ENCLOSURE 2

SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT 50-354/85-98

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

HOPE CREEK NUCLEAR GENERATING STATION

ASSESSMENT PERIOD: NOVEMBER 1, 1985 - NOVEMBER 30, 1986

BOARD MEETING DATE: JANUARY 28, 1987

PRESENTATION TO LICENSEE: APRIL 7, 1987

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I. INTRODUCTION

A. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect observations and data on a periodic basis and to evaluate licensee performance. The SALP process is supplemental to the normal regulatory processes used to ensure compliance to NRC rules and regulations. It is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to licensee management in order to improve the quality and safety of plant operations.

An NRC SALP Board, composed of the staff members listed in Section B below, met on January 28, 1987 to review the collection of performance observations and data in order 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 2.0 of this report.

This report is the SALP Board's assessment of the licensee's safety performance at the Hope Creek Generating Station for the period November 1, 1985 through November 30, 1986. The summary findings and totals reflect a thirteen month assessment period.

B. SALP Board Members

Chairman

W. Kane, Director, Division of Reactor Projects

Members

W. Johnston, Deputy Director, Division of Reactor Safety
P. Eselgroth, Chief, Projects Branch No. 2, DRP
L. Bettenhausen, Chief, Operations Branch, DRS
L. Norrholm, Chief, Reactor Projects Section 2B, DRP
R. Borchardt, Senior Resident Inspector, Hope Creek
E. Adensam, BWR Project Directorate, NRR
D. Wagner, Licensing Project Manager, NRR

Other Attendees

D. Allsopp, Resident Inspector, Hope Creek
R. Gallo, Chief, Reactor Projects Section 2A, DRP
R. Summers, Project Engineer, Section 2B, DRP
M. Shanbaky, Chief, Facilities Radiation Protection Section, DRSS

W. Lazarus, Chief, Emergency Preparedness Section, DRSS
L. Wink, Reactor Engineer, Test Programs Section, DRS
R. Keimig, Chief, Safeguards Section, DRSS

C. Background

C.1 Licensee Activities

The licensee began the evaluation period with construction activities essentially complete and preoperational testing approximately 32% complete. On December 2, 1985, the scheduled initial fuel load date was revised from December 2, 1985 to February 15, 1986, and overall project completion responsibility was transferred from the Vice President - Engineering to the Vice President - Nuclear. The Assistant General Manager for Hope Creek operations was assigned the duties of project completion manager. Many of the more significant preoperational tests were conducted during the months prior to fuel load. In addition to the system testing conducted during the early part of this assessment period, significant licensee resources were dedicated to the completion of administrative functions. These administrative functions included the writing and issuance of station administrative procedures, surveillance test procedures, maintenance procedures, and department operating procedures. A large effort was also directed toward reducing the number of outstanding NRC inspection items.

On April 11, 1986, Facility Operating License NPF-50 was issued to PSE&G authorizing operation of the reactor at power levels not to exceed 5% power. Fuel load activities commenced on April 15. Except for a two day delay caused by a faulty refueling bridge power supply cable, fuel loading progressed without a major delay until it was completed on April 27, 1986.

On May 2, 1986, an alert was declared when offsite power was lost to the four vital buses and only two of four emergency diesel generators (EDG) were available for loading. Although only 2 of 4 EDGs are required to satisfy Technical Specifications in operational conditions 4 and 5, the emergency classification guide left no room for interpretation and required the declaration of an alert. The licensee made the required notifications, restored power to the vital buses and terminated the alert within one half hour.

Initial criticality was achieved on June 28, 1986, and was followed by a full core shutdown margin demonstration and a source range non-saturation demonstration.

On June 29, 1986, the reactor scrammed on high intermediate range monitor (IRM) flux. The reactor was in a non-coincidence reactor protection system logic mode at the time (shorting links removed). Having just completed the necessary tests to install the shorting links, the reactor had been placed in a sub-critical condition. Due to decreasing neutron counts, the operator was downranging IRMs. The operator intended to down-range IRM "B", however he incorrectly selected IRM "D", which then exceeded the RPS trip point and a reactor scram resulted. The licensee reinstalled the shorting links, restarted the reactor and resumed startup program testing.

The licensee manually scrammed the reactor on June 30, 1986, to repair the reactor manual control system (RMCS), which had been inserting a continuous rod motion block for unknown reasons. The licensee and General Electric representatives diagnosed the problem as a failed RMCS power supply. The licensee completed RMCS power supply replacement and the unit went critical on July 1, 1986.

On July 4, 1986, the reactor scrammed during heatup for power ascension testing. The scram occurred when an average power range monitor (APRM) channel "E" high upscale neutron trip was coupled with a half scram manually inserted due to narrow range level perturbations. The shift carried out the scram procedure and the plant was placed in a shutdown condition. The APRM channel "E" high upscale neutron trip was attributed to a failed local power range monitor (LPRM) which was subsequently bypassed. The reactor was taken critical on July 7, 1986.

At 6:30 p.m. on July 6, 1986, an alert was declared when tampering was considered a possible cause for the initiation of the diesel generator (DG) building fire suppression system. No water was actually released since the fusible links remained intact. Subsequent investigation revealed that an area detector (heat sensor) malfunction caused the system initiation and that tampering was not the cause. The alert was terminated at 7:30 p.m. on July 6, 1986.

On July 12, 1986, the licensee inserted a manual scram when both "C" and "D" steam flow transmitters in main steam line "B" sensed high steam flow and shut all main steam isolation valves (MSIVs). The high steam flow indication was attributed to transmitter drift. Both "C" and "D" transmitters were replaced and the reactor taken critical on July 13, 1986 to continue low power testing.

During the period from July 15 to July 20, 1986, the unit experienced four separate automatic initiations of the high pressure coolant injection (HPCI) system. During each of the events, the HPCI turbine was tripped before any water was

injected into the reactor vessel. A review of plant conditions prior to, and after the actuations showed that reactor vessel water level remained within the normal range and that the HPCI system should not have received an actuation signal. The licensee's investigation and a subsequent test conducted on July 20, 1986, established the most probable cause for three of these spurious actuations to be workers in the drywell bumping into reactor vessel level sensing lines. For the actuation on July 16, 1986, the cause was determined to be an instrument and controls (I&C) technician valving error. In an effort to prevent further spurious actuations, the licensee placed more stringent controls on access into the drywell and reinforced the importance of proper valve operations to I&C technicians.

On July 19, 1986, the reactor scrammed from approximately 0.5% power due to an operator error in the manipulation of the "B" and "G" IRM range switches. The reactor was taken critical on July 19, 1986, for continuation of the low power test program.

On July 25, 1986, a reactor scram occurred from 3% power due to reactor vessel low water level. Surveillance testing was in progress on the turbine stop and control valves when an operator erroneously shut the valves to start turbine chest warming. This resulted in all bypass valves opening and a reactor high water level due to swell which tripped the two operating feed pumps. Feedwater was not restored before the reactor scrammed on low level. All systems responded normally to the scram. Following a SORC review of the event, the reactor was made critical at 7:48 a.m. on July 26, 1986.

On July 30, 1986, the reactor scrammed while troubleshooting the -22 volt DC portion of the electro-hydraulic control (EHC) logic system. During troubleshooting, the -22 volt DC supply failed and all bypass valves went full open causing a reactor vessel high water level which tripped all feed pumps. The feed pumps could not be restarted prior to receiving a low water level reactor scram. The licensee commenced a reactor startup at 3:15 a.m. on July 31, 1986, and terminated startup at 4:45 a.m. when the rod position indication system (RPIS) failed. The reactor was maintained sub-critical until RPIS troubleshooting was complete and the reactor taken critical later that day.

On August 8, 1986, the licensee declared an unusual event when it was discovered that the reactor building to torus vacuum breaker butterfly isolation valves were inoperable and would have prevented the vacuum breakers from fulfilling their safety function. The plant was shutdown and separate investigations by the plant staff and the offsite safety review committee commenced. It was determined that the differential pressure transmitter sensing lines were connected backwards, such that the isolation valves would close as a vacuum was created in the

torus instead of open as required. The licensee's corrective actions included a complete walkdown of the vacuum breaker system and a verification that similar problems did not exist in other plant systems.

On August 13, 1986, the reactor was placed in operational condition 1 and the main generator was synchronized to the grid. The shutdown from outside the control room test was conducted on August 22, 1986.

On August 31, 1986, the reactor scrammed on low vessel level. Loss of level control occurred during plant startup when a secondary condensate pump was started. The startup control system was controlling reactor level since the feedwater control system does not have single element control capability. The licensee reviewed the event, took the reactor critical, and entered operational condition 1 on September 2, 1986.

On September 6, 1986, the unit scrammed from 38% power due to low water level in the reactor vessel. The low water level condition occurred during reactor feed pump (RFP) minimum flow valve (MFV) response tuning. In preparation for tuning the "C" RFP MFV, the "C" RFP was paralleled with the running RFP. While paralleling RFPs, the "C" MFV began oscillating which resulted in reactor level oscillations and a low level reactor scram. This scram was caused by a combination of operator inexperience and a lack of feed system tuning. The unit returned to power operation on September 7, 1986.

On September 11, 1986, a "Loss of Offsite Power" (LOP) test was commenced as part of the power ascension test program. This test simulated a total loss of offsite power by simultaneously opening the appropriate circuit breakers on the 13.2 KV ring bus and tripping the main turbine. The plant's automatic response was then evaluated, including the fast transfer of selected buses to emergency DC power, the starting and loading of all four emergency diesel generators (EDG), and the automatic sequencing of loads needed to respond to the resulting scram. The LOP test was initiated from approximately 20% reactor power. The reactor plant's response to the resulting transient was within design limits. However, because cooling water flow to the drywell coolers was lost, the Senior Nuclear Shift Supervisor (SNSS) aborted the test and had offsite power restored to the site distribution system. Cooling water flow was lost due to the tripping of the reactor auxiliary cooling system (RACS) pumps. In addition to the loss of RACS, other problems identified during the test included: the failure of the "C" EDG output breaker to automatically close and supply power to the "C" 1E bus, the sustained loss of power to the safety relief valve acoustic monitor panel, the failure of the "B" safety auxiliary cooling system (SACS) pump to restart, and the loss of reactor building ventilation.

The unit remained shut down from September 12 to October 9, 1986. During this outage, the licensee conducted an investigation into the causes for the LOP discrepancies and took corrective actions. In addition to the LOP related activities, the service water pipe elbows at the SACS heat exchangers were replaced due to erosion.

On September 24, 1986, a Confirmatory Action Letter (CAL No. 86-12) was issued to the licensee to confirm that an Augmented Inspection Team (AIT) was being dispatched to the Hope Creek site to assess the anomalies identified during the LOP tests.

After receiving authorization from the AIT team leader, a non-critical OP test was conducted on October 2, 1986. This test was successful in that it satisfied all Level 1 and Level 2 acceptance criteria. In addition to the original LOP test scope, this test also verified the proper operation of a sample of Bailey 862 logic module functions not previously tested. Based upon the satisfactory test results, on October 7, 1986, the CAL was modified and the NRC authorized a plant startup in order to conduct an LOP test with the reactor critical.

The loss of offsite power (LOP) test was conducted from approximately 20% power on October 11. All Level 1 and Level 2 acceptance criteria were met and although a number of observations were made, the test results were determined to be acceptable.

After successful completion of the LOP test, NRC Region I authorized a plant restart for power ascension testing. The unit was brought critical on October 12.

On October 18, 1986, the reactor scrammed on low reactor vessel water level after an I&C technician installed a test box on the "A" reactor feed pump (RFP) flow controller. The test box caused both the "A" and "B" RFPs to run back to minimum flow causing a decrease in water level. The licensee's investigation determined that a wiring error had been made internal to the test box. The test box wiring configuration was corrected prior to the continuation of power ascension testing on October 19.

The facility attained 100% power on November 10.

On November 14, 1986, the reactor scrammed from 97% power after receiving a reactor vessel high pressure signal. The high pressure condition was caused by power ascension closure testing of a main turbine control valve.

The licensee entered cold shutdown on November 16, 1986, in order to conduct various outage repairs. The reactor was taken critical on November 28, for continuation of the power ascension program. The unit remained in operational condition 1 through the end of the assessment period.

C.2 Inspection Activities

Two NRC resident inspectors were assigned to the site throughout the assessment period, and for a total of four months, there were three resident inspectors on site. During this thirteen month assessment period, 9170 hours of direct inspection were performed, which equate to 8460 hours on an annual basis.

During the assessment period, five NRC team inspections were conducted to examine the following areas:

- As-built inspection in the areas of mechanical, electrical, instrumentation and control, and structural systems as well as a review of as-built equipment for selected emergency procedures and Final Safety Analysis Report (FSAR) accident analysis assumptions.

- Technical Specification review to determine whether the draft Technical Specifications and the Final Safety Analysis Report were in agreement with the plant's as-built condition.

- Special inspection of the Hope Creek SAFETEAM program.

- Post accident sampling and monitoring systems inspection to verify the implementation of selected NUREG-0737, Clarification of TMI Action Plan Requirements.

- Operational Assessment Team Inspection to assess the facility's operational effectiveness.

An Augmented Inspection Team was dispatched to the Hope Creek site to review the anomalies that occurred during the power ascension loss of offsite power tests.

