U. S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NO. 50-272/86-99; 50-311/86-99

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

SALEM GENERATING STATION

ASSESSMENT PERIOD: October 1, 1986 - December 31, 1987

SALP BOARD FEBRUARY 5, 1988

TABLE OF CONTENTS

I. INTRODUCTION

A. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect the available observations and data on a periodic basis and to evaluate licensee performance based upon this information. The SALP program is supplemental to the normal regulatory processes used to ensure compliance to NRC rules and regulations. The SALP program is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to the licensee's management to promote quality and safety of plant operation.

The NRC SALP Board, composed of the staff members listed below, met on February 5, 1988 to review the collection of performance observations and data and to assess licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance". A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's safety performance at the Salem Generating Station for the period October 1, 1986 through December 31, 1987. It is noted that the summary findings and totals reflect a 15 month assessment period.

The SALP Board was comprised of the following:

Chairman

S. J. Collins, Deputy Director, Division of Reactor Projects (DRP)

Members

W. F. Kane, Director, Division of Reactor Projects (DRP) (part-time)
W. R. Butler, Project Director, PDI-2 (NRR) (part-time)
J. E. Richardson, Acting Deputy Director (DRS)
E. C. Wenzinger, Sr., Chief, Reactor Projects Branch 2 (DRP)
R. M. Gallo, Chief, Operations Branch (DRS)
R. R. Bellamy, Chief, Facilities Radiological Safety and Safeguards Branch (DRSS) (part-time)
P. D. Swetland, Chief, Reactor Projects Branch 2B (DRP)
T. J. Kenny, Senior Resident Inspector, Salem (DRP)

Other Attendees (non-voting)

R. R. Keimig, Chief, Safeguards Section (DRSS) (part-time)
W. J. Lazarus, Chief, Emergency Preparedness Section (DRSS) (part-time)
W. J. Pasciak, Chief, Effluents Radiation Protection Section (DRSS) (part-time)
M. M. Shanbaky, Chief, Facilities Radiation Protection Section (DRSS) (part-time)
R. J. Summers, Project Engineer, Branch 2B (DRP) (part-time)
M. J. Cioffi, Radiation Specialist (DRSS) (part-time)
D. T. Wallace, Operations Engineer (DRS)

II. CRITERIA

Licensee performance is assessed in selected functional areas. Functional areas normally represent areas significant to nuclear safety and the environment.

One or more of the following evaluation criteria were used to assess each area.

1. Management involvement and control in assuring quality.
2. Approach to resolution of technical issues from a safety standpoint.
3. Responsiveness to NRC initiatives.
4. Enforcement history.
5. Operational events (including response to, analysis of, and corrective actions for).
6. Staffing (including management).
7. Training and qualification effectiveness.

However, the SALP Board is not limited to these criteria and others may have been used where appropriate.

Based upon the SALP Board assessment each functional area evaluated is classified into one of three performance categories. The definitions of these performance categories are:

Category 1: Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used such that a high level of performance with respect to operational safety is being achieved.

Category 2: NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and concerned with nuclear safety; licensee resources are adequate and reasonably effective so that satisfactory performance with respect to operational safety is being achieved.

Category 3: Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear strained or not effectively used such that minimally satisfactory performance with respect to operational safety is being achieved.

The SALP Board may determine to include an appraisal of the performance trend of a functional area. Normally, this performance trend is only used where both a definite trend of performance is discernible to the Board and the Board believes that continuation of the trend may result in a change of performance level. Improving (declining) trend is defined as:

Licensee performance was determined to be improving (declining) near the close of the assessment period.

III. SUMMARY OF RESULTS

A. Overall Summary

The Salem facilities continue to operate in a safe, competent manner. The leadership of site and corporate management in setting high goals with respect to plant safety and reliability is evident by the commitment of resources to identify and solve problems, the establishment of ownership and accountability for facility performance, and the prompt conservative approach to safety issues, particularly when continued plant operation was affected. The licensee's handling of service water corrosion/erosion problems, electrical coordination discrepancies and reactor vessel head leaks exemplfy this element of performance.

Operator performance during routine and abnormal conditions has been good. Some instances of inattention to detail and inadequate communications/interface with other departments have resulted in plant trips or other events. While the frequency of trips has been reduced, particularly for Unit 1; the number of trips for Unit 2 can be improved. Problems identified in the operator requalification program also require further licensee attention.

The surveillance program satisfactorily implements a large number of test requirements to assure reliable equipment operation. Weaknesses in attention to detail and inter-department interface continue to result in a small, but growing number of missed or late surveillances.

There is an effective radiation protection program onsite, with challenging ALARA goals and adequate resources and management commitment to successfully achieve them. Not withstanding, recurrent weaknesses in the quality of radiation protection procedures and the implementation of laboratory quality controls need to be addressed.

Noteworthy good performance was recognized in the maintenance, security, emergency planning, outages and assurance of quality areas. In each case, the licensee's aggressive approach to excellence, quality of training, and commitment of resources were exemplary.

In the engineering area, older plant problems such as inadequate implementation of new regulatory requirements and poor documentation of the design basis for the plants continue to affect overall performance. Recent licensee initiatives appear to be effective in identifying and correcting these problems. Nevertheless, the assessment of licensee performance in this area reflects the continuing concern over previous performance weaknesses.

The strength of the management team and the positive worker attitude contribute to the improving trend in licensee performance overall. Recurring lapses in individual attention to detail particularly in the surveillance area, longstanding problems with radiation protection procedures and quality control in the chemistry area, and continuing design and engineering support discrepancies indicate that further licensee emphasis in these areas is warranted.

B. Background

1. Licensee Activities

Unit 1

Unit 1 began this assessment period at 83% due to loading restrictions within the electrical plant. The restrictions were self imposed due to station transformer loading problems identified after the August 26, 1986 false loss of offsite power. Following manipulation of electrical loads between Unit 1 and 2, which conformed to licensee commitments to the NRC, the Unit operated at various power levels up to 100% until March 1, 1987, when a tanker struck and destroyed a 500 KV line from Hope Creek to Keeney, Delaware. The loss of this line restricted electrical output from Salem and Hope Creek because of the potential for off-site electrical line instability if another 500 KV line was lost with all three plants operating at full power.

On March 8, 1987, the unit was removed from service for planned maintenance and the replacement of No. 1 Auxiliary Power Transformer. The unit was returned to service on March 15, after completion of this maintenance. Unit output was restricted to 71% due to the loss of the 500 KV Keeney line.

On March 27, 1987, a new plant tripping device was energized allowing the units to return to 100% power. This device was installed to trip one operating unit, if another off-site high voltage line would be lost. The unit selected by the trip-a-unit device would trip, thus restricting output power from the Artificial Island (location of Hope Creek and Salem Generating Stations). To prevent undesired trips, the trip-a-unit device was disarmed and unit output reduced anytime electrical storms in the area threatened high voltage line reliability.

On April 6, 1987, Steven Miltenberger was appointed to the position of Vice President - Nuclear Operations and Corbin McNeill was promoted to Senior Vice President - Nuclear.

On June 2, 1987, the unit tripped due to a lightning strike on the line that had the trip-a-unit in service. The trip-a-unit had not been disarmed because the electrical storm intensity was below the criteria necessary to disarm. This forced the licensee to reevaluate the criteria for removing the trip-a-unit. It was determined that such a lightning strike was not common and the criteria was not changed.

On October 2, 1987, the unit was removed from service for a refueling outage and plant modifications. The licensee performed the following major changes to the facility: (1) removal of the RTD bypass loop; (2) installation of bottom mounted core exit thermocouples and the elimination of the instrument penetrations on the reactor head; (3) removal of the boron injection tank, as well as other modifications. The unit remained in the refueling outage (Mode 5) at the end of this report period. The startup from the outage was delayed by a service water flooding event and the discovery of cracks in three spare control rod drive mechanism penetrations.

During this rating period Unit 1 participated in an IAEA sponsored program to monitor plant activities to prevent diversion of special materials. The staff and management enthusiastically supported these safeguards activities and performed in an exemplary manner.

Unit 2

Unit 2 began this report period operating at 65% power with No. 21 feed pump out of service. On October 2, 1986, the unit was removed from service for a refueling outage. While taking the unit off the line, the licensee successfully demonstrated a partial unit shutdown from outside the control room. Outage activities included: (1) An intrusion of resin into the Refueling Water Storage Water Storage Tank and eventually into the refueling cavity; (2) A complete assessment of all of the welds in the service water system related to the containment fan cooler units; (3) replacement of No. 21 component cooling water heat exchanger tubes; and other design changes and maintenance.

On December 23, 1986, during the restart from refueling, the unit tripped from 8% power while troubleshooting an electro-hydraulic control (EHC) system failure. Repairs were made and the unit was brought on line on December 24, 1986. (The unit operation was restricted due to the same condition of the electrical plant that was delineated above for Unit 1.)

On December 28, 1986, the unit tripped from 77% power due to loss of level in No. 23 steam generator. The cause was a control system failure of the feedwater regulating control valve, which caused the valve to shut. On December 29, 1986, the unit was returned to service.

On January 18, 1987, the unit was being taken off the line due to a main generator exciter ground fault alarm when at 3%, the unit tripped due to a high neutron flux signal which was

inadvertently initiated by an instrument technician performing a surveillance on the nuclear instrument channels. The unit was returned to service on January 19, 1987.

On March 12, 1987, the unit tripped from 96% power due to a main generator loss of field. The event was caused by operating the generator in an over excited condition. This was a new operating condition necessitated by the electrical problems on the off-site electrical system with newly generated excitation curves and excitation metering that was not calibrated with the tolerances desired. The licensee reissued the curves, recalibrated the instrumentation, and restarted the unit on March 14, 1987.

On April 7, 1987, the unit tripped from 85% due to loss of electro-hydraulic control system D.C. power. The problem was traced to a failed servo card which was replaced. The unit was cooled down to repair a non-isolable valve in the reactor coolant system not caused by the trip. The licensee also identified a main generator stator water leak which was also repaired. The unit was returned to service on April 17, 1987.

On June 25, 1987, the unit was removed from service to investigate the reasons for a high vibration on No. 6 turbine bearing, and an unusual noise in the vicinity of No. 22 moisture separator reheater (MSR). The licensee performed a visual inspection of low pressure turbines, piping, and MSR's with no identified problems. A vibration analysis contractor was brought to the site, and on June 30, 1987 the unit was restarted and brought to 62% power (the point where vibration and noise began to accelerate). The source of the noise was pin-pointed and the unit was once again removed from service. A transition piece diaphragm gasket in a low pressure turbine had failed. It was replaced and the unit was placed in service on July 13, 1987.

On August 6, 1987, the unit tripped from 100% power when No. 24 steam generator experienced a high-high level. The reason for the high level was the operator's inattention to the feedwater control system which had been placed in manual because of an ongoing surveillance test. The operator was counseled and retrained, and the unit was returned to service on August 7, 1987.

On August 7, 1987, the licensee removed the unit from service after main output transformer oil samples indicated insulation breakdown in one of three inservice transformers. During this plant outage, the licensee also identified a small leak on the seal weld for #5 reactor vessel head instrument (conoseal)

penetration. The transformer was replaced with an on site spare, and the conoseal leak was repaired. The unit was returned to service on August 27, 1987.

