U. S. NUCLEAR REGULATORY COMMISSION

REGION I

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Licensee:	Public Service Electric and Gas Company
Facility:	Hope Creek Nuclear Generating Station
Location:	P.O. Box 236 Hancocks Bridge, New Jersey 08038
Dates:	April 29, 1997 - May 31, 1997
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EXECUTIVE SUMMARY

Hope Creek Generating Station
NRC Inspection Report 50-354/97-03

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 5-week period of resident inspection; in addition, it includes the results of announced inspections by a regional inspectors in the areas of plant operations, engineering, and radiological effluents and environmental monitoring. Additionally, a regional inspector was on site conducting oversight inspection of the self-initiated Service Water Operational Performance Inspection. The results of this effort will be documented in a future NRC report.

Operations

Operators responded well to the transient events, and acted safely, promptly and effectively to stabilize plant conditions. Accurate event reports were completed well within established criteria. (Section O1.1)

Operators demonstrated a generally good questioning attitude prior to authorizing scheduled work in the station. Log keeping, peer checking, and procedural adherence was generally performed well. However, several examples of inappropriate equipment manipulations and inattention to detail during control room operations caused the inspectors to question the effectiveness of recently instituted human performance improvement initiatives. (Section O4.1)

Maintenance

Observed maintenance activities were generally conducted well, with appropriate procedures in use at the job sites. Frequent supervisory and engineering presence was evident during risk significant on-line system outages. Work week management critiques were thorough and highly self-critical. Recent management emphasis on corrective maintenance backlog reduction has been effective. (Section M1.1)

Material condition of the station service water system improved as a result of the work completed during recent on-line maintenance outages, but several unanticipated degraded equipment conditions were identified during or following the work which led to a significant increase in overall SSW system unavailability. (Section M2.1)

On two notable occasions, maintenance technicians failed to adhere to established procedures for work on safety-related equipment; one of these instances resulted in the unintentional (and unrecognized) inoperability of the high pressure coolant injection system for 11 days. Though recently initiated corrective actions appeared to be good, prior corrective actions stemming from similar previously identified occurrences were not adequate to preclude recurrence. (Section M4.1)

Engineering

PSE&G's seismic evaluation of a condition involving missing or poorly secured Motor Control Center and Substation Transformer cover bolts was considered to be good. Corrective and preventive actions to address this specific concern were based on a thorough root cause analysis and were deemed to be adequate. (Section E1.1).

Inadequate engineering design specifications provided to a strainer element manufacturer led to additional station service water outage delays and design change implementation deferrals. (Section M2.1)

Management of engineering work backlog improved during the period. Good engineering involvement in the work week management process was observed. A Quality Assurance department audit of engineering performance was judged to be excellent. However, significant reductions in system engineering department staffing was a cause for concern in light of the large engineering work load. (Section E7.1)

PSE&G's efforts to resolve a self-identified concern involving pre-mature failures of Struthers-Dunn 219NE relays in safety-related panels was timely and comprehensive. (Section E8.1)

Plant Support

The licensee implemented and maintained very good radioactive liquid and gaseous effluent control programs which were in conformance with regulatory requirements. The chemistry and radiation protection department staff demonstrated good knowledge of the effluent control program. The radiation monitoring and plant air balance systems managers (engineering department) also effectively demonstrated their knowledge of the programs. The responsible department staff responded to QA Audit findings in a timely manner and with sound resolution. The inspector identified that sampling methodologies for air particulates and charcoal filters could be improved to avoid the interruption of the effluent Radiation Monitoring System (RMS) operation (Section R1 through R6).

The licensee continued to implement an effective radiological environmental monitoring program (REMP) and meteorological monitoring program (MMP). The Offsite Dose Calculation Manual (ODCM), Technical Specifications (TS), and the Updated Final Safety Analysis Report were properly implemented. The 1995 and 1996 audit reports effectively assessed the strengths and weaknesses of the REMP and MMP. The licensee's performance of the REMP and MMP was good. Notwithstanding, the completion of a design change package relative to updating and correcting thirty one meteorological monitoring facility drawings was not timely, resulting in an unresolved item requiring further review (R1 through R7).

The inspectors concluded that PSE&G operations and security personnel demonstrated excellent response to the loss of vital area keys event; short and long term corrective actions were both prompt and thorough. Security personnel appropriately logged this event in department records. (Section S7.1)

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Report Details

Summary of Plant Status

Hope Creek began the inspection report period at 100 percent power. Full power operation was maintained throughout the period spanning April 29, 1997 through May 31, 1997, except for a power reduction to 80 percent on May 27, 1997 following an unplanned loss of the "C" feedwater heater train and a further power reduction to 70 percent on May 31, 1997 to support control rod manipulations. At the end of the period the reactor had been operated continuously for 205 days and was 101 days from the beginning of the seventh refueling outage.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using NRC Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious; specific events and noteworthy observations are detailed in the sections below.

O1.2 Operator Response to Events and Transient Conditions

The inspectors continued to observe good overall operator response to transient events and unplanned operational occurrences. During this report period, operators were required to report three non-emergency events to the NRC. The first event involved an unexpected automatic start (i.e. engineered safety feature actuation) of the "C" station service water (SSW) pump on May 20, 1997 while preparing to remove the associated subsystem from service for a scheduled on-line maintenance outage. This event was ultimately attributed to excessive silt buildup in the redundant "A" SSW subsystem flow transmitter instrument lines which reduced the indicated flow in that loop below the setpoint for opposite train automatic operation.

The second reportable event occurred on May 27, 1997, and involved a brief, unplanned thermal power excursion 5 percent above the 3293 MW licensed power level. This transient resulted from a failure of the power supply for the "C" feed water heater train, which caused a reduction in feed water heating and a subsequent reactor power increase. Additionally, operators effectively responded to this transient condition and promptly placed the plant in a stable condition; alarms were properly acknowledged, abnormal operating procedures were implemented, and reactor power was quickly reduced to 80 percent using recirculation flow and control rod insertion. Operators appropriately reported this event within 24 hours of occurrence in accordance with Hope Creek license condition 2.F.

The final reportable event resulted from a May 28, 1997 inservice test failure of the high pressure coolant injection system. Operators properly reported this condition

in accordance with 10 CFR 50.72(b)(2)(iii) as an event which alone could have prevented the fulfillment of a safety function needed to mitigate the consequences of an accident. Specific details associated with this event are documented in Sections O4.1 and M4.1).

The inspectors concluded that operators responded well to the noted events, and acted safely, promptly and effectively to stabilize plant conditions. Accurate event reports were completed well within established timeliness criteria.

O4 Operator Knowledge and Performance

O4.1 Control of Routine Activities

a. Inspection Scope (71707)

Throughout the report period the inspectors witnessed numerous activities in the control room, including tasks which were administrative in nature as well as those involving control of safety-related and balance of plant equipment. Additionally, the inspectors conducted frequent interviews and reviewed varying significance level action requests generated in accordance with PSE&G's corrective action program, both to assess the effectiveness of the program as well as to include self-identified and self-revealing operational issues as part of the overall evaluation.

b. Observations and Findings

The inspectors noted that operators typically demonstrated good, careful use of procedures both in the control room and in the field. Additionally, when plant conditions warranted entry into abnormal operating procedures, that fact was generally noted in the reactor operator's narrative logs. Several reactivity manipulations were made during the report period which were completed without incident, in spite of difficulties experienced with several control rods "sticking" and "double-notching." Operators were appropriately sensitive to the impact of scheduled work activities on plant operation, and frequently rejected work orders which had the potential to adversely impact overall risk. The inspectors observed frequent use of the newly instituted management expectation for "peer checking," which appeared to help increase individual awareness of planned equipment manipulations during routine operation and testing.