Two special inspections were also conducted, as follows:

- An investigation into the cause for the inoperability of the reactor building to suppression chamber pressure relief system.

- An inspection in support of a licensing action related to the deletion of the fire protection Technical Specifications in accordance with Generic Letter 86-10.

This assessment 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 evaluation criteria, a synopsis of these two areas is provided. For example, quality assurance effectiveness has been assessed on a day-to-day basis by resident inspectors and as an integral aspect of specialist inspections. Although quality work is the responsibility of every employee, one of the management tools to measure this effectiveness is reliance on quality assurance inspections and audits. Other major factors that influence quality, such as involvement of first-line supervision, safety committees, and worker attitudes, are discussed in each area. Due to limited inspection activities in the fire protection area, it is not included as a separate functional area in this report. Inspection activity that was performed in the area of fire protection is included in the Plant Operations functional area and related licensing activities are discussed in Section IV.I.1.

Tabulations of inspection activities and associated enforcement actions are contained in Tables 3, 4 and 5. The percentage of total inspection time devoted to a functional area, tabulated in Table 3, is included at the heading of each area analyzed in Section 4.

II. CRITERIA

Licensee performance was assessed in selected functional areas significant to nuclear safety at operating facilities.

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

1. Management involvement in assuring quality.

2. Approach to resolution of technical issues from a safety standpoint.

3. Responsiveness to NRC initiatives.

4. Enforcement history.

5. Operational and construction events (including response to, analysis of, and corrective actions for).

6. Staffing (including management).

7. Training effectiveness and qualification.

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 so 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 are 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 to be strained or not effectively used so that minimally satisfactory performance with respect to operational safety is being achieved.

Trend. The SALP Board may determine to include an appraisal of the performance trend of a functional area. Normally, this performance trend will only be used when both a definite trend of performance is discernible to the Board and the Board believes that continuation of the trend will result in a change of performance level.

Improving: Licensee performance was determined to be improving near the close of the assessment period.

Declining: Licensee performance was determined to be declining near the close of the assessment period.

III. SUMMARY OF RESULTS

3.1 Overall Facility Evaluation

The licensee completed the transition from a construction facility to an operating nuclear power plant during this assessment period. The plant progressed from a 90% complete construction status to being only a few weeks away from commercial operation in a thirteen month period. A very ambitious schedule was established by management, and, although not met for most milestones, it did provide good direction throughout the period. Despite the ambitious schedule, a good perspective on quality and nuclear safety was maintained.

Plant procedures and administrative programs are generally of high quality, due in part to the operating experience evaluation program. Some aspects of the radiation protection program, however, warrant additional management attention. Efforts to improve administrative activities without sacrificing quality are also needed. The incident report program provides excellent feedback of operating experience to all departments.

Control room operations have been conducted in a consistently professional and safety conscious manner. Noise and access control, especially during power ascension testing, have been excellent. Except for two operator-error-induced scrams early in the test program, the operators have performed well throughout the period. The shift turnover meetings, work control group, and Technical Specification interpretations promote good performance in the operations area. Areas which warrant attention include: maintenance of control room logs, reducing the number of alarming annunciators and reducing the number of unplanned scrams and reportable events.

The organization is generally well staffed with qualified personnel. The radiological and chemistry department vacancies which have been recently created need to be filled promptly in order to provide the necessary supervisory oversight. Approximately one-third of all reportable events were attributable to personnel error (mostly during surveillance tests). The major contributor to these events has been spurious initiation signals of the engineered safety features (ESF). The occurrence rate of these events has been significantly reduced by comprehensive corrective action programs.

Overall, a solid foundation has been established for the first cycle of plant operation. Management support is evident, particularly in the areas of emergency planning, security, and quality assurance. The licensee recognizes the need for additional attention to support programs, in particular, radiological controls.

3.2 Facility Performance

Functional Area		Category Last Period (11/1/84-10/31/85)	Category This Period (11/1/85-11/30/86)	Recent Trend
A.	Plant Operations	1*	2	
B.	Radiological Controls	2	2	
C.	Maintenance	2	1	
D.	Surveillance	Not Evaluated	2	
E.	Emergency Preparedness	2	1	
F.	Security and Safeguards	1	1	
G.	Outages	Not Evaluated	No Rating	
H.	Preoperational and Startup Testing	2	2	
I.	Licensing Activities	2	1	
J.	Training and Qualification Effectiveness	Not Evaluated	2	Improving
K.	Assurance of Quality	Not Evaluated	2	

* This area was titled Operational Readiness in the previous SALP

IV. PERFORMANCE ANALYSIS

A. Plant Operations (33%, 3030 Hours)

1. Analysis

The functional area of "operational readiness" was evaluated to be Category 1 during the previous assessment period. Some weaknesses were identified but the general conclusion was that the transition from construction to operations was well controlled, staffing was adequate and experienced, training programs were effective, and administrative controls under development appeared generally adequate. The SALP Board recommended that the applicant provide NRC an operational readiness presentation, based on a self appraisal, which was completed during April, 1986.

The operations area was under continual review by two resident inspectors for the entire assessment period and by a third resident for a total of four months. In addition to the resident inspectors, this area was reviewed by preoperational and startup program inspectors, the augmented inspection and operational assessment teams, and senior NRC management during numerous site visits. Two sets of initial operator licensing examinations were given to a total of 25 candidates during February and July, 1986. Training and qualification effectiveness is discussed in Section J of this report.

Plant operations have been conducted in a consistently conservative and safety conscious manner. The transition of project completion responsibility from the Vice President - Engineering to the Vice President - Nuclear on December 2, 1985 (5 months prior to fuel load), helped change the focus from construction completion to plant operations. Assigning the assistant general manager for Hope Creek operations to the position of project completion manager and providing him with the resources necessary to do his job, significantly contributed toward establishing a high standard of performance and emphasis on nuclear safety. A safety conscious attitude was apparent throughout the entire Hope Creek operations organization. Senior plant management is intimately involved with the day-to-day operation of the plant. The station's general manager and all department managers attend a daily management meeting to discuss current issues and establish priorities for future activities. The Vice President - Nuclear occasionally attended these meetings. All work activities are scheduled by the planning department based upon the priorities established by management and input from the work group supervisors. This method of planning and scheduling has worked well throughout the power ascension program and has ensured that the "big picture" was maintained. The station operations

review committee (SORC) has generally done a thorough job of overseeing plant operations. The offsite safety review group performed a number of in-depth reviews including an independent investigation into the causes for the inoperability of the reactor building to suppression chamber pressure relief system. In addition to an accurate assessment, their recommended corrective actions were timely and effective.

The licensee has been responsive to NRC concerns both prior to, and since, plant licensing. Major NRC team inspections such as the As-Built, Technical Specification, Augmented Inspection Team, and the Operational Assessment Team inspections received timely and effective support during the assessment period. Prior to plant licensing, all appropriate NRC open items were resolved. The licensee's commitment tracking system has ensured prompt resolution of outstanding inspector concerns. Numerous briefings were conducted for the NRC on spurious engineered safety feature (ESF) actuations, Bailey 862 solid state logic modules, the inoperable reactor building to suppression chamber pressure relief system, and the loss of offsite power tests.

Plant procedures and administrative controls are thorough and based upon a review of over 3000 documents such as IE bulletins, circulars, information notices, INPO documents and vendor recommendations. However, in an effort to incorporate these numerous requirements, recommendations, and good practices, a large administrative burden has been created for the plant staff. Occasionally, this burden impacts negatively on the implementation of the overall program. A review of the equipment malfunction identification tagging (EMIT) system identified a large percentage of tags on equipment in the plant were no longer valid, and system walkdowns by the NRC have identified a number of discrepancies in the tagging request inquiry system (TRIS) valve lineups. It appears that this administrative burden contributed to a month long delay in determining the inoperability of the reactor building to suppression chamber pressure relief system.

The Operations Department has a more than ample number of both licensed and non-licensed operators to meet staffing requirements and man a 5 shift rotation with a minimum use of overtime. The control room is consistently maintained in a professional manner with very good access and noise control. Noise control is especially aided by the plant page system design which prevents routine pages from being heard in the control room. The control room environment is also aided by the use of a work control group that processes all work orders, surveillance tests, and blocking permits outside of the control room with the exception of the senior nuclear shift supervisor's (SNSS) final approval.

The narrative control room log needs to be improved. On occasion, the logs have been found to lack detail and are inconsistently maintained among different shifts. In addition, there is significant duplication of information between the SNSS, shift supervisor, and control room operator's logs. Also, the control room alarm system needs to be improved. The large number of overhead annunciators that are in alarm at any given time, interferes with the ability to understand current plant conditions. During full power operations, over 50 annunciators in alarm have been observed.

With the exception of two violations identified shortly after initial licensing, no further Technical Specification adherence problems have been identified in the operations area. The establishment of a formalized TS interpretation log has aided the operators in establishing a consistent and well thought out approach to TS compliance.

Shift briefings conducted by the SNSS in the operations support center are noted as a strength. Pre-shift briefs are conducted for both the operators and all other support organizations. Despite the pre-shift briefings, the interface between operations and chemistry needs improvement. A number of TS action statement violations involving a failure to take a sample have occurred, partially as a result of inadequate communications between departments.

Control room operator errors directly caused, or may have contributed to, 3 of the 14 unplanned scrams during the power ascension program. (All plant scrams are described in Table 6 of this report.) Although higher than desired, this number appears consistent with other recently licensed BWRs. There have been 89 reportable events since low power license issuance on April 11, 1986. Of these events, 47 can be categorized as personnel errors and/or new procedure problems. The major contributors to the reportable events are: 7 loss of coolant accident (LOCA) signals, 9 engineered safety feature (ESF) actuations, and 5 high pressure coolant injection (HPCI) system actuations. The majority of these spurious signals share the common root causes of valve misoperation, and inadvertent contact with sensing lines during drywell work. The licensee formed a task force to investigate these events and completed the following corrective actions: (1) installed quick disconnects on instruments, (2) installed identification tags on sensing lines, (3) installed protective cages around instrument racks, and (4) blew back instrument lines to remove entrapped air. Based upon recent performance, these corrective actions have been effective.

The licensee has implemented a strong housekeeping program throughout the plant. An integral part of this program is the plant management tours made on a routine basis and the follow-up inspections to verify implementation of corrective action. A plant painting program is being implemented that should also improve the plant's appearance. Considering the status of the plant during this assessment period, housekeeping and cleanliness are adequate.

During the assessment period, two inspections were performed to review the licensee's fire protection program, the system's installation, and the FSAR and Technical Specifications for compliance with Generic Letter 86-10. During these inspections, corporate and site management exhibited thorough and aggressive involvement with, and control of, fire protection program activities. It was also evident that priority was given to problems requiring hardware solutions. The licensee requested deletion of the fire protection Technical Specifications as recommended in Generic Letter 86-10. The NRC determined that deletion of these Technical Specifications was in accordance with the guidance provided in the Generic Letter and that existing fire protection requirements have been incorporated into plant procedures and equivalent administrative controls exist to control these activities. It was concluded that adequate controls exist to evaluate fire protection program changes and ensure the ability to achieve and maintain safe shutdown in the event of a fire. Staffing for the fire protection program and training of personnel were judged to be adequate.

In summary, the proper perspective on safety has been established throughout the plant staff and station procedures. Control room operator performance during plant transients and events has been a noteworthy strength. Strong management attention is evident in the day-to-day operation of the facility.

2. Conclusion

Rating: Category 2

Trend: None

3 Board Recommendations

Licensee: Evaluate methods to improve administrative activities consistent with safe plant operations.

NRC: None

B. Radiological Controls and Chemistry (6%, 592 Hours)

1. Analysis

During the previous assessment period, the licensee's performance was evaluated as Category 2 in the area of Radiological Controls and Chemistry. Weaknesses identified during the period were: a lack of adequate licensee oversight and attention to detail in the development of the radiation protection program; a need-to improve coordination and communication between the operations, radiation protection, and chemistry groups; and a lack of adequate justification to support deferral of operability of certain process radiation monitors.

Inspection early in this period found a continuation of the radiation protection program development problems identified during the last period. These included inadequacies in the radiation work permit program, high radiation area access control program, and airborne radioactivity sampling and analysis program. A number of technical deficiencies in procedures were also identified and were attributed to inattention to detail during procedure reviews by the station and corporate radiation protection group. These problems were attributed to the lack of a thorough operational readiness review of the program by the licensee. Although QA audits of selected elements of the radiation protection program were performed, they focused primarily on procedure compliance and not on program adequacy. While a limited operational readiness assessment of station radiation protection program adequacy was performed by the corporate radiation protection group, the assessment findings were not tracked to resolution or verified closed by the corporate group. The licensee initiated aggressive action to resolve subsequent NRC findings. The findings were prioritized and contractor support was obtained to assist in their resolution. Despite the number of findings, the licensee was able to adequately resolve them to the satisfaction of the NRC prior to issuance of the low power license. In order to further upgrade the program, the licensee, after issuance of the low power license, initiated a contractor review of the entire program to identify other weaknesses. The findings are tracked by computer to resolution and monitored by management. The effectiveness of this review has yet to be verified.