On October 24, 1987, the licensee removed the unit from service when it could not be determined, through analysis and records search, that Class 1E electrical breaker coordination existed. The licensee brought the unit to Mode 5 and performed analyses and electrical modifications to the unit. On December 17, 1987, it was certified that breaker coordination existed. The Keeney 500 KV electrical line was also returned to service in December 1987, thereby removing the need for the trip-a-unit protection. The trip-a-unit equipment was de-activated for both units, Unit 2 was restarted and remained at 100% power through the end of this report period.

2. Inspection Activities

Two NRC resident inspectors were assigned during the inspection period. The total of 4288 hours (3430.4 annualized) was expended utilizing resident and region based inspectors.

During the period, NRC team inspections were conducted as follows:

a. Balance of Plant special inspection on the feedwater and condensate systems (Inspection Report 272/87-18, 311/87-20).
b. Appendix "R" Fire Protection Team (Inspection Report 311/87-29).
c. Electric Breaker Coordination Team (Inspection Report 272/87-35, 311/87-35).

Inspection Activities and the distribution of hours are shown in Tables 1 and 2. Enforcement activities are summarized in Table 3.

This report also discusses "Training and Qualification Effectiveness" and "Assurance of Quality" as separate functional areas. Although these topics, in themselves, are assessed in the other functional areas through their use as criteria, the two areas provide a synopsis. For example, quality assurance effectiveness has been assessed on a day-to-day basis by resident inspectors and as an integral aspect of specialist inspection. Although quality work is the responsibility of every employee, one of the management tools to measure this effectiveness is the use of quality assurance inspections and

audits. Other major factors that influence quality, such as involvement of first-line supervision, safety committees, and work attitudes, are discussed in each area.

C. Facility Performance Analysis Summary

	Functional Area	Category Last Period 10/1/85-09/30/86	Category This Period 10/1/86-12/31/87	Trend
1.	Plant Operations	2	2	--
2.	Chemistry and Radiological Controls	1	2	--
3.	Maintenance	1	1	--
4.	Surveillance	2	2	--
5.	Emergency Preparedness	1	1	--
6.	Security and Safeguards	1	1	--
7.	Refueling, Outage Management	2*	1	--
8.	Engineering Support	2*	2	--
9.	Licensing Activities	2	2	--
10.	Training and Qualification Effectiveness	2	2	--
11.	Assurance of Quality	2	1	--

*These functional areas were combined in the last SALP.

D. Unplanned Shutdowns, Plant Trips, and Forced Outages

Date & Power Level	Description	Root Cause	Functional Area
	UNIT 1		
3/8/87 - 100%	The unit was removed from service to replace No. 1 Auxiliary Power Transformer Restart: 3/15/87	Equipment failure/ design	--
6/2/87 - 100%	Unit trip from trip-a-unit protection system due to a valid trip sensor actuation. Restart: 6/4/87	Lightning	--
	UNIT 2		
12/23/86 - 8%	Unit trip on turbine trip due to loss of turbine control while reducing main turbine load with the EHC in a degraded operating condition Failure to maintain turbine load below the low power setpoint Restart: 12/24/86	Personnel error/poor judgement	Operations
12/28/86 - 77%	Unit trip on No. 23 low steam generator level due to a failed shut feed regulation valve. Circuit card in the feed control system failed. Restart: 12/29/86	Equipment failure/random	--
1/18/87 - 3%	Reactor trip on spurious High Neutron flux signal when a technician pulled a fuse while trouble-shooting a rod block signal on the intermediate range instrument. This action was inappropriate for the existing plant condition. Restart: 1/19/87	Personnel error: Training deficiency.	Maintenance

D. Unplanned Shutdowns, Plant Trips, and Forced Outages (Cont.)

Date & Power Level	Description	Root Cause	Functional Area
3/12/87 - 96%	Unit trip on turbine trip due to main generator loss of field. Excitation metering was insufficient for operation in the over excited condition. Restart: 3/14/87	Design Error	Engineering Support
4/7/87 - 85%	Unit trip on turbine trip due to loss of DC power to the EHC system. EHC circuit card failed. Restart: 4/17/87	Equipment failure/random	--
6/25/87 - 62%	Controlled shutdown to investigate high vibration and noise associated with the main turbine. Restart: 6/30/87	Equipment anomaly: Cause was not determined.	--
7/3/87 - 62%	Controlled shutdown to correct main turbine vibration caused by a gasket failure at the low pressure turbine inlet transition piece. Restart: 7/13/87	Equipment failure/random	--
8/6/87 - 100%	Unit trip on high steam generator level in #24 steam generator with the feed system in manual control. Restart: 8/7/87	Personnel error: Operator inattention to detail.	Operations

D. Unplanned Shutdowns, Plant Trips, and Forced Outages (Cont.)

Date & Power Level	Description	Root Cause	Functional Area
8/7/87	Controlled shutdown due to impending failure of a main output transformer because of insulation breakdown due to aging.	Equipment failure/random	-
	This outage included the identification and repair of #5 conoseal leak on the reactor head.		
	Restart: 8/27/87		
10/24/87	Controlled shutdown due to design documentation problems related to electric breaker coordination.	Inadequate documentation of design basis.	Engineering Support
	Restart: 12/17/87		

NOTE: The root cause in this Table is the opinion of the SALP Board based on the inspector(s) description of the event; and may, in certain instances, differ from the LER.

IV. PERFORMANCE ANALYSIS

A. Plant Operations (32.3%, 1385 Hours)

1. Analysis

Licensee performance in this area was rated as Category 2, and improving at the end of the previous SALP period. Weaknesses in the last period included an above average number of reactor trips (18), numerous fire protection deficiencies, and a number of operator errors.

The licensee continues to have a strong management team committed to plant betterment, and which clearly recognizes safety issues and understands NRC policies and regulations. There is consistent evidence of prior planning and the assignment of priorities by the licensee when dealing with plant operations. Reviews, decisions and corrective actions are clear, timely and in keeping with NRC and industry standards. Often the corrective actions for identified concerns such as the RWST resin intrusion, conoseal leak and transformer problems exceed requirements.

Licensee management at the corporate and station levels have been conservative and responsive regarding the operation of the Units. The licensee has shutdown and cooled down the units on four occasions (listed on pages 6-9) during this assessment period to install, repair or modify systems, and to address safety related problems. Startup following these shutdowns and refueling outages was approved by the licensee only after all the identified concerns were fully resolved.

During this assessment period the licensee has exhibited their commitment to safety and the regulatory process by their prompt and thorough followup on: strike preparations, identification and followup corrective action on a resin intrusion into the refueling water storage tank, reactor vessel head leaks and the service water flooding event. The professionalism of the operators in the control room has been evident in the conduct of operations. However, during the conduct of licensed operator examinations, isolated instances of informality of operations were observed. These instances have included operators leaning against control board rails, control panel indications being obscured by procedures, and operators not wearing personnel monitoring devices as directed by licensee policy. Operator performance during plant trips and abnormal operating conditions remains prompt and competent. The housekeeping at the facility has been rated above average by NRC inspectors and management.

Licensee weaknesses in this functional area manifest themselves principally in the area of personnel error and inattention to detail. Two of seven trips resulted from inadequate operator attention to abnormal operating conditions. Human error was also noted in events related to isolating a component on the wrong unit for maintenance and omission of post maintenance testing on a diesel generator prior to its return to service. This inattention to the operations interface with other departments also resulted in missed surveillance tests as described in Section D of this assessment. Also, there were instances of fire watches not posted and sleeping fire watches identified by the licensee. These problems indicate room for improvement in shift communication, interface with other departments and more consistent attention to detail in operational activities.

The number of reactor trips has been reduced from 18 in the previous SALP period to 7 in this assessment period, which was three months longer. As a result of the licensee's trip reduction efforts, there was only one trip on Unit 1 and the remainder were on Unit 2. Four trips were caused by equipment breakdowns, one as a result of a lightning strike, and two trips were related to human error.

The staffing of the facility remains at a full complement and staff turnover is low. During this assessment period the Vice President of Nuclear was elevated to a Senior Vice President of Nuclear (a new position) and a new Vice President of Nuclear was hired. The Engineering and Plant Betterment Department was reorganized to provide more responsive support to the plant operating staff. These changes are detailed in Section H of this report. The stability of the staff contributes to the consistency in implementation of operational programs.

The Station Operations Review Committee (SORC) meets frequently but not excessively. The Committee was observed to be thorough and complete with their reviews of safety related issues and their tracking of issues that have not been concluded. The SORC committee reviews and assesses all unit trips and shutdowns for root cause and correction prior to unit restart.

The Nuclear Safety Review (NSR) group which consists of onsite and offsite safety review groups is a full time dedicated organization, consisting of managers and eight full-time engineers. This organization provided effective oversight of the routine activities specified in technical specifications and applicable industry standard. In addition, they provided independent assessment to management regarding the causes of significant operational occurrences and the incorrect certification of breaker coordination.

In summary, the operations organization is competent, responsive and highly motivated toward safe plant operations. The licensee has an aggressive approach to resolve problems encountered in the operation of the units. In particular, a strong management team is evident, which fosters a safety conscious attitude and an accountability for performance. Operator response to events has been good, and trip frequency has decreased. However, human error due to inattention to detail or poor interface communications continues to be a contributor to plant trips and other events. SORC and the safety review groups continue to be effective.

2. Conclusion

Rating: 2

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

B. Chemistry and Radiological Controls (12.1%, 525 Hours)

1. Analysis

This area was rated Category 1 last assessment period. Licensee strengths in the last assessment were noted in a strong commitment to minimize personnel exposures and reduce radwaste volume. Program improvements were also noted with renovations to the RCA access control point. This included new computerized access controls, the installation of sensitive personnel friskers to enhance the radioactive material control program, and additional office space for the radiation protection staff. Weaknesses in the quality of radiation protection procedures and the need for improvement in the chemistry laboratory QA/QC program were identified.

During this review period, there were eight routine and reactive inspections in the radiological controls area. Routine inspection reviews included organization and staffing, training and qualifications, procedures, internal and external exposure controls, the ALARA program, radiological and non-radiological chemistry, effluent controls and monitoring, and solid radioactive waste management and transportation. One reactive inspection was conducted to review the circumstances of a primary water spill, hot particle contamination, and repetitive defeating of a locked high radiation door. Principal problems identified during this assessment period where failure to adhere to procedures, failure to establish procedures, and failure to maintain positive controls over locked high radiation areas.

Weaknesses in the radiation protection procedures, highlighted in the two previous SALPs were not fully resolved in this assessment period, in spite of licensee commitments to complete implementation of the new procedures prior to the beginning of the 1987 refueling outages. Further, problems were again identified both in the radiological and non-radiological chemistry laboratory QA/QC areas. These continued unresolved issues indicate a weakness in licensee implementation of effective corrective action to NRC identified weaknesses.

Radiation Protection

During this assessment period, the radiation protection organization responsibilities were expanded to include chemistry. The planned change to the organization specifically impacts the technician level, in that, a technician "pool" will perform both chemistry and health physics functions. This was the status of

the radiation protection organization in 1980, during the HP appraisal. A significant appraisal finding was a lack of technical depth within the technician pool for health physics activities. The concept of combining HP and chemistry functions was identified as a generic industry weakness which was corrected as a result of the NRC's HP appraisals of 1980. The appraisal cited insufficient time and experience given to HP tasks which were necessary to appreciate and develop the technical skills necessary to perform in an effective manner. The licensee's subsequent actions to correct this deficiency were separation and dedication of technicians to health physics and chemistry. The proposal of the technician "pool" suggests a return to an organization which has already been shown to be detrimental for effective program performance throughout the industry. The impact of the technician "pool" on program performance, and the effectiveness of the training and qualifications program to support the "pool" will be evaluated in the future.