In spite of the observations noted above, the inspectors were concerned about the implications of two specific equipment mis-manipulations that were caused by operations department trainees. Specifically, on May 25, 1997, a trainee unintentionally operated a safety-system motor-actuated valve from the control room while "walking down" a control panel. Another event which occurred just after the inspection period ended involved a trainee who improperly operated emergency diesel generator controls from the control room while attempting to synchronize the machine to its associated vital AC bus. The inspectors were concerned that station operators did not maintain an appropriate amount of sensitivity and supervision over the actions of licensed-operator trainees.

Additionally, the inspectors reviewed a licensee-identified issue involving multiple errors associated with a routine quarterly inservice test (IST) of the high pressure coolant injection (HPCI) system. Specifically, on May 29, 1997, the Hope Creek IST engineer determined that operators failed to establish the required HPCI system flow during the conduct of the test procedure, HC.OP-IS.BJ-0001(Q). Further, the shift supervisor had reviewed and approved the data recorded by the reactor operator during the May 28, 1997 test and failed to identify that the acceptance criteria had not been satisfied. Subsequent root cause analysis performed by operations department personnel concluded that individual inattention to detail during the conduct of assigned duties was the primary factor. The inspectors noted that operators judged the May 28, 1997 test to be invalid and the test was successfully re-performed on May 30, 1997.

The inspectors reiterated their concerns to station management regarding operations department human performance during the conduct of routine evolutions; particularly since the inspectors had raised similar concerns following other events in the recent past which were similar in nature. Hope Creek management stated that human performance improvement was a top priority of the station, and that several initiatives had been recently instituted to better understand the magnitude of the problem (e.g. developed specific performance indicators) and to cause immediate and lasting improvements in this area.

c. Conclusions

Operators demonstrated a generally good questioning attitude prior to authorizing scheduled work in the station. Log keeping, peer checking, and procedural adherence was generally performed well. However, several examples of inappropriate equipment manipulations and inattention to detail during control room operations caused the inspectors to question the effectiveness of recently instituted human performance improvement initiatives.

O8 Miscellaneous Operations Issue

O8.1 (Closed) Violation 50-354/95-087-01013: failure to perform an adequate written safety evaluation prior to startup and operation of the Decontamination Solution Evaporator (DSE). The inspector verified the corrective actions described in the licensee's response letters, dated August 17, 1995 and September 15, 1995, to be reasonable and complete.

O8.2 (Closed) Violation 50-354/95-087-01023: failure to establish adequate procedures for ensuring proper operation of the DSE, as well as for limiting any releases to the environment. The inspector verified the corrective actions described in the licensee's response letters, dated August 17, 1995 and September 15, 1995, to be reasonable and complete. No similar problems have been identified.

O8.3 (Closed) Violation 50-354/95-160-01014: failure to ensure a Senior Reactor Operator (SRO) remains in the Control Room. The inspector verified the corrective actions described in the licensee's response letter dated December 1, 1995, to be

reasonable and complete. The inspector also verified the responsible Senior Nuclear Shift Supervisor's response letter dated October 10, 1995, to be reasonable and accurate.

O8.4 (Closed) Violation 50-354/95-160-02014: failure to submit a Licensee Event Report after discovering that no Senior Reactor Operator was present in the Control Room. The inspector verified the corrective actions described in the licensee's response letter dated December 1, 1995, to be reasonable and complete. The inspector also verified the responsible Senior Nuclear Shift Supervisor's response letter dated October 10, 1995, to be reasonable and accurate.

O8.5 (Closed) URI 50-354/94-19-02: On September 16, 1994, PSE&G reported that a licensed Senior Reactor Operator assumed licensed duties as a Nuclear Shift Supervisor without having completed the required proficiency watches. The licensee implemented detailed instructions to all licensed operators and Shift Technical Advisors (revised in Personnel Qualification and Training, HC.OP-AP.ZZ-0014 on December 20, 1994). Based on the isolated nature of the incident and the subsequent licensee administrative controls, the inspector concluded that PSE&G has properly addressed and resolved the issue. This licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

O8.6 (Closed) URI 50-354/95-016-01: On September 8, 1995, an automatic ESF actuation occurred when the HPCI pump suction path swapped over from the CST to the suppression chamber on high torus level. This unresolved item was open pending submittal of a Licensee Event Report. LER 95-020 was submitted on October 9, 1995. This LER was considered closed in NRC Inspection Report 50-354/95-17. A supplement to LER 95-020 was submitted on November 30, 1995. The supplemental LER described the root cause and additional licensee corrective actions. The inspector concluded that the licensee's analysis and corrective actions in the supplemental LER were appropriate. The unresolved item is administratively closed.

O8.7 (Closed) Violation 50-354/95-019-01: failure to perform technical specification requirements during a reactor shutdown and during refueling operations. The licensee's responses to these violations were provided in Licensee Event Reports, 50-354/95-034-00 and 50-354/95-035-00. The LERs were closed in NRC Inspection Report 50-354/95-19. The inspector verified the corrective actions described in the LERs to be reasonable and complete.

O8.8 (Closed) Violations 50-354/95-216-01013&01023&01033&01043: failure of Reactor Operators to correctly implement procedures during the shutdown cooling bypass event on July 7-9, 1995. The inspector verified the corrective actions described in the licensee's response letter, dated January 11, 1996, to be reasonable and complete. No similar problems were identified.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707)

The inspectors observed all or portions of the following work activities:

- Hiller-actuated SACS valve replacements
- AK403 Safety-related panel room chiller unit outage
- "A", "C", "D" Service water system outages
- "B" Reactor protection system motor generator replacement
- Struthers-Dunn safety-related panel relay replacements
- "E" Filtration, Recirculation, and Ventilation system outage

Details of specific work activities are documented in later sections of this report.

Additionally, the inspectors reviewed maintenance and planning department performance indicators, work week management critique reports, and quality assurance audit materials while conducting their assessment.

b. Observations and Findings

Throughout the report period, the inspectors witnessed generally good overall control and implementation of safety-related work activities at the station. In all observed cases, appropriately authorized work orders and associated maintenance procedures were present at the job sites. First-line maintenance supervisors and planning department work week managers were frequently observed monitoring the status of in-progress work activities. Temporary scaffolding, where needed to support work, was properly constructed and evaluated per established guidance, and removed in a timely manner following completion of the work activities they were there to support. Post-maintenance testing was adequate to demonstrate equipment operability following outage completion.

The inspectors noted that corrective maintenance backlog at the station has been reduced significantly over the past several months, from a total of nearly 1200 work activities in December 1996 to approximately 600 at the end of the report period. This fact indicated that recent management emphasis on corrective maintenance backlog reduction has been effective. Overall work backlog, however, including preventative maintenance items and work scheduled for completion during the upcoming refueling outage, had not declined as dramatically.

