

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

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Report No. 50-354/97-02

Licensee: Public Service Electric and Gas Company

Facility: Hope Creek Nuclear Generating Station

Location: P.O. Box 236  
Hancocks Bridge, New Jersey 08038

Dates: March 18, 1997 - April 28, 1997

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## EXECUTIVE SUMMARY

### Hope Creek Generating Station NRC Inspection Report 50-354/97-02

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection; in addition, it includes the results of announced inspections by regional inspectors in the areas of plant operations, physical protection and engineering support. A routine core inspection of the security program was conducted during the period of March 17-21 and April 14-17, 1997. The conclusions and major assessment finding of that inspection are contained in this report; however, the entire details of that inspection are contained in NRC Inspection Report 50-272/97-07; 50-311/97-07.

#### Operations

The inspectors concluded that operator response to the plant events was good, in that the necessary immediate actions were taken; the events were properly classified in accordance with the licensee's Event Classification Guide (Emergency Plan); and, NRC reporting requirements were met. (Section O1.2)

Operators safely operated the Hope Creek Station. However, the Nuclear Shift Supervisors were challenged with a large number of administrative tasks not directly associated with safe and reliable plant operation. The Nuclear Shift Supervisors did not review key plant parameters as frequently as required by the Operations Standards. (Section O1.3)

The affects on human performance were not evaluated prior to implementing a schedule that included work weeks of 72 hours and 60 hours before a scheduled day off. (Section O1.3)

Plant operations department personnel effectively identified a potential emergency diesel generator surveillance test pre-conditioning concern, and implemented prompt and appropriate corrective actions to resolve the issue. (Section O2.1)

A non-licensed equipment operator error resulted in operation of an emergency diesel generator at full load with half of the cylinder petcocks in the open position, indicating a lack of attention to detail and inadequate independent verification of petcock position following maintenance. An engineering evaluation to determine the potential impact of this event on future engine operation was good. (Section O4.1)

Station operators exhibited good control of the plant during both planned evolutions and unanticipated events. (Section O4.2)

The inspectors concluded that the licensee's use of performance monitoring was good and provided valuable assessment data regarding both human performance and equipment performance. (Section O8.1)

## Maintenance

The observed maintenance activities were conducted properly and indicated generally good performance in adherence with station procedures. (Section M1.1)

The inspectors identified several examples of minor degradation of the Hope Creek plant paging system and concluded that existing programmatic controls to ensure that the system remained in an acceptable condition were not fully effective. (Section M2.1)

## Engineering

A safety auxiliaries cooling system temporary modification which replaced system cross tie valves with blank flanges was adequately justified in an associated safety evaluation, and was properly implemented in accordance with station procedures. (Section E2.1)

All current temporary modifications were appropriately scheduled for removal during or before the next refueling outage. (Section E2.1)

NRC inspectors discovered additional examples of inadequate implementation of the PSE&G scaffolding control program, indicating weaknesses in the immediate corrective actions taken following the initial NRC identification of this concern. (Section E2.2)

## Plant Support

The inspectors concluded that access to abandoned Unit 2 areas was positively controlled and administered. Hope Creek management ensured that Unit 1 vital area boundaries were maintained and that no radioactive waste materials were stored in unauthorized locations. Housekeeping in the Unit 2 spaces was poor, yet did not appear to impact the material condition of Unit 1 support equipment. (Section R1.1)

The inspector concluded that the licensee was maintaining the Radiation Monitoring System (RMS) equipment properly as indicated by performance monitoring data review. In addition, it was also noted that the overall availability of the RMS was very good and showed much improvement over operations in 1995 and early 1996. (Section R2.2)

The security program was determined to be adequate to protect public health and safety. Appropriate corrective actions have been implemented to address previously identified weaknesses in the program. The alarm station operators were knowledgeable of their duties and responsibilities and security training was being performed in accordance with the NRC-approved training and qualification plan. Protected area detection equipment satisfied the NRC-approved Physical Security Plan (the Plan) commitments, security equipment testing was being performed as required by the Plan, and maintenance of security equipment was being performed in a timely manner as evidenced by minimal compensatory posting associated with security equipment repairs. Based on observations and discussions with security officers, the inspectors determined that they possessed the requisite knowledge to carry out their assigned duties and that the training program was effective. As an addition to the inspection, the UFSAR initiative, Section 4.2.2 of the Plan titled, "Vehicle and Cargo Controls," was reviewed. The inspectors determined, based on

discussions with security supervision, procedural reviews, and observations, that vehicles were being searched and controlled prior to entry into the protected area as described in the Plan and applicable procedures. (Section S)

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## Report Details

### Summary of Plant Status

Hope Creek began the inspection period at 100 percent power. Full power operations were maintained throughout the inspection period spanning March 18, 1997, through April 28, 1997, except for a power reduction to 30 percent power on April 5 and 6 to support maintenance activities including a temporary repair to a steam leak on the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems' steam line drain pots' common drain line in the steam tunnel; repair a steam leak on a moisture separator instrument; and, repair the fast acting solenoid on the No. 2 main turbine stop valve. Other minor power reductions occurred during the period to support maintenance and testing activities. At the end of the inspection period on April 28, 1997, the reactor was at 100 percent power, had operated continuously for 172 days, and was 134 days from the beginning of its seventh refueling outage.

The licensee announced the following organizational changes during the inspection period:

On April 7, 1997, the Nuclear Engineering Department was reorganized to have four engineering directors reporting to the Senior Vice President of Engineering. The four directors were: Mark Reddemann, Director of Salem Design Engineering and Fuels; Mark McGough, Director of Plant Engineering and Projects; Gary Overbeck, Director of Hope Creek and Component Engineering; and, Mike Rencheck, Director of Salem System Engineering.