An NRC identified concern for the previous two assessment periods regarding the consolidation, quality and consistency of radiation protection procedures was not resolved during this assessment period. Further, the lack of well established, clearly defined procedures resulted in two examples of failure to adhere to the requirements of existing procedures. There was also one example of failure to establish procedures for the calibration and use of airborne radioactivity monitors. These violations, along with the delay over resolving this issue indicates a weakness in management implementation of effective corrective actions.

The external exposure control program is well defined and effectively implemented. The scheduling and execution of routine radiation surveys were thorough and well controlled. Posting of radiologically controlled areas was effective, but there were repetitive instances of personnel defeating locked high radiation area doors. The licensee's initial corrective actions in this case were not effective in identifying and correcting the root cause of this problem. Subsequent actions appear to have been more effective.

The licensee maintains and implements a generally adequate and well defined internal exposure control program. Engineering controls are effectively used to maintain airborne radioactivity levels well below those requiring respiratory protection. However, violations were identified in the use and calibration of air sampling equipment, proper analytical methods, documentation and adherence to procedural requirements which relate to the status of radiation protection procedures already discussed.

The licensee's ALARA program exhibited effective performance during the current period. Realistic annual and outage exposure goals were developed. A significant scope of work activities was undertaken during the Unit 1 1987 outage, including refueling, 10 year ISI, RTD bypass removal, steam generator activities, reactor coolant pump seal replacements and pressurizer and reactor vessel instrumentation modifications. Pre-work ALARA planning was initiated early and ALARA reviews were comprehensive and well documented. The licensee used audio and video equipment extensively, for monitoring work in high exposure areas, shielding, and mock-up training. Work evolutions and exposure tracking were closely monitored by HP technicians assigned to specific work packages.

Unanticipated work activities, such as the secondary side steam generator "J" nozzle replacements, conoseal head leak repair, pressurizer spray valve replacement, and CRD vent fan change-out during 1987 increased the original 1987 ALARA goal of 560 person-rem by 20%. In spite of this, licensee exposure for this assessment period was 635 person-rem for 1986, and about 675 person-rem for 1987. These exposure values (i.e., 2 units) compare favorably with industry PWR annual averages (approximately 400 person-rem/year/unit).

Radiological Effluent Control and Monitoring

During the assessment period, one inspection was conducted in this area. The licensee is implementing an adequate program for liquid and gaseous radioactive effluent control. Radioactive effluent releases were made in accordance with procedures and technical specification requirements. Semi-annual Radioactive Effluent Release Reports were comprehensive. However, licensee responsiveness to concerns identified during an NRC inspection in this area during the previous assessment period, regarding a programmatic upgrade in the radio-chemistry laboratory QA/QC program, indicated a lack of thoroughness and management oversight. Improvements in the interlaboratory QC program and laboratory QC procedures were not implemented from the initial commitment date of April 14, 1986 to the time of the inspection, March, 1987. The licensee's commitment to upgrade the electrical power supply to the counting room has similarly been prolonged. Also, the lack of management oversight was noted by the failure to resolve a licensee audit finding regarding the timeliness of radiochemistry procedure review because of the inability to escalate the audit finding to a management level sufficient for resolution. Within the chemistry organization, positions are identified and responsibilities defined.

In the area of air cleaning systems testing, weaknesses were identified with respect to the thoroughness of management oversight and QA review. Time spans of eleven months in one instance and one year in another had elapsed before final management and QA review were completed for the test results, indicating a lack of adequate attention to followup on potential problems.

No onsite inspections of the licensee's environmental monitoring program were conducted during this assessment period. However, routine surveillance and event reports were reviewed. These reviews indicated that a generally effective Radiological Environmental Monitoring Program was conducted by the licensee. Sampling frequencies, types of measurements, analytical sensitivities and reporting schedules generally complied with technical specification requirements.

Two LERs were submitted in this area during the assessment period. Both were related to technical specification surveillance requirements not being completed within the required time due to personnel error.

Solid Radioactive Waste Management and Transportation

During the assessment period, one inspection was conducted in this area. The licensee is implementing an effective program for solid radioactive waste management and transportation. The licensee's organization in this area is defined in position descriptions and responsibilities are clearly delineated. The staff is experienced and only minor use is made of consultants to upgrade the computer program used to classify radioactive waste. Licensee response to an NRC identified concern regarding training of all personnel with involvement in the radwaste area was timely and thorough. Both Quality Assurance and Quality Control programs were thoroughly and comprehensively implemented. Procedures and check lists were well defined. Records were complete, well maintained and available.

Water Chemistry Controls

Late in the assessment period, two inspections in the water chemistry controls area were conducted. Twelve out of 45 Brookhaven National Laboratory non-radiological chemistry standard results comparisons were in disagreement. The disagreements were generally due to poor calibration techniques

and procedures. These weaknesses are similar to those identified in this area during the previous assessment period. This is an indication of a lack of attention to detail, as well as a weakness in management response to NRC identified concerns. In addition, some of the problems were the results of the licensee's reliance upon contractor support personnel in the chemistry area rather than in-house staff expertise.

In the area of plant systems, the licensee has implemented a generally adequate water chemistry control program. Weaknesses in control of in-line instrumentation suggest a need for further emphasis in quality control of chemical measurements. Licensee initiated special task forces and contracted vendor audits have identified suggestions for program improvements, indicating licensee site management recognition of the need for improvement in water chemistry controls. Additional corporate support may be warranted to augment site initiatives in this area. Operating procedures were generally conservative, resulting in few corrosion-related problems with primary and secondary water systems.

In summary, the licensee's radiation protection program is generally acceptable. Strong performance continues to be noted in the control of personnel exposures through the implementation of an effective ALARA program, and in effluent controls, environmental monitoring, and solid radioactive waste management and transportation. In contrast, weaknesses persist regarding the quality of radiation protection procedures and in the chemistry laboratory QA/QC area. The licensee's failure to resolve these long standing NRC concerns indicates an inability to focus management attention to affect timely corrective action.

2. Conclusion

Rating: 2

Trend: None

3. Board Recommendation

Licensee: 1. Provide and complete a schedule of radiation protection program procedure upgrades.

2. Re-evaluate the dual assignment of HP and chemistry technicians in light of HP appraisal findings in this area.

3. Improve radiological and nonradiological laboratory QA/QC and followup NRC and licensee audit identified weaknesses in these areas.

NRC: None

C. Maintenance (9.7%, 421 Hours)

1. Analysis

The last SALP assessment rated this area a Category 1 and highlighted the new work order control system that had been incorporated into a computer system called the Managed Maintenance Information System (MMIS).

During this assessment period, the resident inspectors observed maintenance routinely. Two region-based inspections reviewed the maintenance, modification and retest programs. No violations or concerns were identified.

The planning for the maintenance department (mechanical, electrical and I&C) is performed by the planning department who also controls the MMIS. After the planning department determines when the work orders will be accomplished, a complete package including parts, procedures and tag out is turned over to the maintenance department for performance of the maintenance. The planning department, upon completion of the work, then returns the system or systems to operational status. This system tends to eliminate duplication of work orders and gives more coordination between departments when performing work on specific systems.

The maintenance department routinely performs the maintenance in a timely, effective manner. Isolated problems have been identified such as, troubleshooting of the EHC system and nuclear instrumentation system causing two reactor trips, recurrent packing leakage on feedwater isolation valves, and failure to perform PM's on warehouse stored rotating machinery. The licensee's actions in response to these issues were prompt and effective.

Non-safety related transformer problems were reviewed by region based inspectors during this assessment period. Preventive measures instituted by the licensee include obtaining equipment for monitoring and tracking transformer oil status. This action is aimed at preventing future occurrences, such as the failure of a Generator Main Transformer at Hope Creek in 1987. The licensee has taken positive steps in designing a continuous monitoring system that will provide a readily available status of transformer parameters. The implementation of these systems will allow the licensee to predict the optimum time for preventive maintenance of the Station and Main Generator Transformers, and will aid in identifying further actions necessary to prevent future transformer failures.

The licensee catalogs maintenance work requests into categories depending on parts availability, engineering input, plant conditions, "in planning stage", and "scheduled to be worked". The ratio of the number of work orders ready to work in conjunction with the plant conditions in which the work may be performed is manageable (about an eight day back log). Technical Specifications and "necessary for plant operation" work orders are usually performed within twenty four hours.

The maintenance department works closely with the systems engineers in identifying and correcting equipment deficiencies to return a unit to service, and installing minor design changes. Management encourages problem identification from any source. The identification of calibration deficiencies for lead-lag controllers by training and vendor personnel, and the prompt corrective measures exemplify licensee performance in this area.

One inspection reviewed the inservice inspection, water chemistry controls, and radiological records for steam generator No. 13. Water chemistry has been well controlled throughout the life of the plant in order to provide extended life for the steam generators. The effectiveness of these controls is evidenced by the extremely small number of tubes that have required plugging or repair. Steam generator 13 has only 16 tubes that have been plugged. Of these 16, 10 were plugged prior to service as a precaution against erosion. The licensee's preventive actions have resulted in a high level of effectiveness in the area of steam generator maintenance.

The licensee's continued application of a live loaded valve packing program (which is now in effect on most of the valves within both units) is beginning to show positive results on ALARA and plant shutdowns. There are fewer primary and secondary valve leaks, and less contaminated leakage in the sumps. The smaller time necessary to repack highly radioactive valves is helping keep radiation doses ALARA.

The licensee selected a manager, maintenance engineer and a staff engineer, and assigned them to a full time preventive maintenance project for six months. The team utilized working groups ranging from 6 to 12 people from Vice Presidents down to engineers to develop a program that will ultimately establish a reliability centered maintenance program for Artificial Island. The program will include predictive maintenance, enhanced preventative maintenance and a more structured root cause analysis feed back into the maintenance program. The program pilot system is scheduled to go into effect in 1988 with full scale development in 1989.

During outages, maintenance related tasks were performed professionally and on time. The maintenance department utilized contract personnel to enhance and expand the maintenance force in order to complete the larger outage workload. Also, the licensee is currently utilizing individuals from the QC department in the day to day work assignments in the maintenance area. The licensee hopes to make the individual worker and their peers responsible for QC of all work performed The on loan QC personnel is the beginning of the program to meet this goal.

In summary, the maintenance department management is aggressive and proactive. There is a consistent and structured approach to maintenance, utilizing well written procedures and technical manuals. The department resolves identified problems in a timely manner. The maintenance department is adequately staffed and competently trained.

2. Conclusion

Rating: 1

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

D. Surveillance (11.1%, 479 Hours)

1. Analysis

During the last assessment period, surveillance was rated a Category 2. There were several missed or late surveillances which were caused by personnel error and lack of attention to detail.

During this assessment period, a Containment Integrated Leak Rate Test (CILRT) for each Unit was witnessed by NRC specialists. The resident inspectors reviewed routine surveillance activities regularly.

The test procedure and conduct of the CILRTs were consistent with the requirements specified in the technical specifications and station administrative procedures. The staff assigned to the performance of the tests were experienced in the evolution, utilized technically adequate procedures, and were supported by management. Implementation of the procedures was error free, as a result of step-by-step rehearsals prior to each major activity. QA/QC involvement in these activities was thorough, and included surveillance tours, and the performance of surveillances and audits by QC personnel that evidenced a high degree of knowledge in the tests.

