days into the unit 2 refueling outage, that a valve in the pressurizer code safety valve loop seal drain line had been closed throughout the operating cycle from July 1993 until October 1994. The immediate safety implication is that the licensee could not assure, based on any analysis existing as of March 15, 1995, that the water hammer from the impact of the water in the loop seal on the valve discharge line would not deform the discharge pipe and restrict flow to less than that required by design. The licensee is currently performing an analysis to demonstrate that the valves could have performed their intended function, however, engineering stated that analysis will not be able to show that the thrust loads will be within code allowable limits.
- Service Water (SW) Leaks: The licensee is completing a seven year pipe replacement project that will replace most (about 19,000 linear feet are safety related) of the safety related SW piping with 6% moly stainless steel. This project will probably continue through 1997. Currently, approximately 90% of the safety related portion of the project has been completed, including the majority of the SW piping in containment, diesel bays, SW intake structure, and auxiliary building. Based on NRC inspection, SW pipe replacement project is progressing satisfactorily as scheduled.
- Unit 2 Sustained Operation of Greater Than 100% Power: during the recent outage, the licensee confirmed erosion of the feedwater flow nozzles resulting in incorrect online calorimetric data. Upon discovery, licensee immediately reduced power for both units, and began adjusting instrument setpoints to insure conservative operation. The licensee concluded that 102.5% was the exact power level and operating at that power level did not invalidate any of the UFSAR Chapter XV conclusions.
- Work Control Problems: During the Unit 2 refueling outage, the licensee and the NRC identified additional examples of failure to follow established procedures relative to the control of maintenance work activities. These examples were similar to those previously identified during the Unit 1 outage, November - December 1993.

### 3. ESCALATED ENFORCEMENT ACTIVITIES

- The NRC issued a Level III Violation on March 8, 1994, documented in NRC Inspection Report 50-272 and 311/93-23; 50-354/93-25. The violation was based on multiple examples of PSE&G's failure to follow procedures and their failure to properly control safety-related activities.
- The NRC issued four Level III and two Level IV violations and imposed a Civil Penalty of \$500,000 on October 5, 1994. The violations were documented in NRC Letter EA 94-112 and were based on the licensee's performance prior to and during the April 7, 1994 event.
- On February 8, 1995, PSE&G met with NRC at Region I in King of Prussia to discuss the findings of the Office of Investigation relative to assertions of violations involving 10 CFR 50.5 "Deliberate Misconduct," and 10 CFR 50.7 "Employee Protection."
- On July 28, 1995, a pre-decisional enforcement conference reviewed numerous violations for potential escalated enforcement. The violations involved:
  - thirteen examples of inadequate corrective action including failure to promptly resolve a known safety issue associated with the pressurizer overpressure protection system, failure to correct inoperable PRA recirculation valves for both trains of RHR at Salem Unit 2, and failure to correct inoperable switchgear supply fans at Salem Unit 1;
  - failure to control a modification to insure that it was correctly implemented (installing the loop drains for the pressurizer code safety without insuring that the drain valves were properly aligned, or insuring that post modification testing verified that the drain performed its intended function); and
  - a repeat failure to comply with the Technical Specification action statement requirement for an inoperable PORV.

Enforcement action is still pending.

### 4. IPE INSIGHTS

- Salem submitted its IPE to the NRC in July 1993; the document is still under NRC review. The resident inspectors applied PRA principles to their inspection activities, even during plant activities since the licensee shut the units down in May/June 1995. As a result, the inspectors identified problems associated with Service Water, RHR, Component Cooling Water, and the Emergency Diesel Generators.



### III. ANALYSIS/ASSESSMENT

#### 1. PREVIOUS SALP RATINGS AND OVERVIEW

##### a. Previous SALP Ratings

<u>Functional Area</u>	<u>June 19, 1993</u>	<u>November 5, 1994</u>
Operation	2	3
Maintenance/ Surveillance	2	3
Radcon	1	N/A
Emergency Preparedness	1, Declining	N/A
Security	1	N/A
SA/QV	2	N/A
Engineering & TS	2	2
Plant Support	N/A	1

Current assessment period: November 5, 1994 to March 9, 1996.