Each week, station personnel involved with work week planning, scheduling and implementation gathered to critically assess their performance with respect to the work week management process. The inspectors noted that these assessments were thorough and highly self-critical, and provided an open and honest evaluation

of station performance. The inspectors observed that a common theme in recent work week critiques was that system outage scope growth and emergent work resulting from unanticipated equipment failures had the largest impact on schedule adherence, currently averaging about 85 percent. Additionally, inadequate planning and procurement practices often caused scheduled work to be withdrawn just prior to work commencement. The inspectors were aware that numerous initiatives were either planned or being implemented to address the documented problems.

c. Conclusions

Observed maintenance activities were generally conducted well, with appropriate procedures in use at the job sites. Frequent supervisory and engineering presence was evident during risk significant on-line system outages. Work week management critiques were thorough and highly self-critical. Recent management emphasis on corrective maintenance backlog reduction has been effective.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Service Water System Outages

Three separate station service water (SSW) on-line maintenance outages were conducted during the report period, all of which were designed to improve the overall reliability of the system. The inspectors noted that PSE&G categorized SSW as an "a(1)" system in accordance with 10 CFR 50.65 ("maintenance rule"), and that appropriate justification had been established prior to increasing SSW unavailability for additional on-line maintenance. Planning and engineering personnel developed adequate on-line maintenance plans in an effort to maximize the efficiency of the outages and to minimize their impact of plant risk. The primary objectives of the outages were to perform SSW pump replacements, implement a discharge strainer element design change, and perform routine preventive maintenance.

In many instances, the objectives of the SSW outages did not meet expectations. Specifically, average outage lengths were double the scheduled durations, largely due to unanticipated work needed to resolve degraded conditions (excessive strainer vessel corrosion, a check valve replacement, a motor replacement, traveling screen misalignments, etc.) identified either during the outages or during post-maintenance testing. Additionally, the planned strainer element modification could not be implemented because the new elements would not fit properly in the strainer assembly, a condition later attributed to a failure to provide the manufacturer with appropriate critical dimensions prior to fabrication. Some procedural adherence issues were also evidenced during the associated work, examples of which are detailed in Section M4.1 below. The inspectors noted that, for each of the issues that surfaced during the work, PSE&G personnel initiated action requests to document and determine appropriate resolution.

The inspectors concluded that, though the overall material condition of SSW system had improved as a result of the work completed during the recent on-line maintenance outages, several unanticipated degraded equipment conditions were identified during or following the work which led to a significant increase in SSW system unavailability. Additionally, inadequate engineering design specifications provided to a SSW discharge strainer element vendor led to additional outage delays and design change implementation deferrals.

M4 Maintenance Staff Knowledge and Performance

M4.1 Maintenance Procedure Quality and Adherence

During the report period, the inspectors either observed or were informed of several instances of failures by maintenance technicians to adhere to established procedure requirements during safety-related work activities. Additionally, the inspectors reviewed several action requests generated during the period which identified problems with maintenance procedure quality.

Specifically, on May 22, 1997, during an on-line maintenance outage of the "C" SSW system, the inspectors reviewed a completed work package associated with a pump discharge check valve inspection. The inspectors observed that a technician had completed the inspection and had made narrative remarks on the work order regarding the "as found" condition of the valve and the fact that the inspection was completed satisfactorily. Since some degradation of the valve internals was noted, the inspectors questioned the basis for a satisfactory inspection and reviewed the attached governing inspection procedure, HC.MD-GP.ZZ-0046(Q). However, upon review of the procedure at the job site, it was evident that the procedure had not been used during the actual valve inspection since the applicable steps had not been signed off and the included inspection checklist had not been annotated.

The inspectors questioned the cognizant mechanical maintenance supervisor who believed the check valve inspection to be within the "skill of the craft." However, based on a review of PSE&G management expectations with regard to procedural compliance and an interview with the responsible work planner, the inspectors concluded that the procedure should have been used. Additionally, the inspectors judged the quality of the noted procedure to be weak in that no explicit inspection acceptance criteria was available to make an informed decision about the permissible amount of valve internal degradation. An action request was promptly initiated to document the latter concern regarding procedure quality, but maintenance management intervention was required to document the former concern; an action request describing this issue was not generated until June 6, 1997.

On May 28, 1997, station operators reported that the high pressure coolant injection (HPCI) system was declared inoperable due a failed inservice test. Specifically, the pump minimum flow valve failed to close as required following HPCI initiation. Prompt PSE&G investigation into the cause of this condition determined that the differential pressure transmitter which provides a signal for the

minimum flow valve to close was "valved out" of service. Subsequent validation of this presumed cause resulted in the discovery that this transmitter had been calibrated by maintenance technicians on May 17, 1997, but not properly restored to service in accordance with the governing maintenance procedure. Additionally, PSE&G learned that the independent verification of valve positions following the calibration activity was not performed according to procedural requirements, resulting in a missed opportunity to identify the problem early on.

In response to this event, PSE&G management initiated a significance level 1 action request to investigate fully the cause(s) of this event. Immediate actions, which included a detailed review of all other work the responsible technician had performed that day, were deemed to be comprehensive. The impact on the functional capabilities of the HPCI system (i.e. amount of system flow diverted away from the reactor vessel through the minimum flow valve), had not been fully evaluated by the end of the report period. Further, long term corrective actions and preventive measures had not yet been developed, but the licensee stated that a previously-initiated maintenance department "intervention," which involved two weeks of intensive off-site maintenance training in an effort to improve the "culture" of the department, was intended to result in improvements in this area. Finally, an operations and maintenance department "stand down" was held by station management on May 30, 1997, to communicate the implications of this event and to reiterate PSE&G management's expectations with regard to procedural compliance.

In light of the above described events, combined with recently issued licensee event reports (LER 97-04 and 97-06) which describe reportable events attributed to poor maintenance practices, the inspectors judged that the corrective actions instituted as a result of similar NRC findings made in early 1996 as part of the Restart Assessment Team Inspection and follow up reviews, were ineffective. As a result, the inspectors judged these recent examples of maintenance technicians failing to adhere to applicable procedures for safety-related work to be two examples of a violation of 10 CFR 50 Appendix B Criterion XVI; specifically, ineffective corrective action for a previously-identified significant condition adverse to quality. **(VIO 50-354/97-03-01)**

III. Engineering

E1 Conduct of Engineering

E1.1 NRC Follow-up on Loose or Missing Fasteners Associated with Electrical Covers of the Motor Control Center (MCC) and Substation Transformer (ST) Cabinets

a. Inspection Scope (92903)

On May 14-16, 1997, an inspection of Hope Creek Generating Station was performed to determine the status of the licensee's assessment and corrective actions for loose or missing fasteners for the electrical covers of the Motor Control

Center (MCC) and Substation Transformer (ST) cabinets. The scope of this inspection included: a) a review of the root cause analysis addressing the loose or missing fasteners; b) a review of the seismic evaluation to verify that the as-found condition of the MCC and ST are capable of withstanding a postulated seismic event by keeping the back covers in place; and c) an assessment of the licensee's corrective and preventive actions.

b. Observations and Findings

Root Cause Analysis

The inspector reviewed the licensee's root cause analysis which concluded that the design of the MCC cover attachment was poor because periodic removal of the panels to perform routine maintenance activities is required. Action Requests (AR) were initiated on all deficient MCCs to address the generic implications. All existing deficiencies have been evaluated and no deficiencies which would affect seismic operability were found.

PSE&G engineering personnel also determined that the ST cabinet cover problems were the result of damaged threads or mechanical misalignment; and, in addition, these deficiencies had not been entered into the station Corrective Action Program. The inspectors noted that this has been corrected and that all deficiencies have been entered. Once again, there were no seismic operability implications regarding the STs as a result of cover fastener problems.

Seismic Evaluation

The inspector reviewed the licensee's seismic evaluation of the as-found configuration of the MCC and the ST back cover fasteners and determined that the evaluation was performed properly and that the conclusions regarding operability were reasonable.