A contributing factor to the lack of adequate program development was a reorganization of the station radiation protection group which resulted in the loss of some key supervisory personnel and the lack of a fully staffed corporate radiation protection group. The losses adversely affected the corporate group's capability to provide normal program development support. At the close of the assessment period some positions remained vacant and administrative procedures had not

been updated to reflect revised reporting chains and personnel responsibilities. Experienced contractor personnel were effectively used to augment the organization.

Due to the low radiation and radioactive material source terms, the radiation protection program was not sufficiently challenged to allow NRC to fully evaluate oversight and control of in-plant radiological work activities. However, limited NRC review of radiation protection technician performance in the field, and review of an unplanned exposure to the hand of a technician indicated weaknesses in the supervisory oversight of initial program implementation and the training program for some technicians. Also, the assignment of a junior technician to handle radioactive sources was considered inconsistent with the goal of assuring that personnel are assigned to tasks commensurate with their training and experience.

A need to increase supervisory oversight of activities in the radiation protection area was evidenced by the following: some technicians using improper meters to perform radiation surveys, inadequate documentation of radiation surveys, lack of consistent performance of surveys, and use of inadequate radiation work permits to control work with radioactive sources. The licensee initiated appropriate action to review and resolve the deficiencies associated with the identified problems. Technicians were reinstructed regarding proper meter use and documentation of surveys, source control was tightened, and reviews of program implementation were initiated. The training program was permanently revised to address the identified problems. In addition, supervisors were counseled and directed not to assign individuals, including junior technicians, to tasks for which they had not been qualified.

The special inspection to review implementation of NUREG-0737 post-accident sampling and analysis recommendations identified a number of problems requiring licensee attention. Although appropriate sampling and analysis equipment was installed and operable, and procedures were in place where needed, NRC review and observation during walkthroughs identified a lack of adequate field testing of procedures, weaknesses in training and qualification of personnel, and weak intragroup communications. The weaknesses identified did not preclude collection of samples but did delay their collection. The licensee initiated aggressive and timely corrective action to address these NRC identified problems. Regarding effluent monitoring and control, NRC review determined that the licensee's recovery from delayed installation/testing of the process and effluent monitors, resulting from the vendor going out of business, was well planned and executed.

Reviews of the ALARA Program found that a management commitment to ALARA was evident. In addition, state-of-the-art techniques are evaluated and adopted as appropriate. Radiation protection personnel have been placed in the planning and scheduling group to provide for effective group interface and understanding of planned work. Although a basic ALARA Program is in place, program elements needing up-grade were the ALARA goals program and on-going job reviews. These areas are being reviewed and evaluated by the licensee in response to NRC concerns.

Reviews of radiation protection facilities and equipment found them to be of acceptable quality. Radiation protection equipment was considered state of the art with ample supplies available. The supplies were adequate to support plant operation, demonstrating adequate management attention to this important area.

Resolution of effluent sample line loss issues associated with the north and south plant vent monitors was delayed due, in part, to the resignation of the Senior Radiation Protection Supervisor-Radioactive Material Control and the subsequent elimination of the position. Personnel were unable to locate contractor line loss test reports and line loss test results were not reviewed, evaluated and incorporated into plant effluent surveillance procedures, demonstrating poor control of records and inadequate evaluation and use of test results.

The water chemistry control program was reviewed and found to conform to generally-accepted industry standards for controlling contaminant ingress, activated product transport, and corrosion of pressure boundary and heat transfer surfaces. Radiological capability test standard intercomparisons showed all measurements to be in agreement. However, comparisons of chemistry measurements for metals and boron were in disagreement and weaknesses in controlling, charting and trending chemical measurements were noted. Resolution of these technical issues was delayed, in part, by the resignation of the Chemistry Engineer.

Reviews of preoperational/startup testing of radwaste systems and initial implementation of the radwaste management program indicated that management attention was directed to developing, implementing, and maintaining a generally effective radwaste management program. The licensee requested and received approval for deferral of test completion for the gaseous and solid radwaste systems into the startup phase. Preoperational testing of the liquid radwaste system showed that the system was able to perform its intended function. Tests were completed in a timely manner and met generally-accepted industry standards for such tests.

The development of the packaging and shipping program was delayed by discussions between the Hope Creek Generating Station and the Salem Station regarding a unified packaging and shipping program. No radwaste shipments from Hope Creek Generating Station were completed during the assessment period.

In summary, NRC reviews at the beginning of the period identified numerous programmatic deficiencies, particularly in the area of radiation protection. These deficiencies were attributed to lack of a thorough review of program operational readiness, reorganizations, and some staff vacancies. However, the licensee was able to prioritize the NRC identified problems and resolve them in a timely manner. The remaining problems indicate a need to strengthen the internal audit program, stabilize the organization, fill identified position vacancies and improve inter- and intra-group communication.

2. Conclusion

Rating: Category 2

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

C. Maintenance (5%, 445 Hours)

1. Analysis

The previous SALP evaluated the maintenance functional area as a category 2. Noted strengths included the maintenance training program and experienced supervisors and managers. The majority of weaknesses identified were associated with the transition from construction to operations, and the shift of equipment responsibility from Bechtel to PSE&G. The SALP Board recommended that this interface problem be resolved in order to prevent problems during the operations phase. Early in this assessment period, the station maintenance group assumed full responsibility for the maintenance of all equipment.

During this assessment period, NRC inspectors conducted administrative program and procedure reviews, and observed a limited number of corrective and preventive maintenance activities.

The maintenance department is adequately staffed with experienced personnel although the use of contractors is still required to complete the required staffing in the instrument and controls (I&C) area. There are approximately 60 personnel in the mechanical and electrical maintenance sections, all of whom are permanent PSE&G employees. Approximately one half of the 80 I&C personnel are contractors. The reliance on contractors is being reduced as new hires complete their required training. These staffing levels appear to be adequate for the plant work load since the number of outstanding corrective maintenance work orders is maintained at approximately 800. Less than 10% of the outstanding corrective maintenance work orders would be categorized as safety-related high priority. The total outstanding work order count is normally higher than 800 because all preventive maintenance (PM), and surveillance tests (ST), are also given work order numbers by the inspection order (IO) program. The IO system appears to be an effective management tool for the scheduling and tracking of periodic PM and ST requirements.

The majority of maintenance department activity has been in the areas of minor valve repair, gasket leaks, early life failure replacements, preventive maintenance, and surveillance tests. Surveillance tests are further discussed in Section D. The major activities observed during this assessment period include control rod drive (CRD) seal replacement, repair and replacement of service water elbows at the safety auxiliary cooling system (SACS) heat exchangers, and replacement of the B residual heat removal (RHR) pump. Although these activities were generally well controlled, some problems were identified. A lack of procedural adherence and a failure to satisfy the appropriate prerequisites was observed during the CRD seal

replacement. Also, the service water system was declared operable following reassembly, even though a deficiency report documenting questionable wall thicknesses had not been dispositioned. The licensee has taken corrective action for these problems, however, there has not been sufficient basis to evaluate their long term effectiveness.

The plant management meetings, shift turnover meetings, and use of a planning department to prioritize and schedule all work activities has been an effective method of placing management's plan into action. The maintenance planners are responsible for developing a complete work package including special instructions, procedures, tool and parts requirements, and retest requirements. This significantly reduces the administrative burden on the worker in the field and ensures a consistency among work packages.

Based upon a limited review in this area, good practices that have been noted are a comprehensive preventive maintenance program, the use of MOVATS on all safety-related, motor operated valves, the incorporation of the operational experience evaluation program findings into procedures, and the development of a master equipment list.

In summary, based upon a limited amount of review, it appears that a good foundation of procedures and programs has been established in the maintenance area. Corrective actions have been taken for procedure adherence and operability determination problems which occurred early in the assessment period. There has been limited activity in program implementation during the period and the organization has not been fully challenged.

2. Conclusion

Rating: Category 1

Trend: None

3. Board Recommendations

Licensee: None

NRC: Maintain normal inspection activity.

D. Surveillance (9%, 823 Hours)

1. Analysis

The surveillance area was not evaluated during the previous assessment period. Surveillance tests performed by the licensee are the responsibility of several departments, depending on the surveillance. The operations, maintenance, chemistry, and site protection departments participate in surveillance testing. This section addresses surveillance tests performed without reference to the particular department involved. Surveillance activities were routinely witnessed by NRC inspectors. Because of problems encountered with the review of preoperational test packages, an increased emphasis was placed on the technical adequacy and performance of surveillance tests during this assessment period. The surveillance program is a well defined, computer based system that utilizes technically adequate procedures. The use of the computerized inspection order (IO) system for scheduling all periodic surveillance tests allows for efficient and generally effective management oversight of the approximately 5000 surveillance tests performed on an annual basis.

Prior to the initial entry into each reactor operational condition, the completion of mode change required surveillance tests was frequently the critical path. Test progress normally lagged the schedule for a number of reasons including:

- Not all surveillance procedures were fully written and approved before needed.

- Technicians were not familiar with all procedures.

- Time delays for equipment failures were not factored into the schedule.

Of the 89 reportable events during this assessment period, 26 are associated with the performance of surveillance tests. Deficient surveillance procedures resulted in, or contributed to, the July 25 scram on low water level and the November 14 scram on high pressure. Schedule pressure and technician unfamiliarity with surveillance procedures contributed to many of the reportable events and to an NRC concern regarding the use of unauthorized temporary procedure changes which altered the intent of the procedure but had not been Station Operations Review Committee (SORC) approved. Based upon recent performance, these problems have been corrected.

Six instances of a failure to perform required surveillance tests or take the action required by the appropriate technical specifications were identified. The lack of effective communication between the operations and chemistry departments has caused failures to obtain and analyze a number of samples required by the technical specifications. It is noted that many of these samples are situational in nature and cannot be placed into the normal scheduling program. The licensee recognizes that a problem exists and has taken steps to improve the situation. There has not been sufficient basis to evaluate the effectiveness of the corrective actions.

On numerous occasions during this assessment period, a single channel loss of coolant accident (LOCA) signal was generated from a not always apparent cause. It appears likely that some of the LOCA signals resulted from valve operations on or around the reactor pressure and level instrument racks which feed the reactor protection and emergency core cooling system logic schemes. However, because the exact cause for all of these LOCA signals could not always be positively determined, the licensee formed a task force to identify the root cause of these LOCA signals. The investigation included a review of all available data. Although no positive determination could be made of the cause for the signals, a comprehensive action plan was carried out. These actions included: blowing back all instrument lines to remove entrapped air, installing identification tags on all LOCA/ECCS instruments and sensor lines, installing quick disconnects on LOCA/ECCS instruments, technician training, review of all LOCA/ECCS surveillance procedures, and installing cages around instrument racks. These actions have apparently been effective since no spurious LOCA signals have been generated during the last four months of the appraisal period.

Regarding effluent monitoring and control, our review found that the licensee's recovery from delayed installation/testing of the process and effluent monitors, resulting from the vendor going out of business, was well planned and executed. However, the simultaneous need for preoperational testing of the monitors and continuous surveillance of those monitors to support early operation led to occasional lapses in Technical Specification surveillance tests. On two occasions, effluent monitors were removed from service and necessary grab samples were not taken resulting in self-identified failures to meet Technical Specification surveillance requirements. The failure to ensure adequate communications among the various testing, operations and technical support groups, and to clearly assign responsibility for declarations of operability/inoperability, contributed to the problems noted.

The licensee implemented adequate local leak rate test (LLRT) and containment integrated leak rate test (CILRT) programs. The tests were conducted using acceptable procedures and equipment, and the test personnel were knowledgeable and well qualified.

In summary, the majority of difficulties experienced in the surveillance area can be attributed to the self-imposed schedule pressures associated with the plant entering the startup phase of testing. The procedures and administrative controls in place are adequate to implement an effective surveillance program. Increased attention is needed to improve communications between departments in order to reduce the number of missed nonroutine surveillance tests.

2. Conclusion

Rating: Category 2

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

E. Emergency Preparedness (5%, 454 Hours)

1. Analysis

During the previous assessment period, the licensee was evaluated as Category 2 in the area of Emergency Preparedness. That assessment was based on the results of an Emergency Preparedness Implementation Appraisal (EPIA) conducted on August 12-16, 1985, observation of the annual exercise held on October 29, 1985, and two routine inspections. Several critical emergency planning (EP) program areas were determined to be incomplete and indications were that management attention had been diverted from Hope Creek EP capabilities development to (i) upgrading the Salem EP program and (ii) corporate reorganization. The licensee's performance during the October 29, 1985 exercise was good with only a few weaknesses noted.

During this assessment period, there were two inspections. One inspection was a follow-up emergency preparedness inspection conducted February 3-6, 1986, of concerns identified during the August 1985 EPIA. All but two of the concerns identified during the EPIA had been resolved. One unresolved item related to incomplete emergency preparedness training since sufficient numbers of personnel had not been qualified to provide a 24 hour emergency staffing capability. The licensee committed to complete key personnel training and provide qualified staff prior to exceeding 5% power. The licensee affirmed, in writing, on April 8, 1986, that training had been completed and would be maintained. Full staffing capability was satisfactorily demonstrated during the November 12, 1986 full-participation exercise. A second unresolved item involved the radiation monitoring system (RMS). The installation, calibration, functional testing and operability of process and effluent monitors has now been confirmed by reactor health physics inspections. The RMS computer links were completed and computer capability demonstrated. Functionality of the RMS during simulated emergency conditions was confirmed during the November 1986 exercise.

