GPU Nuclear

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Writer's Direct Dial Number:

July 11, 1988

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, DC 20555

Dear Sirs:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Response to NRC Bulletin No. 88-04
"Potential Safety-Related Pump Loss"

On May 5, 1988, the USNRC issued Bulletin 88-04 which requested all licensees to investigate and correct as applicable two pump miniflow design concerns. Accordingly, this letter provides GPUN's response to the bulletin.

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.

Our evaluation for each safety-related system at Oyster Creek (with pump minimum recirculation arrangements) is provided in Attachment I. The systems evaluated are the Core Spray, Shutdown Cooling, Condensate Transfer and Control Rod Drive Systems.

As a result of our evaluation, GPUN concludes that the above systems preclude any significant pump-to-pump interaction or situations in which a "stronger" performing pump would dead-head a "weaker" pump during operation in minimum recirculation. We believe that pumps in 3 of the 4 systems clearly have adequate minimum recirculation flow. With regard to the Core Spray System at the present time, although historical data strongly suggests that the current minimum flow of the pumps is adequate, additional vendor data will be a factor in our ultimate determination. Details are included in the attachment.

A followup report will be submitted after obtaining verification from the pump suppliers that current miniflow rates are adequate. As requested by the bulletin, our evaluation and supporting documentation will be maintained at Oyster Creek for a minimum of two (2) years.

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If further information is required, please contact Mike Heller, Oyster Creek Licensing at (609)971-4680.

Very truly yours,

E. E. Fitzpatrick
Vice President and Director
Oyster Creek

EEF/MH/dmd
(0520A)
Attachment

Sworn to and Subscribed
before me this 11th day
of July 1988.

Diana M. DeBlasio
DIANA M. DeBLASIO
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires 6-5-91

cc: Mr. William T. Russell, Administrator
Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

NRC Resident Inspector
Oyster Creek Nuclear Generating Station
Forked River, NJ 08731

ATTACHMENT I

Evaluation Summary

Systems evaluated are the (1) Core Spray, (2) Shutdown Cooling, (3) Condensate Transfer, and (4) Control Rod Drive Systems.

1. Core Spray System

The Core Spray System consists of two loops, designated System 1 and System 2, each containing two main pumps and two booster pumps. Each pair of pumps (main and booster pump in series) has a minimum flow line from the discharge of the booster pump back to the torus. The recirculation lines for both pairs of pumps in one loop share a header downstream of individual check valves, and restriction orifices. System 1 and System 2 do not share a common recirculation line.

A. Potential for Dead Heading

A post Loss of Coolant Accident (LOCA) initiation of the Core Spray System results in the preferred main pump and booster pump in each loop actuating. The remaining main and booster pump in each loop will not actuate unless there is a failure of the preferred pump. The system start logic precludes operation of two parallel pumps in the same loop and therefore, the dead heading of one pump by another in the same loop is not a concern.

B. Adequacy of Pump Minimum Flow

The Core Spray pumps are operated at minimum flow during operability and inservice testing and could possibly run at minimum flow for a longer period in an accident scenario. Although the manufacturer's design minimum flow is 300 gpm, calculations done in response to this bulletin indicate that the actual minimum flow value based on installed flow orifice size is closer to 100 gpm. The period of time for which the pumps are on minimum flow for testing is of a short duration and not considered significant from the stand point of pump degradation. Maintenance records have shown no abnormal or excessive wear of the pumps or motors as a result of monthly testing over the life of the plant. In the event of an accident demand on the system, the preferred pumps in each loop would run on minimum recirculation until the reactor pressure decreased to less than 285 psig. For a design basis LOCA this time is less than one minute. A small break LOCA would result in a longer period of time on recirculation.

The difference in the design versus calculated minimum flow is being further evaluated and the pump manufacturer's input on required flow

will be a significant factor in the ultimate disposition of this discrepancy. It is believed that a decision on the matter will be made by September 30, 1988 with any modifications required to be done in accordance with the Long Range Planning Program. In the meantime, continued operation is justified based on past performance and lack of any indications of insufficient minimum flow. A followup report will be submitted at the conclusion of our pump manufacturer verification effort.

2. Shutdown Cooling System

The Shutdown Cooling System (SDC) is used during the second phase of plant cooldown to bring the reactor vessel from 350°F to 140°F for refueling and maintenance. The system is not required for accident mitigation.

A. Potential for Dead Heading

The three Shutdown Cooling pumps have individual minimum flow recirculation lines from the pump discharge to the pump suction and are not subject to the pump-to-pump interaction outlined in Bulletin 88-04.

B. Adequacy of Pump Minimum Flow

Operation of the SDC pumps at minimum flow is limited to start-up of the system during plant cooldown. The pumps operate at a continuous recirculation flow of approximately 17% of design flow while the system is being brought on line. This period is of short duration and is not considered a significant contribution to pump degradation.

3. Condensate Transfer System

The Condensate Transfer pumps supply make-up water from the condensate storage tank to the shell side of the isolation condensers. The recirculation lines for both Condensate Transfer pumps are routed back to the condensate storage tank through a common 3 inch header.

A. Potential for Dead Heading

The Condensate Transfer pumps are not normally run on minimum flow in parallel except during a pump swap (i.e., startup of one pump with shutdown of the other pump). Normal operation of the system has one pump operating on minimum flow and available to supply make-up water to various plant systems as necessary. The operation of a second pump in parallel with the first would depend upon system demand and would not result in both pumps operating on minimum flow. Since operation of both pumps on minimum flow is of short duration, the effects of pump-to-pump interaction are not a concern.

B. Adequacy of Pump Minimum Flow

The minimum recirculation flow for the Condensate Transfer pumps has previously been increased to 25-30 GPM (10-12% of design) due to the inadequacy of the original installed capacity. The increased minimum flow capacity has been verified as acceptable by the pump manufacturer.

4. Control Rod Drive System

The Control Rod Drive pumps supply water from the condensate storage tank (CST) to the control rod drive mechanisms, the head cooling system, and under certain emergency conditions provide low flow, high pressure make-up to the reactor. Both Control Rod Drive pumps have their minimum flow lines returning to the CST through a common header.

A. Potential for Dead Heading

The Control Rod Drive pumps are not normally run in parallel, except during a pump swap. During power operation, one pump is in service providing flow and pressure to the charging header and the cooling water header. Since parallel operation of the pumps is limited during normal operation to a short duration (i.e., pump swap), pump-to-pump interaction is not a concern in this mode.

During a reactor scram, sufficient flow and pressure is provided to the charging header by the one pump in operation. Under emergency conditions, both Control Rod Drive pumps could be operated per the Emergency Procedures, as a post-LOCA water source; however, the pumps would be lined up to inject to the reactor and would not be operating in minimum flow. Therefore, pump-to-pump interaction would not be a concern.

2. Adequacy of Pump Minimum Flow

Each Control Rod Drive pump has an installed minimum flow capacity of 20 gpm or 20% of rated flow. This has been evaluated and considered adequate.