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SUBJECT: Responds to Bulletin 88-004 re potential safety-related pump loss.

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January 31, 1989

U. S. Nuclear Regulatory Commission
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Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Follow-up Response to NRC Bulletin No. 88-04:
Potential Safety-Related Pump Loss

- References:
- 1) NRC Information Notice No. 87-59: Potential RHR Pump Loss
 - 2) NRC Bulletin No. 88-04: Potential Safety-Related Pump Loss
 - 3) July 8, 1988 letter from D. C. Hintz, WPSC, to NRC Document Control Desk

NRC Bulletin No. 88-04: Safety-Related Pump Loss outlined two NRC concerns over possible safety-related pump degradation. The first concern was with deadheading pumps that are operated in parallel with shared miniflow recirculation piping at low flow rates. The second concern was with the adequacy of installed miniflow recirculation piping for single pump operation at low flow rates.

Reference 3 transmitted WPSC's response to NRC Bulletin No. 88-04. In the response it was stated that all safety-related pumps were reviewed, with no deficiencies discovered, but further review was required to investigate the adequacy of the recirculation piping for the safety injection (SI) pumps, auxiliary feedwater (AFW) pumps, and residual heat removal (RHR) pumps. WPSC also stated that the final review of the SI, RHR and AFW pumps would be completed within 120 days of WPSC's July 8, 1988 submittal. A subsequent extension to this schedule was granted by Kewaunee's NRC Project Manager in an October 20, 1988 conference call. This letter transmits the results of the reviews of the SI, AFW, and RHR pumps, which is the remaining information requested in NRC Bulletin 88-04.

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WPSC worked with the SI, AFW, and RHR pump manufacturers to resolve the minimum flow rate concerns of Bulletin 88-04. Based on plant-specific configurations and operating practices, each manufacturer provided the following recommendations for pump operation at low flow rates:

RHR Pumps

Minimum flow rate of 70 GPM for an accumulation of 60 hours annually.

AFW Pumps

No less than 15% of the best efficiency point (36 GPM) not to exceed 10 hours per month.

SI Pumps

Short term minimum flow (2 hours or less in 24 hours) - 70 GPM

Continuous minimum flow (in excess of 2 hours in 24 hours) - 120 GPM

Kewaunee's RHR and AFW pumps are operated within the manufacturer recommended minimum flow rate limits. The current minimum recirculation flow rate of the RHR pumps is 179 GPM, and the pumps are operated less than 60 hours annually in the recirculation mode. The current minimum recirculation flow rate of the AFW pumps is 40 GPM, and the pumps are operated less than 10 hours per month in the recirculation mode.

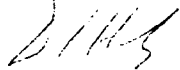
Operation of Kewaunee's SI pumps in the recirculation mode is not within the minimum flow rate limits recommended by the manufacturer. The current minimum recirculation flow rate for the SI pumps is 47 GPM. This is 23 GPM less than that recommended by the SI pump manufacturer.

Current plans are to increase the minimum recirculation flow rate of the SI pumps. An engineering evaluation has been initiated to assess the impact of an increase in SI recirculation flow rate on the Kewaunee safety analysis assumptions. If the evaluation concludes that a 23 GPM increase in SI recirculation flow rate is acceptable, the system will be modified accordingly. It is estimated that the modification could be in place by the end of KNPP's 1990 refueling outage, assuming that the engineering evaluation demonstrates that no major system balancing or testing is required for the modification.

Operation of the SI pumps in the present configuration is not a short term safety concern. The concerns raised in Bulletin 88-04 are with degradation of pump impellers due to extended operation at low flow rates. Kewaunee's SI pumps are normally operated in the recirculation mode only during inservice testing, which lasts approximately 15 minutes per quarterly test, and following pump maintenance to verify pump operability, which also lasts approximately 15 minutes per test.

In conclusion, the operation and design of the RHR and AFW pumps has been reviewed, and it has been determined that the minimum pump flow rate concerns of Bulletin 88-04 do not apply. It has also been determined that the minimum recirculation flow rate of the SI pumps is less than that recommended by the pump manufacturer. WPSC is currently evaluating a modification to the SI system that would increase the minimum recirculation flow rate. The modification will be implemented provided it does not invalidate any safety analysis assumptions. Until this modification is complete, it has been determined that operation of the SI pumps in the current recirculation mode is not a safety concern.

Sincerely,

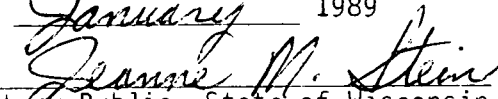


D. C. Hintz
Vice President - Power Production

PIS/jms

cc - Mr. Robert Nelson, US NRC
US NRC, Region III

Subscribed and Sworn to
Before Me This 31st Day
of January 1989


Notary Public, State of Wisconsin

My Commission Expires:
June 23, 1991