On April 17, 1997, the Nuclear Business Unit was reorganized as follows: Leon Eliason, Chief Nuclear Officer; L. Storz, Senior Vice President - Operations; E. Simpson, Senior Vice President - Engineering; J. McMahon, Director, Quality Assurance; and, E. Salowitz, Director, Business Support. Among the changes in the organization responsibilities were: creating a new organization and director position for Salem Unit 1 Recovery; moving the Licensing function and organization into the Nuclear Engineering organization from the former Quality Assurance/Nuclear Safety Review (QA/NSR) & Licensing organization; consolidating the planning function into the Business Support organization; and, consolidating the maintenance organizations for both Salem and Hope Creek into a single support organization. Key personnel assignments within the new organization were: J. Benjamin, Director, Salem Unit 1 Recovery; M. Trum, General Manager, NBU Maintenance; and, D. Crouch, Manager, Maintenance & Construction Planning.

### I. Operations

#### **O1 Conduct of Operations**

##### **O1.1 General Comments (71707)**

Using 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

Three non-emergency event notifications were made during this report period. The first event involved the high pressure coolant injection (HPCI) system being declared inoperable on March 22, 1997, due to an unexpected closure of its steam supply line containment isolation valve during system testing. Additional information on this event and the licensee's corrective actions are found in Section M8.1 of this report. The second event involved a report of degraded equipment (Struthers-Dunn 219 NE Series relays) necessary for accident mitigation on April 7, 1997. Additional information on this event and the licensee's corrective actions can be found in Section M2.3 of NRC IR 50-354/97-01 and Section M8.2 of this report. The third event involved a licensee notification of a minor oil spill to the State of New Jersey Department of Environmental Protection. The inspectors concluded that this last event was considered minor and no additional information is provided in this report. The inspectors further concluded that operator response to the events was good, in that the necessary immediate actions were taken; the events were properly classified in accordance with the licensee's Event Classification Guide (Emergency Plan); and, NRC reporting requirements were met.

## O1.3 Extended Control Room Observations

### a. Inspection Scope (71715)

An inspector performed an extended control room observation to evaluate the impact of Hope Creek's low Senior Reactor Operator (SRO) shift manning levels. The inspector focused on SRO on-shift activities.

### b. Observations and Findings

Hope Creek implemented a new schedule for on-shift SRO's on March 14, 1997. The intent of this new schedule was to alleviate scheduling difficulties associated with vacation and low SRO shift manning levels. The new schedule is based on a 10 week cycle and a 12 hour shift. This new schedule includes a 72 hour and a 60 hour work week once every 10 week cycle. As an example, Crew E SROs are scheduled to work 6 night shifts starting May 10, 1997, followed by 3 days off, and then followed by 5 night shifts before another day off. The previous schedule required on-shift SRO's to work no more than 48 hours prior to a scheduled day off. The inspector noted that the new schedule includes work weeks that are an exception to the nominal work week schedule defined in Hope Creek Technical Specification (T.S.) 6.2.2. T.S. 6.2.2 in part requires that operating personnel work a nominal 40-hour week while the unit is operating. Hope Creek Technical Specifications further define the shift schedule to be based upon a 12 hour shift with a work week of either 36 hours or 48 hours. Hope Creek senior management is taken exception to the nominal 40 hour work week described in T.S. 6.2.2 due to the low SRO shift manning levels. Hope Creek senior management considers the low SRO shift manning levels to be an unforeseen problem requiring overtime above

the nominal 40 hour week. T.S. 6.2.2 in part allows the use of overtime in the event of unforeseen problems.

The inspector was concerned that Hope Creek did not evaluate the potential affects on human performance prior to implementing the new schedule, especially during the extended work weeks of 72 hours and 60 hours. The inspector reviewed time sheets for the on-shift SROs from October 3, 1996 through March 14, 1997 and he verified the working hours to be within T.S. 6.2.2 requirements.

It appeared to the inspector that Nuclear Shift Supervisors (NSS) did not meet the Operations Standards by not reviewing key plant parameters at least once per hour. The inspector observed Nuclear Control Operators (NCO) monitoring panels as described by the Operations Standards. The inspector observed other instances where control room personnel did not meet the Operations Standards. The Senior Nuclear Shift Supervisor (SNSS) and NSS often leaned on the inner horseshoe panels while conducting turnover in the outer horseshoe area. Food was displayed on the NCO's desk for extended periods. Personnel not assigned to the shift, including Operations senior management, consumed food in the control room. It appeared to the inspector that the Senior Nuclear Shift Supervisor did not enforce these Operations Standards.

The inspector interviewed six on-shift SROs. Each SRO interviewed indicated a concern with the administrative duties required of the Nuclear Shift Supervisor. The SROs feel that they are challenged to prevent administrative activities from distracting their safe operation of the unit. It appeared to the inspector that the NSSs spent excessive time on the computer involved with work control processes and especially the action request process. The Operations Manager is considering alternatives to alleviate some of the significant administrative duties of the Nuclear Shift Supervisor. The Operations Manager intends to add two licensed operators to the Operations Support Staff. Full time clerical support has been assigned to support the Control Room. Operators interviewed considered this a significant improvement.

The inspector observed both the SNSS and NSS to engage in activities in the NSS Office. The NSS Office is within the control room boundary defined by Station Operating Practices. However, the NSS Office is not in audible range of the reactor operator at the controls nor in audible range of the control room annunciators. If the SRO in the control room is not in audible range, he must remain in sight of the reactor operator at the controls in accordance with Station Operating Practices. The inspector observed both the SNSS and NSS simultaneously engage in activities in the NSS Office and neither individual visually monitored the control room.

The inspector observed the use of "peer check" to be frequent and adequate. "Peer check," as mentioned in this report, refers to a human performance initiative wherein a second individual verifies correct equipment manipulation before any action is performed.