The Equivalent Static Method was used to perform the Seismic II/I evaluation on the MCC back covers with missing screws. The acceleration used in the evaluation was very conservative. The results showed that the stress on the screws is within the allowable tolerance. Seismic evaluation for the ST cover with missing bolts was also performed using Site Specific acceleration data, and Equivalent Static Method. The resulting calculated stresses were less than the allowable and in both cases (MCC and ST) the calculated results support the conclusion that the as found configurations were capable of holding the covers in place. Therefore, there was no potential Seismic II/I interaction.

Corrective Actions

Although in this case the operability of the as-found configuration of the missing and loose back cover fasteners of the MCC and the ST cabinets was demonstrated, the licensee took corrective and preventive actions to reduce the likelihood

of loose or missing cover fasteners. The inspector reviewed the licensee's actions and determined them to be acceptable.

Alternate methods of securing the MCC covers were considered. Based on this evaluation, a tool has been procured and satisfactorily tested to install a threaded insert in the hole left by stripped threads. With the threaded insert installed, a machine screw is used to secure the MCC cover. Since an MCC outage is required to install the threaded inserts, the noted problems will be addressed during normally scheduled MCC outages. The MCC Preventive Maintenance (PM) Procedure (HC.MD-PM.ZZ-0006 (Q)) will also be revised to provide instructions for installing threaded inserts in the stripped thread locations. This action will begin during the upcoming Hope Creek refueling outage (RF07), when the MCCs scheduled for PMs will be taken out of service.

Regarding the transformer covers, licensee management stressed that maintenance personnel must ensure that ARs are initiated for all conditions adverse to quality as described in NC.NA-AP.ZZ-0000 (Q), " Action Request Process." When equipment is reassembled after corrective or preventive maintenance, it is the expectation that all bolts and fasteners will be properly secured before the equipment is released for service, or an AR will be initiated to document any deficiencies.

c. Conclusion

Thorough root cause and seismic analyses demonstrated that the licensee appropriately addressed the issue of loose or missing fasteners associated with electrical covers of the Motor Control Center (MCC) and Substation Transformers (ST) cabinets. Operability of the as-found condition was demonstrated, and the corrective and preventive actions to ensure proper fastening of these back covers appear to be adequate.

E7 Quality Assurance in Engineering Activities

E7.1 General Observations

a. Inspection Scope (37551)

Throughout the report period, the inspectors focused on the quality oversight of engineering department work. The inspectors reviewed quality assurance (QA) department audit reports, action requests generated pertaining to engineering work practices, and conducted interviews with various levels of the design and system engineering staffs.

b. Observations and Findings

In general, the inspectors observed good coordination of scheduled work week activities with engineering staff. System engineers were frequently observed in the plant monitoring the status of work activities being conducted on their respective

systems. Engineering backshift coverage was also evident for significant on-line system outages.

The inspectors noted that management of the engineering work backlog, which included evaluations to support action request (corrective action program) follow up, safety evaluations for planned design changes, and resolution assessments of degraded plant equipment, improved over the past several months. Specifically, engineering supervision instituted changes in the manner in which work backlog was tracked and prioritized to better understand and manage the efforts needed to reduce significant overdue items. Additionally, engineering department performance indicators were established and utilized to assist station managers in their evaluation of needed focus areas.

Several examples of engineering department work at the individual level was also judged to be good. For example, on May 9, 1997, a system engineer initiated an action request to document a self-identified concern involving a potential single failure issue in the rod control system. This potential failure mechanism, which had been previously unrecognized in the nuclear industry, was promptly reported to the equipment vendor for 10 CFR 21 reportability evaluation. Additionally, this concern was communicated to operations personnel with recommended compensatory actions to mitigate the resultant effects should such a failure occur. Another example of quality engineering work involved follow up to a self-revealing event in which contaminated water was discovered the station's service air system. Prompt and effective response to this issue was evident; engineers initiated a good plan to identify the source of the contamination and developed a safety evaluation (later approved by the Station Operations Review Committee) which justified continued use of the service air system until the problem was ultimately corrected.

The inspectors reviewed the results of a recently completed QA department audit of engineering practices. Seventeen different individuals participated in this month-long review, several of which were non-PSE&G employees specifically utilized to gain insights from industry operating experience. The auditors concluded that while engineering work practices, including design change development, safety evaluation performance, and communications were improving, several problems were still evident regarding compliance with established engineering programs and management expectations. Specific concerns were raised with respect to the quality and quantity of departmental self-assessments, inconsistencies in engineering documentation, and attention to detail in configuration management. Several concerns involving engineering "cultural" issues were also highlighted, which seemed to indicate that future good performance of engineers would be affected if the issues raised were not promptly addressed by station management. Overall, the inspectors judged the quality of this QA effort to be excellent.

Lastly, the inspectors noted a declining trend in system engineering department staffing over the past several months. Specifically, nearly 10 engineers of a normally 30 to 35 member department had either left the company or the engineering organization. In recognition of some of the cultural issues raised in the recent QA audit, combined with the large engineering work backlog and the

necessary preparations for the upcoming refueling outage, the inspectors were concerned that the quality of engineering work, especially the routine plant system monitoring to support continued safe and reliable operation of the facility, would degrade. The inspectors expressed this issue to station management and learned that the concerns were shared by them and that they were taking comprehensive steps to mitigate the potential impact of the reductions in staff. These steps included hiring temporary contractor personnel, recruiting new engineering employees, and diverting some routine work to other Hope Creek departments.

c. Conclusions

Management of the engineering work backlog improved during the period. Good engineering involvement in the work week management process was observed. A Quality Assurance department audit of engineering performance was judged to be excellent. However, significant reductions in system engineering department staffing was a cause for concern in light of the large engineering work load.

E8 Miscellaneous Engineering Issues

E8.1 (Closed) LER 50-354/97-007: Struthers-Dunn 219NE Series Relay Failures Due to Thermal Degradation of Magnetic Vinyl Plastic Bearing Pad Material. This issue was described in NRC Inspection Report 50-354/97-02, Section M8.2 (see also URI 50-354/97-01-02). Based on a review of the information documented in this Licensee Event Report, and an independent verification of a sample of the corrective actions planned and/or implemented to date, the inspectors concluded that PSE&G's efforts to resolve this matter were timely and thorough. Additionally, the inspectors concluded that PSE&G's documentation of this concern accurately described the circumstances involved.

E8.2 (Closed) URI 50-354/97-01-02: Struthers-Dunn 219NE Series Relay Failures Due to Thermal Degradation of Magnetic Vinyl Plastic Bearing Pad Material. This issue was left unresolved pending inspector review of an associated licensee event report, primarily to determine the adequacy of planned corrective actions. This LER review is described in section E8.1 above. Based on the results of this review, the inspectors considered this item closed.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Implementation of the Radiological Environmental Monitoring Program

a. Inspection Scope (84750)

The Radiological Environmental Monitoring Program (REMP) was inspected against Sections 3/4.12.1 and 3/4.12.2 of the Technical Specifications (TS) and Regulatory

Guide 4.1, "Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants." The following activities were conducted to assess the licensee's capability to implement the program.

- Review of REMP procedures and ODCM changes which pertain to REMP;
- Review of the land use census results;
- Review of sample results to confirm sample frequency and impact of the plant on the environment;
- Assessment of the method for evaluating the results of the samples;
- Observation of personnel collecting samples from selected sampling locations;
- Examination of air sampling equipment relative to function, operability, and calibration; and,
- Review of results of prevailing wind determination for the last ten years to assess any significant changes since pre-operation to the present.

b. Observations and Findings

Previously, oversight of the REMP was the responsibility of the senior staff engineer, Chemistry Services, Technical Services. In April 1997, the REMP was moved to Radiological Protection Services, Technical Services. (Section R6.1 pertains.) The contractor laboratory, PSE&G Maplewood Testing Services (MTS), was responsible for the collection and analysis of environmental samples, performing the land use census, reviewing and assessing the analytical data, and generating the annual Radiological Environmental Operating Reports (REOR).