##### b. SALP Overview (derived from the summary paragraph of each SALP section):

#### OPERATIONS

On January 12, 1995, the SALP board met to discuss PSE&G's performance at Salem during the period from June 19, 1993 to November 5, 1994. The board concluded that operators generally responded appropriately with good command and control to the many plant trips and operational transients that occurred over the SALP period. Likewise, they demonstrated good proficiency in making emergency declarations for events for which such declarations should have been considered. However, performance over the assessment period demonstrated significant weaknesses in several areas. Operators did not practice ownership of the plant and did not aggressively enlist other plant departments to resolve longstanding equipment problems which frequently challenged them in normal and upset plant conditions. A lack of an appropriate questioning attitude by operators resulted in anomalous indications, or conditions being unnoticed or not understood and not being acted upon. A lack of guidance for and training of operators on operability decisions resulted in some decisions being nonconservative or having weak technical bases. Examples of nonconservative approaches to entering and exiting LCOs occurred over the period. Some difficulties were experienced managing and controlling outage activities. Poor self assessment within the Operations department coupled with ineffective independent assessment of Operations by the Quality Assurance and Nuclear Safety Review organization contributed to the continuation of performance problems throughout most of the period.

#### MAINTENANCE/SURVEILLANCE

The board concluded that performance weaknesses were evident in maintenance programs and activities, such as procedural adherence and adequacy, the feedback process, specification of post-maintenance testing requirements, and control of work activities by numerous onsite groups. Management has improved its safety focus in prioritizing and scheduling maintenance activities. However, management oversight of corrective action program activities has been weak as evidenced by the high recurrent equipment failure rates. Inconsistencies in troubleshooting activities and root cause analysis contributed to the delay in correcting recurring problems. Material condition of the plant continues to improve, but there remain several areas that need improvement. Although the in-service testing program was adequate, management did not effectively resolve self assessment findings. Programs for in-service inspection, erosion/corrosion and steam generator leakage monitoring were adequately implemented.

#### ENGINEERING

The Board concluded that Engineering performance was inconsistent, with substantial variation in quality. The quality of the discipline design work was good, with significant engineering management focus shown in several modification activities. However, engineering work priorities did not always reflect plant needs. In several significant programmatic areas in which the Engineering organization had an important role, performance was, on balance very good. Significant problems, nonetheless were noted associated with root cause assessments and with equipment problem resolution. The fact that there existed engineering capability, that when focused by station management and brought to bear on important issues, demonstrated the ability to achieve very good performance, suggested that a significant aspect of the problem was associated with the effective engagement of available engineering expertise in activities important to safe plant operations, such as in root cause assessment and equipment problem resolution.

#### PLANT SUPPORT

The Board concluded that plant support functions contributed effectively to safe plant performance. Performance in the radiation protection area continued to be a significant licensee strength. Well trained technicians and staff coupled with effective management resulted in aggressive ALARA program implementation with significant dose savings realized. Excellent performance in the radiological environmental monitoring and effluent control programs was again noted. There was continued good performance in the emergency preparedness area. Security program performance continued to be a strength. Fire protection program implementation was substantially improved.

2. LICENSEE RESPONSE TO PREVIOUS SALP FUNCTIONAL AREA WEAKNESSES/REGENT  
LICENSEE PERFORMANCE TRENDS (in the last year)

• OPERATIONS

The licensee response to the SALP did not provide detailed information on plans to address performance inadequacies. The response generally agreed with the NRC's assessment of Salem performance. In addition, the response stated an intention to correct Salem performance problems. Since the response letter was issued, senior PSE&G management has initiated an effort to determine the cause of the ineffectiveness of previous corrective actions. In addition, PSE&G management proposed reorganizations of several organizations (discussed in more detail below), and implementation of a "step change" process intended to produce results, rather than activity without results.

In response to the April 7 event, Operations management provided improved guidance to operators for command and control and conservative operation of the plant.

