

Public Service
Electric and Gas
Company

E. C. Simpson

Senior Vice President - Nuclear Engineering

Public Service Electric and Gas Company

P.O. Box 236, Hancocks Bridge, NJ 08038

609-339-1700

JAN 27 1997

LR-N96439

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

**RESPONSE TO GENERIC LETTER 96-06/120 DAY REPORT
ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354**

Gentlemen:

This letter provides the 120 day response to Generic Letter 96-06 for the Hope Creek Generating Station. Public Service Electric and Gas Company (PSE&G) has reviewed the issues identified in the Generic Letter and has implemented appropriate actions to maintain operability of affected systems. The attachment to this letter provides the details of PSE&G's response, including a description of actions taken, conclusions regarding susceptibility, identification of affected systems, the basis for continued operability, and corrective actions taken and planned.

Sincerely,

E C Simpson

Attachment
Affidavit

9702040227 970127
PDR ADOCK 05000354
P PDR

1072/1

JAN 27 1997

Document Control Desk
LR-N96439

-2-

C Mr. H. J. Miller, Administrator - Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. D. Jaffe, Licensing Project Manager - Hope Creek
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop 14E21
Rockville, MD 20852

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

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
33 Arctic Parkway
CN 415
Trenton, NJ 08625



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 the Hope Creek Generating Station, are true to the best of my knowledge, information and belief.

El Simpson

Subscribed and Sworn to before me
this 27th day of January, 1997

Kimberly J. Brown
Notary Public of New Jersey

Notary Public of New Jersey

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

My Commission expires on _____

ATTACHMENT

RESPONSE TO GENERIC LETTER 96-06/120 DAY REPORT
ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354
LR-N95439

I. INTRODUCTION

Generic Letter 96-06 identifies the following three concerns:

A. Water hammer

Cooling water systems serving the containment air coolers may be exposed to the hydrodynamic effects of water hammer during either a loss-of-coolant accident (LOCA) or a main steamline break (MSLB).

B. Two-Phase Flow

Cooling water systems serving the containment air coolers may experience two phase flow conditions during postulated LOCA and MSLB scenarios. The heat removal assumptions for design basis accident scenarios were based on single-phase flow conditions.

C. Thermally induced Overpressurization

Thermally induced overpressurization of isolated water-filled piping sections in containment could jeopardize the ability of accident-mitigating systems to perform their safety functions and could also lead to a breach of containment integrity via bypass leakage.

II. SUMMARY OF REQUESTED ACTIONS

Generic Letter 96-06 requests that addressees determine the following:

1. If containment air cooler cooling water systems are susceptible to either water hammer or two-phase flow conditions during postulated accident conditions; and
2. If piping systems that penetrate the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.

Response to Generic Letter 96-06/120 Day Report

In addition to the individual addressee's postulated accident conditions, these items should be reviewed with respect to the scenarios referenced in the Generic Letter.

If systems are susceptible, addressees are expected to complete the following:

1. Assess the operability of affected systems; and
2. Take corrective action in accordance with the requirements stated in 10CFR50 Appendix B and as required by the plant Technical Specifications.

III. SUMMARY OF REPORTING REQUIREMENTS**A. Requested Content of the 120 Day Report**

The Generic Letter requests a written summary report that includes the following information within 120 days of the date of the letter:

1. A description of actions taken in response to the requested actions;
2. The conclusions reached relative to susceptibility to the water hammer, two phase flow, and overpressurization concerns. If systems are found to be susceptible, identify the affected systems and describe the specific circumstances involved;
3. The basis for continued operability of affected systems and components; and
4. A description of corrective actions that were implemented or that are planned.

IV. REPORT REQUESTED WITHIN 120 DAYS**A. Description of Actions Taken**

The three concerns identified in the Generic Letter have been reviewed for applicability to Hope Creek. The results of these reviews are discussed in Section B, below. For systems determined to be susceptible to the conditions described in the

Response to Generic Letter 96-06/120 Day Report

Generic Letter, an operability determination has been processed in accordance with plant procedures and the Corrective Action Program. Corrective measures to permanently resolve any degraded or non-conforming conditions identified as a result of reviewing the concerns raised in the Generic Letter are described in Section D, below.

B. Conclusions Regarding Susceptibility/Identification of Affected Systems/Description of Specific Circumstances

1. Water hammer/Two-Phase Flow Concerns

The Hope Creek design basis and procedural guidance for the use of non-safety related drywell coolers during post-LOCA and post Main Steam Line Break (MSLB) scenarios were reviewed to evaluate susceptibility to water hammer and two-phase flow. This review concluded that the drywell coolers are not credited in the Hope Creek accident analyses to mitigate the consequences of a LOCA or MSLB. Therefore, the heat removal assumptions for design basis accident scenarios would not be adversely impacted by any potential for two-phase flow in the drywell coolers. Since this is the case, no further evaluation of the two-phase flow concerns is required.

To evaluate susceptibility to water hammer, the procedures controlling drywell cooler operation during post accident scenarios were reviewed. Based upon this review, it was determined that drywell cooler isolation interlocks are overridden in accordance with Emergency Operating Procedure HC.OP-EO.ZZ-0102A(B). This Emergency Operating Procedure (EOP) directs the operator to place all drywell coolers in service, if available, by overriding the containment isolation interlocks when high drywell temperatures exist in post accident scenarios. It has been determined that this action could result in a water hammer when attempting to place the drywell coolers in service under the following post accident drywell conditions:

- a. anytime the water in the drywell coolers is greater than 250 degrees F and the isolation interlocks are defeated; or
- b. if water in the drywell coolers, which initially is less than 250 degrees F, is heated then cooled prior to defeating the containment isolation interlocks.

