ENCLOSURE 1(b)

FINAL SALP REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

REPORT NO. 50-354/90-99

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

HOPE CREEK GENERATING STATION

ASSESSMENT PERIOD: AUGUST 1, 1990 - DECEMBER 28, 1991

BOARD MEETING DATE: FEBRUARY 27, 1992

TABLE OF CONTENTS

I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) is an integrated Nuclear Regulatory Commission (NRC) staff effort to collect observations and data and to periodically evaluate licensee performance on the basis of this information. The SALP process is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. SALP is to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful feedback to the licensee's management to improve the quality and safety of plant operations.

An NRC SALP Board, composed of the staff members listed below, met on February 27, 1992, to review the collection of performance observations and data and to assess the licensee's performance at the Hope Creek Generating Station. This assessment was conducted 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 IV.C of this report.

This report is the NRC's assessment of the licensee's safety performance at the Hope Creek Generating Station for the period August 1, 1990 to December 28, 1991.

The SALP Board was composed of:

Chairman:

C. W. Hehl, Director, Division of Reactor Projects (DRP), Region I (RI)

Members:

T. P. Johnson, Senior Resident Inspector, Salem/Hope Creek, RI
S. Dembek, Project Manager (Hope Creek), Office of Nuclear Reactor Regulation (NRR)
C. L. Miller, Director, Project Directorate I-2, NRR
A. R. Blough, Chief, Projects Branch No. 2, DRP, RI
M. W. Hodges, Director, Division of Reactor Safety (DRS), RI
R. W. Cooper, Deputy Director, Division of Radiation Safety and Safeguards (DRSS), RI

Others in Attendance:

J. R. White, Chief, Reactor Projects Section 2A, DRP, RI
H. K. Lathrop, Resident Inspector, Salem/Hope Creek, RI
S. M. Pindale, Resident Inspector, Salem/Hope Creek, RI
B. C. Westreich, Reactor Engineer, DRP, RI
I. B. Moghissi, Reactor Engineer Intern (Salem), NRR
J. C. Stone, Project Manager (Salem), NRR
M. J. Davis, Performance Evaluator, Performance & Quality Evaluation Branch, NRR
L. S. Cheung, Senior Reactor Engineer, Electrical Section, DRS, RI

Others in Attendance (continued)

R. J. Paolino, Lead Reactor Engineer, Electrical Section, DRS, RI
D. L. Caphton, Senior Technical Reviewer, DRS, RI
W. J. Pasciak, Chief, Facilities Radiation Protection Section, (FRPS), DRSS, RI
R. L. Nimitz, Senior Radiation Specialist, FRPS, DRSS, RI
J. C. Jang, Senior Radiation Specialist, Effluents Radiation Protection Section, DRSS, RI
C. Z. Gordon, Senior Emergency Preparedness (EP) Specialist, EP Section, DRSS, RI
D. F. Limroth, Senior Reactor Engineer, Safeguards Section, DRSS, RI

II. SUMMARY OF RESULTS

II.A Overview

PSE&G operated the Hope Creek reactor in a manner that demonstrated a high level of nuclear safety, and exhibited a safety conscious attitude. Strong licensee management involvement and oversight were evident, and conservatism was displayed in most functional areas. Strong performance was also noted during Hope Creek's third refueling outage. Self-assessment, corrective action and root cause analysis programs were maintained at a strong and effective level. As a result, plant operations, radiological controls, emergency preparedness, security, and safety assessment/quality verification (SA/QV) maintained a superior level of performance. However, relative to SA/QV, the SALP Board did express some reservation due to instances of management inattention and poor communications that affected the quality of licensee response to certain generic issues (motor operated valves and station blackout rule). Personnel errors continued to persist in nearly all functional areas, but appeared to be on the decline.

Licensee attention to the maintenance/surveillance area has resulted in some improvement. However, a Category 2 with an improving trend was once again assigned. The SALP Board determined that performance deficiencies in the maintenance/surveillance area and shortcomings associated with spare parts/material procurement prevented this functional area from fully achieving anticipated improvements.

The level of performance in the engineering/technical support area declined during this assessment period. Significant weaknesses were noted relative to engineering's development and response to the motor operated valve program. This was indicative of a lack of management involvement and oversight, and miscommunication and poor attention to detail on the part of engineering personnel. Additional weaknesses were noted relative to other engineering support activities. While these deficiencies existed, some improvements have been made in spare parts availability and material procurement. Plant operations and maintenance were well supported by the onsite and corporate engineering staffs. Corrective actions for engineering-related deficiencies were generally timely and effective.

Overall, individual performance and supervisory involvement in the field was very good, though some personnel errors were apparent in most functional areas. Personnel errors also contributed to reactor trips, but effective management attention appears to be producing an improving trend as evidenced by performance at the end of this SALP period.