The inspector identified a discrepancy between the Hope Creek Updated Final

Safety Analysis Report (UFSAR) Section 8.3.1.1.3.10 and the Hope Creek standard operating procedure, Emergency Diesel Generators Operation (HC.OP-SO.KJ-0001(Q) Rev. 26). The UFSAR requires specific action to be taken after an emergency diesel generator operates longer than four hours at less than 20 percent rated load. Hope Creek does not track cumulative unloaded time and the actions for extended operation at light load conflict with the UFSAR. The licensee initiated an Action Request to track this issue to resolution.

The inspector noted headphones and cables stored in a control room panel during the performance of a seismic monitor surveillance. The licensee promptly removed the headphones and cables and initiated an Action Request.

c. Conclusions

Operators safely operated the Hope Creek Station. However, the Nuclear Shift Supervisors were challenged with a large number of administrative tasks not directly associated with safe and reliable plant operation. The Nuclear Shift Supervisors did not review key plant parameters as frequently as required by the Operations Standards. The affects on human performance were not evaluated prior to implementing a schedule that included work weeks of 72 hours and 60 hours before a scheduled day off.

**O2 Operational Status of Facilities and Equipment**

**O2.1 Pre-Conditioning of Emergency Diesel Generator Air Start Valves**

a. Inspection Scope (62707, 61726)

The inspectors evaluated the Hope Creek operations department response to an industry operating experience feedback issue involving pre-conditioning of emergency diesel generator (EDG) air start valves.

b. Observations and Findings

On April 10, 1997, operations department staff personnel determined that the manner in which Hope Creek operators prepared the EDG's for monthly operability surveillance testing was similar to the process employed by another nuclear utility which had recently been issued a Notice of Violation for preconditioning the engine for successful testing. Specifically, operators typically "bar-over" the EDG's using the air start system to implement a vendor recommendation to remove accumulated moisture in the engine cylinders when the machine has not been operated within the previous 7 days. However, as a result of the industry experience, operations and engineering department management appropriately concluded that the Hope Creek practice constituted pre-conditioning the air start valves, effectively nullifying the validity of the subsequent surveillance test. As a result, the operations department issued a "night order" to the operating shifts to ensure that, until this concern could be fully evaluated, all EDG pre-start evolutions would include barring-over the engines using an alternate air supply.

The inspectors observed that operations personnel appropriately entered this issue into the station's corrective action program for condition evaluation, reportability review, and corrective action development. Additionally, the inspectors witnessed operations training department instructors in the field with equipment operators demonstrating the use of the alternate air supply and EDG manual barring device.

The inspectors questioned whether this issue should have been identified earlier as part of the recently completed Technical Specification Surveillance Improvement Project (TSSIP). However, it was subsequently determined that finding an issue of this nature, i.e. potential pre-conditioning mechanisms, was outside the scope of the TSSIP review.

c. Conclusions

Plant operations department personnel effectively identified a potential emergency diesel generator surveillance test pre-conditioning concern, and implemented prompt and appropriate corrective actions to resolve the issue.

**O4 Operator Knowledge and Performance**

**O4.1 Observation of "C" Emergency Diesel Generator Surveillance Test**

a. Inspection Scope (61726)

The inspectors witnessed a periodic technical specification surveillance test of the "C" Emergency Diesel Generator (EDG). Interviews with the personnel responsible for implementing and supervising the activity were conducted, as was a detailed test procedure review.

b. Observations and Findings

On April 23, 1997, the inspectors observed plant equipment operators (EO) completing the field portions of surveillance test procedure HC.OP-ST.KJ-0003(Q) for the "C" EDG. This test was required to implement the requirements of TS 4.8.1.1.2. Three different EOs were assigned to perform various portions of the field activities. One of the pre-startup activities required to support EDG test operation involved "barring-over" the engine with air to remove moisture which may have accumulated in the cylinders. At Hope Creek, small petcocks installed on each of the 12 EDG cylinders are installed which, if opened, permit compressed gases in the cylinders to vent to the room housing the engine. By procedure EOs open then close these petcocks during the barring-over process to ensure moisture is eliminated.

Prior to engine start, the inspectors verified that the barring-over process was completed by reviewing the field copy of the test procedure and by questioning the EOs. However, once control room operators started and fully loaded the "C" EDG, it was evident that some of the petcocks had been left in the open position because of smoke and unusual noise emanating from one side of the engine. The field EOs

promptly recognized that 6 of the 12 petcocks had been left open and closed them without incident. The responsible EO, a relatively new employee, drafted an action request in accordance with the corrective action program to document the occurrence.

The inspectors discussed the implications of this event with cognizant station operators and managers, including a discussion of a similar event which occurred on this same EDG in February of 1996 (see NRC Inspection Report 50-354/96-80). Additionally, the inspectors reviewed the fact finding summary completed by the operations department to validate stated causal factors, safety significance, and generic implications. The inspectors agreed with PSE&G's assertion that the event was caused by human error (inattention to detail, inadequate skills or knowledge, lack of experience), but further judged that this error was clearly a failure to adhere to the operating procedure for barring-over the EDG. Further the inspectors questioned the lack of independent verification of petcock position following operation. The inspectors noted that operations management conducted coaching/counseling sessions with the responsible individual, and reinforced expectations for procedural adherence before allowing him to resume shift responsibilities. Additionally, station personnel were evaluating the need for independent verification and/or whether a "peer check" process was necessary to ensure that future petcock operations would be correct.

The "C" EDG surveillance was completed satisfactorily, and a post-event engineering analysis concluded that operating the EDG at full load with 6 petcocks open did not result in any consequence to the machine. However, the inspectors judged that the failure to shut the EDG cylinder petcocks following pre-startup evolutions constituted a violation of HC.OP-SO.KJ-0001(Q), "EDG System Operation" (VIO 50-354/97-02-01).

c. Conclusions

A non-licensed equipment operator error resulted in operation of an emergency diesel generator at full load with half of the cylinder petcocks in the open position, indicating a lack of attention to detail and inadequate independent verification of petcock position following operation. An engineering evaluation to determine the potential impact of this event on future engine operation was good.