The second inspection included observation of the November exercise. The licensee satisfactorily demonstrated the ability, within scenario limitations, to: identify accident conditions; declare the correct emergency action level; notify governmental authorities; activate and staff emergency response facilities; take proper corrective actions; develop protective action recommendations; interface with governmental authorities including the NRC Director of Site Operations; effectively plan recovery operations; and adequately provide measures to protect public health and safety. In addition, strong performance was noted in the areas of personnel exposure control and radiation surveys. No significant deficiencies were identified; and, overall licensee performance during the exercise was adequate.

The Emergency Preparedness Manager resigned and has been replaced by a staff senior emergency planner promoted to fill the vacancy. The Artificial Island emergency preparedness staff which supports Hope Creek consists of twelve professionals. Management has provided appropriate support of EP.

An Alert was declared on May 2 when offsite power was lost to the vital buses and again on July 6 when tampering was considered a possible cause for a plant fire suppression system actuation. In both cases, notifications were made promptly and the emergency plan effectively implemented.

The licensee has installed a state-of-the-art siren system to meet the requirement for an alert and notification system. This system provides hard copy diagnostics of performance for any one or all sirens. Additionally, an advanced surface water clearing plan for Delaware River surface waters has been developed and was satisfactorily tested during the November 1986 exercise.

The licensee and the State of New Jersey have negotiated an agreement whereby the State receives 10 CFR 50.72 notifications in the same time frame as the NRC as well as the follow-up 10 CFR 50.73 Licensee Event Reports.

FEMA will complete its review of the New Jersey State Radiological Emergency Response Plan for Artificial Island during 1987 to determine if approval is warranted per 44 CFR 350.12. "350" approval has been given to the Delaware Plan, contingent upon a successful siren test.

In summary, the licensee has dedicated sufficient corporate management attention and resources to establish an effective emergency preparedness program. Strong performance has been noted during events and drills.

2. Conclusion

Rating: Category 1

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

F. Security and Safeguards (4%, 348 Hours)

1. Analysis

During the previous assessment period, the licensee was evaluated as Category 1 in the area of Security and Safeguards. The previous SAL assessment of this area was based on reviews of pre-operational activity in the development of a site security program. The licensee was effective in: integration with the Salem security program, resolution of outstanding issues, and training security personnel.

During this assessment period, the licensee completed both the integration of the Hope Creek facility security program with the Salem program and a major upgrade to the security program that began several years ago. That upgrade included a combined access control facility, installation of an integrated security computer system and associated hardware, computerized access control devices, state-of-the-art assessment aids and new personnel search equipment. Those extensive activities were completed by developing and implementing plans in a comprehensive, well thought out and organized manner. Management attention and oversight of the program was evident throughout the period from the smooth transition and relatively trouble-free implementation of program changes. The licensee provided NRC with thorough and clear progress reports and prompt notifications whenever changes to the plans were necessary.

The licensee aggressively addressed previously issued NRC security related guidance during the development of the Hope Creek program. The licensee demonstrated a clear understanding of the safety and safeguards issues and effectively applied Salem program experiences to the Hope Creek program. Solutions to technical safeguards problems were sound, timely and conservative. Concerns identified by NRC were promptly and effectively resolved by the licensee in a competent manner.

The NRC Site Evaluation Team was able to review and certify the Hope Creek security program for implementation with minimal difficulty and delay due to adequate records and preparation. Aggressive corporate management attention to the development and implementation of the security program aided in NRC certification. The licensee has been effective in fostering a highly professional attitude towards maintaining performance objectives of the NRC approved security plans by continued and effective management. The performance of the security systems and equipment has been sound and relatively trouble free since the initial startup period. This performance results from the extensive design, procurement and engineering effort expended on program development. To date, the impact of integrating Hope Creek into the Salem security program has been essentially unnoticeable when viewed from an NRC regulatory perspective.

Corporate management's interest in establishing and maintaining a strong security program was further demonstrated by the high quality of security force performance indicated during a special NRC inspection of the security force training and qualification program. That inspection was conducted to determine the quality and effectiveness of the training program and to measure the ability of security personnel to carry out their assigned duties. The training is conducted by individuals who are experienced and competent in their field and who are assigned to security training only. Training facilities have adequate classroom space and good training aids. Lesson plans are well developed, thorough, and kept current through feedback from supervisory personnel who perform on-the-job surveillance of security personnel performance. The results of the special inspection indicated that the security training program is broad in scope, of high quality, and administered in a highly professional manner. The results indicated extensive corporate and onsite licensee management involvement in the training program as well as a strong positive influence on the part of the contractor's site management and supervisory personnel.

The licensee's security plans, procedures, and instructions are clear, concise and thorough. Letters and reports submitted to NRC are also clear, promptly submitted, technically accurate, and seldom generate questions from the NRC.

The licensee's security management and contract security force supervisors display a very positive and conservative attitude towards plant security issues and compliance with regulatory requirements. These individuals are quick to understand issues that arise during simulated and actual security events and how those issues can impact on plant security.

The security program is strongly supported by the other plant operating divisions on site and frequent interface is evident. The maintenance staff detects unacceptable conditions with security equipment, and then aggressively pursues corrective action before they develop into major problems. When minor problems were found during NRC inspections, security managers were most often already aware of them and were in the process of establishing corrective actions. This degree of cognizance is creditable to a strong internal audit and surveillance program and is further evidence of the licensee's desire to implement a high quality security program.

Security force personnel exhibit excellent morale because of their recognized and respected role onsite, the excellent support they are afforded by the management of all divisions and the quality of the equipment they have been provided. As a result, they carry out their assigned duties and responsibilities in a professional and dedicated manner.

Corporate security management is actively involved in the Region I Nuclear Security Organization and other nuclear industry groups engaged in security innovations and the development of security program standards. This is evidence of management support of the security program at a high level in the licensee's organization.

To ensure continued effectiveness of the security program, the licensee conducts in-house surveillances to monitor the performance of the security organization. Experienced and knowledgeable personnel perform these surveillances and the findings are aggressively pursued to ensure prompt and effective corrective action and feedback to the training program. These surveillances are conducted in addition to the annual security program audit required by the NRC.

Housekeeping of the access control facility and other security areas is noteworthy. The general state of cleanliness demonstrates a high degree of pride and morale on the part of the security force.

The licensee submitted two security event reports pursuant to 10 CFR 73.71(c) during the assessment period. Both events were bomb threats that were adequately responded to by the licensee and were subsequently determined to be hoaxes.

During the assessment period, the licensee submitted a temporary change (TC) applicable to both the Salem and Hope Creek security plans. This TC identified compensatory measures that would be implemented during modifications necessary to consolidate the Salem and Hope Creek protected area. Prior to the submittal of this change, the licensee contacted Region I Safeguards personnel and requested a meeting onsite to review and discuss the modification plans. The resulting TC fully described the issues. The approach to and planning for this modification is another indicator of the licensee's commitment to maintain an effective and high quality security program.

In summary, close licensee management attention to this area has resulted in an effective security program following a smooth transition period during which the Salem features were expanded to encompass the Hope Creek site.

2. Conclusion

Rating: Category 1

Trend: None

3. Board Recommendations

Licensee: None

NRC: Due to the hiring of a new security force contractor, maintain normal levels of inspection.

G. Outages (NA)

1. Analysis

This functional area was not evaluated during the previous assessment period. Additionally, because the plant was in the preoperational and startup testing phases of operation throughout the period, there were no typical outages. Significant maintenance activities were discussed in Section C. For this reason, this assessment will focus mainly on outage management and organization and on the engineering support and planning organizations. .

The licensee has established a planning department that is responsible for the planning, prioritizing, and coordination of outage, as well as routine, work activities. The station's priorities are established at a daily plant management meeting. This meeting is followed by a supervisor's plan of the day meeting where additional manpower, resources, and coordination details are discussed. All departments are represented at both meetings so that a complete picture of plant activities can be established. The written plan of the day schedule is used as the basis for the day's activities and for leading the shift turnover meetings. This entire process fosters good inter-department communications throughout the nuclear department and has the potential of becoming an effective outage management process.

The licensee utilizes a station system engineer concept. Each system engineer is assigned a limited number of systems and is responsible for remaining cognizant of all factors that could affect the system's operability. They have been found to be knowledgeable and were helpful to the various NRC team inspections and the resident inspectors. The systems engineers have done a noteworthy job in root cause determinations and in developing corrective actions for spurious LOCA/ESF actuations, feedwater control problems, and high drywell temperature problems.

The engineering staff has not consistently displayed the initiative to identify and resolve technical problems in the field. For example, the Bailey 862 reliability program, increased vendor failure analysis requirements, and more capable test equipment were a result of the NRC's interest in this area rather than the nuclear engineering staff's initiative. Once problems are identified to the engineering staff, they have displayed the capability to provide adequate technical support. The use of an engineering department single point of contact, who attends the morning management meeting, has promoted effective communications between the Hope Creek operations and engineering staffs.

The Engineering Department has self-identified the need for further improvement and contracted for an independent evaluation of the department with the following results:

- The need to establish a performance measurement system

- The need for simplification of management processes in the following areas:

  - Design Change Requests
  - Management By Objective
  - Work prioritization
  - Project tracking and control
  - Procurement
  - Decision making/communication
  - More effective resource utilization and,
  - More engineering technology utilization

The licensee has established a task force to address the above concerns and is currently taking trips to selected utilities who have demonstrated proven performance in these areas. The task force members are conducting biweekly reviews with the Vice President - Nuclear. Completion of the Engineering Department improvements is set for mid-February 1987.

In summary, the station's method of planning and prioritizing work has been effective throughout the power ascension program. The station system engineers have done a noteworthy job, however as identified by the licensee, the Engineering Department needs to improve performance and responsiveness. Due to the lack of normal outage activities, no rating has been issued in this area.

2. Conclusion

Rating: No rating

Trend: None

3. Board Recommendations

Licensee: Meet with NRC to present the results of Engineering Department task force findings and plans for addressing the findings.

NRC: None

H. Preoperational and Startup Testing (38%, 3478 Hours)

1. Analysis

The functional area of preoperational testing was evaluated to be Category 2 during the previous assessment period. Weaknesses were identified in the area of preoperational test procedure scope, content, adherence and level of review and in the area of system turnover from construction to the startup group. The SALP Board recommended that the applicant be especially thorough in the review of preoperational test results and the overall program and that the applicant ensure that modifications and shifting of test commitments do not negate the results of completed preoperational tests.

During the current assessment period, the licensee achieved a number of major milestones. These included the completion of system turnover from construction, the completion of the preoperational testing program, initial fuel loading, initial criticality and the completion of a significant fraction of the startup testing program resulting in the initial attainment of rated power operation. Inspections of preoperational and startup testing activities were conducted by region-based and resident inspectors. Concerns identified by the inspectors involved inadequate test procedures, failure to follow test procedures, inadequate review of test results and failure to comply with a license condition when making changes to the test program.

The preoperational testing program was judged to be technically and administratively adequate. Senior management personnel were appropriately involved in activities and pursued an aggressive schedule for completion of the program. Staffing levels were maintained throughout the program and test personnel were judged to be qualified and adequately trained.

While improvement was noted from the last assessment period, weaknesses in the system turnover process continued to impact preoperational testing. To meet schedule milestones, systems were turned over from construction to the startup group with numerous incomplete work items. The performance of preoperational tests on these incomplete systems required extensive changes in test procedures and the documentation of many test exceptions. One example of this process involved the station service water preoperational test. The approved test results contained 225 test exceptions, of which 62 remained open at the time the test results were accepted. The numbers of test changes, test exceptions, and retests made the determination of the adequacy of the preoperational testing difficult. In response to these concerns, the licensee agreed to perform Technical Specification surveillance testing and forego credit for completed preoperational tests.

On August 8, 1986, a reactor shutdown was initiated and an unusual event declared after it was determined by the licensee's staff that the reactor building to suppression chamber pressure relief system was inoperable and the plant was operating in violation of Technical Specifications. The subsequent investigation into this event determined that a design drawing error made in 1983 during plant construction caused this system to be inoperable. In the event that a vacuum was created in the suppression chamber, the butterfly isolation valves in series with each vacuum breaker would have remained shut, which would have prevented the vacuum breakers from fulfilling their design safety function. This condition had existed since 1983, and remained undetected until August 8, 1986. The licensee's corrective action included a design change to correct the design drawing error, a review of plant systems for similar design errors, a verification of valve lineups on all reactor building systems and a review of all temporary modifications. No similar problems were identified.

Administrative deficiencies related to the accelerated test schedule were noted by the NRC. Instances of procedure nonconformance, unauthorized deletion of quality assurance mandatory witness points, and inadequate review of test results were identified during the NRC review of the test results of preoperational tests SN-1, automatic depressurization system, and GT-1, drywell ventilation. In response to these identified deficiencies, the licensee committed to improve their review process and added an additional level of review. This additional review was in the form of a test review board that performed an independent technical assessment of procedures and results. While improvement in this area was noted, administrative control of the preoperational testing program continued to be an area of concern for the balance of the program.