II.B Facility Performance Analysis Summary

	Functional Area	Rating, Trend Last Period	Rating, Trend This Period
1.	Plant Operations	1	1
2.	Radiological Controls	1	1
3.	Maintenance/ Surveillance	2, Improving	2, Improving
4.	Emergency Preparedness	1	1
5.	Security	1	1
6.	Engineering/ Technical Support	1	2
7.	Safety Assessment/ Quality Verification	1	1

Previous Assessment Period: May 1, 1989 through July 31, 1990

Present Assessment Period: August 1, 1990 through December 28, 1991

II.C Unplanned Shutdowns, Unit Trips and Forced Outages

	Date	Power Level	Root Cause	Functional Area
1.	11/4/90	100%	Personnel error/ Design	Maintenance/ Surveillance

The reactor scrammed from high power due to the closure of one main steam isolation valve (MSIV) when the MSIV's instrument gas line sheared at the instrument block. The gas line had been improperly connected after valve maintenance. This combined with a poor design resulted in vibration induced fatigue cracking of the line and MSIV closure.

2.	11/17/90	100%	Component failure/ incomplete root cause	Safety Assessment/ Quality Verification

The reactor scrammed following a main turbine trip due to high moisture separator level during surveillance testing of the combined intermediate valves. Licensee root cause analysis for a similar trip occurring on January 6, 1990, was incomplete. A failed check valve on the normal drain line allowed backflow to the moisture separator during testing.

3.	2/19/91	24%	Component failure	N/A

The reactor scrammed on low water level during startup when the feedwater level control valve failed closed. A relay in the control circuitry failed, closing the startup level control valve. Level decreased to the scram setpoint before operators could respond to the condition.

4.	2/23/91	24%	Component failure/ incomplete vendor information	N/A

An unplanned shutdown occurred due to hydrogen leakage from the main generator. Vendor modifications to the No. 9 hydrogen seal were not communicated to the licensee. Once installed, the seal failed.

5.	5/7/91	100%	Personnel error/ Design	Maintenance/ Surveillance

The reactor scrammed on low water level during surveillance testing of the feedwater level control (FWLC) system by a maintenance I&C technician. A personnel error due to lack of attention to detail caused the FWLC to sense a false high level resulting in reactor feedwater pump response to lower actual level. A contributing cause was design of cabinet such that leads had to be lifted inside. The licensee had previously identified this issue and had initiated a design change; however, it had not been completed prior to the scram.

III PERFORMANCE ANALYSIS

III.A Plant Operations

III.A.1 Analysis

The previous SALP rated Hope Creek operations as Category 1. That assessment concluded that the Hope Creek reactor was operated skillfully and in a safety conscious manner. Reactor operator error contributed to one of four reactor scrams. Strong management and supervisory oversight and involvement occurred at all levels from the senior reactor operator through the station general manager. An aggressive approach by management was effective in reducing the number of personnel errors. Senior reactor operator failure rate during licensing and requalification exams was higher than normal.

During this assessment period, the reactor was operated in a manner that demonstrated a nuclear safety conscious attitude. Operators competently performed their duties during unit startups, shutdowns and transients. There were four reactor scrams during the period, but none were the result of operator error. Operator response to reactor scrams and plant transients was commendable. In several instances, prompt actions by operators minimized plant transients and averted the necessity for reactor scrams due to a lightning strike event, a runback of the recirculation pumps event, and reactor feedwater and condensate pump trips.

The five operating shifts are effectively staffed as each has three Senior Reactor Operator (SRO) and three Reactor Operator (RO) licensed individuals (one above Technical Specification requirements). Two separate SRO licensed individuals supervise the work control group during regular hours. There are a total of 41 licensed operators, including 31 on shift, and 10 in staff and training positions.

The licensed reactor operator training programs for Hope Creek were well developed, implemented, and strongly supported by management. Licensed operator initial and requalification examinations have shown that candidates were well prepared. Increased management attention was effective in reducing exam failures. As a result, the candidates performed well during examinations. Facilities used for training were excellent. During examinations, the operators exhibited good administrative knowledge, good knowledge of and familiarity with plant systems and components, good understanding and interpretation of annunciators and alarm signals, and the ability to quickly and accurately diagnose the events or conditions based on signals or other instrument readings. However, results of an initial examination near the end of the period indicated a higher than expected number of candidate failures. Non-licensed operator training was found to be performed well.

Strong plant management oversight and attention to operations were evident on a daily basis. An operational perspective of plant problems and work prioritization was well understood

and was enhanced by daily meetings. Examples included scram followup, actions associated with a fuel pin leak, and the identification and diagnosis of increasing drywell unidentified leak rate.

Licensed operators' plant awareness, safety perspective, and professional control room demeanor were consistently evident. Plant operations were well supported by detailed procedures. Procedural adherence was very good. Shift turnovers were formal and included thorough briefings of the relief crew. Control room access was controlled, and activities were limited to those directly related to plant operations. Aggressive management attention has resulted in significant reductions in the number of lit annunciators. The use of overtime was properly controlled. Good performance of non-licensed equipment operators was noted during observations made on plant tours, and during equipment testing and operation. The licensee was successful in keeping operations department personnel errors low. This was particularly evident during the refueling outage.

Overall, the licensee's implementation of the Emergency Operating Procedure (EOP) program has functioned well. EOPs have been improved with technical adequacy issues being satisfactorily resolved. Implementation of the current EOPs has been performed in a thorough manner. Continued EOP administrative improvements are in process.