During the assessment period, the post modification test program was reviewed noting that test procedures were properly approved, and technically adequate. Post modification testing was observed to be conducted in an orderly fashion by knowledgeable personnel.

One inspection was directed toward the Cycle 4 Startup Physics Testing Program for Unit 2. This review indicated that the testing program has been implemented in an adequate manner. All surveillance tests and I&C Work Orders that supported the cycle 4 startup were noted to be adequately preplanned and were properly executed. Management involvement in the program was evidenced by the high quality of the Refueling Test Sequence Procedure. In addition, test results were noted to have been adequately evaluated and documented.

At Salem surveillances are tracked by computer. The system tracks about 2500 safety related surveillance tests per year, as well as all non safety related surveillances. The program is sound and a written schedule is produced on a daily basis. Some scheduling problems were identified because of the difference in scheduling surveillances during plant shutdowns and outages.

During these periods, the scheduling is manually accomplished by schedulers. The licensee has recognized this problem and is developing a program to account for schedular differences during Unit shutdowns.

During this assessment period, there were an increased number of personnel errors related to missed or late surveillances. Specific examples are: shift supervisors not issuing the surveillance packages to be performed, correct surveillance performed but on the wrong unit, engineering not providing valve numbers for expanded ASME Section XI valve tests, omission of tests on the fuel handling crane, and performance of an inadequate post test procedure. Although the number of these events (missed or late surveillances) is small in relation to the total number of tests performed yearly, these occurrences have increased during this assessment period. This indicates that corrective measures for previous missed or late surveillances have not been effective and more licensee oversight and attention to detail in the implementation of surveillances is warranted.

The licensee's calibration program for gages and instrumentation was not consistently implemented to assure the accuracy of instruments used for plant operation. Technical specification required instrumentation was calibrated and recorded during each surveillance by procedure. However, in the balance of plant (BOP) there were calibration stickers on some gages and instruments and not on others. The inconsistency was confusing to operators and supervisors as to the validity of readings taken from unlabeled gages, and to management and auditors measuring the effectiveness of the calibration program. Toward the end of this assessment period, the licensee had corrected the method for identifying calibrated gages and instrumentation. Technical specification instruments remain as described above, instruments used to operate the BOP are now divided into information only instruments and instruments necessary for operation. The instruments necessary for operation are now calibrated on a three or five year cycle depending on their application. Operators were updated to the new method of calibration being performed.

In summary, no major discrepancies were identified in the surveillance area, and there appears to be a sound surveillance program in place. However, implementation problems related to the applicability and support of the surveillance programs are the most frequently identified problems at Salem. These discrepancies identified both by the NRC and the licensee indicate the need for better attention to detail.

2. Conclusion

   Rating: 2

   Trend: None

3. Board Recommendation

   Licensee: None

   NRC: None

E. Emergency Preparedness (1.1%, 47 Hours)

1. Analysis

There is a consolidated Emergency Plan for the Artificial Island complex, including the Salem and Hope Creek facilities. Consequently, the assessment of emergency preparedness is a combined evaluation of both facilities' emergency response capabilities.

During the previous assessment period, the licensee was rated Category 1 in the area of Emergency Preparedness at Hope Creek and Salem. This assessment was based on strong management commitment to the hardware and programmatic requirements of this functional area, and the performance of the licensee's staff during exercises at both Salem and Hope Creek.

During this assessment period, there were three announced inspections of Emergency Preparedness at Artificial Island. One inspection was the observation of a Hope Creek full participation exercise. There was no exercise at Salem. In addition, four actual unusual events were declared at Hope Creek and one at Salem. Implementing procedures were correctly followed for all but one of the unusual events. On July 30, 1987, Hope Creek made a one hour notification to the NRC per 50.72(b) instead of declaring an unusual event. The licensee detected the error within sixteen minutes and then declared the unusual event. The Hope Creek Event Classification Guide has been modified to avoid a recurrence of this misclassification.

Observations made during the routine safety inspections at Hope Creek and Salem indicate regulatory requirements were fully satisfied. A drill testing various aspects of the program is conducted at both Salem and Hope Creek on a weekly basis. The high degree of training and experience is reflected in the excellent performance noted during their annual exercise. Emergency response training is current; 1,450 personnel are qualified for one or more emergency response positions - 600 for each site and 250 for both sites. Operators received eight hours of emergency preparedness training including response to one fast breaking scenario "run" on the Hope Creek simulator. Health Physicists demonstrated the ability to correctly use the four available dose projection systems. A dosimetry comparison was made involving three of the licensee's systems, systems for both States and the NRC. The results were within acceptable limits.

A review of communications and call-in test data also showed satisfactory results. Independent audits are current. Executives and senior managers interface with State government officials. Safety parameter display systems (SPDS) are in place and functional at Hope Creek and Salem, a Post Implementation Appraisal for Salem has been conducted. No significant deficiencies have been identified to date.

PSE&G has put considerable effort into working with off-site authorities to complete final review and approval of off-site plans. Results of the annual public Alert and Notification system (sirens, etc.) test specified by FEMA were submitted during December 1986. FEMA has not completed the review. The Delaware Emergency Plan was given contingent, favorable reviews and comments per 44 CFR 350.12, pending acceptance by FEMA of the siren test data. New Jersey has submitted its plan for similar review. The licensee has developed a computerized data base for special needs residents (hearing and mobility impaired) living within the ten mile Emergency Planning Zone.

Additional licensee strengths in this area are noted as follows: (1) Contracts are in place to provide for plume aerial surveillance; (2) ten diverse, redundant communications systems are in place; and (3) a full-time, 37 person site fire department is available for emergency support, with half of them qualified as Emergency Medical Technicians. The staff is divided into shifts and work around-the-clock.

In summary, a strong management commitment to emergency preparedness is evident by the hardware and comprehensive training program achievements in this area, and by licensee cooperation with outside agencies toward approval of State Emergency Plans. Licensee effectiveness is demonstrated by the consistent high quality performance of the staff during emergency exercises.

2. Conclusion

Rating: 1

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

F. Security and Safeguards (4.3%, 187 Hours)

1. Analysis

There is a consolidated Security Plan for the Artificial Island complex, including the Salem and Hope Creek facilities. Consequently, the assessment of security and safeguards is a combined evaluation of both facilities' protection capabilities.

During the previous assessment periods, both the Salem and Hope Creek security programs were assessed as Category 1. These ratings were influenced by a well-planned transition for the integration of the two security programs; a major upgrade of security systems to include the installation of an integrated security computer system and associated hardware, computerized access control devices, state-of-the-art assessment aids and new search equipment; and a strong security management staff.

Management's attention to, and involvement in, assuring the implementation of an effective and quality security program remained evident during this assessment period. The licensee was very effective in maintaining good support for the security program from other functional groups at both stations. Frequent organizational interfaces and good working relationships were apparent from the professional attitude of all employees toward the security program, as well as the attention given by the maintenance groups to prevention and correction of problems with security systems and equipment.

As further evidence of management's interest in an effective and quality program, it was noted that all security shift supervisors, who provide around-the-clock oversight of the contract security force, attended a special 30-day training course on regulatory and security program requirements and objectives. In addition, security management continued to participate in nuclear industry groups engaged in security related matters.

The licensee also continued to implement a self-initiated appraisal program carried out by security management and supervisory personnel. Adverse findings were promptly resolved and factored into the training and qualification program in an effort to prevent their recurrence. The appraisal program is in addition to the NRC's required annual program audit that is conducted by experienced quality assurance personnel. The last annual audit was comprehensive in both scope and depth. Audit findings were distributed to appropriate management personnel for review, and corrective actions for deficiencies were prompt and effective. This also demonstrates the licensee's desire to implement an effective and quality security program.

During this assessment period, the licensee engaged a new contractor to provide the administration, supervision, and training of the security force. The new contractor was able to retain most of the incumbent members of the force. The change in contractors went smoothly as a result of good planning on the part of the licensee.

Staffing of the security organization appears adequate, as evidenced by a controlled use of overtime. The installation and maintenance of state-of-the-art systems and equipment has significantly reduced the use of compensatory posts for systems and equipment failures and, thus, reduced the need for extensive overtime. Both the licensee's proprietary supervisors and the contractor's supervisors are well trained and experienced, and exhibit a conservative and positive attitude toward security. Security force personnel are also well-trained and exhibit high morale and professionalism in carrying out their duties. The licensee's efforts to establish and maintain such a professional image for the security force is another indicator of the licensee's desire to implement an effective and quality security program. It is also reflected by the generally excellent state of cleanliness in all security facilities.

The training and requalification program is well developed and carried out by a training administrator and two full-time instructors. In addition to initial and requalification training, on-the-job performance evaluations are conducted which test the proficiency of individuals on general and specific security program requirements. The on-the-job performance evaluations have provided management the ability to review and enhance the performance and job knowledge of security personnel and to correct deficiencies as they are detected. This is another initiative that is indicative of the licensee's desire to implement an effective program.

During the assessment period, there were two events involving security guards who were discovered being unattentive to duties. One (at Hope Creek) was discovered by the NRC Resident Inspector and the licensee was cited for the violation. The other (at Salem) security guard was discovered by the on duty security shift supervisor.

In each case, the licensee took prompt and effective corrective action. The associated security event reports submitted by the licensee pursuant to 10 CFR 73.71c were complete and well written, and required no further information from the licensee. These events appear to be isolated cases of poor performance and do not indicate a programmatic problem. They occurred during the latter part of the assessment period and until that time,

the licensee's overall good enforcement record during this period is attributed to management's involvement in the security program, the continuing self-appraisal program, comprehensive annual audits and the security training program.

During this assessment period, the licensee submitted three "temporary changes" to the Plans. These changes included compensatory measures to be implemented during construction of a building addition inside the protected area and during the special supervisory training program. The changes were clear and fully described the issues. Prior to submittal of these changes, the licensee discussed them with Region I safeguards personnel at a licensee-requested meeting on site and at the Region I office. The licensee also provided its response to the August 4, 1986 Miscellaneous Amendments to 10 CFR 73.55 codified by the NRC, and submitted the consolidations of the Salem and Hope Creek Security Plans, Safeguards Contingency Plans, and Training and Qualification Plans into the Artificial Island Security Plan, Safeguards Contingency Plan, and Training and Qualification Plan. The Artificial Island Plans were generally of high quality; however, several discrepancies were identified during the NRC review. A management meeting was held with the licensee during which the licensee was able to fully explain each discrepancy and provide acceptable resolutions. The licensee subsequently submitted amendments to the plans that resolved the discrepancies. Considering the magnitude of the effort involved in consolidating the Salem and Hope Creek plans into one, the discrepancies were considered by the NRC to be minor oversights that did not materially effect the quality of the Artificial Island Plans. The safeguards licensing group is adequately staffed with experienced personnel who are knowledgeable of NRC security program objectives and committed to maintaining an effective and high quality security program. Management involvement, advance planning, and the expenditure of necessary capital and personnel resources was noteworthy and indicative of high level management support.

In summary, the licensee continued to implement a highly effective and quality security program for Artificial Island. Management interest in the program remained evident through its continued support and attention to program needs.

2. Conclusion

Rating: 1

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

G. Refueling, Outage Management (7.4%, 322 Hours)

1. Analysis

The last SALP rated outages and engineering support as Category 2. With regard to outages, the assessment addressed generally effective outage planning, oversight and implementation. The newly organized planning department was highlighted as an unproven refueling outage initiative.

During this assessment period there were two refueling outages and four plant shutdowns as discussed in Section III.B of this report.

