

Public Service  
Electric and Gas  
Company

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**SEP 25 1996**

LR-N96297

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Gentlemen:

**RESPONSE TO AN APPARENT VIOLATION IN  
INSPECTION REPORT NO. 50-354/96-06  
SSWS/SACS THROTTLE VALVES  
FACILITY OPERATING LICENSE NPF-57  
HOPE CREEK GENERATING STATION  
DOCKET NO. 50-354**

Pursuant to the provisions of 10CFR2.201, this letter submits the response of Public Service Electric and Gas Company (PSE&G) to an apparent violation described in NRC Inspection Report No. 50-354/96-06, dated August 29, 1996. Information pertaining to the description of the event, the reason for the violation, the corrective actions taken, safety significance and mitigating factors is provided in Attachment 1.

PSE&G would like to emphasize that the issues discussed in the apparent violation were self-identified during the review of a Station Service Water System (SSWS) design change and reported in LER 96-009-00 on April 12, 1996. When this issue was identified, prompt and comprehensive corrective actions were implemented to ensure continued system operability and to prevent recurrence of the problem, including: 1) the initiation of a complete and thorough review of the circumstances that led to this problem in accordance with Hope Creek's Corrective Action Program; 2) repositioning of the throttle valves; and 3) performance of a flow balance to support a SSWS backwash strainer design change, which verified proper throttle valve position.

In addition, PSE&G is continuing the Configuration Baseline Document validation review of safety significant systems (as committed in LER 95-037-00) to validate system operation. Issues identified during these reviews have been, and will continue to be, identified, resolved and tracked in accordance with Hope Creek's Corrective Action Program.

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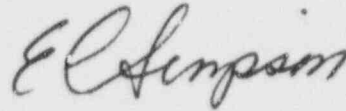
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Should you have questions or comments on this transmittal, do not hesitate to contact us.

Sincerely,



Attachment  
Affidavit

C Mr. H. Miller, Administrator - Region I  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
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Mr. D. Jaffe, Licensing Project Manager - Hope Creek  
U. S. Nuclear Regulatory Commission  
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Rockville, MD 20852

Mr. R. Summers  
USNRC Senior Resident Inspector (X24)

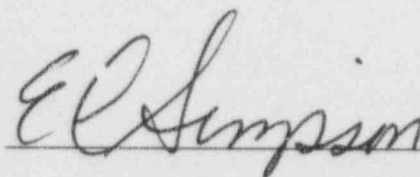
Mr. K. Tosch, Manager IV  
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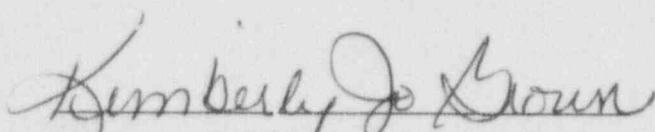
STATE OF NEW JERSEY )  
                                  ) SS.  
COUNTY OF SALEM        )

E. C. Simpson, being duly sworn according to law deposes and says:

I am Senior Vice President - Nuclear Engineering of Public Service Electric and Gas Company, and as such, I find the matters set forth in the above referenced letter, concerning Hope Creek Generating Station, are true to the best of my knowledge, information and belief.

  
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Subscribed and Sworn to before me  
this 25<sup>th</sup> day of September 1996

  
Notary Public of New Jersey

KIMBERLY JO BROWN  
NOTARY PUBLIC OF NEW JERSEY  
My Commission Expires April 21, 1998

My Commission expires on \_\_\_\_\_

## ATTACHMENT

REPLY TO AN APPARENT VIOLATION  
INSPECTION REPORT NO. 50-354/96-06  
HOPE CREEK GENERATING STATION  
DOCKET NO. 50-354

LR-N96297

### I. INTRODUCTION

On April 12, 1996, Public Service Electric and Gas Company (PSE&G) transmitted LER 96-009-00, in accordance with the provisions of 10CFR50.73, for operation in an unanalyzed condition due to inappropriate Station Service Water System (SSWS)/Safety Auxiliaries Cooling System (SACS) throttle valve settings. On August 29, 1996, NRC Inspection Report No. 354/96-06 was issued. In that inspection report, the event described in LER 96-009-00 was cited as an apparent violation of NRC requirements.

As requested in the inspection report, on September 3, 1996, PSE&G contacted Mr. Larry Nicholson to inform the NRC that PSE&G elected to submit this violation response in lieu of attending a pre-decisional enforcement conference. In accordance with the provisions of 10CFR2.201, PSE&G hereby submits a written response to the notice of violation which includes: 1) the reason for the violation; 2) the corrective steps that have been taken and the results achieved; 3) the corrective steps that will be taken to avoid further violations; and 4) the date when full compliance will be achieved. In addition, PSE&G is providing information on the safety significance of this issue and mitigating factors that were involved with the violation.