A higher than expected number of automatic scrams has continued for several years. The licensee was very concerned about these scrams and embarked on an independent, comprehensive scram review in order to identify common causal factors and establish corrective actions. This review was thorough. Short term results appeared to be successful as the unit operated continually for seven and one-half months at the end of the period. Two scrams occurred in 1991.

Plant housekeeping has continued to improve during the period. Plant area painting, the assignment of housekeeping area responsibilities, and management focus and attention have been effective in achieving this level of housekeeping.

The overall fire protection program was effective. Dedicated fire protection personnel performed well and were knowledgeable, which demonstrated an effective training program. The fire brigade was staffed by the Site Protection group personnel, which minimized the reliance on operators to respond to fire and first aid emergencies. Appropriate operator involvement and interface in fire emergencies were provided. Overall, plant and site management aggressively supported the fire protection program.

Hope Creek conducted its third refueling outage during the period. Outage preparations were excellent. The licensee employed many lessons learned from the previous post refueling outage critique, resulting in an effectively conducted outage, despite significant emergent work. Refueling activities, including reactor core offload, the subsequent reload,

and fuel sipping, were effectively controlled. The unit was returned to service from its third refueling outage in a safe and effective manner. Pre-startup activities, unit startup and power ascension were well planned and executed.

Summary

The Hope Creek reactor was operated conservatively with nuclear safety as the top priority. Operator errors remained low; however, unplanned automatic reactor scrams continued to be a concern. Strong management and supervisory oversight of and involvement in operations were evident. The licensee conducted its third refueling outage effectively. An effective training program was noted as evidenced by exam results and operator performance during routine and transient events. However, poor performance was noted during an initial exam given at the end of the period.

III.A.2 Performance Rating: Category 1

III.B Radiological Controls

III.B.1 Analysis

The previous SALP report rated radiological controls as Category 1. Program strengths included: good management involvement, effective internal review processes such as quality assurance audits and surveillances, good resolution of technical issues, and good staffing levels. No weaknesses were noted.

During the current assessment period, the level of management involvement was excellent. Managers actively observed ongoing work activities, identified problems were effectively corrected using the formal Radiological Occurrence Reporting system, and internal self-assessments, audits and surveillances continued to be used effectively to assure quality in the Hope Creek radiological control programs.

The level and quality of staffing in the area of radiation protection (RP) remained high throughout this period. A new, appropriately qualified Radiation Protection Manager (RPM) was appointed during this assessment period, and the level and quality of staffing of RP technicians continued to be excellent. Although RP technicians met appropriate qualification requirements, there was a need to clearly define types of work experience acceptable for RP technician qualification purposes.

The RP training program continued to be excellent. For example, RP supervisors received annual continuing training which included systems training; nuclear codes, standards, and regulatory concerns; and root cause analysis. The RP technician continuing training also

remained excellent, and included plant systems training. An area for improvement was the system training programs, which contained little on expected radiological conditions expected during various system operating modes.

The licensee implemented an aggressive ALARA program. Excellent exposure reduction efforts were undertaken during the refueling outage. For example, an elaborate automated system for removal, maintenance and re-installation of the control rod drive mechanisms was used. In addition, audio/visual and remote reading dosimetry were effectively utilized to control work under the vessel to reduce unnecessary personnel exposure. The licensee was sensitive to any opportunity to reduce personnel exposure, as evidenced by removal of a carbon steel reactor water clean-up line located in the overhead of a Reactor Building corridor. The line exhibited contact dose rates of 800 mR/hr and required shielding to allow personnel free access to the corridor. Licensee efforts to reduce personnel radiation exposure during surveillance and in-service inspection (ISI) activities continued to be effective as evidenced by excellent water chemistry control and the use of zinc injection. Overall control of work in radiologically controlled areas typically was excellent.

Late in the period, an evaluation of the on-site dosimetry processing laboratory by personnel from the National Voluntary Laboratory Accreditation Program (NVLAP) identified a number of significant weaknesses in the management of the PSE&G processing laboratory. The licensee immediately suspended processing of dosimeters and implemented extensive corrective actions to improve processing. NRC reviews at the end of the period indicated corrective actions were on-going and dosimetry system performance met applicable performance standards. The NRC's review of this matter found that the weaknesses stemmed from the loss of key supervisory and management personnel and a lack of understanding, by replacement personnel, of regulatory aspects associated with maintaining an accredited personnel dosimetry program. Although no decrease in the quality of dosimetry processing information was identified, this matter indicated weak understanding of program and personnel qualification requirements by management.

The solid radwaste/transportation program continued to be strong. The organization and staffing exhibited stability and strength. The unique asphalt solidification system continued to operate well, and the on-site storage of radwaste was minimal. The quality oversight of radwaste processing was of good technical depth and scope, with an appropriate level of surveillance of the various radioactive material shipments. For example, QC surveillances identified calculational errors, in some radioactive shipments, that were corrected immediately. The licensee's training program continued to provide excellent radwaste and transportation content.

The licensee continued to conduct an effective Radiological Environmental Monitoring Program (REMP). The meteorological monitoring program was sufficient in ensuring that meteorological instruments were operable, maintained, and calibrated. Furthermore, the meteorological data were obtainable from various locations on and off site. An effective QC program was in place to assure the quality of REMP sample analyses. The audits performed

by the Quality Assurance Department were thorough and of technical depth to assess the REMP.