The inspector reviewed the REMP procedures and observed the contractor personnel collect certain samples using the procedures. The sampling and analysis procedures were controlled and updated by the laboratory and Technical Services maintained a copy of the procedures. The REMP procedures contained appropriate information and methods comparable to industry standards and good practices. The inspector observed the contractor personnel exchange air particulate filters and charcoal canisters from selected air samplers, and discussed certain sample techniques not observed such as collection of milk, water, and sediment samples. The inspector visited a milk farm and several selected thermoluminescent dosimetry (TLD) locations for direct radiation measurements. Sampling procedures and practices were designed to minimize the chances of cross contamination. Samples were collected from the locations and at the frequencies required by the TS and ODCM. The analytical results demonstrated that the types and frequencies of analyses were performed as required. The inspector noted that radiological dose to the public was in conformance with technical specifications.

The licensee continued to collect and analyze supplemental samples in addition to the routine samples required by the requirements in Technical Specifications to enhance the data source of the environmental monitoring program. The type, frequency, and results of the routine and extra samples were documented in the Annual Radiological Environmental Operating Reports (REOR) for 1995 and 1996. In 1996, the licensee removed analyses not specifically required by the Salem and Hope Creek Technical Specifications from the REMP. The analyses removed were the strontium analysis in air particulates, well and potable waters; gross alpha analysis in air particulate and surface waters; monthly TLDs; gamma spectroscopy in beef; potassium-40 by atomic adsorption; and tritium analysis of fish and crab flesh. The changes were documented in the 1996 annual REOR. The inspector reviewed the licensee's justification and noted that the licensee determined that the program changes would not impact the intent of the REMP. The licensee continued to collect more samples than required by the TS and implemented the REMP effectively.

The 1996 land use census was performed by October 25, 1996, according to the procedure and Section 3/4.12.2 of the TS. Performance of the land use census was thorough and complete. No program changes (e.g., changes in sample locations) were required as a result of the census.

In 1995, the licensee moved an air sampler (location 2F2) 1.4 miles closer to the site. The air sampler was moved because electricity at the original location had been terminated. The new location was indicated as 2F6 (same sector) in the ODCM. The licensee submitted a safety analysis review according to 10 CFR 50.59. The inspector reviewed the analysis and determined it to be complete. Based on the wind direction analysis, the licensee's decision for the new location appeared to be satisfactory.

The inspector reviewed the wind direction assessments (wind roses) from the past 10 years and compared them to the pre-operational wind roses to detect changes, if any, in the prevailing wind directions. No significant changes were determined. The environmental monitoring control stations are still valid.

The inspector noted the licensee intends to move the location of the control air sampler. Currently, the sampler is 110 miles north from the site, located on the roof of the Maplewood building. Although this location is clearly beyond impact from plant operations, the licensee decided to place a new sampler closer to the sight and in the least prevalent wind direction. The original control air samplers will remain until the new ones becomes effective. The licensee reviewed meteorological data from June 1969 to May 1971, January to December 1995, and January to June 1996 to determine the most appropriate location for the new air sampler. The licensee chose a location in the west northwest direction (Sector 14) approximately 15 kilometers from the site. The inspector reviewed the data and determined that the licensee's choice for this new sampler satisfies both the Salem and Hope Creek Technical Specifications. The licensee plans to submit a safety analysis review according to 10 CFR 50.59 and document the change in the ODCM.

The inspector noted that Technical Services does not have a program/process to periodically review and assess results of the environmental samples analyzed by the contractor laboratory. The contract laboratory collects and analyzes environmental samples, reviews the analytical results, and generates the annual REOR. The senior staff engineer, Technical Services reviewed the annual report approximately 2 to 3 weeks prior to submittal to the NRC, as required by procedure NC.CS-RR.ZZ-0003 (Q), "Implementation of the REMP." Technical Services relied on the laboratory itself and the quality assurance audit program to review the analytical results. The inspector discussed this issue with the Technical Services supervisor who subsequently initiated actions to incorporate periodic review of analytical results as part of the REMP oversight.

The air samplers were in operation and good physical condition. The MTS personnel maintained a program to minimize the amount of sample loss due to mechanical failure. Each unit was inspected for general function every week during exchange of filters and cartridges. They were replaced every 12 months for overhaul and the gas meters were calibrated every 2 years. The results of the calibrations were within the established acceptance criteria. The inspector noted that the procedure did not specify calibration frequency for the gas meters. The licensee stated that a calibration frequency will be added to the procedure and justification for the selected frequency will be documented by the end of 1997.

c. Conclusions

Based on the above review, observation, and discussions, the inspector determined the licensee's performance in implementing the REMP continued to be good.

R1.2 Meteorological Monitoring Program (MMP)

a. Inspection Scope (84750)

The Meteorological Monitoring Program (MMP) was inspected against Sections 2.3.3.2 and 7.7.1.13 of Salem UFSAR and Sections 2.3.3 and 7.7.1.11 of Hope Creek UFSAR. The following activities were conducted to assess the licensee's ability to implement the program.

- Review of calibration procedures, calibration results, and channel check logs;
- Review of calibration results of individual sensors;
- Discussion of data acquisition and availability of data;
- Observation of the material condition of meteorological equipment; and
- Reviewed status of the meteorological monitoring facility drawings.

b. Observations and Findings

The inspector observed the contractor, J. Healy Co., perform the quarterly calibration of the meteorological monitoring instrumentation. The inspector noted that the licensee performed the calibrations according to the implementing procedures. The licensee does not submit the wind speed sensors to a wind tunnel test. The licensee relies on the contractor's knowledge and experience to ensure the sensors are performing properly. Every quarter, the contractor performs a visual check for cup damage and shaft alignment, tests are performed at the logic board from the sensor, zero and span checks are performed, and known signals generated by a calibrated Fluke digital voltmeter are traced through the loop and the bearings are replaced semi-annually to assure the low starting speed threshold is met. The results of this calibration were within the acceptance criteria. The inspector reviewed calibration data from 1995 to 1997. The calibrations were performed quarterly, checks were performed monthly, and the results were within the acceptance criteria as required by the procedure ND.RS-SC.MET-1201 (Q) Rev. 3, "Artificial Island Meteorological Monitoring Program Calibration and Maintenance Procedure."

The inspector reviewed the UFSAR for Salem and Hope Creek and the meteorological administrative procedure. Hope Creek received approval from the NRC to transfer the meteorological program requirements from the TS to the Hope Creek UFSAR on September 25, 1996. The administrative procedure ND.RS-AP.MET-1201(Q), "Artificial Island Meteorological Monitoring Program Administrative Procedure" dated July 1995 had not been changed to reflect the transfer. In response, the licensee initiated actions to update the administrative procedure.