### II. REPLY TO THE APPARENT VIOLATION

#### A. Description of the Apparent Violation

"As one of the committed corrective actions regarding a problem with operating the SACS system at a temperature lower than permitted by analysis (see LER 50-354/95037), the licensee engineering department began a review of six risk significant systems to validate that key design basis operating limits were appropriately incorporated into system operating and surveillance procedures. During the engineering validation process, the licensee identified that the [Service Water] flow throttle valves for the SACS heat exchangers had been improperly set in November 1992 and this condition remained unidentified/uncorrected until March 1996 (see LER 50-354/96009).

While the licensee identified the problem regarding the SWS flow throttle valve position and has taken corrective action, failure to ensure the operability of the service water system for all

possible design basis conditions was an apparent violation of technical specification 3.7.1.2.b, in that the flow path, which includes manual valves, was not maintained in order to provide sufficient cooling water flow from the Delaware river to the SACS heat exchangers to meet the design requirements of the SACS system."

**B. Response to the Apparent Violation**

PSE&G does not dispute the violation.

**1. Description of the Event**

As described in LER 96-009-00, in March 1996, during Hope Creek Generating Station's sixth refueling outage, flow balancing of the SSWS was being performed in concert with a design change being implemented for the SSWS backwash strainer valves. During the flow balancing, flow and pressure drop measurements were taken to evaluate SSWS/SACS performance. From these measurements, Engineering personnel determined that the SSWS/SACS heat exchanger throttle valves were in a position that restricted the SSWS from supplying sufficient flow through the SSWS/SACS heat exchangers for the most limiting design basis conditions. Specifically, the as-found positions of the throttle valves were such that flow was inconsistent with assumptions (for low river water level, maximum pump degradation, maximum heat exchanger fouling and high ultimate heat sink {UHS} temperatures) used in the design calculations for SSWS/SACS performance. Please note that the revised positioning of the backwash strainer valves (the Design Change Package {DCP} was placing the valves in the continuous full open position) did not impact SSWS/SACS performance since the last flow balance was performed with these valves fully open.

The follow-up root cause evaluation determined that, following SSWS/SACS throttle valve replacement during the fourth refueling outage (November 1992), the SSWS was flow balanced with the throttle valves set in their as-found position. This flow balance was performed under a separate work order and was not performed as part of the valve replacement DCP re-test requirements. The flow balance work order acceptance criteria at that time required measurement of SSWS/SACS heat exchanger pressure drops to ensure that minimum SSWS/SACS flows would be available during normal operation and design basis accidents. However, the acceptance criteria did not appropriately consider the effects of degraded SSWS/SACS performance or worst case environmental conditions (i.e., extreme low



river water level and UHS high temperature). In addition, because the flow balance was not performed as part of the valve replacement DCP re-test section, normal controls for re-test were not implemented.

As a result, the SSWS/SACS valves were set in a position (as-found in March, 1996) that reflected the SSWS/SACS pump performance, river water level, and UHS temperature existing at the time (November, 1992) and not in a position that ensured adequate SSWS/SACS flow during combined worst case design basis conditions.

On 3/17/96, the initial assessment of SSWS/SACS operability determined that there were no immediate concerns since SSWS/SACS was capable of providing adequate cooling for either shutdown or power operation conditions under the existing plant conditions (i.e., low UHS temperatures). On the same day, with the design change for the SSWS backwash strainers already installed, proper SSWS flow balancing was completed. The flow balancing utilized acceptance criteria established to set the proper throttle valve position for design basis maximum UHS temperatures, SSWS and SACS pump performance, SSWS/SACS heat exchanger efficiency, lowest postulated river water level and potential instrument inaccuracies.

2. Reason for the Violation

The causes of this event were attributed to procedural and personnel deficiencies. The procedures used for the development of engineering evaluations did not provide acceptance criteria for field verification of the assumed conditions analyzed and the design change process was ineffectively implemented in November 1992, when flow balance verification was not included as part of the DCP. In addition, the engineer conducting the November, 1992 flow balance test, under a separate work order, was not aware of the need to compensate for worst case conditions while performing the test on the SSWS.

3. Corrective Steps That Have Been Taken and Results Achieved

On 3/17/96, with the design change for the SSWS backwash strainers already installed, proper SSWS flow balancing was completed. The flow balancing utilized acceptance criteria established in system calculations generated to set proper throttle valve position for design basis parameters: UHS temperatures, maximum allowed SSWS and SACS pump performance degradation, SSWS/SACS heat exchanger efficiency, river water level and instrument inaccuracies.