The licensee continued to conduct excellent radioactive liquid and gaseous effluent control programs. Outstanding calibration techniques for effluent/process radiation monitoring systems were employed. The Nuclear Training Department conducted an excellent training program for Chemistry/Radiation Protection technicians who were actually performing effluent processes.

The licensee summarized and reported historical radioactive liquid and gaseous release data since the start of commercial operations for trending purposes in its semiannual report. Such reporting was a noteworthy licensee initiative.

Late in the period, the licensee identified low level contamination in the on-site sewage system. The licensee isolated the contaminated sewage and implemented appropriate corrective actions to preclude recurrence, reflecting an excellent understanding of this technical issue. Air cleaning systems were well maintained and tested.

Summary

PSE&G continued to maintain and implement an effective radiological controls program. Managers effectively controlled radiological work. Staffing levels continued to be excellent. The ALARA program continued to demonstrate management's commitment to reducing personnel exposure and maintaining a low source term within the plant. The licensee implemented an effective environmental and effluent controls program as well as an effective radwaste processing, handling and shipping program.

III.B.2 Performance Rating: Category 1

III.C Maintenance/Surveillance

III.C.1 Analysis

The last SALP rated the Hope Creek maintenance/surveillance functional area as a Category 2, improving. That assessment concluded that the station had successful maintenance and surveillance programs which were adequately scheduled, planned and implemented. Program strengths included effective management, a well-trained and experienced work force and good procedures. Weaknesses were noted in the procurement process and post-maintenance system restoration. Personnel errors continued to contribute to noted plant events and scrams.

Maintenance:

The Hope Creek maintenance program was well planned, staffed and organized, and demonstrated strong performance in this area, including improved adherence to procedures and appropriate oversight of maintenance activities. Management at all levels was noted to be directly and intimately involved in the maintenance program. During the period, the licensee implemented the use of fixed shift work coverage, leveling work activity impact and improving scheduling efficiency and accuracy. Pre-outage system walkdowns were initiated to improve outage efficiency. Planned maintenance outages of safety-related equipment were screened by plant management to assure that a net safety benefit was provided. These initiatives have been effective and were positive indicators of management's safety-conscious and detailed control of plant maintenance. Safety-related equipment availability was high, as indicated by the licensee's trending data.

The most significant strength of the maintenance organization continued to be its stable and well-trained staff. Maintenance training received strong management support, with the training center providing extensive electrical and mechanical training facilities. Line supervision provided good work direction. Adherence to procedures and attention to detail continued to improve, as evidenced by a reduced amount of rework and fewer personnel errors. However, a small number of instances were noted where attention to detail was poor. For example, a number of minor post maintenance material deficiencies existed on the standby liquid control system, and required preventive maintenance was not performed on a spare core spray pump motor after rewinding. Overall, the maintenance staff was very knowledgeable in their respective areas of responsibility.

Management dedicated additional resources to address weaknesses noted in maintenance support activities. The material and procurement groups were reorganized and placed under the direction of a general manager. A new warehouse, into which central receiving and the numerous on-site storage areas would be consolidated, was completed late in the period. Maintenance facilities were generally well equipped, maintained and controlled. Material control was enhanced by the implementation of the computerized warehouse automated material management system (WAMMS). However, spare parts availability and obsolescence continued to impact the timeliness of some maintenance activities. The number of delayed routine maintenance requests due to parts problems decreased over the period.

During the assessment period, Hope Creek completed one refueling outage and conducted several forced outages. Maintenance planning and outage organizations were noted strengths during the third refueling outage from December 1990 to February 1991. Virtually all pre-planned activities were completed with less than two percent rework, an indication that management had effectively communicated their expectations regarding attention to detail and work performance quality. Significant emergent work on the recirculation system piping welds was completed with no adverse impact on the overall outage. Control rod drive maintenance activities and forced outage repairs to a leaking hydrogen seal on the main generator in late February 1991 were well-planned and executed. In general, station

housekeeping was very good. However, instances were noted where post-maintenance system restoration and cleanup were poor. Management was aggressive in addressing these issues and improvements in these areas were noted in the latter half of the period.

Maintenance contributed to one of four scrams during the period. In November 1990, the reactor scrammed after a main steam isolation valve closed when its instrument gas line sheared at the instrument block. This line had been incorrectly reinstalled following maintenance during a previous assessment period. However, the design of the gas supply lines and their susceptibility to vibration were also causal factors.

Notwithstanding the minor weaknesses identified in this area, the licensee has managed and performed a large number of maintenance activities in an effective and safety conscious manner.

Surveillance:

The Hope Creek surveillance program was effectively and conservatively managed and implemented throughout the assessment period. Surveillance tests were effectively scheduled and tracked through the managed maintenance information system (MMIS), which coordinated the performance of the affected departments. The cooperative interaction of the groups involved continued as a strength in the surveillance program.

