

Public Service
Electric and Gas
Company

Steven E. Miltenberger

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Vice President and Chief Nuclear Officer

July 12, 1988
NLR-N88093

United States Nuclear Regulatory Commission
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Washington, DC 20555

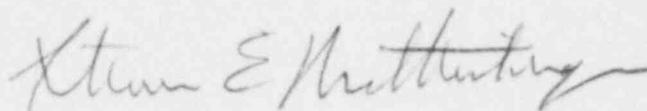
Gentlemen:

RESPONSE TO NRC BULLETIN 88-04
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

Public Service Electric and Gas Company has received the subject NRC Bulletin regarding potential safety-related pump loss. The information requested by this Bulletin as related to the Hope Creek Generating Station is provided in the enclosure to this letter.

Should you have any questions with regard to this transmittal, please do not hesitate to contact us.

Sincerely,



Enclosure

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PDR ADOCK 05000354
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C Mr. G. W. Rivenbark
USNRC Licensing Project Manager

Mr. G. W. Meyer
USNRC Senior Resident Inspector

Mr. W. T. Russell, Administrator
USNRC Region I

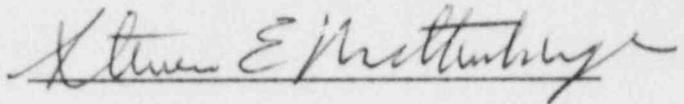
Mr. D. M. Scott, Chief
Bureau of Nuclear Engineering
Department of Environmental Protection
380 Scotch Road
Trenton, NJ 08628

Ref: RESPONSE TO NRC BULLETIN 88-04

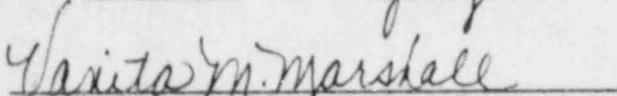
STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

Steven E. Miltenberger, being duly sworn according to law deposes and says:

I am Vice President and Chief Nuclear Officer of Public Service Electric and Gas Company, and as such, I find the matters set forth in our letter dated July 12, 1988, concerning our response to NRC Bulletin 88-04, are true to the best of my knowledge, information and belief.



Subscribed and Sworn to before me
this 12th day of July, 1988



Notary Public of New Jersey

VANITA M. MARSHALL
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires May 6, 1993

My Commission expires on _____

ENCLOSURE

RESPONSE TO NRC BULLETIN 88-04
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

The purpose of this bulletin was to request licensees to investigate and correct, as applicable, two miniflow design concerns. The first concern involves the potential for the dead-heading of one or more pumps in safety-related systems that have a miniflow line common to two or more pumps or other piping configurations that do not preclude pump-to-pump interaction during miniflow operation. The second concern is whether or not the installed miniflow capacity is adequate for even a single pump in operation.

The written response requested in Action Item 4 of NRC Bulletin 88-04 is presented below.

NRC BULLETIN 88-04, ACTION ITEM 4

Provide a written response that (a) summarizes the problems and the systems affected, (b) identifies the short-term and long-term modifications to plant operating procedures or hardware that have been or are being implemented to ensure safe plant operations, (c) identifies an appropriate schedule for long-term resolution of this bulletin, and (d) provides justification for continued operation particularly with regard to General Design Criterion 35 of Appendix A to Title 10 of the Code of Federal Regulations (10 CFR 50), "Emergency Core Cooling" and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling System for Light Water Nuclear Power Reactors."

RESPONSE

4.(a) Summarize the problems and systems affected.

At Hope Creek Generating Station, the Core Spray and RHR/LPCI systems are the only two safety-related systems which incorporate shared miniflow line configurations. Review of system design has indicated that the subject concern does not affect Hope Creek.

For the RHR/LPCI system, the 4 inch miniflow lines join into an 18 inch header that discharges to the torus. As such, no appreciable back pressure is anticipated that could cause the dead-heading of a "weaker" pump. Each miniflow line includes a flow orifice prior to the common header. This would tend to desensitize the system to the strong pump/weak pump concern by reducing the pressure at the entrance to the common header. The minimum flow line is adequately sized to ensure continuous operation of both pumps at the required minimum flow.

The core spray pumps each incorporate a 3-inch miniflow line that discharges into a four inch header. The 3-inch lines include flow orifices with a 1-inch bore, while the common header has a 2.2-inch bore orifice. The common header discharges to the torus. Again, the flow orifices in the individual pump discharge lines should equalize any strong pump/weak pump mismatch while the discharge to the torus would tend to create minimal backpressure. The minimum flow line is adequately sized to ensure continuous operation of both pumps at the required minimum flow.