Response to Generic Letter 96-06/120 Day Report

Due to the presence of relief valves on the piping in the drywell, inventory would be lost as the temperature rises, and when the water cools, pressure may decrease below the saturation pressure of the water. These conditions would enable the formation of voids in the piping, which could result in a water hammer when the drywell coolers are placed into service.

Although the exact magnitude of the water hammer loads was not determined, it was concluded that the system containment penetrations were not designed for potential water hammer loads, and as a result, containment integrity could be challenged during these post accident scenarios when the isolation interlocks are overridden. When this determination was made, the condition was identified in the Corrective Action Program (AR 961220079) to ensure that: 1) appropriate controls would be implemented to maintain operability of the system containment penetrations (discussed in Sections C and D below); and 2) the issue would be appropriately evaluated for reportability. On December 20, 1996, at 1606 hours, a four hour report was made in accordance with the requirements of 50.72(b)(2)(iii) since the potential loss of containment integrity was a condition alone that could have prevented the control of the release of radioactive material.

2. Overpressurization Concern

For the overpressurization concern, a review of drawings revealed that seven penetrations exist that could be susceptible to overpressurization as described in Generic Letter 96-06. These penetrations have inside and outside containment isolation valves that receive closure signals during LOCA conditions but do not have installed pressure relief devices. As a result, the subsequent post accident heat-up of the water trapped between each pair of closed isolation valves may result in pressures that are beyond maximum design pressure.

All other water filled containment penetrations at Hope Creek have a configuration that provides inherent overpressure protection or are provided with relief valves. Examples of inherent overpressure protection include penetrations having no inside containment isolation valves associated with piping that is open to the containment or reactor vessel and penetrations with check valves that provide relief into the containment or reactor vessel.

The seven identified penetrations that are susceptible to overpressurization are listed below:

Response to Generic Letter 66-06/120 Day Report

PENETRATION #	SERVICE
P9	REACTOR WATER CLEANUP SUCTION
P10	RESIDUAL HEAT REMOVAL HEAD SPRAY
P17	REACTOR RECIRCULATION SAMPLE LINE
P25	DRYWELL FLOOR DRAIN SUMP
P26	DRYWELL EQUIP. DRAIN SUMP
P29	REACTOR AUXILIARIES COOLING SYSTEM SUPPLY
P30	REACTOR AUXILIARIES COOLING SYSTEM RETURN

Based upon analyses of the seven above penetrations, Penetrations P9 and P17 would not be susceptible to thermal expansion of the fluid in the piping (and associated overpressurization) since the fluid contained in the piping is initially at a higher temperature than the postulated post accident temperatures inside of containment.

C. Basis for Continued Operability of Affected Systems

1. Water hammer/Two-Phase Flow Concerns

As stated previously, the two-phase flow concern does not impact the operability of drywell cooler system since it is not required to remove heat from the containment in post accident scenarios. Therefore, a basis for continued operability is not necessary to address this issue.

Administrative controls were implemented to prohibit the use of the isolation override feature for the drywell cooler water supply penetrations. Prohibiting the use of the drywell coolers in post accident scenarios prevents water hammer loads from adversely impacting the containment penetrations. This interim compensatory action has been determined to be sufficient to maintain operability of the drywell penetrations during post accident conditions. Since the design and licensing basis of Hope Creek does not require the use of the drywell coolers to mitigate the consequences of an accident, no Technical Specification actions or other compensatory measures were required to be taken to implement those administrative controls. Actions being taken to permanently resolve this condition are discussed in Section D, below.

Response to Generic Letter 96-06/120 Day Report

2. Overpressurization Concern

There are five penetrations (P10, P25, P26, P29 and P30) potentially affected by overpressurization under post accident conditions. An operability assessment was performed for these affected penetrations using the criteria in Appendix F of Section III of the ASME Code as specified in the guidance contained in NRC Generic Letter 91-18.

The piping systems associated with these five penetrations are not required to perform any system related function after a LOCA or MSLB event. The only specified function for the piping sections between the inboard and outboard isolation valves is to maintain containment integrity. As defined in F-1220(A) of Appendix F, the stress analyses must ensure that a violation of the pressure retaining boundary will not occur under post LOCA conditions. A thermal expansion and overpressurization analysis demonstrates that the maximum stresses in the affected piping sections and isolation valves remain below the ultimate strength of the component materials. In addition, the thermal expansion induced stresses are self limiting, ensuring that the structural integrity of the penetrations will be maintained in post accident conditions. Therefore, these five penetrations are considered operable but degraded. In accordance with Generic Letter 91-18, this operability assessment and use of Appendix F will remain valid until the next refueling outage, when corrective measures (described in Section D, below) are implemented.

D. Corrective Actions Taken/Planned1. Water hammer/Two-Phase Flow Concerns

As stated previously, there are no adverse consequences from the two-phase flow concerns identified in Generic Letter 96-06; therefore, no corrective actions are required to address this issue.

To address the water hammer issue, either: 1) revisions to Hope Creek EOPs will be made to address overriding of the containment isolation interlocks of the chilled water system; or 2) the affected containment penetrations will be reanalyzed or modified to accommodate the water hammer loads. A determination of the most appropriate method to resolve this issue is being made, and final implementation of corrective actions will be completed by the end of the next refueling outage (RFO7).

Response to Generic Letter 96-06/120 Day Report

2. Overpressurization Concern

To address the overpressurization concern with the aforementioned five penetrations, a design modification will be made. Pressure relief devices will be installed in Penetrations P10, P25, P26, P29 and P30. Installation of these pressure relief devices will be completed by the end of the next refueling outage (RFO7).