Surveillance procedures were well written, accurate and complete. Procedural enhancements were made in a timely manner, however, a weakness was identified in the procedure revision process where needed changes were not always incorporated in all related procedures. The licensee had implemented a policy whereby most surveillance activities which affected safety system redundancy or initiation were performed on the night shift, but only between the months of May and September when electrical load demands were high. During this assessment period, that policy was extended to a year-round basis. As a complement to the fixed shift work schedule, this policy contributed significantly to reducing stress levels in the control room and to reduction in the number of late or missed surveillances.

The number of surveillance related incidents, while still high, continued to decrease from the two previous assessment periods. Corrective actions taken to reduce personnel errors, the predominant cause of such incidents, have been generally effective, particularly during the second half of this period. For example, the introduction of plastic spring clips to assist in properly locating and identifying relay contacts, terminal strip points and cabling in mid 1991 aided in reducing the misidentification of components. No such events occurred during the latter part of the period. Additionally, there were no missed maintenance or I&C surveillances during 1991. While one scram occurring during this period was attributed to personnel error during surveillance testing of the feedwater level control system, an inadequate cabinet design contributed to the event. The licensee had addressed the issue of cabinet scram sensitivity, but the appropriate design modification, to install external test boxes, had not yet been implemented for this particular cabinet.

The inservice inspection (ISI) program at Hope Creek continued to be well planned and implemented. Licensee personnel involved in the program were noted to be knowledgeable and thorough in the performance of their inspection activities including ultrasonic testing of intragranular stress corrosion cracking (IGSCC) susceptible piping. In particular, the licensee's investigation into indications discovered in recirculation piping welds during the third refueling outage, including the development of an enhanced testing technique, and the resultant corrective actions, were commendable. The licensee had implemented an effective program, based on industry standards, to assess erosion/corrosion in various plant components and piping. No significant thinning was detected in over eighty areas inspected during the third refueling outage.

Summary

The Hope Creek station has continued implementation of successful and effective maintenance and surveillance programs. These programs have been well scheduled, planned and managed. Program strengths included management involvement, a stable and well-trained staff and well-written procedures. Management efforts have been successful in reducing the number of personnel error related events. Weaknesses included occasional lapses in attention to detail, material procurement, and continued, albeit reduced, personnel error initiated plant events.

III.C.2 Performance Rating: Category 2

Trend: Improving

III.C.3 SALP Board Comment

While progress has been made on resolving a number of issues in this area, the Board noted the continuing number of personnel errors, especially in the surveillance area, and persistent spare-parts related backlogs were issues requiring continued close management attention.

III.D Emergency Preparedness

III.D.1 Analysis

The Emergency Preparedness for Artificial Island covers both Hope Creek and Salem Generating Stations, therefore the assessment of emergency preparedness is a combined evaluation.

III.D.2 Performance Rating: Category 1

III.E Security

III.E.1 Analysis

The Security Plan for Artificial Island covers both Hope Creek and Salem Generating Stations, therefore the assessment of security is a combined evaluation.

III.E.2 Performance Rating: Category 1

III.F Engineering/Technical Support

III.F.1 Analysis

The previous SALP rated Engineering and Technical Support as Category 1. The previous assessment indicated that improvements in the performance of corporate engineering were observed. The overall experience levels within the onsite system engineering group were also improved. No significant weaknesses were observed during the last SALP period.

Engineering and Technical Support for Hope Creek was provided by corporate engineering, known as Engineering and Plant Betterment (E&PB), and the onsite system engineering group. E&PB handled major engineering efforts such as plant modifications, and design bases reconstitution. The onsite system engineering group supported operations, maintenance, testing and minor design change activities. E&PB is well staffed with experienced personnel in various engineering disciplines.

The onsite system engineering group was well staffed with experienced and knowledgeable personnel. The licensee continued to implement their pipeline program to train new system engineers. Most system engineers have received formal root cause training. Evidence of good system engineer support for station activities and a good safety perspective include: (1) identification and followup of an ultimate heat sink related design deficiency; (2) maintenance trending; (3) disposition for degraded equipment; (4) procedure generation; (5) identification of and corrective actions for control rod scram time calculation errors; and (6) disposition of reactor recirculation instrument line leakage.

The licensee has been generally aggressive in identifying and following up on engineering related deficiencies. The corrective actions taken as a result of a recirculation system pipe weld crack is a good example. The corrective actions involved state-of-the-art equipment and techniques and the use of recognized industry experts for analysis. These actions, along with a metallurgical analysis of samples obtained from the cracked welds effectively resolved the problems and surpassed ASME Section XI Code requirements. In contrast, the licensee was slow to properly identify the root cause and implement appropriate corrective actions after a filtration, recirculation and ventilation system (FRVS) heater fuse failure.

Technical support for refueling and maintenance outage periods, and for post outage recovery activities was noted to be effective. Both E&PB and onsite system engineering participated in and interfaced with the outage organization on a daily basis. The system engineering group provided strong support during reactor startup and power ascension testing.

On schedule progress was observed in the Hope Creek Configuration Baseline Documents (CBD) project. The CBD project involves the design basis reconstitution of 146 systems and structures for Hope Creek. Twenty four systems were completed during this SALP period. The CBD project has delivered quality products. The licensee also implemented the computerized Document Information Management System (DIMS) to complement the hard copy CBD for the completed systems.