Within the planning department there are groups of personnel dedicated to outage planning as well as daily operational maintenance planning. The outage planners dedicated to either Unit 1 or 2 (2 groups) maintain a living schedule, which is computerized. When outages are forthcoming, little notice is required to have a comprehensive schedule ready for work to be performed. The management within this organization is aggressive in the planning of outages and the work planned is generally completed on time. The four outages, one on Unit 1 and three on Unit 2 were performed on schedule and the Units were returned to service within a day of the scheduled time, with all planned work and in some cases additional work being performed. Management has not hesitated in removing the Units from service and cooling them down, if necessary, in order to facilitate repairs in the interest of personnel and nuclear safety.

Refueling outages are also preplanned. Design changes for the outage are identified far enough in advance that the design packages are delivered to prospective contractors for fixed price bidding in advance of the start of the outage. Management meetings, held three times daily during outages, address the issues and problem areas squarely, and determine responsible management to resolve the issues in a timely fashion. No instances were identified any area where safety was compromised for timely completion of a job or project.

When the refueling outages have been prolonged, the reasons were usually unplanned factors that were identified as the outage progressed. When confronted with a contingency, the scheduling department was aggressive in factoring the newly identified work into the schedule. Examples of this are: (1) Identification, during routine steam generator inspections, that the "J" tube feed nozzles were degraded to an unacceptable level. The result was replacement of all "J" tubes in all steam generators;

(2) flooding of the service water bay; (3) identification of cracks in the spare control rod drive mechanism penetrations; and (4) identification of degradation in the welds of the service water system inside containment, which resulted in all service water piping welds within the containment being examined and the necessary repairs being performed.

The planning department expanded their department to include an operations group that reviews, schedules and performs tag outs of equipment. This evolution is performed in the annex just outside of the control room. The group keeps the operations department informed of the work to be performed that day, either during an outage or when the unit is operating, by direct involvement with the operating shift. This arrangement reduces the traffic in the control room, thus minimizing disruptions in control room activities.

In summary, management and the planning department are aggressive in preplanning outages. During outages, they are equally aggressive in seeing that work is performed satisfactorily, on schedule and without impacting personnel safety or nuclear safety.

2. Conclusion

Rating: 1

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

H. Engineering Support (22.0%, 922 Hours)

1. Analysis

The last SALP assessment rated the combined outages and engineering support area as Category 2. That assessment discussed the organizational weaknesses within the Engineering Department, as well as specific areas (10 CFR 50.59 reviews and environmental qualification) where engineering support had been weak. The last SALP also described new licensee initiatives planned to address these weaknesses.

The onsite system engineering group is directly involved in the day to day operation of the facility and are engineers that have complete cognizance of a particular assigned system or systems. Whenever there is an identified concern within the facility, the engineer assigned to the faulted system is alerted. These engineers are extremely knowledgeable of their assigned systems and have demonstrated this through clear identification of root causes for; 1) Unit trips, 2) chemistry anomalies, especially oxygen in the condensate system, and 3) system malfunctions.

When design changes are instituted such as, the installation of new undervoltage relays which involved a technical specification change and the upgrading of procedures, the system engineer conducted training sessions for operators and I&C technicians to explain the changes. The engineers have also provided safety analyses and engineering evaluations for plant malfunctions such as, the resin that was found in the refueling water storage tank, and the reactor head penetration leak on Unit 2. These evaluations were concise, thorough and technically sound.

The nuclear fuel engineering support provided for plant operations is timely, technically sound, and includes independent verifications for the assurance of quality. Procedures are technically adequate, and management support is evident by the quality of personnel and the level of staffing. Another positive indicator in this area is the willingness of management to provide technical assistance for audits of fuel vendors.

The systems engineers and their management have provided assessments and information for NRC regulatory issues. These responses have been timely, thorough and have provided information in excess of what was requested. The inspectors were able to assess and close out regulatory issues with confidence that the safety issues were thoroughly addressed.

One incident occurred, where a steam generator (SG) was not fully drained which caused a reactor coolant spill when the SG was opened. The cause was attributed to changes made with regard to the operation of the Residual Heat Removal (RHR) System during a drained condition. To protect the RHR pump from vortexing, a higher minimum reactor vessel level was specified. However, engineers failed to recognize that the new high level specification would not allow the reactor coolant system loops to fully drain. Following the spill, the licensee's actions to correct the anomaly were prompt and effective.

In previous SALPs the off-site engineering department has been identified as having weaknesses in design review interfaces, procedural development and the adequacy of the technical review process. These weaknesses continued to be identified, but to a lesser extent during this assessment period. The implementation of site-based system engineers has improved the responsiveness to operational concerns, but interface problems with the offsite design organizations are still evident. Other NRC findings in this area were largely the result of the previous practices and do not necessarily reflect the current organization. Nevertheless, for illustration these types of findings are discussed in the next two paragraphs.

Review of the approach and criteria for design and evaluation of piping and support systems revealed several technical considerations which were either ignored or poorly addressed in the governing design documents. This conclusion is further supported by the lack of documentation of piping stress analyses. The identification of an error in a contractor's technical report for U-bolt piping anchor assemblies and several concerns related to ISI of these anchor assemblies supports the conclusion of technical inadequacies in the mechanical engineering organization. Though the licensee agreed to address these concerns, it was apparent that past reviews and approvals of documents and procedures in these areas were lacking in depth and technical adequacy.

Weaknesses in management's effectiveness were also noted in the review of design interfaces during the process of design modification. Though the topic of interface between various engineering disciplines was included in the procedures for design modification, this guidance was vague and ineffective. Two modifications initiated by the mechanical group, and involving the addition of load attachments to a building structure were completed without the interface or knowledge of the Civil/Structural discipline. These findings led to several problems and indicated that a programmatic weakness existed

in the design interface area. The engineering department also failed to provide valve number changes for Section XI code modifications resulting in a missed surveillance.

Significant deficiencies were identified by NRC and the licensee in the implementation of Appendix R fire protection requirements at Unit 2. These problems include lack of separation and protection for redundant systems needed for safe shutdown of the plant, and inadequate breaker coordination for associated electrical circuits. Potential violations are pending in these matters. The importance of these fire protection issues is emphasized because similar problems were identified at Unit 1 in 1983. The licensee hired a consultant to review the fire protection program well after the date when compliance was required. Some of the deficiencies were identified by the licensee and reported to NRC prior to our inspection. Other problems such as the breaker coordination issue had not been focused on by licensee management. Compensatory measures were implemented by the licensee upon identification of individual problems. The tardiness of licensee verification of satisfactory fire protection measures and the unfamiliarity of licensee personnel with the requirements in this area indicated a lack of management emphasis and attention in the fire protection area. Following NRC review of this area, the licensee reviewed the details of the identified problem areas. In most cases, acceptable compensatory measures were identified to justify continued operation of the facilities until modifications could be implemented. However, uncertainties regarding electric breaker coordination resulted in the voluntary shutdown of Unit 2 pending verification of as-built and design parameters, and modifications to several breaker coordination relays. These actions were completed on both units and verified by NRC prior to plant restart.

In a letter to the NRC, the licensee made an incorrect statement regarding the existence of electric breaker coordination. The NRC and the licensee performed special investigations which identified informality in communication between staff and management personnel, inadequate measures for deficiency reporting within the engineering organization, and inadequate management of commitment tracking as causes for the mis-statement. This is another example of inadequate interface and communications between organizations and departments. Licensee management is presently implementing corrective actions for these concerns.

During this assessment period a wrong assumption led to a delay in placing the fuel back into the vessel after the thermocouple guide tube modification had been performed. The engineering department took advantage of a shutdown on Unit 2 to take measurements for the modification and assumed that the measurements on Unit 1 were the same. The result was some of the guide tubes were too long to allow the fuel to rest firmly on the core support plate. The licensee performed an investigation into the reason for the interference and identified the problem. The licensee has taken corrective measures to prevent recurrence.

At the end of this SALP period, the licensee implemented further reorganization within the Engineering and Plant Betterment Department to institutionalize a project matrix organization which successfully handled service water, and electrical system problem recovery projects. The new matrix organization also managed the Design Modification Packages (DCPs) for Units 1 and 2 for the "Second Level of Undervoltage Protection for the Vital Bus" system which were well defined. The engineering study and calculations that established these modifications were complex, and required extensive calculations from the system to the component level. During the review of the DCPs, it was clear that Quality Control played an important role in verifying that installation and test results reflected the requirements in the DCPs. A review of engineering documentation indicated that the reports were detailed, and considered parameters such as cable and transformer losses that were not part of the original study. All aspects of the program were well controlled and documented. A review of as-built drawings verified that the drawings reflected the present configuration of the plant undervoltage installation. An additional inspection found modification packages for the Unit 1 outage to be accurate, well organized and complete, with QA/QC involvement characterized by appropriate hold points and well defined acceptance criteria.

In September of 1987, the NRC became aware of a potential problem with breaker coordination at the Salem Units. In October of 1987, the licensee determined that the degree of breaker coordination for the electrical distribution system affecting safety related equipment was not sufficiently established and documented to warrant continued operation of Unit 2. Site management subsequently shut down Unit 2.

Results of the NRC review of the breaker coordination issue indicated that the cause of the problem was primarily the inadequate maintenance of design basis documents for the units. The licensee's corrective actions were sufficiently comprehensive to address the problem. In particular, the

licensee's review included not only safety related circuit breakers, but also the potential impact of breaker coordination for non-safety related circuits. The licensee's technical reviews were generally thorough and based on sound technical judgement. In addition, site staff's responses to NRC questions resulted in a satisfactory resolution for each of the problems identified. The licensee has also initiated efforts to improve the quality and retrieval capability for design basis documents.

In conclusion, NRC inspections identified management support and overall quality in the engineering and technical support areas. NRC review of site events and breaker coordination problems indicate that site management responded in a thorough and effective manner. Continued deficiencies in the fire protection program indicate that further attention to this area is warranted. Long standing design basis problems and interface issues with operations and the off-site engineering organization are being addressed by ongoing long term corrective action programs. The effectiveness of these initiatives will be assessed by future NRC review.

2. Conclusion

Rating: 2

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

I. Licensing Activities

1. Analysis

During the previous SALP period, the licensee was rated as Category 2 with a consistent trend in this functional area. The previous SALP report noted good management overview in the area as evidenced by timely submittals, when changes to the technical specifications were needed to coalesce with the units' operations. The previous SALP also noted certain weaknesses in the quality of the technical justifications for licensing actions that were submitted.

At the beginning of the current SALP period, the licensing backlog for Salem, Units 1 and 2 were 44 and 45, respectively. These items represented a mixture of licensee and NRC staff initiatives. During the SALP period, 16 licensing items were completed for Unit 1 and 13 for Unit 2. Nine new items were added for Unit 1 and 10 for Unit 2. This left a backlog of 37 items for Unit 1 and 42 items for Unit 2 at the end of the SALP period.

The licensee's activities in this functional area are conducted by a well trained group, generally efficient in operation. The licensing group exhibited a high degree of cooperation with the NRC. The good communications between the licensing group and the NRC has been helpful in processing licensing actions. The licensee continues to be active in industry groups, most notably the Westinghouse Owners Group.

With regard to NRC initiatives, the licensee's responses to NRC's requests for additional information have generally been responsive and technically accurate, though sometimes not timely with respect to the need for completing the review. During the current SALP period, the NRC initiated its Safety Issues Management System to improve its tracking of implementation schedules associated with safety issues. The licensee was responsive to this initiative and provided updated information on two occasions, the most recent in September, 1987.