In response to NRC concerns, Operations management developed a flow chart for operability determinations. Inspectors have occasionally noted weak or incorrect interpretation of Technical Specifications.

The inspectors have also noted that the Operations Manager has convinced the department staff that change is necessary, and fostered an increasing sense of ownership and team work.

• MAINTENANCE AND SURVEILLANCE

Secondary/BOP equipment deficiencies pose significant challenges to plant operations, e.g. manway failure, condensate header damage, COPU filter replacement, CW traveling screens, FW feed control at low power levels.

In order to improve overall performance, PSE&G reorganized the maintenance department and formed a separate planning department reporting to the Salem General Manager. The new maintenance organization consists of a Mechanical Maintenance Manager and a Controls Maintenance Manager reporting to the Salem Maintenance Manager. The Salem Maintenance Manager, who came to Salem from Comanche Peak, reports directly to the Salem General Manager.

To address the existence of long standing equipment problems, plant management required operators to develop a list of workarounds to be addressed by maintenance personnel in accordance with assigned priority.

• ENGINEERING AND TECHNICAL SUPPORT

Salem and corporate engineering have not consistently communicated well with operations, nor has operations communicated well with engineering. System engineering has not effectively prioritized their workload, nor have they effectively monitored equipment reliability, as demonstrated by the "workaround" list generated in response to this NRC identified concern. The system engineers did not receive training on operability or Generic Letter 91-18 until September 1994.

An NRC observation related to the Salem rod control issue was that the initial troubleshooting efforts lacked clear leadership and delegation of responsibilities. This resulted in the efforts narrowly focusing on the most recent system malfunction without adequate attention to the repetitive nature of the failures and the need to determine and correct the root cause. The failure of PSE&G to determine the root cause of the failures resulted in numerous aborted startup attempts. The team did observe significant improvements in the control of troubleshooting and root cause determination during the inspection. A management oversight team was initiated to review all I&C troubleshooting activities in an effort to reduce events caused by troubleshooting.

In late February 1995, PSE&G announced a reorganization of the Nuclear Engineering department (corporate engineering). PSE&G management redirected resources no longer required to support the Salem revitalization project (since it would be substantially complete in 1995) to better support Salem and Hope Creek operation. The effects of this reorganization have not yet been demonstrated.

#### • PLANT SUPPORT

The NRC noted that PSE&G continued to perform at a noteworthy level in the area of radiological protection through September 1995, and especially during the Unit 2 refueling outage (Oct. 94 - Jan. 95).

The licensee's annual partial-participation emergency preparedness exercise was conducted on October 5, 1995. On-site response to the simulated emergency was very good. No exercise weaknesses were identified. Late on October 4, however, Salem Unit 1 experienced a loss of all overhead annunciators for one hour. Although the unit was completely defueled at the time, the Emergency Classification Guide required operators to declare an Alert. Despite the requirements of the ECG, the operators made a one hour report instead. When the Operations Manager, new to the Salem organization, subsequently arrived onsite and reviewed the ECG, he instructed the operators to declare an Alert in accordance with the ECG.

#### • SAFETY ASSESSMENT/QUALITY VERIFICATION

In December 1994, PSE&G named a new Director of Quality Assurance and Nuclear Safety Review. His priorities included implementing a Corrective Action Program and improving the QA audit and inspection quality. He also became very active in improving the effectiveness of the Nuclear Review Board, an offsite review group.

### 3. LICENSEE PERFORMANCE STRENGTHS AND WEAKNESSES \*

Salem performance continued to be inconsistent.

#### Strengths:

- Radiation protection program implementation continues to be very strong.
- The new line management team has demonstrated high expectations for performance. Oversight of the System Readiness Reviews demonstrated the implementation of those high standards.

The Director of Quality Assurance and Nuclear Safety Review has consistently demonstrated exceptionally high standards for performance and an excellent safety perspective. In addition, he has provided the Quality Assurance organization with the means to contribute to improved Salem performance through substantive findings and significantly improved credibility with the line organizations. For example, Engineering management accepted recent IST findings at Salem as accurate, fair, and non-trivial.