E&PB worked well with onsite system engineering. The establishment of an E&PB small design change project group, coupled with an effective plant modification design change process, has been effective in reducing the system engineering group workload. This has resulted in increased system engineering presence in the field. However, significant weaknesses were found in engineering's development of the safety related motor operated valve (MOV) program in response to Generic Letter 89-10. Several recommended actions of the generic letter were not properly addressed. For example, due to a lack of management attention and poor communications, the development of a program to address safety related MOVs was slow and well behind the committed schedule; switch setpoint values for safety related MOVs were not properly communicated to the maintenance department from the engineering department, and the switches were set improperly; and known industry issues, such as diagnostics inaccuracies, differential pressure testing, trending of failures, and periodic verification of MOV capability were not adequately addressed in the program.

Improvements were noted in the engineering procurement activities. Until 1990, the licensee had no formal procedure for controlling the commercial grade item dedication program. The Hope Creek program was based on the EPRI guidelines, was fully implemented, and worked very well. However, spare parts deficiencies, involving documentation and planning, continued, including: (1) inadequate supply of replacement parts resulting in the seismic monitoring system being out of service during a seismic event; and (2) environmental qualification inadequacies for nuclear instrumentation system detector connectors.

Engineering's Self-Assessment Program emphasized the key performance elements to the engineering and management personnel. By setting goals and tracking them and by having upper management support, significant improvements have been achieved in the areas of overdue item reduction, safety evaluation quality and design change progress timeliness.

The submittals and supporting analyses for license amendment requests were generally well written and technically sound with one exception; the incorrect classification of the suppression pool water temperature instruments (Category 1 vs. Category 2). The need for NRC additional information requests was infrequent. However, Hope Creek responses to

generic issues were in some cases incomplete or inadequate. For example, the Hope Creek responses to the Station Blackout Rule (SBR) were determined to be incomplete. Conclusions that Hope Creek complies with the SBR could not be drawn from the licensee's submittals. As discussed above, the response to GL 89-10 and its supplements was inferior.

Summary

Hope Creek has been aggressive in identifying and following up on engineering related deficiencies. The corrective actions taken as a result of the recirculation system pipe weld crack is a good example. Significant weaknesses in the development of the safety related MOV program were observed. Weaknesses were also observed in Hope Creek responses to the Station Blackout Rule, in the initial root cause evaluation associated with the FRVS heater fuse failures, and in responses to the NRC regarding Generic Letters. Despite these weaknesses, E&PB and onsite system engineering worked well in providing technical support to the plant. Improvement in the engineering procurement program was observed however, some minor problems were noted relative to documentation and planning.

III.F.2 Performance Rating: Category 2

III.F.3 SALP Board Comment

There was a distinct difference in quality between the licensee's responses to generic issues and its other submittals. The licensee should pay particular attention to improving the overall quality of its responses to generic issues.

III.G Safety Assessment/Quality Verification

III.G.1 Analysis

The previous SALP rated Safety Assessment/Quality Verification (SA/QV) as Category 1. The Hope Creek licensee was commended for having a well run, safety conscious organization. Management was noted as being involved with the plant on a daily basis, and for making its safety conscious attitude known throughout the plant. The licensee effectively identified problem areas and ensured prompt and effective corrective actions. However, isolated personnel errors continued to be an area meriting additional management attention.

Throughout this period, individual performance was very good. Direct supervision at the site by first and second line supervisors and comprehensive management oversight of station activities were strengths. However, personnel errors continued in all functional areas. Additionally, four automatic scrams from power occurred during this SALP period, including one attributed to the SA/QV area. The scram attributed to SA/QV was a repeat reactor scram due to a moisture separator high level induced turbine trip. The licensee review of an identical scram, in January 1990, did not completely identify all of the causal factors of the

event. Otherwise, licensee actions to determine root causes of personnel errors and scram rates were thorough and aggressive. An independent root cause analysis of the twelve scrams occurring since August 1988 was performed. Management endorsed the report's findings and implemented a wide range of corrective measures based on the report's recommendations. No scrams occurred during the second half of the assessment period. Another exception to this good personnel performance was when chemistry, training and emergency preparedness personnel failed to adequately follow procedures associated with post accident sampling system (PASS) operations. Consequently, deficient conditions involving the operability of the PASS were not documented or corrected promptly.

As mentioned in the Engineering/Technical Support section of this report, the licensee's amendment and relief requests were generally of high quality, technically sound and complete. The staff rarely required additional information to evaluate the licensee's proposal. Although the licensee's amendment requests were generally technically well written, there have been numerous administrative errors in their submittals during this SALP period. Two NRC Regional Waivers of Compliance were processed during this SALP period. One licensee submittal was well written and demonstrated good engineering practices. However, weaknesses were identified in a second submittal concerning the replacement of a safety auxiliaries cooling system pump casing relative to the completeness of the technical information and the safety basis determination. This occurred early in the period. Additionally, as previously noted in the Engineering/Technical Support section, the licensee's responses to NRC GL 89-10 Supplement 3 and the Station Blackout Rule were not technically adequate.