O4.2 Operations Shift Performance Observations

The inspectors observed control room operators and equipment operators in the field respond to various transient events at the station, both planned and unplanned. Specifically, the inspectors witnessed unplanned trips of the "A" control room ventilation system and the "A" control rod drive hydraulic pump, the latter of which led to several control rod hydraulic control unit accumulator low pressure alarms. Additionally, pre-planned transfers of reactor protection system power supplies and steam jet air ejectors were observed. Both of these evolutions had the potential to induce significant plant transients if performed incorrectly. Finally, the inspectors observed operators conduct a significant plant power reduction to support emergent

corrective maintenance in the steam tunnel.

The inspectors noted that in all cases, operators appropriately employed the procedural guidance applicable for each event or evolution. Good command and control of the evolutions were evident. Operator logs accurately reflected each of the events/evolutions after they were completed. Overhead alarms were promptly acknowledged and evaluated. Technical specification action statement entries were made as required. Where appropriate, operators initiated action requests in accordance with the PSE&G corrective action program to determine root causes and corrective actions.

Station operators exhibited good control of the plant during both planned evolutions and unanticipated events.

## **O8 Miscellaneous Operations Issue**

### **O8.1 Operations Performance Monitoring**

The inspectors reviewed the licensee's current performance monitoring practices and observed regular management discussions based on the performance monitoring indications. The licensee frequently discusses the aggregate impact of plant deficiencies and assesses the nature of the deficiencies to ensure that corrective actions are timely and effective. The inspector noted that the performance monitoring indicators show some improvement in reducing control room deficiencies. However, other indicators, such as the "cumulative unplanned LCO hours indicator," show some weakness in schedule adherence by plant personnel and an increasing equipment failure rate. Overall, the inspector concluded that the licensee's use of performance monitoring was good and provided valuable assessment data regarding both human performance and equipment performance.

## **II. Maintenance**

### **M1 Conduct of Maintenance**

#### **M1.1 General Comments**

##### **a. Inspection Scope (62707, 61726)**

The inspectors observed all or portions of the following maintenance and surveillance activities:

- HPCI/RCIC common drain pot drain line temporary leak repair by encapsulation
- "B" reactor protection system (RPS) motor-generator set repair
- "A" service water system (SWS) pump replacement and screen repair

- "E" filtration, recirc, and ventilation system (FRVS) "Hiller" valve replacement
- Agastat and Struthers-Dunn relay replacements
- "B" steam jet air ejector (SJAE) pressure control valve emergent repair
- "A" control rod drive (CRD) pump troubleshooting
- "C" emergency diesel generator (EDG) 184-day surveillance test

b. Observations and Findings

Except for the previously noted problem noted with observed equipment operator performance during the conduct of the "C" EDG 184-day surveillance test (see Section O4.1), the inspector observed generally good work coordination between operations, radiation protection, maintenance and engineering departments in the conduct of the above activities. For example, good ALARA practices were observed for the encapsulation of the HPCI/RCIC drain line that was leaking into the steam tunnel. Also, good Station Operations Review Committee (SORC) reviews of the proposed temporary repair method and development of specific monitoring conditions for the degraded pipe and its affect on nearby safety-related equipment were observed by the inspectors.

c. Conclusions

The inspectors concluded that the observed maintenance activities were conducted properly and indicated generally good performance in adherence with station procedures.

**M2 Maintenance and Material Condition of Facilities and Equipment**

**M2.1 Degradation of the Plant Paging (Gai-Tronics) System**

During routine tours of the Hope Creek station, the inspectors noted several areas of the plant in which it was difficult to hear station-wide plant page announcements. Subsequent investigation resulted in the identification of several paging system speakers that were either not functioning or were barely audible. Individual action requests were drafted to initiate work orders to correct each of the deficiencies noted by the inspectors. However, after the inspectors raised the possibility of a potential programmatic concern with respect to paging system monitoring and maintenance, station management initiated a level 2 condition report to evaluate the full extent of the condition and to develop any necessary corrective actions.

The inspectors reviewed the UFSAR section which describes the Hope Creek paging system operation and design basis. While information regarding system monitoring and maintenance was not specific, in general the inspectors concluded that the station was maintaining the system in an adequate condition. Station management agreed that more stringent programmatic controls for ensuring that the paging system remained fully functional were necessary.

The inspectors identified several examples of minor degradation of the Hope Creek plant paging system and concluded that existing programmatic controls to ensure that the system remained in an acceptable condition were not fully effective.

## **M8 Miscellaneous Maintenance Issues**

- M8.1 (Closed) LER 50-354/97-06: High Pressure Coolant Injection Isolation Due to Personnel Error During Functional Testing. This event involved an automatic isolation of the HPCI system steam line containment isolation valve that occurred on March 22, 1997 during the performance of a scheduled functional test of the high drywell pressure instrumentation. Based on the licensee investigation into the cause of this event, it was determined that the technician conducting the aforementioned test erroneously inserted test leads into a test point associated with the HPCI isolation logic causing the event. This test point was located just above the test point that the technician was supposed to use. The licensee's corrective actions included: restoring the isolated HPCI system to proper lineup; reporting the event to the NRC via both 10 CFR 50.72 and 10 CFR 50.73, as required; taking appropriate disciplinary action with involved personnel; and, communicating the nature of the event with all station personnel, as well as conducting specific lessons-learned training with I&C technicians. The inspector concluded that the licensee's actions promptly corrected this procedure adherence inadequacy. 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.
- M8.2 (Open) URI 50-354/97-01-02: The licensee informed the NRC of potential failure of Struthers-Dunn 219 NE series relays, used in a variety of safety-related applications at the plant. The licensee had observed an increasing trend in failures and then identified that the failures were related to wrong or missing bearing pad materials leading to thermal degradation and ultimate failure of the components. On April 23, 1997, the licensee provided additional information regarding observations of the affected relays to NRC representatives for vendor inspection and event assessment and generic communications. The licensee stated that it planned to submit an LER about this concern in early May 1997. The inspector concluded that the licensee's efforts to date were comprehensive. The licensee confirmed the failure mechanism and failure modes with the vendor and have taken appropriate action to ensure that affected relays in safety-related applications are known to be functional. This matter remains open pending review of the licensee's planned LER submittal.
- M8.3 (Open) LER 50-354/97-05 and URI 50-354/97-01-04: Operation in a Technical Specification Prohibited Condition due to Failure to Perform Monthly Flowpath Verification Surveillance Checks of the Residual Heat Removal (RHR) System Crosstie Valves. This event documents part of the licensee evaluation of an NRC identified concern with a modification to the RHR system providing crosstie flowpaths for the "C" and "D" RHR pumps. This concern is identified in Section E1.1 of NRC IR 50-354/97-01. This LER specifically addresses the fact that after implementation of the modification to the "C" RHR subsystem in 1994, the licensee failed to revise appropriate surveillance and operating procedures to ensure that the associated low pressure coolant injection (LPCI) flowpath was maintained properly.