During the current SALP period, the licensee's effectiveness relating to licensing activities appeared to decline. Weaknesses were noted in schedular planning which resulted in late licensee submittals and responses. As an example, in mid-May the licensee submitted a proposed change requesting replacement of the existing RTD by-pass system with a newly designed system. The request should have been submitted in February or March 1987. Very early discussion between the licensee and the NRC had

made the licensee aware that NRC review would be lengthy (6 months) because of the complexity of the issue. The licensee intended to implement the modification on Unit 1 during the next refueling outage scheduled late in September 1987. As a result of the late submittal, an expedited NRC review was necessary in order for the amendment to be issued in November, barely in time to permit implementation of the new design on Unit 1. Other examples of submittals which were not tendered in a timely manner included the second 10-year interval ISI program and corrected analyses in support of Appendix R exemptions. Increased licensee emphasis on planning and completing license action milestones appears to be needed to improve performance in this area.

Other than the shortcomings with the timeliness of some submittals, the licensee maintains good technical capability to resolve the problem areas which arise during the NRC review process. In addition, the licensee utilizes the services of other outside nuclear support groups who may be required to assist in problem resolution or to utilize new and proven techniques to enhance the operation and safety of the plant.

In summary, the licensee continues to provide excellent cooperation with the NRC and maintains a knowledgeable licensing staff. License change requests are prioritized so that license amendments may be processed and issued on dates that coalesce with the plants' operational schedules. This process has been generally successful; the exceptions usually resulted from a lack of effective planning. Licensee submittals during the SALP period exhibited improved technical justifications.

2. Conclusion

Rating: 2

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

J. Training and Qualification Effectiveness

1. Analysis

This area was rated Category 2 in the last SALP assessment. A strong commitment to training was noted with weaknesses identified in the success of initial license candidates; and, inadequate training leading to several reactor trips.

During this assessment period, management involvement and control in assuring a high quality of training continued, as evidenced by improvements in the Nuclear Training Department laboratories such as, the addition of Nuclear Instrumentation and rod control unit facilities to be used for maintenance training; and offering six month System Engineer's training courses to QA personnel.

A common weakness which was noted in many functional areas involves attention to detail by licensee employees. The increasing proportion of personnel errors is indicative of a need to improve awareness and performance in this area. In addition, one plant trip was related to inadequate technician training. Overall, however, the satisfactory completion of the majority of activities conducted onsite reflects positively on the quality of the INPO accredited training programs. In particular, the strong licensee performance in the maintenance, emergency planning and security areas was due, in part, to the training and qualification effectiveness in these areas.

The QA/QC involvement with the non-licensed training program is characterized by thorough and comprehensive audits. These audits routinely address the qualifications and training of non-licensed personnel and timely corrective actions for those activities which are not adequate.

Three operator licensing examinations were administered during the reporting period. One reactor operator candidate and eight senior reactor operator candidates were examined; seven of these candidates received their license. During the simulator portion of initial licensing examinations, it was observed that the operators were generally familiar with their responsibilities; and with the required actions during emergencies, both individually and as a team. The operator candidates also demonstrated a familiarity with the use of EOPs, specifically in the application of prerequisites, precautions, initial conditions and transitions.

The February 1987 examination resulted in a concern directed toward the level of training received by operators regarding the differences between the Unit 1 and Unit 2 Technical Specifications (T.S.). Insufficient understanding of these differences led to an unsatisfactory rating for an individual being examined for Unit 2. The lack of understanding by this candidate and other operators in the control room indicates that

other licensed personnel may need additional training on the unique requirements of the Unit 2 Technical Specifications.

The NRC administered requalification written and operating examinations to seven senior reactor operators (SROs) and five reactor operators (ROs) in June 1987. Two SROs and three ROs passed all portions of the examinations. The requalification program evaluation resulted in an unsatisfactory rating for the program. This determination was based on the low pass rate of operators being administered the exams. Some of the areas of weakness identified during the review consisted of: operator informality during the simulator scenarios which was demonstrated in several ways, among them, lack of supervision during certain safety significant evolutions including bistable tripping; and the performance of a procedure out of sequence. In addition, several operators demonstrated a lack of knowledge of radiation monitoring equipment, and an inability to operate the Unit 2 Radiation Monitoring System computer.

In response to the unsatisfactory rating of the requalification program, site management organized an Examination Review Team to determine the root cause of the examination failures. Short and long term corrective actions were devised by the licensee, and included in part: remedial training and reexamination, Operations Directive revisions that standardize the use of procedures, an increased emphasis on the understanding of the bases for procedural steps, incorporation into the requalification program of specific topics that require further training, and increased management attention toward simulator training and control room conduct.

Overall, training programs are characterized by a strong commitment and responsiveness to the needs of site personnel. Security, maintenance and emergency training were noted as particularly effective. However, some general weaknesses were identified in the effectiveness of training programs as indicated by the licensee operator requalification program results; operator informality; and the overall training program effectiveness in reducing the frequency of personnel errors.

2. Conclusion

Rating: 2

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

K. Assurance of Quality

1. Analysis

Assurance of Quality is a summary assessment of management oversight and effectiveness in implementation of the quality assurance program, and administrative controls affecting quality. Activities affecting the assurance of quality as they apply specifically to a functional area are addressed under each of the separate functional areas. Consequently, this functional area is not an assessment of the quality assurance department alone, but is an overall evaluation of the effectiveness of management's initiatives, programs, and policies which affect or assure quality.

Corporate and station managers remain visible and actively involved in station activities commensurate with their level of responsibility. Station management meets daily to discuss the problem areas within the plant. These meetings are also attended by corporate managers on occasion. Operational direction and day to day operational activities are the outcome of these meetings. Corporate and station management make plant walkthroughs frequently and are sensitive to plant cleanliness and safety. Management is sensitive to safety issues, and NRC and INPO identified concerns.

The licensee stresses doing jobs correctly the first time and first line supervisors are frequently found at the job site. To emphasize and assess the implementation of this philosophy the licensee uses the following: Banners, signs, and slogans are displayed throughout the plant that address management's approach to Assurance of Quality. These signs are updated frequently with different QA/QC type messages. Quality control personnel have been assigned to the maintenance department to oversee quality assurance on a day to day basis. These assigned individuals are independent of maintenance, however they do assessments and evaluations to improve or enhance maintenance activities. The Employee Involvement Program (EIP) instituted last year is still in full force at the station. This is a program that facilitates management/worker interfaces and rewards good performance. There is also a Quality Awareness Committee comprised of nuclear department volunteers who periodically issue a "Quality Gram" to promote improvements in quality performance, and finally a Quality Concerns Reporting Program that enables plant personnel to confidentially express quality concerns to be investigated by licensee QA personnel. The above programs are generally effective, however, the large proportion

of personnel error related events identified by the licensee points to weakness in the attention to detail at the worker and first line supervisory levels.

There were two region based inspections performed within the QA/QC organization. Warehouse storage conditions, records of item locations, and original equipment manufacturer (OEM) storage requirements were observed to be adequate. The identification by NRC personnel of incomplete preventive maintenance for various motors in storage focused additional licensee attention toward the preventive maintenance of these items. The licensee acknowledged this problem, and has established a Site Service Group to develop a program to streamline the processing of documents necessary for the performance of preventive maintenance activities for stored components.

The Nuclear QA Audit Group is well organized and managed. The licensee utilizes the Offsite Safety Review Committee and consultants as a team approach to review the site audit program on a regular basis. These reviews are effective in identifying quality concerns as evidenced by in-depth and comprehensive annual reports issued by the teams. The QA organization performs quarterly surveillance overviews on all plant departments which provide plant management with a useful assessment of the department performance. These overviews are keyed to SALP identified or INPO identified concerns. QA also monitors contractor activities during outages, and has issued work stoppages when working conditions have become degraded. These are considered strengths, however weaknesses were identified in 10 CFR Appendix B violations, mainly in the engineering of certain systems discussed in the engineering section of this report, and the wrong gasket used when replacing a hand hole gasket on No. 23 steam generator. Both of these issues have been resolved.

As discussed in the chemistry and radiological controls analysis, weaknesses were observed in the control of radiochemistry laboratory QA/QC program and should be addressed.

As discussed in the engineering section, design basis retention and document control has been a main contributor to NRC concerns during this assessment period; specifically with regard to breaker coordination, followup on hangers installed in the 1979 and 1980 period, concrete walls and improper breaker settings of Unit 2 diesel generators. The licensee is aware of this issue and is beginning to address the methods for recovery of such records in the future.

In summary, the sensitivity to Assurance of Quality is evident at all worker levels and throughout management at the Salem Station. When safety issues are identified the licensee responds in a prompt thorough and effective manner in order to provide NRC management with an accurate assessment of the concern, and a prompt conservative approach to resolution.

2. Conclusion

Rating: 1

Trend: None

3. Board Recommendation

Licensee: None

NRC: None

V. SUPPORTING DATA AND SUMMARY

A. Investigations and Allegations Review

Six allegations were received, followed up and closed during this assessment period. The allegations involved: (1) contractor labor supervisor extorting money from laborers and using illegal drugs; (2) Inadequate repair of service water piping; (3) Improper use of weld overlay and procedures; (4) Improper surveillance testing of service water pumps; (5) Guards being overworked; and (6) Equipment damaged to discredit contractors and get them removed from the site.

All six allegations were found to be unsubstantiated.

B. Escalated Enforcement Actions

1. Civil Penalties

None

2. Orders

None

3. Confirmatory Action Letters

None

C. Management Conferences

November 11, 1986 - Meeting in Region I office to discuss licensee's corrective actions taken to prevent events similar to the false loss of offsite power event that occurred on August 26, 1986.

February 24, March 10, and March 17, 1987 - Meetings at Salem to discuss the Salem electrical distribution system.

July 16, 1987 - Meeting in Region I office to discuss the Consolidated Artificial Island Emergency Plan.

September 29, 1987 - Meeting in Region I to discuss Unit 2 reactor vessel head leak and proposed schedule for replacement of service water piping.

November 3, 1987 - Meeting in Region I to discuss the electrical distribution system and breaker coordination as related to Appendix "R".

D. Licensee Event Reports

Forty-five LERs were submitted by the two Salem units during this period. The LERs are listed in Table 4. The causal analyses of the LERs are as follows: (1) Eighteen LERs were attributed to personnel error (three plant trips); (2) Twelve LERs were a result of licensee identified plant conditions discovered during plant walkdowns and engineering evaluations; (3) Six LERs were attributed to procedural errors and were a product of omission of key information necessary to perform the operations for which they were written (one plant trip); (4) Five LERs were attributed to equipment failure (two plant trips).