As discussed in the engineering/technical support section, Engineering and Plant Betterment (E&PB) generally performed well. However, one major exception was a lack of management attention and oversight regarding the motor operated valve (MOV) program. Poor communications among plant maintenance, licensing and E&PB personnel were contributing factors in this poor performance.

The Station Operations Review Committee (SORC) provided consistent and effective review of significant plant issues, including design changes, post-scram reviews and reportable events. Following repeated multiple failures of the filtration, recirculation and ventilation system (FRVS) heater fuses in May and July, 1991, the SORC met on several occasions to perform an in-depth review of the root causes, safety implications and proposed corrective actions. While the licensee was not aggressive in its response to the May 1991 fuse problem, actions taken following the July 1991 event were thorough and effective.

The licensee's major event review process, the Significant Event Response Team (SERT), was effective during this period. In addition to the comprehensive scram review, a review of the November 1990 high moisture separator level scram led to significant enhancements in

turbine control valve surveillance testing. Recommendations generated from SERT reviews were promptly acted upon by management and tracked in the licensee's Action Tracking System.

The Safety Review Group (SRG) and Station Quality Assurance (SQA) have demonstrated effective independent reviews of Hope Creek issues. For example, SRG performed a detailed and effective review of the safety evaluation process. SQA performed a thorough review of personnel errors and recommended effective corrective actions. Both the SRG and SQA provided assistance to all SERT efforts, and SRG led and managed the detailed scram review effort.

The licensee generally took aggressive action to review its reportable events. Licensee Event Reports (LERs) were well written and accurate. A large number of the LERs submitted during this SALP period listed a previous occurrence of a similar reported event (e.g., FRVS fan automatic starts).

Hope Creek conducted its third refueling outage during the period. Outage preparations were excellent. The licensee employed many lessons learned from the previous post refueling outage critique, which resulted in outage completion essentially as scheduled despite significant emergent work. SQA was effective during all phases of the outage, performing a large number of performance based surveillance and hold point activities. The continuous 24-hour day coverage provided by SQA was a noted strength, as was management involvement during all phases of the outage. PSE&G instituted an incentive plan involving both Hope Creek and Salem personnel in order to increase the focus on plant safety, job quality and attention to detail. Overall outage performance was very good and no safety significant concerns were identified.

Hope Creek station management, including the General Manager and department heads, provided effective and safety conscious oversight of station activities on a daily basis. This was evidenced in daily meetings with the senior nuclear shift supervision and operating crew and in management accountability meetings. In addition, the General Manager conducted effective State-of-the-Station meetings twice a year. Corporate management was highly visible relative to Hope Creek station activities. Operations personnel exhibited a professional and questioning attitude during the performance of the their duties. A good safety perspective was noted involving the discovery, evaluation and actions taken when drywell unidentified leakage significantly increased in September 1990.

Summary

Hope Creek continued to be a well run, safety conscious facility. The licensee's management of the third refueling outage was a noteworthy strength. The licensee effectively identified problem areas, and ensured prompt and effective corrective actions. Individual performance was very good; however, isolated personnel errors continued to be an area meriting additional attention. Lack of management attention and poor interdepartmental communications resulted

in an inadequate response to the motor operated valve program. Safety review committees and quality assurance groups provided effective and independent oversight of activities.

III.G.2 Performance Rating: Category 1

III.G.3 SALP Board Comment

While the Board considered that the licensee, overall, continued to achieve excellent performance in this area, isolated instances of management inattention and poor communication contributed to the insufficient quality of PSE&G's responses to generic communications pertaining to motor operated valves and the station black-out rule. As expressed in III.F.3, prompt management attention to this area should prevent performance decline.

IV. SITE ACTIVITIES AND EVALUATION CRITERIA

IV.A Licensee Activities

The Hope Creek unit began the SALP period operating at full power. The unit automatically scrammed on November 4, 1990, when one main steam isolation valve inadvertently closed at full power due to a rupture of the primary containment instrument gas line. The unit then proceeded to cold shutdown to perform maintenance and followup activities for the reactor scram.

The unit was restarted on November 14, 1990, and the turbine generator was synchronized on November 15, 1990. On November 17, 1990, the unit automatically scrammed from 100% power due to a main turbine trip during valve testing. The unit was restarted on November 18, 1990.

The unit was shutdown on December 26, 1990, to commence the third refueling outage. The unit restarted from the refueling outage on February 16, 1991. A reactor scram on reactor water low level from 24% power occurred on February 19, 1991. The unit restarted on February 21, 1991; however, a shutdown due to excessive generator hydrogen leakage was performed on February 23, 1991. Restart from this forced outage occurred on March 2, 1991.

On May 7, 1991, the unit automatically scrammed from 100% power due to low water level caused by a feedwater control malfunction. The unit restarted on May 11, 1991.

Small power reductions were performed throughout the period to perform maintenance and testing activities. At the end of the SALP period, the unit had operated continuously for 231 days.

IV.B NRC Inspection and Review Activities

Four NRC resident inspectors were assigned to Artificial Island during the assessment period. NRC team inspections were conducted in the following areas:

-- Emergency Preparedness Inspection conducted on October 29 through November 2, 1990, to observe the Artificial Island annual exercise.