**Weaknesses:**

Salem performance continues to be weak in:

- Planning
- Control of maintenance;
- Operations, as demonstrated by poor control of tagging.

**Weaknesses with some recent signs of improvement:**

- Operators standards for acceptable performance. Operators stopped work in two cases (one case was a complete Salem stop work) for failure to adhere to procedures. Two SROs relieved an equipment operator for sleeping on duty. Operators stopped tagging for a week in response to several tagging errors.
- Engineering support. Engineering performed well in support of the bolting (incorrect material) problems associated with the safety related 230 VAC system. Inspectors considered the System Readiness Reviews to be high quality .



#### 4. NRC TEAM INSPECTIONS WITHIN THE LAST YEAR

<u>Area/Date</u>	<u>Findings</u>
Special Inspection Team (SIT) April 26-May 12, 1995	The purpose of the SIT was to assess effectively the licensee performed from a safety perspective in the areas of problem identification, prioritizing and conducting work, and management oversight of plant performance.



## IV. INSPECTION PROGRAM STATUS

### 1. STATUS OF INSPECTIONS

The inspection program status is reflected in attached MIPS report #2. The data is current as of the date of the MIP. The MIP indicates that inspection program is on-track with the planned resource allotment; no significant shift in inspection activities is warranted.

### 2. PROPOSED CHANGES TO MIP

The NRC Salem Assessment Panel (SAP) is reviewing the development of PSE&G's restart plan and concurrently developing an inspection plan. Salem intends to present their restart plan including all actions they plan to implement, in a meeting with the NRC in either late November or December, 1005. The SAP will then publish and implement the accompanying NRC inspection plan.

### 3. SIGNIFICANT ALLEGATIONS AND INVESTIGATIONS

Three Salem allegations are related to or resulted from a December 3, 1992 altercation between two SRG engineers and the former General Manager (GM), Operations Manager (OM), and, to a lesser extent, the Manager-Quality Assurance & Nuclear Safety Review (QA&NSR). OI substantiated harassment and intimidation (H&I) in this case. Enforcement conferences were conducted with the licensee and the affected managers on February 8 & 23, 1995. Some of these managers engaged in willful misconduct (pre-decisional). Enforcement action was taken.

Since the licensee's effort to terminate several employees for poor performance on July 18, 1994, the Region has received additional multifaceted allegations from two terminated employees that are currently under review. One of these pertained to 23 separate management, operations, and engineering concerns. These were presented to NRC personnel in a face to face meeting on August 8, 1994. One concern pertaining to the low pressure over protection system (POPS) was substantiated. Inadequate design compromised the redundant capability of the PORVs to limit RCS pressure under low temperature conditions. An enforcement panel agreed to proceed with additional action after OI completed its review of potential willful misconduct and harassment and intimidation issues. An additional multifaceted allegation involved both technical issues and potential H&I issues. This allegation concerns six technical issues raised regarding the environmental qualification of equipment. Currently, the EQ issues are being reviewed by DRS and the wrongdoing issues are being reviewed by OI. This allegation also involved a terminated employee. The NRC received this allegation from senior PSE&G management.

Additional allegations with potential safety significance have been substantiated. Non safety related limit switches were installed in two of eight reactor vessel head vent valves (safety-related application), and an incorrect Technical Specification definition of controlled leakage, with the result that Safety Injection flow supplied to the core, in the event of a RCP seal supply line failure during an accident, could have (and at

times would have) been less than assumed in the accident analysis (no violation was issued, since Salem was always in compliance with the Technical Specification requirements).

Collectively, these allegations implicate the previous station management's ability to personally resolve and address safety issues. Regarding the December 1992 altercation, this incident and the two related allegations appear to be due to management's confrontational attitude with QA&NSR personnel. Since these managers have been replaced, this concern appears to have dissipated. The EQ allegation and its OI component, and the 8/94 allegation appear to stem from a tendency of PSE&G to manage by memo. They are not effectively using their root cause programs. Management's failure to identify and resolve root causes was a direct contributor to these two allegations. Based on the SALP (50-272/93-99) and a recent engineering inspection (50-272/95-01), this appears to be a continuing concern.