The startup testing program was well-defined, technically comprehensive and adequately managed with appropriate administrative controls. The licensee assigned the daily management, planning and conduct of the startup testing program to the NSSS vendor (General Electric). An aggressive schedule for startup testing was established and vigorously pursued during the assessment period. Staffing levels were ample and test personnel were experienced and well qualified. Technical training for test personnel was extensive and included use of the plant simulator for performance training on selected procedures. Lack of senior management involvement in the day-to-day conduct of the test program is viewed as a weakness.

Early in the startup testing program, deficiencies similar to those encountered during the preoperational testing program were identified by NRC inspectors. An approved startup test procedure for initial criticality, Full Core Shutdown Margin, contained numerous deficiencies including incomplete prerequisites and initial conditions, inadequate precautions and limitations, and a technically incorrect method of assessing the acceptance criterion for reactivity anomalies. Testing activities during the initial criticality were poorly coordinated and resulted in the failure to follow approved procedures. The approved test results for Full Core Shutdown Margin were found to contain calculational errors in the determination of reactivity limits for control rod withdrawal.

The licensee's response to these findings was swift, thorough and effective in preventing the recurrence of these problems. To ensure the adequacy of startup test procedures, a Technical Review Board (TRB) was instituted and assigned to review all test procedures. The TRB proved to be an extremely effective tool and a significant improvement in the overall quality of test procedures was noted. Coordination of testing activities during major evolutions was significantly improved by the increased involvement of the senior nuclear shift supervisors in the planning and preparations for testing. Additional personnel were assigned as independent reviewers of test results to ensure that adequate time was available to perform thorough reviews.

On September 11, 1986 the Loss of Offsite Power (LOP) test was terminated early when a number of systems functioned improperly. Among the problems noted were the failure of one diesel generator output breaker to close automatically, the loss of power to the acoustic monitor system, the failure of the reactor building ventilation system and the loss of the reactor auxiliaries cooling system and the emergency service air compressor. Following the test, the licensee initiated an extensive investigation into the causes of the identified deficiencies and took corrective actions to resolve these problems. On September 19, 1986 the licensee performed a noncritical LOP test to verify that the corrective actions taken had been successful in resolving the problems. All problems identified during the initial LOP were verified to have been corrected, however, additional problems were encountered that were not identified during the initial test due to short time span of that test.

Following the noncritical LOP test, the NRC dispatched an Augmented Inspection Team to review the licensee's actions and to follow the resolution of all identified problems. On October 2, 1986 the noncritical LOP test was repeated and all test acceptance criteria were verified to be satisfied. A final demonstration of satisfactory integrated plant response

was performed on October 11, 1986 when the critical LOP test was successfully repeated.

One concern identified by the Augmented Inspection Team involved the adequacy of the licensee's administrative controls for making changes in the startup testing program. A license condition requires that changes in the startup testing program be made in accordance to 10 CFR 50.59. Follow-up investigation revealed that management had failed to establish adequate administrative controls in this area. Licensee's corrective action on this finding included a detailed review and revaluation of all startup testing program changes and the issuance of an administrative procedure to control any future changes.

In summary, senior station management involvement in the startup testing program was judged to be adequate. While they were always very responsive to NRC concerns and consistently instituted effective corrective action, their failure to incorporate the lessons learned in the preoperational testing program into the startup testing program resulted in similar deficiencies and NRC findings early in the program. One significant strength noted was the performance of operations shift personnel during the startup testing program. They consistently maintained a cautious, conservative attitude toward plant operations and testing activities. They were in clear control of all station activities and contributed significantly to the successful coordination of major testing activities.

2. Conclusion

Rating: Category 2

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

I. Licensing Activities (NA)

1. Analysis

During the previous assessment period, the licensee was evaluated as Category 2 in the area of Licensing Activities. The previous SALP assessment was based on the resolution of SER open issues, numerous NRC audits conducted at licensee facilities, and the licensee's responses to NRC initiatives. The assessment noted that the licensee should have been more aggressive in the resolution of certain SER issues and should have been more timely in the resolution of those issues in light of the fuel load date.

This was the first complete SALP cycle in which the Vice President-Nuclear and his staff have been responsible for all site activities. Corporate management has exhibited strong involvement and control in Hope Creek licensing activities. At every major onsite meeting during the SALP cycle attended by NRR, the Vice President-Nuclear actively participated. Similarly, the Vice President-Nuclear and his staff travelled to NRR offices in Bethesda, Maryland on numerous occasions to participate in meetings important to the licensing of Hope Creek. Overall, management has exhibited strong involvement in licensing activities for both special events and day-to-day activities. PSE&G appeared very motivated in producing quality responses to staff questions and exhibited evidence of prior planning in producing responses to NRC concerns. In most cases, responses are sufficiently complete and timely. Decision making is done at a level which assures adequate management review. Management involvement is evident in PSE&G's responses to staff concerns as most responses indicate awareness of policy, design and operational considerations.

During the current rating period all outstanding SER issues were resolved, a number of exemptions to the regulations were processed and granted, a compressed power ascension test program was proposed and submitted to the NRC, and the low and full power operating licenses were issued. In addition, following licensing, a number of Technical Specification amendment requests have been submitted. In all cases, the licensee has exhibited a clear understanding of the issues involved as exemplified by the licensee's effort to "compress" the power ascension test program. For each test, the licensee identified the purpose of the test, the proposed modifications, and provided safety evaluations supporting the requested modifications. During various conversations with the licensee regarding the proposed modifications, the licensee exhibited a very clear understanding of the issues involved. Similarly, the licensee exhibited clear understanding of the issues involved when it

submitted various exemption requests. Each request was accompanied by a detailed safety evaluation in support of the request, and the necessary findings under 50.12a. In each case, it was the licensee's responsibility to demonstrate to the staff's satisfaction the acceptability of the proposed action. The licensee did so with clear knowledge and full understanding of the issues at hand and their implications on plant operations.

Conservatism is routinely exhibited by the licensee when the issue involves safety significance. Most of the licensee's submittals have exhibited careful forethought, consideration of the proposed action, and technically sound responses.

In most cases, technically sound resolutions are proposed initially; however, during this rating period, one example exists where this was not the case. In this instance, involving the testing of Bailey 862 solid state logic modules (SSLMs), the licensee proposed removing a fixed number of module sample population on a regular basis for testing during power operations. Following discussions with the staff, the staff and licensee both agreed that this was not an acceptable test method, and the proposal was superseded. In this instance, the licensee appeared overeager to resolve the NRC concern without assuring itself that a safety concern did not exist. Overall, however, sound resolutions are initially proposed.

In most cases, PSE&G was responsive to staff initiatives. With the exception of not submitting the detailed control room design review Summary Report II on the schedule required by a license condition, most submittals met the deadlines. The licensee has provided timely responses to a number of Generic Letters during this rating period. PSE&G appears to make special efforts in resolving issues in a timely fashion, and with full knowledge of the issues at hand. The licensee's responses are usually technically sound and thoroughly presented and supported. In the few cases where the licensee has not provided sufficiently detailed responses, upon notification of this, the licensee has been very responsive in supplying the needed additional information. Usually this evaluation is provided within twenty-four hours. As noted earlier, acceptable resolutions to issues are initially proposed in most cases.

Positions in the Hope Creek organization, including senior-level management, are well defined. Positions and their associated responsibilities are accurately described in the FSAR and Emergency Plan and appear to be consistent with actual practice. Since the last SALP cycle, PSE&G has filled the vacancies that existed in the organization. The staff has reviewed the qualifications of the individuals filling the previously vacant

positions and found them acceptably qualified. The licensee has maintained a substantial and knowledgeable licensing staff to assure timely and quality responses to NRC concerns.

In conclusion, corporate management is taking a very active role in licensing matters and responses to NRC initiatives continue to be timely, thorough, complete and conscious of safety impacts.

2. Conclusion

Rating: Category 1

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

J. Training and Qualification Effectiveness (NA)

1. Analysis

During this assessment period, Training and Qualification Effectiveness is being considered as a separate functional area for the first time. Training and qualification effectiveness continues to be an evaluation criterion for each functional area.

The various aspects of this functional area have been considered and discussed as an integral part of other functional areas and the respective inspection hours have been included in each one. Consequently, this discussion is a synopsis of the assessments related to training conducted in other areas. Training effectiveness has been measured primarily by the observed performance of licensee personnel and, to a lesser degree, as a review of program adequacy.

The licensee operates and maintains well equipped training facilities which provide training for all of the nuclear departments including operations, I&C technicians, electricians, mechanics, chemists, health physics technicians, machinists, and welders. The Hope Creek training program is modeled after the Salem program which has been INPO accredited in all ten training areas.

The NRC administered two sets of initial operator licensing examinations at Hope Creek during this SALP assessment period (February 1986, and July 1986). A total of 25 Senior Reactor Operator candidates were examined with 22 passing.

Weaknesses identified during the oral examinations included an unfamiliarity with the flow signals to the APRM/RBM systems, ADS logic, and fire protection equipment. It was also noted that several candidates had a fundamental misconception about the operation of the feed water control system (FWCS).

Two unplanned reactor scrams, early in the power ascension program, were a result of control room operator errors. In both cases, an IRM range switch was incorrectly downranged resulting in an IRM-high trip. A difference between the simulator and the as-built feedwater system may have contributed to two other scrams. The simulator does not accurately reflect the as-built condition of the feedwater turbine reset logic and the actions required to reset the turbine from the control room. Because of these differences, the operators were slow to recover a tripped feed pump and the reactor scrammed on low level. Prompt corrective action in the form of shift briefings was taken and simulator upgrades are planned.

Strengths observed during the oral examinations included the candidates' familiarity with safety and major systems (with the exception of the FWCS). Also, most candidates displayed a responsible attitude toward their duties as licensed operators.

A weakness in the ability to interpret and apply the Technical Specifications was noted during the grading of many of the SRO written examinations. Also identified were weaknesses involving the response of the FWCS (as mentioned above) and fire brigade manning exemptions.

The Hope Creek full scope simulator is performing well and is providing a valuable tool for licensed operator training. The simulator was also used to perform validations of all major power ascension tests prior to actual in plant performance. This significantly improved the quality of power ascension test procedures and provided valuable training to both operators and test engineers.

The plant operators, in general, have positive attitudes towards the training program. They felt they have been adequately trained on plant systems and system operations. They also feel the lecture and simulator programs are excellent. Although varying opinions were observed as to the technical adequacy of the written training material, it was agreed that the readability of these materials could be greatly improved. Based upon discussions and direct observation, the performance of licensed operators in the control room has been observed by the NRC to be excellent. The operators are proficient in recovering from plant transients and equipment malfunctions in a competent and professional manner and have demonstrated a consistently improving knowledge of Technical Specifications as evidenced by daily discussions with NRC inspectors. Knowledge of system operational characteristics, familiarity with procedures, and actions on transient response were noted, and are indicative of effective and valid training for licensed operators.

The licensee's corporate and station management involvement in training is good. Training review groups evaluate training on a regular basis and provide feedback to the training program. The training department is well staffed with experienced personnel. Laboratory facilities are excellent and provide hands on training on such things as rebuilding circuit breakers, Limitorque valve operators and motors. The 2 year assignment of licensed operators to the training department is also a positive feedback mechanism.

The training program has been responsive to the requests of various departments on a timely basis. When it became apparent that valving errors by I&C technicians were causing spurious LOCA signals, the training department set up a training instrument rack on site and provided training to all technicians. This training directly contributed to a reduction in spurious signals. In addition, a modified SRO training program is planned for personnel designated as system engineers. It appears that these changes will have a positive impact on the performance of the engineering support groups.

Regarding training and qualification of radiation protection personnel, a documented training and qualification program for radiation protection personnel has been established and implemented. The program consists of formal classroom and on-the-job training. The program is not yet INPO accredited and is based on a job-task-analysis for the Salem Station. Some findings this period (e.g., lack of adequate training for individuals handling sources and improper use of radiation survey instruments) suggest a need to perform a specific job task analysis for radiation protection personnel at Hope Creek and an upgrade of the program as appropriate. The licensee is planning to do this as part of efforts to become INPO accredited in this area.

Management's interest in establishing and maintaining a quality security program was demonstrated by the high quality of security force performance indicated during a special NRC inspection of the security force training and qualification program. That inspection was conducted to determine the quality and effectiveness of the training program and to measure the ability of security personnel to carry out their assigned duties. The training is conducted by individuals who are experienced and competent in their field and who are assigned to security training only. Training facilities have adequate classroom space and good training aids. Lesson plans are well developed, thorough, and kept current through feedback from supervisory personnel who perform on-the-job surveillance of security personnel performance. The results of the special inspection indicated that the security training program is broad in scope, of high quality, and administered in a highly professional manner. Also, the results indicated extensive corporate and onsite licensee management involvement in the training program as well as a strong positive influence on the part of the contractor's site management and supervisory personnel.

In summary, based upon the high examination pass rate and operators performance in the control room, the licensed operator training program is effective. Problems encountered during plant operations were due to inexperienced personnel more than training inadequacies.