-- Training programs team inspection at the Nuclear Training Center on April 1 through 5, 1991.

-- Motor Operated Valve Inspection conducted at Hope Creek on July 15 through July 19, 1991, to assess licensee response to Generic Letter 89-10.

IV.C SALP Evaluation Criteria

Licensee performance is assessed in selected functional areas, depending on whether the facility is in a construction or operational phase. Functional areas normally represent areas significant to nuclear safety and the environment. Some functional areas may not be assessed because of little or no licensee activities or lack of meaningful observations in that area. Special areas may be added to highlight significant observations.

The following evaluation criteria were used, as applicable, to assess each functional area:

1. Assurance of quality, including management involvement and control;

2. Approach to the identification and resolution of technical issues from a safety standpoint;

3. Enforcement history;

4. Operational events (including response to, analysis of, reporting of, and corrective actions for);

5. Staffing (including management);

6. Training and qualification effectiveness;

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: Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a superior level of performance. NRC will consider reduced levels of inspection effort.

Category 2: Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a good level of performance. NRC will consider maintaining normal levels of inspection effort.

Category 3: Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in an acceptable level of performance; however, because of the NRC's concern that a decrease in performance may approach or reach an unacceptable level, NRC will consider increased levels of inspection effort.

The SALP report may include an appraisal of the performance trend in a functional area for use as a predictive indicator. Licensee performance during the assessment period is examined to determine whether a trend exists. Normally, this performance trend would only be used if both a definite trend is discernable and continuation of the trend would result in a change in performance rating.

The trend, is used, is defined as:

Improving: Licensee performance was determined to be improving during the assessment period.

Declining: Licensee performance was determined to be declining during the assessment period and the licensee had not taken meaningful steps to address this pattern.

ENCLOSURE 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

MAR 2 5 1992

Docket Nos. 50-272
50-311
50-354

Public Service Electric and Gas Company
ATTN: Mr. Steven E. Miltenberger
Vice President and Chief Nuclear Officer
Post Office Box 236
Hancocks Bridge, New Jersey 08038

Gentlemen:

Subject: Initial Systematic Assessment of Licensee Performance (SALP)
Report Nos. 50-272/90-99, 50-311/90-99, and 50-354/90-99

On February 26 and 27, 1992, an NRC SALP Board conducted a review to evaluate the performance of activities associated with the Salem Generating Station, Unit 1 and 2, and Hope Creek Generating Station, respectively. The results of these assessments are documented in the enclosed Initial SALP reports for the period between August 1, 1990 and December 28, 1991. As previously agreed, we will hold a meeting with you and your staff at 10:00 a.m., April 15, 1992, at the Salem Site Processing Facility, Hancocks Bridge, New Jersey, to discuss the findings of these Initial SALP reports. You should be prepared to discuss these assessments and any plans to improve performance. In accordance with NRC policy, this meeting will be open for public observation.

During this assessment period we noted efforts to improve or maintain acceptable performance in all functional areas. Relative to the Salem Generating Station we concluded that your performance in this period was consistent with our previous evaluation, though some improvement was noted in Radiological Controls. Also, the previously declining trend in Maintenance/Surveillance performance was arrested. Relative to the Hope Creek Generating Station we also concluded that your performance was generally consistent with our last evaluation. However, we observed a decline in Engineering/Technical Support primarily as a result of insufficient management attention directed toward programs to verify and validate the adequacy of certain Motor Operated Valves. While some deficiencies were identified, the SALP Board concluded that the Salem and Hope Creek Generating Stations are safely and conservatively operated, and are being maintained in accordance with regulatory requirements.

Upon completion of our discussion of these SALP reports on April 15, 1992, we request that you provide written comments, including any correction of factual information, within 20 days of the date of the meeting. The enclosed reports and your responses will be placed in the NRC Public Document Room.

Sincerely,

Thomas T. Martin
Regional Administrator

Enclosure 1
Salem Generating Station, Initial SALP Report Nos. 50-272/90-99 and 50-311/90-99

Enclosure 2
Hope Creek Generation Station, Initial SALP Report No. 50-354/90-99

cc:
S. LaBruna, Vice President - Nuclear Operations
C. Vondra, General Manager - Salem Operations
J. Hagan, General Manager, Hope Creek Operations
F. Thomson, Manager, Licensing and Regulation
L. Reiter, General Manager, Nuclear Safety Review
M. Wetterhahn, Esquire
R. Fryling, Jr., Esquire
D. Wersan, Assistant Consumer Advocate, Office of Consumer Advocate
J. Robb, Director, Joint Owner Affairs, Philadelphia Electric Co.
J. Lipoti, State of New Jersey
A. Tapert, Program Administrator, Office of Radiation Control, Division of Public Health for the State of Delaware
C. Schaefer, External Operations - Nuclear, Delmarva Power & Light Co.
J. Isabella, Director, Generation Projects Department, Atlantic Electric
Lower Alloways Creek Township
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
The Chairman
Commissioner Rogers
Commissioner Curtiss
Commissioner Remick
Commissioner de Planque
K. Abraham, PAO-RI (24)
NRC Resident Inspector
State of New Jersey