



JOHNSTON PUMP COMPANY

Nuclear Service Division

January 15, 2003

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R4-5A16

Cooper Nuclear Station
P.O. Box 98
Brownsville, NE 68321

Reference: Service Water Gland Water

Attention: Dwight Vorpahl

Fax: 402/825-5179

Per your request, please review the following:

QUESTION 1:

Based on existing Flowserve vendor manual guidance, the recommended normal operating flow range for gland water injection to the Service Water Pumps is 1.5 GPM to 6 GPM. NPPD desires to increase the gland water flow above 6 GPM to assure that the 1.5 GPM minimum is maintained during Service Water system evolutions that change the overall system flow demand. What is the maximum recommended gland water injection flow rate for long term operation, and how does any increase in the maximum flow impact recommended pump components/maintenance intervals?

QUESTION 1 - RESPONSE:

Johnston Pump Company typically recommends that gland water flow be maintained in a range of 10 GPM to 15 GPM for pumps of this design. Since this is an increase from the current flow rate, the increased flow velocity has the potential to increase the wear rate of the bearings and in the tension nut to sleeve clearance area. This wear is generally not excessive, based on our experience, but should be considered when establishing the pump overhaul frequency.

QUESTION 2:

As a follow-on to Question 1, what is the minimum acceptable gland water injection flow for long-term pump operation? (Can it be reduced to less than the current 1.5 GPM?)

QUESTION 2 - RESPONSE:

The design of this pump requires gland water flow to assure efficient lubrication of the bearings. A minimum gland water flow of 1.5 GPM is acceptable for long-term operation and should not be reduced.

QUESTION 3:

What is the impact on service Water Pump components and pump operation if gland water flow is reduced to zero flow for a period of 30 minutes and then restored to normal?

QUESTION 3 - RESPONSE:

With no gland water flow, the temperature of the water in the enclosing tube will increase and the bearings will not be as efficiently lubricated. This would likely result in damage to the bearings. However, we do not anticipate a catastrophic failure of the pump in this scenario. Although the bearings may be damaged, we would expect that the pump would continue to perform its hydraulic function for at least 30 days (dependent on the condition of the pump prior to the event). If a short-term loss of gland

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water flow occurs, the pump should be monitored after the event to determine if vibration levels have increased. If so, the vibration levels should be monitored and the pump should be scheduled for overhaul.

Please do not hesitate to call if you need further information.

Regards,

A handwritten signature in black ink, appearing to read "Gerald D. Harrelson", with a long, sweeping flourish extending to the right.

Gerald D. Harrelson
Nuclear Account Manager

GDH/hm