Table 1

INSPECTION REPORT ACTIVITIES

REPORT NUMBERS INSPECTION DATES		TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
86-28 10/01/86	86-28 10/27/86	RESIDENT	94	ROUTINE RESIDENT INSPECTION
86-30 10/15/86	86-32 10/16/86	SPECIALIST	44	INSPECTION OF CONTINGENCY PLAN EVENTS AND GUIDANCE FOR OPERATIONAL INTERFACES
86-31 10/28/86	86-34 11/24/86	RESIDENT	131	ROUTINE RESIDENT INSPECTION
86-32 11/25/86	86-36 12/31/86	RESIDENT	155	ROUTINE RESIDENT INSPECTION
11/04/86	86-33 11/07/86	SPECIALIST	33	INSPECTION OF THE RADIOLOGICAL SAFETY PROGRAM
11/27/86	86-35	SPECIALIST	73	INSPECTION OF TEST WITNESSING AND 11/19/86 PRELIMINARY EVALUATION OF CONTAINMENT INTEGRATED LEAK RATE TEST AND TOURS OF THE FACILITY
87-01 01/01/87	87-01 01/26/87	RESIDENT	106	ROUTINE RESIDENT INSPECTION
87-02 01/12/87	87-02 01/16/87	SPECIALIST	47	INSPECTION OF LICENSEE ACTIVITIES IN RESPONSE TO OPEN ITEMS RELATING TO IE BULLETINS 79-02 AND 79-14
87-03 01/27/87	87-04 02/23/87	RESIDENT	130	ROUTINE RESIDENT INSPECTION
01/12/87	87-03 01/23/87	RESIDENT	24	SPECIAL INSPECTION OF OPERATION OUTSIDE THE DESIGN BASIS ANALYSIS AS DESCRIBED IN IE INFORMATION NOTICE 87-01
87-04 03/16/87	87-10 03/20/87	SPECIALIST	34	INSPECTION OF THE LICENSEE'S RADIOLOGICAL EFFLUENTS CONTROL PROGRAM
02/03/87	87-05 02/06/87	SPECIALIST	31	CYCLE 4 STARTUP PHYSICS TESTING PROGRAM
87-05 02/24/87	87-07 02/27/87	SPECIALIST	36	ROUTINE INSPECTION OF THE RADIATION PROTECTION PROGRAM

Table 1 (cont.)

INSPECTION REPORT ACTIVITIES

REPORT NUMBERS INSPECTION DATES	TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
87-06 87-11 03/24/87 04/20/87	RESIDENT	89	ROUTINE RESIDENT INSPECTION
87-07 87-08 02/24/87 03/23/87	RESIDENT	140	ROUTINE RESIDENT INSPECTION
87-08 87-09 04/07/87 04/10/87	SPECIALIST	110	INSPECTION OF LICENSEE'S ENGINEERING OFFICE AND SALEM 1 AND 2 PLANT SITES
87-09 87-12 04/13/87 04/16/87	SPECIALIST	42	ROUTINE INSPECTION OF THE LICENSEE'S EMERGENCY PREPAREDNESS PROGRAM CONDUCTED APRIL 13-16, 1987
87-10 87-13 04/16/87 04/16/87	SPECIALIST	39	INSPECTION OF STAFF TRAINING AND LICENSEE ACTION ON PREVIOUS INSPECTION FINDINGS
87-11 87-14 04/15/87 04/20/87	SPECIALIST	17	EFFECTIVENESS OF QUALITY CONTROL & QUALITY ASSURANCE ACTIVITIES IN PROCUREMENT & PREVENTATIVE MAINTENANCE FOR STORED ITEMS
87-12 87-15 04/21/87 05/18/87	RESIDENT	190	ROUTINE RESIDENT INSPECTION
87-13 87-16 05/18/87 05/22/87	SPECIALIST	88	NUCLEAR ENGINEERING INCLUDING IN-PLANT REACTOR ENGINEERING AND, QA/QC INTERFACES, INVOLVEMENT AND OVERVIEW
87-14 87-17 05/18/87 05/21/87	SPECIALIST	62	ROUTINE PHYSICAL SECURITY INSPECTION
87-15 87-18 05/19/87 06/15/87	RESIDENT	112	ROUTINE RESIDENT INSPECTION
87-16 87-19 06/01/87 06/05/87	SPECIALIST	33	INSPECTION OF LICENSEE'S ANALYSIS, VITAL BUS RECORD LEVEL PROTECTION SYSTEMS, QA INTERFACE, SURVEILLANCE PROCEDURES & ELECTRICAL DISTRIBUTION SYSTEM
87-17	CANCELLED		
87-18 87-20 06/15/87 06/19/87	RESIDENT	192	SPECIAL TEAM INSPECTION ON FEEDWATER AND CONDENSATE SYSTEMS

Table 1 (cont.)

INSPECTION REPORT ACTIVITIES

REPORT NUMBERS INSPECTION DATES	TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
87-19 87-21 06/16/87 07/20/87	RESIDENT	138	ROUTINE RESIDENT INSPECTION
87-20 87-22 06/29/87 07/02/87	SPECIALIST	34	INSPECTION OF LICENSEE'S RADIOACTIVE WASTE PREPARATION, PACKAGING AND SHIPPING PROGRAM
87-21 87-26 06/15/87 06/19/87	SPECIALIST	0	OPERATORS EXAMINATIONS GIVEN
87-22 87-23 07/16/87 07/16/87	SPECIALIST	5	A MEETING BETWEEN PSE&G AND NRC REGION I TO DISCUSS CONSOLIDATED EMERGENCY PLAN
87-23 87-24 07/27/87 07/31/87	SPECIALIST	76	INSPECTION OF THE LICENSEE'S RADIATION PROTECTION PROGRAM
87-24 87-25 07/21/87 08/24/87	RESIDENT	223	ROUTINE RESIDENT INSPECTION
87-25 87-27 08/25/87 09/28/87	RESIDENT	204	ROUTINE RESIDENT INSPECTION
87-26 09/15/87 09/17/87	SPECIALIST	0	WRITTEN AND OPERATING EXAMINATIONS ADMINISTERED TO FOUR SENIOR REACTOR OPERATOR CANDIDATES
87-27 09/21/87 09/25/87	SPECIALIST	38	POST MODIFICATION TEST PROGRAM FOR REFUELING OUTAGE
87-28 87-30 09/29/87 11/02/87	RESIDENT	226	ROUTINE RESIDENT INSPECTION
87-29 10/26/87 10/30/87	SPECIALIST	37	STEAM GENERATOR INSERVICE INSPECTION
87-29 09/14/87 09/18/87	SPECIALIST	258	FIRE PROTECTION/APPENDIX "R"
87-30 87-31 10/19/87 10/23/87	SPECIALIST	107	INSPECTION OF RADIOLOGICAL CONTROLS PROGRAM
87-31 87-32 10/26/87 10/30/87	SPECIALIST	115	INSPECTION OF LICENSEE'S ACTIONS ON PREVIOUS NRC FINDINGS

Table 1 (cont.)

INSPECTION REPORT ACTIVITIES

REPORT NUMBERS INSPECTION DATES	TYPE INSPECTION	TOTAL HOURS	DESCRIPTION
87-32 87-33 11/03/87 11/30/87	RESIDENT	183	ROUTINE RESIDENT INSPECTION
87-33 87-34 11/16/87 11/20/87	SPECIALIST	68	INSPECTION OF THE NON RADIOLOGICAL CHEMISTRY PROGRAM
87-34 11/16/87 11/20/87	SPECIALIST	38	OUTAGE MODIFICATIONS FOLLOWUP
87-35 87-35 11/30/87 12/04/87	SPECIALIST	320	FOLLOWUP ON APPENDIX "R" BREAKER COORDINATION ISSUE
87-36 87-36 12/01/87 12/31/87	RESIDENT	97	ROUTINE RESIDENT INSPECTION
87-37 87-37 12/14/87 12/18/87	SPECIALIST	41	INSPECTION OF RADIOLOGICAL SAFETY PROGRAM
87-38 12/20/87 12/23/87	SPECIALIST	28	ILRT ASSESSMENT

Table 2

SALEM 1&2

INSPECTION HOUR SUMMARY

AREA	HOURS	HOURS ANNUALIZED	PERCENT
OPERATIONS	1385	1107.3	32.3
RADCON/CHEMISTRY	525	420.0	12.1
MAINTENANCE	421	336.9	9.7
SURVEILLANCE	479	383.4	11.1
EMERGENCY PREP.	47	37.7	1.1
SEC/SAFEGUARDS	187	149.7	4.3
OUTAGES	322	257.8	7.4
ENGINEERING	922	737.6	22.0
TOTALS:	4288	3430.4	100.0

Table 3

SALEM 1&2

ENFORCEMENT ACTIVITY

A. Violations versus Functional Area by Severity Level

FUNCTIONAL AREA	No. of Violations in Each Severity Level						
	1	2	3	4	5	DEV	TOTAL
OPERATIONS			1	3			4
RADCON/CHEMISTRY				3			3
MAINTENANCE				1			1
SURVEILLANCE							0
EMERGENCY PREP.							0
SEC/SAFEGUARDS							0
OUTAGES							0
ENGINEERING SUPPORT					5		5
LICENSING							0
ASSURANCE OF QUALITY							0
TRAINING & QUALIFICATION							0
TOTALS:			1	7	5		13

Note: Four other violations pending from NRC Fire Protection Team Inspection 50-311/87-29.

Table 3 (cont.)

B. Summary of Violations

INSPECTION REPORTS INSPECTION DATES	REQUIREMENT VIOLATED	SEVERITY LEVEL	FUNCTIONAL AREA	DESCRIPTION
87-02 87-02 01/12/87-1/16/87	CRITERION III 10CFR50 APPENDIX B	5	ENGINEERING	NO PROCEDURES FOR IMPLEMENTING SYSTEM DESIGN INTERFACE MEASURES
	CRITERION V 10CFR50 APPENDIX B	5	ENGINEERING	PIPING AND PIPE SUPPORT DESIGN ACTIVITIES WERE NOT PERFORMED IN ACCORDANCE WITH APPROVED PROCEDURES
	CRITERION VI 10CFR50 APPENDIX B	5	ENGINEERING	DOCUMENTS FOR DESIGN MODIFICATIONS WERE NOT MAINTAINED IN ACCORDANCE WITH REQUIREMENTS
87-03 87-04 01/27/87 02/23/87	T.S. 4.6.1.1.a	4	OPERATIONS	TESTING DID NOT DOCUMENT CONTAINMENT INTEGRITY EVERY 31 DAYS
87-03 01/12/87	T.S. 3.5.2.d	3	OPERATIONS	INOPERABILITY OF BOTH EMERGENCY CORE COOLING SYSTEM AND RESIDUAL HEAT REMOVAL SYSTEM. THE SYSTEM COULD ONLY INJECT WATER TO TWO VS FOUR LOOPS

Table 3 (cont.)

INSPECTION REPORTS INSPECTION DATES	REQUIREMENT VIOLATED	SEVERITY LEVEL	FUNCTIONAL AREA	DESCRIPTION
87-06 87-11 03/24/87 04/20/87	T.S. 4.9.7	4	OPERATIONS	MISSED SURVEILLANCE PERTAINING TO OVERLOAD CUTOFF ON A CRANE THAT CAN TRAVEL OVER SPENT FUEL
87-08 87-09 04/07/87 04/10/87	CRITERION V 10CFR50 APPENDIX B	5	ENGINEERING	WRITTEN PROCEDURES PROVIDING THE SCOPE AND ACCEPTANCE CRITERIA WAS NOT DOCUMENTED FOR 1980 SURVEY OF BLOCK WALLS
	CRITERION XVII 10CFR50 APPENDIX B	5	ENGINEERING	NO RECORDED, CONTROLLED CALCULATIONS WERE AVAILABLE FOR MASONRY WALLS MODIFICATIONS
87-11 87-14 04/15/87 04/20/87	CRITERION XIII 10CFR50 APPENDIX B	4	MAINTENANCE	NO COMPLETED DATA SHEETS TO DOCUMENT ROTATION OF CRITICAL EQUIPMENT IN STOREROOM
87-15 87-18 05/19/87 06/15/87	T.S. 4.5.2b	4	OPERATIONS	OPERABILITY OF EMERGENCY CORE COOLING SYSTEM NOT DEMONSTRATED WITHIN 31 DAYS
87-29 09/14/87 09/18/87	REPORT NOT ISSUED - 4 POTENTIAL VIOLATIONS			

Table 3 (cont.)