2. Conclusion

Rating: Category 2

Trend: Improving

3. Board Recommendations

Licensee: None

NRC: None

K. Assurance of Quality (NA)

1. Analysis

Assurance of Quality is a new separate functional area for this SALP period and 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. Further, this functional area is not an assessment of the quality assurance department alone, but is an overall evaluation of management's initiatives, programs, and policies which affect or assure quality.

During the assessment period, four inspections were performed in the area of quality programs and administrative controls affecting quality. These inspections covered the following areas:

- Administrative procedures, records, design control and modification, review committees and staffing and nonlicensing training for operations;

- Bulletins and Construction Deficiency Reports (CDRs); and

- Licensee actions concerning the Salem ATWS event.

In addition, the implementation of the Quality Assurance (QA) program was reviewed by the resident and region based inspectors in conjunction with other functional areas.

Overall, the licensee appears to have developed a strong program for assuring quality during operations. The licensee established a generally effective program for ensuring the timely issuance of the plant administrative procedures. These procedures are well written, complete and meet the FSAR commitments.

The operating experience evaluation program's review of over 3000 industry documents from the NRC, INPO, and vendors has had a positive impact on the quality of plant procedures. In addition, the incident report program provides a rigorous mechanism to ensure that Hope Creek's own operational experience is evaluated and changes made to procedures when required. All occurrences meeting certain criteria, whether reportable to the NRC or not, are documented and investigated. Each disposition is performed by the appropriate work group and includes the corrective action taken or planned. Station management is required to review and approve the disposition of all incident reports.

In the design change and modification area, the licensee has made major organizational changes with respect to engineering support for plant operations. A new engineering manual has been developed that is a distinct improvement on previous procedures.

In the area of review committees, careful forethought and planning by management in the establishment of the various committees is evident. The Station Operations Review Committee (SORC) has been extensively involved with the preparations for operations since it became functional in July 1984. Since then, the licensee has made significant changes in the SORC review process to enhance the quality and timeliness of committee reviews. Other strengths include the Offsite Safety Review Group initiative to be in the online review of proposed design changes/modifications which exceeds 10 CFR 50.59 requirements. The Offsite Safety Review Group performed a timely and in-depth review of the reactor building to suppression chamber pressure relief system inoperability.

The licensee has implemented an effective program, with adequate staffing to follow-up NRC bulletins, circulars, information notices and CDRs. The evaluation, analysis and resolution of problems and NRC initiatives have been effective and timely.

In the area of licensee actions concerning the Salem ATWS event, licensee management has been aggressive in taking an active part to assure that the ATWS issue receives proper emphasis. This aggressive approach is indicated by the Vice President - Nuclear's letter to station personnel regarding "Commitment Management," and by licensee procedures which have been implemented including the following: Reliability and Assessment Management, Response Coordination, Vendor Interface and Reliability Monitoring. The licensee has established a Response Coordination Team which is responsible for review, approval and implementation of all vendor supplied information, regulatory bulletins, industry standards, engineering recommendations, and operational experiences as applicable.

During this assessment period, the implementation of the QA program was judged as generally very good. Strong points observed during review of other functional areas included extensive QA review of preoperational test results and excellent surveillance coverage of the containment integrated leak rate test (CILRT). One weakness concerns timeliness of addressing quality concerns. QA had previously identified a deficiency involving the use of unapproved temporary procedures for performance of surveillance tests, however, the practice was not corrected until an NRC inspector identified the same concern. Upon subsequent review, the NRC found that

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a large number of QA identified concerns were not responded to in a timely manner by various departments. The licensee has since increased the visibility of QA concerns and improved the timeliness of corrective actions.

The licensee's philosophy on assuring quality at Hope Creek keys on individual achievement of a high level of performance, emphasizing personnel responsibility, accountability, and pride of ownership. In keeping with this philosophy, programs to promote quality awareness and employee involvement have been instituted during this SALP period and appear to be well received by station personnel. Examples of these programs are:

- Plant Material Improvement Programs which include cleanup, painting, and labeling activities in the plant.

- Employee Involvement Program facilitates management/worker interfaces and awards for good performance.

- Quality Awareness Committee comprised of nuclear department volunteers who periodically issue a "Quality Gram" promoting improvements in quality performance.

- Quality Awareness Days are sponsored by individual departments and inform other departments of quality-improvement activities in progress within the sponsor department.

- Quality Concerns Reporting Program enables plant personnel to confidentially express quality concerns to be investigated by licensee QA personnel.

Due to the low radiation and radioactive material source term, the radiation protection program was not sufficiently challenged to allow NRC to fully evaluate oversight and control of in-plant activities. However, a need to increase supervisory oversight of activities in this area was evidenced by: technicians repeatedly using improper meters to perform radiation surveys, less than adequate documentation of radiation surveys, lack of consistent performance of surveys, and use of inadequate radiation work permits to control work with radioactive sources. Although corrected by the licensee when brought to his attention, these examples demonstrate a lack of aggressive oversight of in-plant activities during initial program implementation. A combination of these weaknesses resulted in a technician receiving an unplanned exposure of 1.4 rads to his hands.

Reviews of the external and internal exposure controls program prior to plant licensing found examples of deficient procedures being established and implemented. Examples include a less than adequate: radiation work permit (RWP) program, high radiation area access control program and airborne radioactivity

sampling and analysis program. Although corrected in a timely manner, these examples are indicative of lack of adequate attention to detail during program development and a lack of acceptable reviews.

Quality Assurance review of the technical program development and implementation of the radiation protection program at Hope Creek was limited. Technical evaluation of program procedures was conducted solely by the Station Operations Review Committee. Less than adequate procedures were generated due to insufficient technical review.

Reviews of preoperational/startup testing of radwaste systems and initial implementation of the radwaste management program indicated that management attention was directed to developing, implementing, and maintaining a generally effective radwaste management program. Application of the Quality Assurance program to preoperational tests of the radwaste systems was thorough and demonstrated an effective identification, tracking and closure of test discrepancies. A contingency plan for processing solid radwaste was developed using vendor-supplied solidification equipment temporarily attached to the solid radwaste system. Vendor procedures were reviewed and incorporated as controlled plant procedures and included inspection hold points and other controls governing the vendor's process control programs.

In summary, the licensee has established a generally effective program for ensuring quality. The operating experience evaluation program has had a positive impact on the quality of plant procedures and management has frequently reinforced the role of the individual in assuring quality. However, increased station and corporate management attention is warranted in the radiological controls area.

2. Conclusion

Rating: Category 2

Trend: None

3. Board Recommendations

Licensee: None

NRC: None

V. Supporting Data and Summaries

A. Investigations and Allegation Review

No investigations were conducted during the assessment period.

Five allegations were received during the assessment period.

- Hiring impropriety
- Crack or scratch in a main steam isolation valve (MSIV) poppet assembly.
- Member of Safety Analysis Group does not have a degree.
- Improper drawing control, retests after maintenance, performance of preoperational tests, setup and calibration of radiation monitors.
- Inadequate training in Chemistry Department, unqualified supervisors.

All of the allegations were investigated and no significant safety issues were identified.

B. Escalated Enforcement Actions

On September 24, 1986, a Confirmatory Action Letter (CAL No. 86-12) was issued to the licensee to inform them that an Augmented Inspection Team (AIT) was being dispatched to the Hope Creek site to assess the anomalies related to the Loss of Offsite Power (LOP) tests. The CAL also confirmed that the licensee would take the following actions:

- Defer any additional LOP integrated testing until the NRC AIT team leader determines that such testing can continue.
- Provide any LOP test procedures to the NRC AIT for their review prior to implementation.
- Make available to the NRC AIT relevant written material related to deficiencies identified during the LOP tests conducted on September 11 and 19, 1986, including:
  - preoperational test results
  - surveillance test results
  - component installation and function test records

- Provide a written report to the Regional Administrator prior to restart that includes an analysis of the LOP testing conducted on September 11 and 19, 1986

- Receive Regional Administrator authorization for unit startup.

On October 7, 1986, the CAL was modified to allow a plant startup in order to conduct a reactor critical LOP. The CAL was further modified on October 16 to allow limited continuation of the power ascension test program. Based upon the AIT findings, licensee commitments made in an October 15, 1986 meeting, relating to Bailey 862 modules, and discussions between NRC Region I and PSE&G on October 17, 1986, a letter terminating the CAL was issued on October 21.

On November 17, 1986, an enforcement conference was held to discuss design deficiencies identified during the LOP test, Regulatory Guide 1.97 instrumentation, and the inoperability of the Reactor Building to Suppression Chamber Pressure Relief System. Enforcement action was under review at the conclusion of the assessment period.

C. Management Conferences

- February 27, 1986: SALP management meeting

- March 10, 1986: NRC/Region I - PSE&G readiness for fuel load

- March 11, 1986: NRC/NRR - PSE&G readiness for fuel load

- June 5, 1986: Spurious ECCS actuations, management changes, lessons learned at similar plants during startup, control of work practices

- July 21, 1986: Commission meeting for Hope Creek full power license

- July 24, 1986: Corrective action program to prevent spurious ESF actuations

- September 19, 1986: LOP Test results

- October 15, 1986: LOP Test results and Bailey 862 modules

- November 17, 1986: Enforcement Conference, Design deficiencies, LOP, Vacuum breaker operability, RG 1.97 instrumentation

D. Licensee Event Reports (LERs)

1. Causal Analysis

Eighty-nine LERs, numbered 86-01 through 86-89, were reported during this assessment period. These LERs are characterized in Table 1 by cause for each functional area. Three common causal chains were identified.

a. Emergency Core Cooling System (ECCS) Actuations

Nineteen LERs (354/86-2, 86-7, 86-10, 86-14, 86-19, 86-20, 86-21, 86-23, 86-24, 86-33, 86-39, 86-41, 86-42, 86-43, 86-46, 86-53, 86-54, 86-59, 86-61) describe actuations of the ECCS due to low reactor vessel water level signals. Seven ECCS actuations occurred as a result of personnel error while conducting surveillance tests and nine have unexplained causes. Investigations eventually discovered that ECCS initiations could result when personnel in the drywell stepped on or bumped reactor vessel level instrument piping. While it could not be positively determined that this explanation applied to all unexplained ECCS actuations, the licensee has concluded that it is the most probable cause.

b. Surveillance Testing

Fourteen LERs (354/86-8, 86-9, 86-17, 86-20, 86-21, 86-33, 86-38, 86-43, 86-52, 86-53, 86-57, 86-62, 86-87, 86-89) describe I&C technician personnel errors. Seven LERs (354/86-2, 86-6, 86-13, 86-15, 86-49, 86-55, 86-66) describe events initiated due to I&C procedural errors. Seven of these LERs initiated ECCS equipment and are identified in Section V.D.1.a. of this report.

c. Actuation of Control Room Emergency Filtration (CREF) System

Eight LERs (354/86-12, 86-16, 86-17, 86-25, 86-36, 86-47, 86-74, 86-75) describe inadvertent actuations of CREF. Six CREF actuations occurred due to drift of the high voltage power supply to the ventilation duct radiation monitors. One actuation resulted from an I&C technician error during a surveillance test and another actuation was a result of a design deficiency. The licensee has replaced all high voltage power supplies which have caused inadvertent CREF actuations with an upgraded model.

2. AEOD Review

The Office for Analysis and Evaluation of Operational Data (AEOD) assessed fifteen of the LERs submitted during the assessment period using a refinement of the basic methodology presented in NUREG-1022, Supplement 2. The results of this evaluation, which was sent to the licensee by letter dated January 9, 1987, indicate that Hope Creek has an overall LER score approximately equal with the industry average.

The principal weaknesses identified in the LERs, in terms of safety significance, involve the requirement to provide identification of failed components and the requirement to discuss the safety consequence of the event. The failure to adequately identify the manufacturer and model number of the components that fail prompts concern that others in the industry won't have immediate access to information involving possible generic problems. Deficiencies in the safety assessment discussions cause concerns about whether the potential safety consequences of each event are being identified and evaluated.

A strong point for the Hope Creek LERs evaluated is the discussion of the mode, mechanism, and effect of failed components.