The new throttle valve positions ensure adequate SSWS/SACS performance under postulated design basis conditions. However, additional issues subsequently identified by the review of SSWS and SACS (see LERs 96-015-00 and 96-022-00) have additional impact on SACS/SSWS performance capabilities.

As committed in LER 96-009-00, procedure enhancements were completed which clarify the requirements for field verification of plant conditions against the assumptions in the engineering evaluations.

As committed in LER 96-009-00, a sample of Hope Creek engineering evaluations has been reviewed to determine if appropriate acceptance criteria had been provided. This review sampled approximately 15% of engineering evaluations and identified no additional occurrences where acceptance criteria were deficient.

As part of the comprehensive corrective actions described in LER 95-037-00, the Configuration Baseline Document validation review of SSWS and SACS has continued. Additional issues concerning SSWS/SACS conformance with the licensing and design basis have been identified and are being resolved in accordance with Hope Creek's Corrective Action Program. These issues include the events reported in LER 96-015-00 and 96-022-00. Final reconciliation of these issues with SSWS/SACS operation will take place upon the completion of Engineering's evaluation of these issues. This reconciliation will include any required procedure changes, Technical Specification changes, plant modifications or SSWS/SACS valve repositioning. Compensatory administrative controls will continue to be implemented to ensure continued operability of the SSWS/SACS.

4. Corrective Steps That Will be Taken to Avoid Further Violations

The training program for test engineers has been enhanced since November, 1992. Although the current program has been determined to adequately qualify test engineers to perform system flow balances, the system flow balancing procedure will be enhanced to provide guidance on the need to add margin to system flows to account for design basis conditions and postulated system degradation. These revisions will be completed by December 31, 1996.

SSWS/SACS issues identified during the Configuration Baseline Document validation reviews will continue to be

tracked by and resolved using the Hope Creek Corrective Action Program. SSWS/SACS operability will continually be assessed as issues are identified.

As described in PSE&G letter, dated September 5, 1996 (LR-N96276), a Service Water System Operational Performance Inspection (SWSOPI) will be conducted in October - November, 1996, to confirm the validity of the design and licensing basis reviews which have been completed. The inspection will independently assess the SSWS and interfacing systems using selective sampling vertical-slice inspection methods.

5. Date When Full Compliance Will Be Achieved

With the re-positioning of the throttle valves on 3/17/96, full compliance with Technical Specification 3.7.1.2 was achieved.

C. Safety Significance and Mitigating Factors

An evaluation of SSWS/SACS performance with the as-found throttle valve positions was conducted using the actual plant and environmental conditions. The results of that evaluation indicate that there was no time that Hope Creek operated under conditions where the plant could not meet the minimum required SSWS/SACS flows for LOCA and loss of offsite power scenarios due to throttle valve positions. Therefore, there was no actual safety significance associated with this condition.

If a LOCA/LOP had occurred during coincident worst case design basis conditions (probability conservatively determined to be  $5.2E-9$ /year), SSWS/SACS performance would be degraded such that SACS and/or the suppression chamber operational limits could have been challenged. The result of reduced SSWS flow would have resulted in SACS operating temperatures limits being exceeded, and as a result, the time required to reach Cold Shutdown conditions would have increased. However, as stated in LER 96-022-00, plant operating procedures, in conjunction with operator training, emphasize the assurance of continued SACS operability in post LOCA/LOP scenarios. Although this issue could have challenged SACS operability in LOCA/LOP scenarios, the potential consequences would be limited based on established procedures to remove non-essential loads and/or reposition valves to maintain SACS operation within specified limits.

Additional issues subsequently identified by the review of SSWS and SACS (see LERs 96-015-00 and 96-022-00) had additional impact on the ability on SACS/SSWS performance. The safety significance of those issues were comprehensively addressed in those LERs.



The mitigating factors related to this violation include the following: 1) the issues were self-identified as the result of pre-planned reviews of the SSWS design and licensing basis to support a design change; 2) corrective actions to assess system operability and restore the system to an appropriate configuration were immediately implemented; and 3) comprehensive evaluations of SSWS and SACS conformance with the design and licensing basis is continuing and appropriate controls are implemented to ensure continued system operability. Although prior opportunities to identify this problem existed (see LER 96-009-00), the issues were not self-revealing.

#### **D. Conclusions**

PSE&G concludes that a violation of NRC requirements did occur; however, significant mitigating factors exist since: 1) the safety significance of the issue was minimal; 2) the issue was self identified; and 3) corrective actions were timely and comprehensive.