Failure to ensure the flowpath alignment was considered by the licensee to be a violation of technical specification surveillance requirements. The LER further described that this condition was corrected in December 1995 when the crosstie isolation valve was locked closed. The inspector noted that additional evaluations of this problem were in progress at the close of the inspection period. The inspector considered this matter to be open pending further NRC review of the crosstie modification package.

- M8.4 (Closed) LER 50-354/95-033, Supplement 14 and VIO 50-354/95-11-02: Technical Specification Surveillance Requirement Implementation Deficiencies. This final supplemental report documents the last findings of the licensee's Technical Specification Surveillance Improvement Program (TSSIP). The TSSIP identified two additional surveillance deficiencies associated with the containment hydrogen recombiner system and the rod block monitor. Both surveillance deficiencies were corrected by performance of appropriate testing; however, additional modifications were necessary to fully resolve the rod block monitor concerns. Overall, the inspectors concluded that the licensee actions to identify and correct the surveillance test deficiencies were broad and comprehensive. The conditions leading to the violation cited in NRC IR 50-354/95-11 have been fully evaluated by the licensee and corrected. The surveillance test procedures have been corrected to ensure that the technical specification surveillance requirements were being appropriately implemented. The inspector concluded that the licensee's corrective actions were reasonable and complete.

### III. Engineering

#### **E2 Engineering Support of Facilities and Equipment**

##### **E2.1 Safety Auxiliaries Cooling System Temporary Modification**

###### **a. Inspection Scope (37551)**

The inspectors performed a detailed review of a temporary modification recently installed in the safety auxiliaries cooling system (SACS). This review included an assessment of the associated 10 CFR 50.59 safety evaluation, documents and drawings which describe the operation of the affected system, and an in-plant walkdown of the modified components. Additionally, the number and status of all active temporary modifications at Hope Creek were reviewed

###### **b. Observations and Findings**

Hope Creek personnel installed temporary modification 96-023 in the SACS system on March 21, 1997, which replaced two spent fuel pool cooling system heat exchanger crosstie valves (1EGV-545 and 1EGV-547) with blank flanges. PSE&G deemed this modification necessary to minimize the "sluicing" effect between the two independent SACS loops caused by excessive valve seat leakage. The inspectors independently reviewed the safety evaluation that justified

implementation of this modification, and judged that it satisfied the requirements of 10 CFR 50.59 and the licensee internal "Control of Temporary Modifications" procedure NA.NC-AP.ZZ-0013(Q).

In addition to the safety evaluation review, the inspectors verified that the affected piping and instrumentation drawings were revised to reflect the modified system configuration. Finally, field implementation of the modification was appropriate and was conspicuously labeled as temporary. The temporary modification log in the Hope Creek work control center also correctly tracked this modification. The inspectors noted that this modification would have to be removed prior to spent fuel pool operations in the upcoming refueling outage in order to support the planned full core offload.

The inspectors observed that at the close of the reporting period, there were 24 active temporary modifications installed at the station, 17 of which were implemented subsequent to the last refueling outage. The oldest temporary modification, involving water intrusion into the primary containment instrument gas system, was installed in September 1994. The inspectors noted that all of the modifications were scheduled for removal before or during the next refueling outage.

c. Conclusions

A safety auxiliaries cooling system temporary modification which replaced system crosstie valves with blank flanges was adequately justified in an associate safety evaluation, and was properly implemented in accordance with station procedures. Additionally, all current temporary modifications were appropriately scheduled for removal during or before the next refueling outage.

E2.2 Follow Up to Previously Identified Temporary Structure Control Problems (Open) VIO 50-354/97-01-05

a. Inspection Scope (37551, 92903)

The inspectors conducted follow up reviews of Hope Creek's scaffolding control program to determine the effectiveness of short term corrective actions stemming from previously identified concerns. The NRC issued a Notice of Violation in Inspection Report 50-354/97-01 for inadequate controls associated with scaffold implementation and tracking.

b. Observations and Findings

PSE&G's immediate response to the violation regarding effective control of temporary scaffolding, documented in detail in Inspection Report 50-354/97-01, in part included a detailed walkdown of all accessible areas at the station to locate installed scaffolding, and a "roll out" to all maintenance and engineering personnel reinforcing the expectation that internal administrative controls for scaffolding be effectively implemented. However, during a reactor building walkdown on April 14,

1997, several weeks after initially identifying the problems, the inspectors discovered additional examples of inadequate scaffold control and implementation. Additionally, unlike the original concerns, the inspectors identified scaffolding installed in the plant which was used for equipment protection and for structural support for temporary lead shielding which was not tracked or inspected as required by PSE&G's administrative control procedure, NA.NC-AP.ZZ-0023 (NAP-23).