#### 4. OPEN ITEM STATUS

BACKLOG/No. GREATER THAN 2 YRS

(Unit 1 and 2 - Common) 62/7

NOTE: The large number of open items is due to the issuance of an Appendix R/Fire Protection Team Inspection Report in October 1993 and an EDSFI Team Inspection Report in November 1993.

#### 5. OUTSTANDING LICENSING ISSUES

- GL 89-10 (MOV) - technical differences between NRC/PSE&G. (Hope Creek also)
- EDG amendment - meeting held May 11, 1992 to resolve issues.
- TS amendment to resolve AFW/containment spray issue (see Section II.2.a).
- Increase in surveillance test intervals and AOT for reactor trip and ESPAS.
- Install new digital feedwater control system.
- Evaluation of Control Room Design Deficiencies that were not corrected.
- Bulletin 88-08 (Thermal Stress in Piping Systems Connected to the RCS) - licensee is revising their response.

#### 6. LOCAL/STATE/EXTERNAL ISSUES

##### a. NJ DEPE/BNE

- Still providing input/comments on all PSE&G licensing change requests.
- High interest in resident inspection accompaniment and Salem Assessment Panel activities.
- State inspectors generally accompany all AIT efforts.

B. Other (Recent Media Interest)

- The media attended the public meeting concerning the Restart Action Plan in August 1995. No one from Senator Biden's staff attended that meeting.

## SALEM EXECUTIVE SUMMARY

### LICENSEE PERFORMANCE STRENGTHS AND WEAKNESSES

Salem performance continued to be inconsistent until they shut down in May-June. The new management team has focused on developing a Restart Plan designed to bring about lasting improvement in equipment and plant staff performance .

#### Strengths:

- Senior management has demonstrated significant resource commitment to improving management performance at Salem and in the NBU. The new managers (from outside PSE&G) include a Nuclear Business Unit President, two Senior Vice Presidents, three Directors of Engineering, the Director of Quality Assurance and Nuclear Safety Review, the Nuclear Training Director, the Salem General Manager, the System Engineering Manager, the Salem Operations Manager, the Salem Maintenance Manager, the Salem Projects Manager, and the Salem Planning Manager (planned, not yet announced to the NBU).
- The NBU has committed significant resources to independent assessment of Salem performance. The independent assessment organizations include a management assessment team commissioned by the NBU President, consisting of former utility officers, led by the former Senior Vice President of Florida Power and Light. The NBU has recently made extensive use of Failure Prevention and Investigation, (FPI) International, in developing and assessing the effectiveness of a newly created Corrective Action Program. PSE&G has also used Duke Engineering Services and Beckman Associates to independently assess the quality of the System Readiness Reviews led by the System (engineering) Managers and conducted by Salem multi-disciplinary teams.
- The licensee has demonstrated a significant commitment to improving plant performance. More than 4,000 work orders and 450 modifications are expected to be completed prior to restart.
- Radiation protection program implementation continues to be very strong.

#### Weaknesses:

Salem performance continues to be weak in:

- Planning.

The rate of successful completion of planned work ranges from 25 to 50 percent. Planning meetings continue to capture history rather than steer future events.

- Control of maintenance.

Inspectors have continued to find contractor performing work not controlled by procedure or work orders. Plant management has recently required that two supervisors per shift perform plant tours to identify work control problems.

## GENERAL OBSERVATIONS:

Salem managers clearly understand the need for change at Salem.

The new management team brings considerable outside experience to the NBU, including experience in reforming problem plants.

The Operations organization leadership has demonstrated, initially, a strong sense of safety perspective and high performance expectations. Salem management expects to raise the standards for Operator performance through infusion of higher standards by bringing new leaders (approximately 20 SROs and STAs) into the organization. Salem management expects the necessary improvements in Operations performance to determine the restart date for the Salem units.

The QA organization has undergone a significant improvement in performance under the leadership of the new Director of QA and NSR.

The NBU intends to implement forced personnel performance ranking as a method of improving performance.