INSPECTION REPORTS INSPECTION DATES	REQUIREMENT VIOLATED	SEVERITY LEVEL	FUNCTIONAL AREA	DESCRIPTION
87-30 87-31 10/19/87 10/23/87	T.S. 6.12	4	RADCON	LOCKED HIGH RADIATION DOORS WERE DEFECTED AND LEFT UNLOCKED
	T.S. 6.11	4	RADCON	PRE-JOB BRIEFINGS WERE NOT BEING CONDUCTED AND MPC-HOUR METERS WERE NOT USED
	T.S. 6.8	4	RADCON	FAILURE TO ESTABLISH PROCEDURES FOR CALIBRATION USE AND DATA EVALUATION OF SL4 (MPC-HOUR METERS)

Table 4

SALEM 1&2

LICENSEE EVENT REPORTS

A. LER by Functional Area

FUNCTIONAL AREA	Number by Cause Codes A	B	C	D	E	X	TOTAL
OPERATIONS	2		1	3	2	2	10
RADCON/CHEMISTRY	4						4
MAINTENANCE	2			2	1	2	7
SURVEILLANCE	10			1	1		12
EMERGENCY PREP.							-
SEC/SAFEGUARDS							-
REFUELING, OUTAGE MANAGEMENT							-
ENGINEERING SUPPORT	1	10				1	12
LICENSING ACTIVITIES							-
TRAINING AND QUALIFICATION							-
ASSURANCE OF QUALITY							-
TOTALS:	19	10	1	6	4	5	45

Legend:
A - Personnel Error
B - Design Error
C - External Cause
D - Defective Procedure
E - Equipment Failure
X - Other

Table 4 (cont.)

B. LER Synopsis

SALEM 1

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-019	10/01/86	B	T.S. 3.7.11 NON COMPLIANCE - FIRE BARRIER WALL IMPAIRMENT DISCOVERED
86-020	11/08/86	A	T.S. SURVEILLANCE 4.7.7.1A - SURVEILLANCE NOT COMPLETED WITHIN TIME - DUE TO PERSONNEL ERROR
86-021	11/12/86	A	T.S. SURVEILLANCE 4.3.3.9 - DETECTOR 1R41C FUNCTIONAL TEST NOT IN TIME DUE TO PERSONNEL ERROR
87-001	01/30/87	A	UNIT NO. 1 REFUELING WATER STORAGE BORON CONCENTRATION OUT OF SPECIFICATION DUE TO PERSONNEL ERROR
87-002	03/12/87	A	LOSS OF CONTROL OF A HIGH RADIATION AREA LOCKED DOOR DUE TO PERSONNEL ERROR
87-003	03/26/87	D	CONTAINMENT PRESSURE/VACUUM RELIEF VALVES OPEN BEYOND 1000 HOUR LIMIT DUE TO PROCEDURAL INADEQUACY
87-004	04/10/87	A	DIESEL GENERATOR MISSED SURVEILLANCE DUE TO INADEQUATE POST MAINTENANCE TESTING CAUSED BY PERSONNEL ERROR
87-005	04/23/87	A	1F GROUP BUS UNDERFREQUENCY PROTECTION INOPERABLE DUE TO MISPOSITIONED KNIFE SWITCH
87-006	05/25/87	X	BOTH TRAINS OF HIGH HEAD SI DECLARED INOPERABLE - T.S. 3.0.5 ENTERED
87-007	06/02/87	C	TURBINE TRIP/TX. TRIP FROM 100% - 5021 DEANS LINE CROSS TRIP SCHEME - LIGHTING STRIKE
87-008	06/03/87	A	FAILURE TO IMPLEMENT PORTIONS OF THE INSERVICE TESTING PROGRAM

Table 4 (cont.)

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
87-009	06/04/87	X	T.S. 3.7.11 NON COMPLIANCE - IMPAIRED FIRE BARRIER PENETRATIONS DISCOVERED
87-010	06/10/87	B	NON COMPLIANCE WITH 10CFR50 APPENDIX A CRITERIA FOR SEPARATION OF SAFETY RELATED COMP.
87-011	09/17/87	B	POTENTIALLY INADEQUATE BREAKER COORDINATION
87-012	09/30/87	D	REACTOR TRIP SYSTEM INSTRUMENTATION NOT BEING PUT IN TRIP WITHIN THE REQUIRED TIME FRAME
87-013	10/02/87	E	TRIP FROM SOURCE RANGES HIGH NEUTRON FLUX DUE TO WATER IN THE DETECTOR
87-014	10/08/87	A	LOSS OF CONTROL OF A LOCKED HIGH RADIATION AREA DOOR DUE TO PERSONNEL ERROR
87-015	10/23/87	A	TECHNICAL SPECIFICATION 3.8.1.2B - NON COMPLIANCE DUE TO PERSONNEL ERROR
87-016	11/02/87	B	POWER OPERATED RELIEF STOP VALVE CABLING FOUND DEGRADED - INADEQUATE DESIGN REVIEW
87-017	11/13/87	B	DISCOVERED LEAKAGE PATHS FROM 13 (23) AFW PUMP COMPARTMENT
87-018	12/09/87	D	LEAD/LAG AND DERIVATIVE AMPLIFIERS IMPROPERLY CALIBRATED DUE TO PROCEDURAL INADEQUACY
87-019	12/27/87	X	WASTE GAS OXYGEN GREATER THAN 2% FOR GREATER THAN 48 HOURS

Table 4 (cont.)

SALEM 2

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-010	10/16/86	B	T.S. 3.7.11 NON COMPLIANCE - FIRE BARRIER PENETRATION DISCOVERED IMPAIRED
86-011	11/17/86	A	T.S. SURVEILLANCE 4.9.7 - NOT PERFORMED WITHIN SPECIFIED TIME DUE TO PERSONNEL ERROR
86-012	11/21/86	E	CONTAINMENT SYSTEM - TYPE B & C LEAK RATE OUT-OF-SPECIFICATION DUE TO VALVE 2PR25 EXCESSIVE LEAKAGE
86-013	12/23/86	A	TURBINE REACTOR TRIP FROM 8% ON P-7 INTERLOCK DUE TO TURBINE OVERSPEED
86-014	12/28/86	E	REACTOR TRIP FROM 77% POWER ON STEAM FLOW/FEED FLOW MISMATCH & 23 SG LOW LEVEL DUE TO VALVE 23BF19 CONTROL PROBLEMS
87-001	01/13/87	D	LOSS OF RHR INJECTION CAPABILITY TO TWO COLD LEGS DUE TO TECHNICAL SPECIFICATION MISINTERPRETATION
87-002	01/18/87	A	REACTOR TRIP FROM 3% POWER ON ERRONEOUS HIGH NEUTRON FLUX SIGNAL DUE TO PERSONNEL ERROR
87-003	02/26/87	A	UNIT 2 FUEL HANDLING CRANE MISSED SURVEILLANCE DUE TO PERSONNEL ERROR
87-004	03/12/87	X	GENERATOR-TURBINE/REACTOR TRIP DUE TO LOSS OF FIELD ON THE MAIN GENERATOR
87-005	04/07/87	E	TURBINE/REACTOR TRIP FROM 85% POWER DUE TO LOSS OF DC CONTROL POWER TO TURBINE ELECTRO HYDRAULIC CONTROL SYSTEM BY A FAILED SERVO CARD
87-006	05/06/87	A	T.S. 3.7.10.3 NON COMPLIANCE - INADEQUATE FIRE WATCH DUE TO PERSONNEL ERROR

Table 4 (cont.)

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
87-007	05/11/87	B	T.S. 3.7.11 NON COMPLIANCE - DISCOVERY OF FIRE BARRIER IMPAIRMENT
87-008	05/19/87	A	MISSED T.S. SURVEILLANCE 4.5.2.B DUE TO PERSONNEL ERROR - T.S. 3.0.3 ENTERED
87-009	06/19/87	B	APPENDIX R CRITERIA NON-CONFORMANCE
87-010	06/23/87	A	FIRE BARRIER IMPAIRMENT - NON COMPLIANCE DUE TO PERSONNEL ERROR
87-011	08/06/87	A	REACTOR TRIP - NO. 24 STEAM GENERATOR HIGH-HIGH LEVEL
87-012	09/30/87	X	RHR PUMP ROOM FLOOD CURB MISSING DUE TO PERSONNEL ERROR
87-013	10/02/87	D	T.S. SURVEILLANCE 4.8.1.3.A MISSED DUE TO INADEQUATE PROCEDURAL CONTROL
87-014	10/22/87	B	INCORRECT DIESEL GENERATOR INFEED BREAKER SETPOINT DUE TO INADEQUATE DOCUMENTATION CONTROL
87-015	11/27/87	B	POTENTIAL FOR CERTAIN SW MCC CONTROL CIRCUITS TO PICK UP STARTER COIL
87-016	12/07/87	A	2A DIESEL GENERATOR SURVEILLANCE MISSED DUE TO PERSONNEL ERROR
87-017	12/08/87	D	TECHNICAL SPECIFICATION NON COMPLIANCE DUE TO PROCEDURAL IN ADEQUACY
87-018	12/23/87	A	LATE SURVEILLANCE ON FUNCTIONAL TEST OF WASTE GAS MONITORS

Table 5

SUMMARY OF LICENSING ACTIVITIES

A. NRR LICENSEE MEETINGS

1/ 6/87	AEOD Meeting on False Loss of Offsite Power Transient
5/21/87	Control Room Design Review Meeting
6/15/87	RTD Bypass Modification Meeting
7/ 9/87	RTD Bypass Modification Meeting
11/24/87	North Anna Steam Generator Event Meeting

B. NRR SITE VISITS

10/22-28/86	LPM observation of refueling outage activities
2/18/87	Licensing actions scheduling
5/28/87	Site access training for LPM
9/ 2/87	SIMS Data review
9/28/87	SIMS Data and licensing actions schedule review

C. COMMISSION BRIEFINGS

None

D. SCHEDULAR EXTENSIONS GRANTED

None

E. RELIEFS GRANTED

6/24/87	Interim Relief from certain ASME Code testing requirements - Unit 1
12/29/87	Extension of 6/24/87 Interim Relief

F. EXEMPTIONS GRANTED

9/ 4/87	Exemption from 10 CFR 50, Appendix J, III.D.2(b)(ii)

Table 5 (Cont.)

SUMMARY OF LICENSING ACTIVITIES

G. LICENSEE AMENDMENTS ISSUED

Date	Unit 1	Unit 2	Title
2/26/87	76	50	Reduce No. of Active Fuel Rods
3/31/87	77	51	Operate Fuel Handling Crane
4/ 7/87	78	52	Delete Boron Injection Tank
4/10/87	79	53	Accident Monitoring
6/19/87	80	54	Delete Maximum Fuel Weight
8/24/87	81	-	Facility Attachment
9/23/87	82	-	Replace Fxy Limits
10/16/87	83	55	Change RWST Boron Concentration
11/16/87	84	56	RTD Bypass Modification

H. EMERGENCY CHANGES TO TECHNICAL SPECIFICATIONS

None

I. ORDERS ISSUED

None