The inspectors met with station engineering management to discuss the newly identified issues. During this discussion PSE&G indicated that it had validated the inspectors recent findings, and admitted that the short term actions implemented subsequent to the initial findings were ineffective. Engineering management stated that most of the newly identified scaffolds with inadequate controls were constructed following initial communication of the concerns nearly one month prior. As a result, Hope Creek management upgraded the condition report which tracked this issue from a level 2 (determine apparent cause) to a level 1 (detailed root cause analysis). All the newly discovered problems were promptly corrected. Further, PSE&G as a whole planned to centralize the scaffold construction and control function in an effort the better control the efficiency and consistency of the program.

The inspectors considered the scaffolding construction and control problems identified subsequent to the initial findings as additional examples of the same violation cited in the NRC Inspection Report noted above; specifically, PSE&G personnel failed to implement adequately the requirements of NAP-23.

c. Conclusions

NRC inspectors discovered additional examples of inadequate implementation of the PSE&G scaffolding control program, indicating weaknesses in the immediate corrective actions taken following the initial NRC identification of this concern.

**E8 Miscellaneous Engineering Issues**

**E8.1 Licensee Service Water System Operational Performance Inspection:**

a. Inspection Scope 40501

A region-based inspector observed portions of the licensee's Service Water System Operational Performance Inspection (SWSOPI). The licensee's evaluation of the safety auxiliary cooling system (SACS) was not yet complete.

b. Observations and Findings

The inspector noted the following: (1) SWS analyses were detailed; (2) recent root cause analyses were thorough; and, (3) previous engineering self-assessments on SWS had identified many of the issues found during the SWSOPI.

Most notably, the licensee's self-assessment team found that: (1) corrective actions implemented to monitor for SWS strainer problems were not effective; (2) the implementation of corrective actions from past self-assessments were not in all cases complete and timely; (3) performance monitoring for the SACS heat exchangers was weak; (4) instances of inadequate 10 CFR 50.59 safety evaluations; and, (5) some weaknesses in configuration control for design calculations.

c. Conclusions

The inspector concluded that the licensee's SWSOPI self-assessment effort, to date was thorough. Further NRC observation of the SACS portion of the self-assessment is on-going.

IV. Plant Support

**R1 Radiological Protection and Chemistry (RP&C) Controls**

**R1.1 Walk Down of (Abandoned) Hope Creek Unit 2 Spaces**

On April 28, 1997, the inspectors conducted a comprehensive tour of abandoned Hope Creek Unit 2 buildings to verify that these areas were not being used for unauthorized radioactive waste storage and that vital area boundaries to Unit 1 spaces were adequately posted and controlled. Housekeeping and material condition of Unit 1 support equipment in the Unit 2 spaces were also evaluated.

The inspectors did not identify any areas of the Unit 2 facility that contained radioactive waste material. There were some areas of Unit 2 that required radiologically controlled area postings because of radiation fields induced by the Unit 1 offgas system; these postings were deemed adequate. Further, all of the Unit 1 vital area boundaries which interfaced with Unit 2 structures were adequately posted and positively secured. Housekeeping in all of the Unit 2 areas was poor, in stark contrast to the conditions typically observed in the occupied Unit 1 spaces. Most of the debris in the areas was left over from initial construction. In spite of this assessment, the inspectors judged that none of the Unit 1 support equipment located in Unit 2 spaces (e.g. auxiliary boiler steam, telecommunications wiring and junction boxes, etc.) would likely be affected by the adverse conditions. Additionally, none of the noted Unit 1 support equipment was classified as safety-related.

The inspectors noted that access to the Unit 2 spaces was effectively controlled in that relatively few senior PSE&G individuals had keys to associated door locks. Additionally, a current station administrative procedure provided positive controls to ensure that all personnel entries into the Unit 2 spaces would be conducted safely.

The inspectors concluded that access to abandoned Unit 2 areas was positively controlled and administered. Hope Creek management ensured that Unit 1 vital

area boundaries were maintained and that no radioactive waste materials were stored in unauthorized locations. Housekeeping in the Unit 2 spaces was poor, yet did not appear to impact the material condition of Unit 1 support equipment.

## **R2 Status of RP&C Facilities and Equipment**

### **R2.1 Revised TLD Guidelines**

On April 1, 1997, the licensee revised the TLD guidelines at the site. The new guidelines now require all individuals with radiological controlled area (RCA) access to be issued a TLD. All radiation workers will be required to wear their TLD and an electronic dosimeter while in the RCA. The inspector observed personnel in the RCA after implementation of these new guidelines and found their performance acceptable.

### **R2.2 Radiation Monitoring System (RMS) Performance Indicators**

The inspector reviewed the licensee's RMS performance indicators to ascertain that the licensee was properly maintaining the equipment available for process monitoring of effluents. The inspector observed that, except for the South Plant Vent RMS, that all effluent monitors were being maintained available in excess of 95 percent available. The South Plant Vent RMS annual average was in excess of 85 percent available; however, some of this out-of-service time was necessary to implement improvements to the system. The inspector concluded that the licensee was maintaining the equipment properly as indicated by the performance monitoring. In addition, the inspector noted that the overall availability of the RMS was very good and showed much improvement over operations in 1995 and early 1996.

## **P5 Staff Training and Qualification in EP**

### **P5.1 Unannounced Off-hours Callout Training Drill Critique Review**

The inspector reviewed the subject critique, dated April 16, 1997, to ascertain that the critique assessed performance of the drill responders appropriately and provided reasonable assurance that performance objectives were met. The inspector noted that the critique provided an overall assessment that drill performance met expectations. There were a few areas identified requiring corrective actions or improvements; but, none of these items were considered significant by the inspector. Overall, the licensee's drill conduct was good and the inspector considered this activity as providing good training for the responders.

**S1 Conduct of Security and Safeguards Activities**

A routine core inspection of the security program was conducted by Messrs. G. C. Smith and E. B. King during the period of March 17-21 and April 14-17, 1997. Areas inspected included: previously identified items; protected area barriers and detection aids; alarm stations and communications; testing, maintenance and compensatory measures; training and qualification; organization and administration; quality assurance; and security and safeguards activities. The security inspection feeder report was integrated into the Salem routine resident inspection report, IR 50-272/97-07;50-311/97-07. The conclusions and overall executive summary assessment from that inspection are included in this inspection report, however, the supporting inspection details are documented in the referenced Salem inspection report only.