TABLE 1

TABULAR LISTING OF LERs BY FUNCTIONAL AREA

HOPE CREEK GENERATING STATION

(November 1, 1985 - November 20, 1986)

Area	Cause Code						
	A	B	C	D	E	X	TOTAL
A. Plant Operations	13	6		2	12	12	45
B. Radiological Controls	3				1	1	5
C. Maintenance	6	1		1			8
D. Surveillance	13	1		9	4		27
E. Emergency Preparedness							
F. Security and Safeguards							
G. Outage							
H. Preoperational and Startup Testing							
I. Licensing Activities							
J. Training and Qualification Effectiveness							
K. Assurance of Quality		1			1	1	3
Other		1					1
Totals	35	10		12	18	14	89

Cause Codes:
A. Personnel Error
B. Design, Manufacturing, Construction, or Installation Error
C. External Cause
D. Defective Procedure
E. Component Failure
X. Other

TABLE 2

LER SYNOPSIS

Hope Creek Generating Station

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-001	2/15/86	A	Damaging of "D" Diesel Generator
86-002	4/13/86	D	Inadvertent "B" Channel LOCA Signal During Surveillance Test Performance
86-003	4/15/86	A	Inadvertent RPS Initiation During Performance of NMS Component Troubleshooting Activities
86-004	4/16/86	E	Noncoincident Scram Signal Resulting from Neutron Monitoring System Component Failure
86-005	4/16/86	A	FRVS Inoperability During Core Alterations
86-006	4/17/86	D	Primary Containment Isolation Resulting From a Procedural Inadequacy
86-007	4/20/86	X	B Channel Engineered Safety Features Actuation
86-008	4/24/86	A	Missed Surveillance During Initial Core Loading Due to Personnel Error
86-009	4/25/86	A	Inadvertent RPS "A" Trip System Initiation During Surveillance Testing
86-010	4/26/86	X	A Channel Engineered Safety Feature Actuation
86-011	5/02/86	A	Loss of Off-Site Power
86-012	5/4/86	E	Control Room Emergency Filtration Actuation Resulting From Equipment Malfunction

Table 2 (Cont'd)

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-013	5/6/86	D	Inadvertent Isolation of RWCU System During Surveillance Test Performance
86-014	5/6/86	X	D Channel Engineered Safety Feature Actuation
86-015	5/6/86	D	Spurious A Channel LOCA Initiation
86-016	5/8/86	E	A Control Room Emergency Filtration Initiation
86-017	5/9/86	A	Inadvertent Actuation of the "A' Control Room Emergency Filter Unit During Troubleshooting
86-018	5/12/86	B	Failure of Service Water Strainers
86-019	5/13/86	X	D Channel Engineered Safety Feature Actuation
86-020	5/15/86	A	D Channel Engineered Safety Feature Actuation
86-021	5/15/86	A	D Channel Engineered Safety Feature Actuation
86-022	5/16/86	A	Inadvertent Isolation of Reactor Water Cleanup System
86-023	5/19/86	A	B Channel Engineered Safety Feature Actuation
86-024	5/25/86	D	Inadvertent "D" Channel LOCA Signal During Surveillance Test Performance
86-025	5/30/86	A	Power Supply Trip Causes Control Room Emergency Filtration Chiller Activation
86-026	5/30/86	E	Automatic Start of a Control Room Chiller
86-027	6/2/86	B	Installation of Combustible Material in the Traveling Screen Motor Room

Table 2 (Cont'd)

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-028	6/7/86	X	Spurious Actuation of the "A" Channel of the Standby Liquid Control System
86-029	6/11/86	E	Automatic Start of "B" Control Area Chiller
86-030	6/18/86	A	Automatic Start of "B" Control Area Ventilation Train
86-031	6/29/86	A	Reactor Scram Due to Personnel Error in Ranging IRMS
86-032	6/30/86	E	Initiation of Manual Scram for Troubleshooting of Reactor Manual Control System
86-033	7/3/86	A	Inadvertent "B" Channel LOCA Signals During Instrument Calibration Performance
86-034	7/12/86	E	Main Steam Isolation Valve Closure and Subsequent Manual Scram
86-035	7/4/86	E	Reactor Scram Signal Originating From The Neutron Monitoring System
86-036	7/7/86	E	Isolation of The "A" Control Room Ventilation Unit Due to Radiation Monitor Upscale Trip
86-037	7/12/86	A	Failure to Comply With Technical Specifications Action Statement
86-038	7/13/86	A	Missed Channel Checks on Reactor Protection and Isolation Actuation Instrumentation
86-039	7/14/86	X	"A" Channel LOCA Logic Actuation
86-040	7/9/86	A	Inoperable RCIC Actuation Instrumentation

Table 2 (Cont'd)

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-041	7/15/86	X	Inadvertent HPCI System Initiation
86-042	7/17/86	X	Inadvertent HPCI System Initiation
86-043	7/17/86	A	Inadvertent HPCI System Initiation Due to an I&C Error
86-044	7/25/86	E	Reactor Scram on Low Level Resulting from an EHC Transient
86-045	7/19/86	A	Reactor Scram Due to IRM Ranging Error
86-046	7/20/86	X	Inadvertent HPCI System Initiation
86-047	7/29/86	E	Actuation of the Control Room Emergency Filtration System Due To Radiation Monitor Spike
86-048	7/30/86	E	Full Reactor Scram on Low Water Level
86-049	8/1/86	D	Missed Response Time Surveillance Due to Procedure Inadequacy
86-050	8/1/86	D	Reactor Water Cleanup System Isolation on High Differential Flow
86-051	8/3/86	E	Reactor Water Cleanup Isolation on Spurious High Temperature Trip
86-052	8/20/86	A	Violation of the Surveillance Requirements for the Suppression Pool Temperature Monitoring System
86-053	8/4/86	A	"A" Channel LOCA Logic Actuation
86-054	8/4/86	A	"A" Channel LOCA Logic Actuation and Full Reactor Scram

Table 2 (Cont'd)

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-055	8/5/86	D	Primary Containment Isolation Due To Procedure Inadequacy
86-056	8/8/86	A	Inoperable Reactor Building to Torus Vacuum Breakers
86-057	8/8/86	A	Inadvertent Actuation of the "A" Channel NSSSS Isolation Logic
86-058	8/8/86	A	Failure to Sample Results in Technical Specification Violation
86-059	8/14/86	X	"B" Channel ESF Logic Actuation
86-060	8/16/86	B	Violation of Suppression Pool Level Technical Specification
86-061	8/22/86	D	Inadvertent HPCI System Initiation
86-062	9/20/86	A	Failure to Satisfy TS Surveillance Requirement for Leakage Detection Monitors
86-063	8/28/86	B	ASCO Solenoid Valve Air Supply Pressure Rating
86-064	8/31/86	A	Reactor Scram on Low Level
86-065	9/6/86	X	Full Reactor Scram on Low Reactor Water Level 3
86-066	9/7/86	D	Missed Surveillance: Turbine Bypass Valve Testing
86-067	9/15/86	B	SRV Acoustic Monitors Inop: Seals Missing
86-068	9/17/86	A	Missed Surveillance: North Plant Vent
86-069	9/24/86	D	Reactor Scram - IRM/APRM
86-070	10/22/86	A	"C" Core Spray Pump Discharge Pressure Transmitter Isolated

Table 2 (Cont'd)

LER NUMBER	EVENT DATE	CAUSE CODE	DESCRIPTION
86-071	10/4/86	B	PASS Sample Valves Installed in Less Favorable Orientation
86-072	10/3/86	X	Inoperable Reactor Building Exhaust Radiation Monitoring Instrument
86-073	10/3/86	B	Electrical Penetration Assembly Installation Error
86-074	10/2/86	A	Inadvertent Actuation of "B" Control Room Emergency Filtration Unit when Connecting a Recorder
86-075	10/5/86	B	Inadvertent Actuation of "B" Control Room Emergency Filtration Unit During Troubleshooting
86-076	10/5/86	X	Inadvertent Automatic Start of "B" Emergency Diesel Generator
86-077	10/10/86	E	Inadvertent Isolation of Reactor Water Cleanup System
86-078	11/11/86	E	RWCU Isolation
86-079	10/19/86	E	RWCU Isolation on High Differential Flow
86-080	10/18/86	B	Full Reactor Scram on Low Reactor Water Level 3
86-081	10/19/86	E	Isolation of Reactor Cleanup
86-082	10/28/86	A	High Pressure Coolant Injection System Inoperative
86-083	10/30/86	E	ESF Actuation
86-084	10/30/86	A	North/South Plant Vent Monitors Inoperable
86-085	11/14/86	A	Reactor Scram on High Pressure
86-086	11/14/86	X	Reactor Building Ventilation Isolation
86-087	11/17/86	A	ESF-A Channel NSSSS Isolation
86-088	11/18/86	D	Loss of RHR Room Cooling
86-089	11/19/86	B	RWCU Isolation Due to Loose Wire

TABLE 3

INSPECTION HOURS SUMMARY (11/1/85 - 11/30/86)

HOPE CREEK GENERATING STATION

		HOURS	% OF TIME
A.	Plant Operations.	3030	33
B.	Radiological Controls and Chemistry.	592	6
C.	Maintenance.	445	5
D.	Surveillance	823	9
E.	Emergency Preparedness	454	5
F.	Security and Safeguards.	348	4
G.	Outages.	N/A	
H.	Preoperational and Startup Testing	3478	38
I.	Licensing Activities	N/A	
J.	Training and Qualification Effectiveness	N/A	
K.	Assurance of Quality	N/A	
	Total	9170	100

TABLE 4

ENFORCEMENT SUMMARY (11/1/85-11/30/86)

Hope Creek Generating Station

AREA	SEVERITY LEVEL 1	2	3	4	5	DEV	TOTAL
OPERATIONS				4			4
RAD PROTECTION							
MAINTENANCE							
SURVEILLANCE					4		4
EMERGENCY PREP.							
SEC/SAFEGUARDS							
OUTAGES							
TRAINING EFFECTIVENESS							
LICENSING							
ASSURANCE OF QUALITY							
PREOP/STARTUP			1	8	2		11
TOTALS:			1	12	6		19

TABLE 4 (Cont'd)

ENFORCEMENT SUMMARY

INSPECTION REPORT	REQUIREMENT	VIOL. LEVEL	FUNCTIONAL AREA	VIOLATION
354/85-61 12/01/85	APPENDIX B 01/12/86	4	PREOP/ STARTUP	MANDATORY WITNESS POINT BYPASS DURING PREOP TEST
354/85-61 12/01/85	APPENDIX B 01/12/86	4	PREOP/ STARTUP	INADEQUATE QUALITY CONTROL INSPECTION
354/85-65 2/23/85	APPENDIX J 01/03/86	5	PREOP/ STARTUP	VALVE IMPROPERLY OPERATED IN PREPARATION FOR INTEGRATED LEAK RATE TEST.
354/86-03 01/06/86	APPENDIX B 01/17/86	4	PREOP/ STARTUP	INITIAL CRITICALITY PROCEDURES
354/86-06 01/13/86	APPENDIX B 02/09/86	4	PREOP/ STARTUP	FAILURE TO FULLY TEST CORE SPRAY LOGIC
354/86-10 01/27/86	APPENDIX B 02/07/86	4	PREOP/ STARTUP	BYPASSING OF MANDATORY WITNESS POINTS.
354/86-10 01/27/86	APPENDIX B 02/07/86	5	PREOP/ STARTUP	INADEQUATE REVIEW OF TEST RESULTS.
354/86-20 03/17/86	TECH SPECS 04/30/86	4	OPERATIONS	FRVS INOPERABLE DURING CORE ALTERATIONS.
354/86-20 03/17/86	TECH SPECS 04/30/86	4	OPERATIONS	MISSED SBLC SURVEILLANCE TEST.
354/86-30 06/10/86	LCO 3.0.4 & 3.7.4 07/14/86	4	OPERATIONS	TECHNICAL SPECIFICATION VIOLATION: RCIC INOPERABLE DUE TO NO AUTO-SWAP OF SUCTION TO SUPPRESSION POOL.
354/86-32 06/23/86	APPENDIX B 07/03/86	5	SURVEILLANCE	FAILURE TO PERFORM POWER ASCENSION TEST IN ACCORDANCE WITH APPROVED PROCEDURES
354/86-35 07/07/86	APPENDIX B 07/24/86	5	SURVEILLANCE	USE OF A POWER ASCENSION PROCEDURE INAPPROPRIATE TO THE CIRCUMSTANCES

TABLE 4 (Cont'd)

INSPECTION REPORT	REQUIREMENT	VIOL. LEVEL	FUNCTIONAL AREA	VIOLATION
354/86-35 07/07/86	10 CFR 50 07/24/86	5	SURVEILLANCE	FAILURE TO FOLLOW PROCEDURE AND FAILURE TO ADEQUATELY REVIEW TEST RESULT
354/86-41 08/13/86	TECH SPEC 3.6.4.2 09/02/86	3	PREOP/ STARTUP	REACTOR BUILDING/TORUS VACUUM BREAKER ASSEMBLIES INOPERABLE
354/86-41 08/13/86	TECH SPEC 3.3.7.5 09/02/86	4	PREOP/ STARTUP	ACOUSTIC MONITORS NOT POWERED FROM UNINTERRUPTIBLE SOURCE
354/86-40 08/12/86	TECH SPEC 6.8.1 09/08/86	5	SURVEILLANCE	UNAUTHORIZED OPERATOR AIDS
354/86-48 10/14/86	TECH SPEC 6.8.1 11/17/86	4	OPERATIONS	CORE SPRAY PRESSURE TRANSMITTER ISOLATED
354/86-49 10/11/86	10 CFR 50 10/16/86	4	PREOP/ STARTUP	FAILURE TO FOLLOW PROCEDURE FOR TORQUING ROSEMOUNT TRANSMITTER
354/86-53 10/27/86	LICENSE NPF-57 10/31/86	4	PREOP/ STARTUP	FAILURE TO COMPLY WITH LICENSE CONDITION C10 - DID NOT PERFORM TIMELY 50.59 REVIEW

TABLE 5

INSPECTION REPORT ACTIVITIES (11/1/85-11/30/86)