The inspector reviewed the status of thirty one (31) meteorological monitoring facility drawings and noted that the drawings were in the process of revision. The 31 drawings consisted of electrical, mechanical, piping, and instrument drawings. The inspector noted that the licensee had not taken action to complete a design change package (DCP 1AE-1075) relative to making corrections (red-line) to the drawings since the DCP had been initiated. The DCP had been initiated in 1994 in response to an action request opened during the 1993 quality assurance audit. The 1993 audit identified deficiencies in 31 meteorological monitoring facility drawings. The 1995 quality assurance audit identified, during follow up of corrective actions relative to the 1993 action request, that the DCP 1EA-1075 had not been completed and that no action had been taken by the responsible department. Another action request was opened and the auditor received a completion commitment date of November 15, 1995. The inspector noted, as of May 16, 1997, that DCP 1EA-1075 had remained open, the revised drawings were not validated, and were not considered controlled drawings. The inspector discussed this issue with the auditor and Technical Services and noted that no action had been taken to complete the DCP. The licensee representatives stated that they planned to review the drawings and the current configuration applicable to the drawings to ensure the current revisions are correct, make further revisions if necessary, and complete the DCP after the restart of the Salem Unit 2.

The inspector noted that these drawings may not be related to the safety of the plants, but have been used on at least two occasions to make repairs to the tower (i.e., a power transmitter relay and an inverter). Notwithstanding, without controlled drawings in place, potential exists for improper or inadequate repair, modification, or design change to components and systems that affect the meteorological monitoring program.

Based on the above findings, the inspector determined that completion of the DCP was not timely and that this matter represented a weakness in the licensee's ability to effect timely corrective action for self-identified deficiencies. This matter is considered an unresolved item pending review of the licensee's process and procedures for maintaining control of configuration and design relative to this matter. (URI 50-272/97-12-01; 50-311/97-12-01; AND 50-354/97-03-02)

c. Conclusion

Based on the direct observations, discussions with personnel, and examination of procedures and records for calibration of equipment, the inspector determined that, overall, the licensee's performance of maintaining and calibrating the meteorological monitoring instrumentation was very good. The data were available as required and were easily accessed from several locations, including the control room and the EOF as specified in the UFSAR. The licensee's actions to complete the DCP were not timely, and require further review.

R1.3 Implementation of the Radioactive Liquid and Gaseous Effluent Control Programs

a. Inspection Scope (84750-01)

The inspection consisted of: (1) tour of radioactive liquid and gaseous effluent pathways and its process facilities including effluent radiation monitors, radwaste control room, and the main control room; (2) review of radioactive liquid and gaseous effluent release permits; (3) review of unplanned or unmonitored release pathways; (4) review of the quantification technique for the airborne tritium release; and (5) observation of air particulates and charcoal sampling techniques.

b. Observations and Findings

The inspector toured the radwaste and main control rooms and selected radioactive liquid and gas processing facilities and equipment, including the effluent radiation monitors and air cleaning systems. This equipment was operable at the time of the tour. Effluent/process/area radiation monitors were also operable. Effluent/process/area radiation monitoring terminals in the main control room and at the HP checkpoint were also operable.

During the review of selected radioactive liquid and gaseous effluent discharge permits, the inspector determined that discharge permits were complete and met the Technical Specification/Offsite Dose Calculation Manual (TS/ODCM) requirements for sampling and analyses at the frequencies and lower limits of

detection established in the TS/ODCM. The inspector also noted that there were no unplanned/unmonitored radioactive liquid and gas releases since the previous inspection conducted in February 1996. The inspector noted that the licensee had reviewed the effluent control programs relative to IE Bulletin No. 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment."

The inspector requested the licensee to demonstrate its capability for monitoring and quantifying airborne tritium. The licensee used the water loss values described in the UFSAR (2 gpm for normal operation and 5 gpm for refueling operation) from the spent fuel pool (SFP), since actual makeup to the spent fuel pool (SFP) is not normally tracked. The licensee assumed that water loss was due to evaporation from the SFP released to the environment via the plant vents. The licensee calculated the airborne tritium released using SFP tritium measurement results. Calculated airborne tritium released through the plant vent during 1996 was 14.04 curies and through the main condenser evacuation was 3.7 curies. The licensee reported, in the 1996 Annual Effluent Report, that 18.96 curies of airborne tritium was released. Accordingly, the inspector determined that the licensee's assumptions and calculation methodologies were effective in monitoring and quantifying airborne tritium releases. The inspector noted that if the licensee tracked actual makeup to the SFPs more accurate airborne tritium release could be calculated.

The inspector observed sampling methodologies for particulate filters and charcoal cartridges at the north plant vent (NPV) sampling skid. The inspector noted that the sampling skid had separate sampling chambers for the particulate filter (moving filter) and the charcoal cartridge. The licensee took about two hours to complete the weekly sampling. The inspector stated that the sampling time could be reduced, perhaps from hours to minutes, if the configuration of the sampling skid was changed to follow industry standard practice. The current industrial practice for the air particulate filter uses the same diameter filter as the charcoal filter and assembled in the same sampling chamber. The inspector noted that the RMS system manager had evaluated modifying the sampling skid for all plant vents prior to this inspection. This improved sampling skid is expected to be installed upon the completion of the evaluation and approval by management.

c. Conclusions

Based on the above reviews, that inspector determined that the licensee maintained and implemented very good radioactive liquid and gaseous effluent control programs that were effective in monitoring and controlling radiological effluents.

R2 Status of RP&C Facilities and Equipment

R2.1 Calibration of Effluent/Process/Area Radiation Monitoring Systems (RMS)

a. Inspection Scope (84750-01)

The inspector reviewed the most recent calibration results for the following selected effluent/process RMS and its system flow rates. The inspector also reviewed the licensee's RMS self-assessment and RMS availability.

- South Plant Vent Stack (low, mid, and high ranges) Monitors,
- South Plant Vent Stack Flow Rate Measurement Device
- North Plant Vent Stack (low, mid, and high ranges) Monitors,
- North Plant Vent Stack Flow Rate Measurement Device
- FRVS Noble Gas Monitor,
- Offgas Radiation Monitor,
- Liquid Radwaste Discharge Monitor,
- Cooling Tower Blowdown Monitor,
- Cooling Tower Blowdown Flow Rate Measurement Device
- Safety Auxiliary Cooling Radiation Monitor,
- Control Room Vent Radiation Monitor,
- Main Steam Line Monitors,
- Spent Fuel Pool Area Radiation Monitor, and
- Auxiliary Building Area Radiation Monitor.

b. Observations and Findings

The I&C department had the responsibility to perform electronic and radiological calibrations for the above radiation monitors. The system manager had the responsibility to trend and track the above RMS. All reviewed calibration results were within the licensee's acceptance criteria. Calibration results of the offgas monitor will be reviewed during a subsequent inspection, as they were unavailable to the inspector due to being microfilmed.

During the review of the above RMS calibration documentation, the inspector independently calculated and compared several calibration results, including linearity tests and conversion factors. The inspector determined that the licensee's results were comparable to the independent calculations.

The licensee applied very good calibration methodologies for the above area radiation monitoring systems, including radiological and electronic calibrations. Alert and alarm setpoints calculation methodologies were good. Calibration procedures were very detailed and easy to follow.

The inspector also reviewed RMS assessment and quarterly trending reports that were prepared by the RMS system manager. The RMS system manager assessed the RMS availability using a tracking system (e.g., 99.0% availability of the TS radiation monitor during the first quarter of 1997). The inspector determined that

the RMS system manager provided focus and attention in the areas of: (1) RMS system improvement project; (2) trending analyses for conversion factors and linearities; and (3) follow-up on the progress of modifications.

c. Conclusions

Based on the above reviews, the inspector determined that the licensee maintained and implemented good calibration and assessment/trending programs for effluent/process/area radiation monitoring systems.