The inspectors determined that the licensee was conducting its security and safeguards activities in a manner that protected public health and safety.

**S2 Status of Security Facilities and Equipment**

On April 16, 1997, the inspectors determined by observation, that the actions taken by the licensee to correct the concern were adequate. The inspectors determined that the height of the Protected Area Barrier (PAB) satisfied the requirements of the Plan and that the Intrusion Detection Systems (IDSs) were functional and effective, and were installed and maintained as described in the Plan.

The inspectors determined by discussions with the Central Alarm Station/Secondary Alarm Station (CAS/SAS) operators on April 16, 1997, that the actions taken by the licensee to reiterate expectations concerning alarm assessment were effective. The determination was based on the CAS/SAS operators' responses to the inspectors' questioning. The CAS/SAS operators were knowledgeable of their alarm assessment responsibilities and the alarm stations and communications met the licensee's Plan commitments and NRC requirements.

Documentation on file, reviewed April 16, 1997, confirmed that security equipment was being tested and maintained as required; however, failures of search equipment were not being documented in the test records. The licensee agreed to change its practice to allow for tracking and trending of equipment failures found during testing. Repair work was timely and the use of compensatory measures was found to be appropriate and minimal.

**S5 Security and Safeguards Staff Training and Qualification**

The inspectors determined that training had been conducted in accordance with the Training and Qualification (T&Q) Plan. Based on the Security Force Members' (SFM) responses to the inspectors' questions and the inspectors' observations, the training provided by the security training staff was considered effective.

**S6 Security Organization and Administration**

Management support for the physical security program was determined to be adequate. No problems with the organizational structure that would be detrimental to the effective implementation of the security and safeguards programs were observed or reported.

**S7 Quality Assurance in Security and Safeguards Activities**

The inspectors concluded that the self-assessment program in place to identify, prevent and resolve potential problems was weak and an improved self-assessment program would enhance program effectiveness.

The review concluded that the audit was comprehensive in scope and depth, that the findings were appropriately distributed and addressed and that the audit program was being properly administered.

**S8 Miscellaneous Security and Safeguards Issues**

- S8.1. (Closed) Inspection Followup Item 50-272, 50-311, 50-354/93-28-01 - Review the effectiveness of assessment aids after upgrade is complete. The program to upgrade the assessment aids has been completed and the assessment aids were determined to be adequate to perform their intended function.
- S8.2. (Closed) Violation 50-272, 50-311, 50-354/96-10-03 - Failure to control badge/keycards and failure to display photo badges in the protected area. The inspectors verified the corrective actions described in the licensee's response letter, dated February 26, 1997, to be reasonable and complete and they were found to be properly implemented. No similar problems were identified.
- S8.3. (Closed) Violation 50-272, 50-311, 50-354/EA96-344-01013 - Failure to exercise positive access control over photo badge keycards thereby creating the opportunity for unauthorized access to the vital areas. The inspectors verified that corrective actions described in the licensee's response to letter, dated January 10, 1997, to be reasonable and complete and they were found to be properly implemented. No similar problems were identified.
- S8.4. (Closed) Violation 50-272, 50-311, 50-354/EA96-344-02013 - Failure to conduct a physical pat-down search of a contractor that had caused two portal metal detectors to alarm on three different attempts to pass through them, although these alarms provided reasonable cause to suspect that the contractor was attempting to introduce firearms, explosives, incendiary devices, or other unauthorized material into the protected area, before issuing him a photo badge keycard, and allowing him to enter the protected area. The inspectors verified the corrective actions described in the licensee's response letter dated January 10, 1997, to be reasonable and complete and they were found to be properly implemented. No similar problems were identified.

- S8.5 (Closed) Violation 50-272, 50-311, 50-354/EA96-344-02023 - Failure to notify the senior nuclear shift supervisor (SNSS) of a security threat when a contractor that should have received a pat-down search entered the protected area without a pat-down search. The failure to notify the SNSS resulted in the event not being classified per Event Classification Guide 16. The inspectors verified the corrective actions described in the licensee's response letter, dated January 10, 1997, to be reasonable and complete and they were found to be properly implemented. No similar problems were identified.
- S8.6 (Closed) Violation 50-272, 50-311, 50-354/EA96-344-03014 - Failure to inactivate the security photo badges and personnel access clearance for 12 employees terminated in June and July 1996 within two working days of termination of employment. The inspectors verified the corrective actions described in the licensee's response letter, dated January 10, 1997, to be reasonable and complete and they were found to be properly implemented.
- S8.7 (Closed) Violation 50-272, 50-311, 50-354/EA96-344-04014 - Failure of two security supervisors to qualify in all required critical security tasks prior to being assigned field operations supervisor duties. The inspectors verified the corrective actions described in the licensee's response letter, dated January 10, 1997, to be reasonable and complete and they were found to be properly implemented. No similar problems were identified.
- S8.8 (Closed) Violation 50-272, 50-311, 50-354/EA96-344-05014 - Failure to complete all required tests of an alarm zone prior to releasing the security force member posted at the alarm zone. The inspectors verified the corrective actions described in the licensee's response letter, dated January 10, 1997, to be reasonable and complete and they were found to be properly implemented. No similar problems were identified.
- S8.9 Environmental Activist Rally on April 28, 1997

The environmental activist group, Environmental Response Network, in cooperation with Greenpeace and several other environmental organizations conducted a rally and press conference on April 28, 1997, to protest the planned restart of the Salem Generating Station. The inspectors observed the licensee's planning and coordination with local law authorities to ensure that the planned demonstration was conducted in a safe manner and would pose no threat to operations at the Hope Creek facility. The inspector observed good coordination with the local law authorities, as well as good implementation of enhanced monitoring of the facility surroundings for threat assessment. The demonstration was completed peacefully with no affect on the plant.