Hope Creek Generating Station

REPORT/DATES	INSPECTOR	HOURS	AREAS INSPECTED
354/85-55 11/04/85 11/15/85	SPECIALIST	40	PREOP TEST PROGRAM
354/85-56 10/28/85 12/01/85	RESIDENT	251	ROUTINE RESIDENT INSPECTION
354/85-57 11/12/85 11/15/85	SPECIALIST	76	PREOPERATIONAL SECURITY PROGRAM REVIEW
354/85-58 12/02/85 12/13/85	SPECIALIST	829	AS-BUILT TEAM INSPECTION IN AREAS OF MECHANICAL, ELECTRICAL, INSTRUMENTATION AND CONTROL AND STRUCTURAL SYSTEMS
354/85-59 11/18/85 11/22/85	SPECIALIST	72	PREOPERATIONAL INSPECTION OF CHEMICAL AND RADIOCHEMICAL MEASUREMENT PROGRAM.
354/85-60 11/18/85 11/22/85	SPECIALIST	44	PRESERVICE INSPECTION PROGRAM
354/85-61 12/01/85 01/12/86	RESIDENT	265	ROUTINE RESIDENT REPORT. MAJOR FOCUS ON PREOP TESTING.
354/85-62 12/09/85 12/18/85	SPECIALIST	105	STAFFING, TRAINING, QUALIFICATION OF PERSONNEL AND LOCAL LEAK RATE TESTING.
354/85-63 12/16/85 12/23/85	SPECIALIST	34	CONSTRUCTION PROGRAM
354/85-64 12/02/85 12/13/85	RESIDENT	300	TECHNICAL SPECIFICATION REVIEW CONDUCTED BY PARAMETER INC.
354/85-65 12/23/85 01/03/86	SPECIALIST	115	CILRT INSPECTION
354/85-66 12/30/85 01/03/86	SPECIALIST	63	FOLLOWUP ON GENERIC LETTER 83-28, QA RECORDS AND MEASURING AND TEST EQUIPMENT.
354/86-01 01/07/86 01/11/86	SPECIALIST	142	FIRE PROTECTION AND FOLLOWUP ON CONSTRUCTION PROGRAM OPEN ITEMS.
354/86-02 01/27/86 02/14/86	SPECIALIST	146	PLANT PROCEDURES AND FOLLOWUP ON PREVIOUSLY IDENTIFIED ITEMS.

Table 5 (Cont'd)

REPORT/DATES	INSPECTOR	HOURS	AREAS INSPECTED
354/86-03 01/06/86 01/17/86	SPECIALIST	151	PREOP AND POWER ASCENSION PROGRAMS
354/86-04 01/06/86 01/16/86	SPECIALIST	74	QA PROGRAM OVERVIEW
354/86-05 01/13/86 01/24/86	SPECIALIST	95	PREOPERATIONAL WATER CHEMISTRY CONTROL PROGRAM AND FOLLOWUP ON PREVIOUSLY IDENTIFIED ITEMS.
354/86-06 01/13/86 02/09/86	RESIDENT	410	ROUTINE RESIDENT REPORT WITH EMPHASIS ON PREOP TESTING.
354/86-07 01/21/86 02/14/86	SPECIALIST	50	RADIOLOGICAL CONTROLS INSPECTION
354/86-08 01/27/86 01/31/86	SPECIALIST	32	PREOPERATIONAL SECURITY PROGRAM REVIEW.
354/86-09 02/03/86 02/03/86	SPECIALIST	140	FOLLOWUP OF EMERGENCY PREPAREDNESS IMPLEMENTATION APPRAISAL.
354/86-10 01/27/86 02/07/86	SPECIALIST	145	PREOPERATIONAL TEST PROGRAM IMPLEMENTATION.
354/86-11 01/27/86 01/31/86	SPECIALIST	44	RPV INTERNALS RECORD REVIEW PRESERVICE INSPECTION PROGRAM.
354/86-12 02/10/86 02/21/86	SPECIALIST	103	PREOPERATIONAL AND STARTUP PROGRAM IMPLEMENTATION.
354/86-13 02/10/86 02/14/86	SPECIALIST	82	FOLLOWUP ON OUTSTANDING ITEMS AND MECHANICAL SNUBBER INSPECTION.
354/86-14 02/03/86 02/07/86	SPECIALIST	73	SAFETEAM INSPECTION
354/86-15 02/10/86 03/16/86	RESIDENT	501	ROUTINE RESIDENT INSPECTION WITH EMPHASIS ON OUTSTANDING ITEMS FOLLOWUP AND PREOPERATIONAL TESTING.
354/86-16 02/24/86 03/24/86	SPECIALIST	0	OPERATOR LICENSING EXAM.
354/86-17 02/24/86 02/28/86	SPECIALIST	36	MAINTENANCE AND I&C SURVEILLANCE PROCEDURES.

TABLE 5 (Cont'd)

REPORT/DATES	INSPECTOR	HOURS	AREAS INSPECTED
354/86-18 03/03/86 03/14/86	SPECIALIST	75	PREOP, STARTUP, CILRT, AND SURVEILLANCE TEST INSPECTION.
354/86-19 03/03/86 03/06/86	SPECIALIST	35	FOLLOWUP ON OPEN ITEMS.
354/86-20 03/17/86 04/30/86	RESIDENT	530	ROUTINE RESIDENT
354/86-21 03/12/86 03/21/86	SPECIALIST	108	PREOP AND STARTUP PROGRAM REVIEW.
354/86-22 03/31/86 04/11/86	SPECIALIST	128	INSPECTION BY 3 REGION-BASED INSPECTORS OF PREVIOUS INSPECTION FINDINGS.
354/86-23 04/14/86 04/25/86	SPECIALIST	156	ROUTINE INSPECTION BY 5 REGION-BASED INSPECTORS OF PREVIOUS INSPECTION FINDINGS
354/86-24 04/28/86 05/09/86	SPECIALIST	71	INSPECTION BY 2 REGION-BASED INSPECTORS OF PREOPERATIONAL TESTING
354/86-26 05/01/86 06/09/86	RESIDENT	271	ROUTINE RESIDENT INSPECTION
354/86-27 5/19/86 5/30/86	SPECIALIST	100	INSPECTION FINDINGS ON PREVIOUS INSPECTIONS.
354/86-28 5/27/86 5/30/86	SPECIALIST	65	SECURITY INSPECTION OF TRAINING PROGRAM FOR SECURITY PERSONNEL.
354/86-29 5/27/86 5/30/86	SPECIALIST	38	SPECIAL INSPECTION IN SUPPORT OF LICENSING ACTION RELATED TO LICENSEE REQUEST DATED 5/13/86 TO DELETE FIRE PROTECTION TECH. SPEC.
354/86-30 6/10/86 7/14/86	RESIDENT	353	ROUTINE FOLLOWUP INSPECTION.
354/86-31 6/9 /86 6/20/86	SPECIALIST	75	INSPECTION OF PREVIOUS INSPECTION FINDINGS, POWER ASCENSION TEST PROGRAM.
354/86-32 6/23/86 7/3 /86	SPECIALIST	94	INSPECTION OF POWER ASCENSION TEST PROGRAM COVERING INITIAL CRITICALITY
354/86-33 6/16/86 6/18/86	SPECIALIST	28	UNANNOUNCED INSPECTION OF RADIOACTIVE WASTE (RADWASTE) PROGRAM DURING INITIAL FUEL LOAD ACTIVITIES.

TABLE 5 (Cont'd)

REPORT/DATES	INSPECTOR	HOURS	AREAS INSPECTED
354/86-34 7/7/86 7/11/86	SPECIALIST	0	OPERATOR LICENSING EXAMINATIONS
354/86-35 7/7/86 7/24/86	SPECIALIST	90	INSPECTION OF OVERALL POWER ASCENSION TEST PROGRAM, QA/QC INTERFACES AND TOURS OF THE FACILITY
354/86-36 7/15/86 8/11/86	RESIDENT	204	ROUTINE RESIDENT INSPECTION
354/86-37 7/30/86 8/1 /86	SPECIALIST	26	INSPECTION OF PREVIOUS FINDINGS IN RADIATION AREAS
354/86-38 8/11/86 8/22/86	SPECIALIST	45	POWER ASCENSION TEST PROGRAM, PROCEDURE REVIEWS, QA/QC INTERFACES AND TOURS OF THE FACILITY.
354/86-39 8/12/86 8/15/86	SPECIALIST	36	INSPECTION OF RADIOACTIVE WASTE PROGRAM
354/86-40 8/12/86 9/8/86	RESIDENT	92	ROUTINE RESIDENT INSPECTION
354/86-41 8/13/86 9/02/86	RESIDENT	93	SPECIAL INSPECTION OF THE CAUSES FOR INOPERABILITY OF REACTOR BUILDING TO SUPPRESSION CHAMBER PRESSURE RELIEF SYSTEM.
354/86-42	CANCELLED		
354/86-43 9/2/86 9/5/86	SPECIALIST	31	INSPECTION OF OVERALL POWER ASCENSION TEST PROGRAM.
354/86-44 9/08/86 9/12/86	SPECIALIST	72	ROUTINE INSPECTION OF SOLID RADIOACTIVE WASTES (RADWASTE) PROGRAM DURING STARTUP ACTIVITIES.
354/86-45 9/22/86 9/26/86	SPECIALIST	154	INSPECTION OF THE LICENSEE'S IMPLEMENTATION AND STATUS OF NUREG-0737
354/86-46 9/11/86 9/19/86	SPECIALIST	60	INSPECTION OF OVERALL POWER ASCENSION TEST PROGRAM
354/86-47 9/9/86 10/13/86	RESIDENT	283	ROUTINE RESIDENT INSPECTION
354/86-48 10/14/86 11/17/86	RESIDENT	195	ROUTINE RESIDENT INSPECTION

TABLE 5 (Cont'd)

REPORT/DATES	INSPECTOR	HOURS	AREAS INSPECTED
354/86-49 10/11/86 10/16/86	SPECIALIST	50	INSPECTION OF OVERALL POWER ASCENSION TEST PROGRAM
354/86-50 9/25/86 10/3/86	TEAM INSP	538	INSPECTION OF THE LOSS OF OFFSITE POWER TEST ON SEPTEMBER 11, 1986
354/86-51 11/10/86 12/1/86	SPECIALIST	227	INSPECTION OF EMERGENCY PREPAREDNESS PROGRAM AND IMPLEMENTATION
354/86-52 10/20/86 10/31/86	TEAM INSP	344	OPERATIONAL READINESS TEAM INSPECTION
354/86-53 10/27/86 10/31/86	SPECIALIST	37	INSPECTION OF OVERALL POWER ASCENSION TEST PROGRAM
354/86-54	CANCELLED		
354/86-55 11/10/86 11/19/86	SPECIALIST	48	INSPECTION OF OVERALL POWER ASCENSION TEST PROGRAM

TABLE 6

UNPLANNED AUTOMATIC SCRAMS AND SHUTDOWNS (11/1/85 - 11/30-86)

HOPE CREEK GENERATING STATION

	Date	Power Level	Description	Root Cause	Functional Area
1.	4/15/86	Shutdown	IRM high scram due to bumping IRM cable.	Personnel error	Surveillance
2.	4/16/86	Shutdown	High APRM scram due to failure of 1 LPRM input.	Equipment failure - random	
3.	4/25/86	Shutdown	IRM high scram due to bumping IRM cable.	Personnel error	Surveillance
4.	6/29/86	less than 1%	IRM high scram, caused by downranging the wrong IRM (non-coincident RPS mode).	Personnel error	Operations
	6/29/86	Restart			
5.	6/30/86	1%	Manual scram to trouble-shoot reactor manual control system.	Equipment failure - random	
	7/1/86	Restart			
6.	7/4/86	2%	High APRM trip due to a momentary upscale spike of an LPRM. A half scram was already present due to inoperable instrumentation.	Equipment failure - random	
	7/5/86	Restart			
7.	7/12/86	1%	Manual scram after the MSIVs were automatically closed due to steam flow transmitter drift.	Equipment failure - random	
	7/13/86	Restart			
8.	7/19/86	less than 1%	IRM high scram caused by downranging vice upranging 2 separate IRMs.	Personnel error	Operations
	7/20/86	Restart			

TABLE 6 (Cont'd)

	Date	Power Level	Description	Root Cause	Functional Area
9.	7/25/86	3%	Reactor vessel low level Scram caused by the loss of feed flow after RFP trip on swell induced high level.	Inadequate procedure	Surveillance
	7/26/86	Restart			
10.	7/30/86	6%	The EHC power supply failure caused the bypass valves to open. The resulting swell tripped the feed pumps and level could not be restored prior to the low level scram.	Equipment failure - random	
	7/31/86	Restart			
11.	8/31/86	5%	Reactor feed pumps tripped due to level control difficulties as a result of inadequate minimum flow valve tuning. Operators were unable to reset the trip before low level scram.	Equipment failure	Preop/startup
	9/1/86	Restart			
12.	9/6/86	38%	Low level scram while swapping feed pumps as a result of unstable control of "C" RFP prior to completion of tuning.	Personnel error	Operations
	9/6/86	Restart			
13.	10/18/86	50%	Feedwater control test box had internal wiring errors that caused RFP runback and low level scram.	Faulty test box wiring	Preop/startup
	10/19/86	Restart			
14.	11/14/86	98%	High pressure scram due to control valve closure test exceeding maximum combined flow limit.	Procedure deficiency	Preop/Startup surveillance
	11/28/86	Restart			