R2.2 Air Cleaning Systems and Plant Air Balance

a. Inspection Scope (84750-01)

The inspection consisted of the licensee's most recent surveillance test results (visual inspection, in-place HEPA and charcoal leak tests, air capacity tests, pressure drop tests, and laboratory tests for the iodine collection efficiencies) for the following systems:

- Filtration, Recirculation, and Ventilation System,
- Control Room Emergency Filtration System,
- Offgas Exhaust System, and
- Reactor Building Exhaust System.

The inspector also reviewed surveillance test results (maintaining negative pressures) for the following buildings:

- UFSAR 9.4.4.1 Turbine Building (Negative Pressure)
- UFSAR 9.4.3.1.2 Auxiliary Building Radwaste Area (Negative Pressure)
- UFSAR 9.4.2.1 Reactor Building (Negative Pressure)

b. Observations and Findings

All reviewed surveillance test results were within the licensee's TS/UFSAR acceptance criteria. The inspector determined that the licensee maintained and implemented a good routine surveillance test program.

The licensee maintained negative pressures for the auxiliary building radwaste area and turbine buildings. The inspector verified the negative pressure during a plant tour. However, there were no pressure differences in the measurement devices for these facilities. The licensee (system manager and engineer) verified appropriate negative pressures by periodic exhaust/supply air volume reviews. The licensee stated a formal surveillance log book would be established to track and trend air balance results.

The licensee installed differential pressure (delta-P) measurement devices for the reactor building and read delta-P in the main control room. The licensee recorded negative pressure values in the daily surveillance log book each shift (3 times/day). The inspector noted that the licensee maintained about -0.35 inches of water for the reactor building.

c. Conclusion

Based on the above reviews, the inspector determined that the licensee maintained and implemented a good routine surveillance test program for the air cleaning systems. The responsible individuals had very good knowledge in the area of the plant air balance.

R3 RP&C Procedures and Documentation

a. Inspection Scope (84570-01)

The inspection consisted of: (1) review of selected chemistry procedures to verify processes; (2) review of 1995 and 1996 Annual Radioactive Effluent Report to verify the implementation of TS requirements; and (3) review of the contents of the ODCM for performing the effluent control programs, including projected dose calculations to the public.

b. Observations and Findings

The inspector noted that reviewed effluent control procedures were detailed, easy to follow, and ODCM requirements were incorporated into the appropriate procedures. The licensee had good procedures to satisfy the TS/ODCM requirements for the routine and emergency operations.

The inspector reviewed the 1995 and 1996 annual radioactive effluent release reports. These reports provided data indicating total released radioactivity for liquid and gaseous effluents. The annual reports also summarized the assessment of the projected maximum individual and population doses resulting from routine radioactive airborne and liquid effluents. Projected doses to the public were well below the Technical Specification limits. The licensee summarized historical radioactive liquid and gaseous release data and projected doses since the start of commercial operations for trending purposes, and reported this trend data in annual reports. The inspector determined that there were no anomalous measurements, omissions or adverse trends in the reports.

The inspector reviewed the licensee's ODCM, Revision 15, effective December 1996. The inspector noted that this ODCM was an improvement over previous versions. The ODCM provided better descriptions of the sampling and analysis programs, which were established for quantifying radioactive liquid and gaseous effluent concentrations, and for calculating projected doses to the public. All necessary parameters, such as effluent radiation monitor setpoint calculation methodologies, site-specific dilution factors, and dose factors, were listed in the

ODCM. The licensee adopted other necessary parameters from Regulatory Guide 1.109.

c. Conclusion

Based on the above reviews, the inspector determined that: (1) effluent control procedures were sufficiently detailed to facilitate performance of all necessary steps for the routine and emergency operations; (2) the licensee effectively implemented the TS/ODCM requirements for reporting effluent releases and projected doses to the public; and (3) the licensee's ODCM had improved and contained sufficient specification, information, and instruction to acceptably implement and maintain the radioactive liquid and gaseous effluent control programs.

R6 RP&C Organization and Administration

R6.1 The inspector reviewed the organization and administration of the radioactive liquid and gaseous effluent control programs and discussed with the licensee changes made since the last inspection, conducted in February 1996.

There were no major changes since the last inspection of the programs. The chemistry department had the major responsibility to conduct the effluent control programs. Other groups (i.e., radiation protection, operations, I&C, and system engineers) had supporting responsibilities to the program. Staffing levels appeared to be appropriate for the conduct of routine and emergency operations.

R6.2 Management Controls

a. Inspection Scope (84570)

The inspector reviewed organization changes and the responsibilities relative to oversight of the REMP and MMP, and the annual radiological environmental operating report to verify the implementation of Salem TS Section 6.9.1.7 and the Hope Creek TS Section.

b. Observations and Findings

The licensee made changes to the organization that have affected the REMP and MMP since the previous inspection. Effective April 1997, oversight of the environmental monitoring and meteorological monitoring programs was under Radiation Protection Services (RPS), Technical Services. The supervisor of RPS reports to the technical services manager, who reports to the director of Training and Radiation Safety. The director of Training and Radiation Safety reports to the vice president of Nuclear Operations. The responsibilities relative to oversight of the REMP and MMP have essentially remained the same, however, there were two personnel changes directly related to the REMP responsibility. The supervisor of RPS has been in the position for 2 months, and the senior staff engineer has been in the position for 1 week. The previous senior staff engineer remains available to assist the current engineer and provide turnover. The supervisor stated that he will

perform a self-assessment audit of the REMP and MMP to understand the status of the programs and will make changes as needed.

The annual radiological environmental monitoring reports for 1995 and 1996 provided a comprehensive summary of the results of the REMP around Salem and Hope Creek and met the TS reporting requirements. No omissions, mistakes, or obvious anomalous results and trends were noted.

c. Conclusion

Based on the above review, the inspector determined that the organization changes did not appear to have a negative impact on the oversight of the REMP or the MMP and there were no concerns regarding the annual reports.

R7 Quality Assurance in RP&C Activities

R7.1 Radiological Effluent Audits

a. Inspection Scope (84750-01)

The inspection consisted of: (1) review of the 1996 audit and its responses, if any; (2) QA policy of the measurement laboratory; (3) implementation of the measurement laboratory QC program for radioactive liquid and gaseous effluent samples; and (3) attending a SORC meeting.

b. Observations and Findings

The inspector reviewed QA audit report No. 96-151/152, "Nuclear Business Unit." The inspector noted that the audit team also included other technical personnel. The 1996 audit team identified three findings. These findings were not safety-related, but rather recommended an enhancement to the effluent control programs. The response to these findings was completed in a timely manner. The inspector noted that the scope and technical depth of the audit were sufficient to assess the quality of the radioactive liquid and gaseous effluent control programs.

The licensee held the first meeting of the "Hope Creek/Salem Chemistry QA Policy". The representatives of the both Chemistry Departments discussed the tentative contents of the QA Policy. The inspector attended the meeting and determined that contents and outlines of the policy were good. The inspector reviewed the QC data for intra/interlaboratory comparisons and QC control charts for the gamma spectrometry. When discrepancies were found, effective resolutions were determined and implemented.

The licensee identified that a small segment of the service air piping in the solid radwaste building was contaminated by spent resin in 1988. Service air piping is normally a clean system, therefore, the licensee evaluated the condition to satisfy its procedure and IE Bulletin 80-10 requirements pertaining to control and monitoring of normally non-radioactive systems that became contaminated. The

safety evaluation (AR-970515178) evaluated the actual and potential safety significance, including projected dose calculation to the public.

The inspector attended the Hope Creek SORC Meeting (SORC Meeting No. 97-039) on May 19, 1997. This special SORC meeting was held for about two hours to review the safety evaluation for AR-970515178, which dealt with the potential for the release of radioactive materials to the environment, and the controls and practices to eliminate or reduce the significance of such potential through monitored plant vents.