## V. Management Meetings

### **X1 Exit Meeting Summary**

A recent discovery of a licensee operating its facility in a manner contrary to the UFSAR description highlighted the need for a special focused review that compares plant practices, procedures, and parameters to the UFSAR description.

The inspector identified a discrepancy between the Hope Creek Updated Final Safety Analysis Report (UFSAR) Section 8.3.1.1.3.10 and the Hope Creek standard operating procedure Emergency Diesel Generators Operation (HC.OP-SO.KJ-0001(Q) Rev. 26). The UFSAR requires specific action to be taken after an emergency diesel generator operates longer than four hours at less than 20 percent rated load. Hope Creek does not track cumulative unloaded time and the actions for extended operation at light load conflict with the UFSAR.

Since the UFSAR does not specifically include security program requirements, the inspectors compared licensee activities to the NRC-approved physical security plan, which is the applicable document. While performing the inspection discussed in this report, the inspectors reviewed Section 4.2.2 of the Plan, titled "Vehicle and Cargo Control," the inspectors determined, based on discussions with security supervision and reviews of applicable procedures and records, that vehicles were being searched and controlled prior to entry into the protected area as described in the Plan and applicable procedures.

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on May 9, 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.

### **X3 Management Meeting Summary**

On April 15 and 16, 1997, William L. Axelson, Deputy Regional Administrator for Region I and James C. Linville, Chief of the Reactor Projects Branch No. 3, Region I, toured the Hope Creek and Salem facilities and met with representatives of both organizations. There were no significant findings during the management tour.

## INSPECTION PROCEDURES USED

IP 37550: Engineering  
IP 37551: Onsite Engineering  
IP 61726: Surveillance Observations  
IP 62707: Maintenance Observations  
IP 71707: Plant Operations  
IP 71715: Extended Control Room Observations

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

50-354/97-02-01 VIO Operators failed to follow procedure for testing the emergency diesel generator  
50-354/97-005 LER Failure to perform monthly technical specification flowpath verification surveillance checks of the LPCI system (RHR crosstie valves)

### Closed

50-354/97-006 LER High pressure coolant injection isolation due to personnel error during functional testing  
50-453/95-033 LER Technical specification surveillance requirement deficiencies  
50-354/95-11-02 VIO Technical specification surveillance requirement performance deficiencies  
50-354/96-10-03 VIO Failure to control and display photo-badge keycards for the protected area  
50-354/EA96-344-01013 VIO Failure to exercise positive access control over photo-badge keycards  
50-354/EA96-344-02013 VIO Failure to conduct a required physical pat-down search of a contractor  
50-354/EA96-344-02023 VIO Failure to properly notify the nuclear shift supervisor of a security threat in a timely manner  
50-354/EA96-344-03014 VIO Failure to inactivate photo-badge keycards for 12 terminated employees  
50-354/EA96-344-04014 VIO Failure of two security supervisors to qualify in all required critical tasks prior to being assigned to duty  
50-354/EA96-344-05014 VIO Failure to complete all required tests of an alarm zone prior to release of the post

### Discussed

50-354/97-01-02 URI Degraded safety-related Agastat and Struthers-Dunn relays  
50-354/97-01-04 URI RHR system crosstie modification  
50-354/97-01-05 VIO Failure to properly control temporary structures - scaffold, etc., in safety-related areas.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

M. Trum	Director, Nuclear Operations Support
G. Gibson	Manager, Nuclear Security
J. DeFabo	Supervisor, Quality Assessment
M. Ivanick	Sr. Security Regulatory Specialist
C. Weiser	Security Engineer
A. Kaplinger	Superintendent, Loss Prevention
J. Zudans	Manager, Hope Creek Design Engineering
J. Pollock	Manager, Quality Assurance
P. Roberts	Manager, Hope Creek System Engineering
M. Meltzer,	Superintendent, Hope Creek Chemistry
W. Mattingly	Supervisor, Hope Creek Quality Assurance
T. Cellmer,	Superintendent, Hope Creek Radiation Protection
S. Jones,	Manager, Plant Maintenance
L. Wagner,	Manager, Hope Creek Operations
M. Bezilla,	General Manager, Hope Creek Operations
L. Storz,	Senior Vice President - Operations

### Contractor

R. Cogdall	Project Manager, The Wackenhutt Corporation
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## LIST OF ACRONYMS USED

HPCI	High Pressure Coolant Injection
RCIC	Reactor Core Isolation Cooling
SRO	Senior Reactor Operator
NCO	Nuclear Control Operator
NSS	Nuclear Shift Supervisor
SNSS	Senior Nuclear Shift Supervisor
EDG	Emergency Diesel Generator
TSSIP	Technical Specification Surveillance Improvement Project
EO	Equipment Operators
LCO	Limiting Condition for Operation
SORC	Station Operations Review Committee
RPS	Reactor Protection System
SWS	Service Water System
FRVS	Filtration, Recirculation, and Ventilation System
SJAE	Steam Jet Air Ejector
CRD	Control Rod Drive
RHR	Residual Heat Removal
LPCI	Low Pressure Coolant Injection
SACS	Safety Auxiliaries Cooling System
SWSOPI	Service Water System Operational Performance Inspection
RCA	Radiological Controlled Area
RMS	Radiation Monitoring System
PDR	Public Document Room
NRC	Nuclear Regulatory Commission
PSE&G	Public Service Electric and Gas
SFM	Security Force Members
QA	Quality Assurance
QA/NSR	Quality Assurance/Nuclear Safety Review
PA	Protected Area
T&Q	Training and Qualification
IDS	Intrusion Detection Systems
CAS	Central Alarm System
SAS	Secondary Alarm System
UFSAR	Updated Final Safety Analysis Report
CCTV	Closed Circuit Television