- 4.(b) Identify the short term and long term modifications to plant operating procedures or hardware that have been or are being implemented to ensure safe plant operations.

Operation in the minimum flow mode, which includes the potential for dead-head operation, is already minimized to the short periods of pump startup during routine testing and to system startup during emergency conditions. The frequency of these occurrences is low and the duration of pump operation while in the miniflow mode is small.

With regard to Hope Creek Generating Station, the normal operating procedures for the Core Spray and RHR systems have been reviewed. It was concluded from this review that the procedures contain adequate provisions to minimize the amount of time these pumps will operate in the minimum flow mode.

In addition, the Core Spray and RHR pumps are periodically tested under the Hope Creek IST program. This testing program is intended to promote the identification and subsequent correction of pump degradation problems. Any changes in pump performance would be detected and corrected per routine pump testing in advance of pump degradation due to cumulative low flow effects from pump surveillance testing and normal system starts.

As stated above in our response to Action Item 4.(a), the existing design of the minimum flow lines ensures continuous operation of both pumps at the required minimum flow. Therefore, no short-term or long-term modifications to plant operating procedures or hardware are planned.

- 4.(c) Identify an appropriate schedule for long-term resolution of this and/or other significant problems that are identified as a results of this bulletin.

No significant problems have been identified as a result of our investigation in response to this bulletin.

- 4.(d) Provide justification for continued operation, particularly with regard to 10 CFR 50, Appendix A, GDC 35, "Emergency Core Cooling," and 10 CFR 50.46, "Acceptance Criteria for ECCS for Light Water Nuclear Power Reactors."

The items discussed below provide the basis for concluding that the continued operation of the Hope Creek Generating Station is justified.

1. The potential for pump excessive wear attributable to minimum flow operation and/or dead-heading is negligible. System operation in the minimum flow mode is limited to quarterly surveillance testing and system start during emergency conditions. Therefore, the potential for dead-heading will be low simply due to the percentage of time spent in the minimum flow mode.
2. BWR operating experience demonstrates that short-term operation in the minimum flow mode and/or dead-heading has little or no impact on pump life. Recent inspections of BWR RHR pumps, which have undergone normal testing over a period of approximately ten years, have indicated no pump impeller excessive wear due to minimum flow. It is estimated that the pumps had been operating for up to 30 hours in the minimum flow mode in the period since the previous inspection.

There have been occasions (at other plants) when pumps have operated dead-headed inadvertently (i.e., dead-heading was not caused by minimum flow operation but, for instance, by incorrectly closing a valve). These pumps have continued to function normally.

3. Pump wear attributable to minimum flow and/or dead-heading is not a significant contributor to total system unavailability. Other factors (such as loss of emergency power, loss of cooling, etc.) are more significant. BWR operating history indicates no occurrences of system unavailability due to pump excessive wear attributable to low flow operation.
4. For the RHR and core spray pumps, the only design basis events that would lead to pumps running in the minimum flow mode and/or dead-heading are events that result in an ECCS initiation signal while the reactor is at high pressure (above the pump shutoff head). These events are normally small break LOCAs and loss of drywell cooling isolation events. Of these, only certain small break LOCAs actually require ECCS injection from LPCI or core spray.

Once initiated, the maximum duration that a LPCI or core spray pump may operate in the minimum flow mode for the spectrum of hypothetical LOCAs is less than 30 minutes. This is derived from postulated small break LOCAs, wherein reactor depressurization to below the shut-off head of these pumps is delayed. For large break LOCAs, where the full complement of ECC systems is more fully utilized, the reactor inherently depressurizes through the break. The present minimum flow bypass line is expected to provide adequate protection for these pumps for the short durations postulated during both the small and large break LOCAs.

5. As discussed above, only certain small break LOCAs actually require ECCS injection for LPCI or core spray where the pumps may be operated in the minimum flow mode. However, adequate redundancy provided in the design of the ECCS systems and the operational limitations imposed by the Hope Creek Technical Specifications ensure that the requirements of 10 CFR 50.46 and General Design Criteria 35 of the 10 CFR 50 Appendix A are satisfied.
6. Routine inspection, maintenance, and surveillance practices should detect any pump excessive wear well before system performance is degraded.