Based on the observation of discussions of the technical issues, the inspector determined that SORC meeting was very critical and that the SORC members maintained a questioning attitude. Safety evaluation presenters and SORC members: (1) prepared to discuss technical issues of the safety evaluation report; (2) discussed strengths and weaknesses of the safety evaluation; (3) discussed other possible alternate methods; and (4) developed conclusions. The SORC members concluded that the safety evaluation required more consideration and development of temporary modifications, procedure changes, and administrative controls prior to being resubmitted to the SORC for approval.

c. Conclusions

Based on the above reviews, the inspector determined that the licensee's QA audit was sufficient to effectively assess the radioactive liquid and gaseous effluent control program. Hope Creek/Salem Chemistry QA Policy appeared to be adequate. The licensee implemented a good QC program to validate measurement results for effluent samples. The inspector also determined that the licensee's SORC was thorough, and demonstrated a critical and questioning attitude.

R7.2 Quality Assurance Audit Program

a. Inspection Scope (84750)

The Quality Assurance (QA) audit report (Radiological Effluent Audit 95-151) was reviewed against Section 6.5.2.4.3.j of Salem TS and 6.5.2.4.3.j, k, & m of the Hope Creek TS.

b. Observation and Findings

The inspector noted that the licensee conducted Radiological Effluent Audit 95-151 during September 11 - October 2, 1995, according to TS. The scope of the audit included the environmental monitoring and meteorological monitoring program requirements. All aspects of the scope were completed. The inspector noted that the audit team leader utilized a technical specialist to assess the REMP and the MMP. The technical specialist (auditor) reviewed and understood the TS, ODCM, and the pertinent program procedures. The auditor was familiar with sampling and analytical practices and observed collection of certain samples and reviewed the results obtained by the analytical laboratory. The audit findings were appropriate

and were suggested to refine the REMP. The auditor appropriately followed up on an action request documented in the 1993. The auditor kept the item open but assigned the issue a new action request number. The inspector discussed this issue with the auditor (see Section R1.2 of this report). The auditor stated that item remains open in the quality assurance tracking system and will be reviewed during the 1997 audit.

c. Conclusions

Based on the review of the audits and discussions with the auditor, the inspector concluded that the audit was of sufficient technical depth to effectively identify and assess program strengths and weaknesses. The audit evaluated the technical adequacy of implementing procedures, TS requirements, and practices and performance of the licensee and laboratory personnel.

R7.3 Quality Assurance of Analytical Measurements

a. Inspection Scope (84750)

The inspector reviewed the Quality Assurance (QA) and Quality Control (QC) programs against Section 3/4.12.3 of the TS and recommendations of Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment" to determine whether the licensee had adequate control with respect to sampling, analyzing, and evaluating data for the implementation of the REMP.

b. Observations and Findings

The Maplewood Testing Services (MTS) implemented an interlaboratory comparison program, required by the TS, through continued participation with Environmental Protection Agency (EPA). The inspector reviewed the analytical results of this program and noted the results were within the established acceptance criteria. The inspector reviewed selected quality control charts and calibration records. The charts and calibrations were within the established acceptance criteria.

The inspector noted that the laboratory did not conduct self assessment to measure its own performance against regulations or standards. The laboratory relies on the information presented to them from the quality assurance audits and makes improvements or changes based on the audit findings. The laboratory personnel stated that they intend to initiate a self assessment program by the end of the third quarter (September) of 1997.

c. Conclusion

Based on the above observations, the inspector determined that the performance of the contract laboratory was good and the interlaboratory program was effective.

R8 Miscellaneous RP&C Issues

A recent discovery of a licensee operating their facility in a manner contrary to the UFSAR description highlighted the need for a special focused review that compares plant practices, procedure and/or parameter to the UFSAR descriptions.

While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspector verified that the UFSAR wording was consistent with the observed plant practices, procedures, and/or parameters.

S7 Quality Assurance in Security and Safeguards Activities

S7.1 Loss of Vital Area Keys

On May 1, 1997, a Hope Creek equipment operator discovered a set of vital area keys lying unattended on the floor of a bathroom in the station. The operator promptly reported his discovery to site security personnel and the senior nuclear shift supervisor. The inspectors noted that security personnel immediately retrieved the keys after notification, and commenced a thorough investigation into the matter. Specifically, security management ensured that all Hope Creek vital area doors were physically verified to be closed and locked, all gun cabinets were inventoried, a complete inventory of all security keys was conducted, and security system alarm histories were reviewed for anomalous conditions. The keys were not under positive security guard control for approximately 8 minutes.

During the investigation, security management discovered that the keys were inadvertently released from the key ring attached to an on-watch security officer's belt when he leaned against a sink in the bathroom. Further reviews determined that the key ring used was deficient in that the prong on the key ring "J" hook was outside of the clasp; it was later learned that many such rings purchased by the security department were received from the vendor in this deficient condition. This information was promptly disseminated among all security force members in order to correct the problem.

The inspectors concluded that PSE&G operations and security personnel demonstrated excellent response to the loss of vital area keys event; short and long term corrective actions were both prompt and thorough. Security personnel appropriately logged this event in department records.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on June 10, 1997. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

INSPECTION PROCEDURES USED

IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 37551:	Plant Engineering
IP 84750-01:	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 90712:	Event Report Review

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-354/97-03-01	VIO	ineffective corrective action for previously identified concerns with maintenance procedural adherence
50-354/97-03-02	URI	potential weaknesses in the design change process.

Closed

50-354/94-19-02	URI	licensed SRO assumed licensed duties as a Nuclear Shift Supervisor without having completed the required proficiency watches
50-354/95-16-01	URI	engineered safety feature actuation occurred when the HPCI pump suction path swapped over from the CST to the suppression chamber on high torus level
50-354/95-19-01	VIO	failure to perform technical specification requirements during a reactor shutdown and during refueling operations
50-354/95-087-01013	VIO	failure to perform an adequate written safety evaluation prior to startup and operation of the DSE
50-354/95-08-01023	VIO	failure to establish adequate procedures for ensuring proper operation of the DSE, as well as for limiting any releases to the environment
50-354/95-160-01014	VIO	failure to ensure a SRO remains in the control room
50-354/95-160-02014	VIO	failure to submit a licensee event report after discovering that no SRO was present in the control room

50-354/95-216-01013, 01023, 01033, & 01043	VIO	failure of operators to implement procedures
50-354/97-007-00	LER	Struthers-Dunn 219NE series relay failures
50-354/97-01-02	URI	Struthers-Dunn 219NE series relay failures

Discussed

None

LIST OF ACRONYMS USED

AB	Auxiliary Building
ALARA	As Low As is Reasonably Achievable
ARMS	Area Radiation Monitoring System
DSE	Decontamination Solution Evaporator
HEPA	High Efficiency Particulate
HP	Health Physics
HPCI	High Pressure Coolant Injection
MTS	Maplewood Testing Services
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PDR	Public Document Room
PSE&G	Public Service Electric and Gas
QA	Quality Assurance
QC	Quality Control
REMP	Radiological Environmental Monitoring Program
REOR	Radiological Environmental Operating Reports
RMS	Radiation Monitoring System
RP&C	Radiological Protection and Chemistry
SACS	Safety Auxiliary Cooling System
SFP	Spent Fuel Pool
SORC	Station Operations Review Committee
SRO	Senior Reactor Operator
SSW	Station Service Water
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report