



## Nebraska Public Power District

August 27, 1979

Mr. Karl V. Seyfrit, Director  
U.S. Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Region IV  
611 Ryan Plaza  
Suite 1000  
Arlington, Texas 76011

Subject: Response to IE Bulletin No. 79-15

Reference: (1) IE Bulletin 79-15, "Deep Draft Pump Deficiencies",  
July 11, 1979

Dear Mr. Seyfrit:

This letter is written in response to IE Bulletin No. 79-15.

Reference 1 describes several deficiencies that were noted within the past 1½ years on deep draft pumps. Deep draft pumps are defined as those pumps that are vertical turbine pumps with impellers located in bowls in a sump or a self-contained barrel. Problems with these pumps involved design and workmanship deficiencies which required extensive inspection, replacement of parts and major redesign. There was particular concern when these pumps were utilized in ECCS and RHR applications where long-term cooling capability is required following a LOCA or similar event. Our response to items 1 through 6 of Reference 1 is as follows:

### Item 1

There are four deep draft pumps similar to the pump shown in Figure 1 of the subject bulletin installed at CNS in a safety related application.

### Item 2

The following is the nameplate data for the four pumps:

Manufacturer	-	Byron Jackson
Model	-	28KXL-1STG
Capacity	-	8000 GPM @ 125 Ft. Head
Applications	-	Service Water Pumps A thru D

Reference 1 seemed most concerned when the pumps were primarily in a standby condition and may be called upon to operate for extended periods of time during accident conditions. The Service Water Pumps operate

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continuously which provides sufficient operational experience to establish a preventive maintenance program to alleviate known operational problems. The pumps are disassembled and inspected every 18 months as scheduled with a preventive maintenance program or sooner as operating data indicates.

Item 3

The overall dimensions of the pump are as follows:

- a. Height from suction bell to centerline of the discharge pipe is 46'-6".
- b. The discharge flange is a 20"-150# flange.
- c. The overall length of the pump and driver is 54'-3-1/8".

Item 4

The Service Water System as a whole demonstrated during preoperational tests that it performed within the design limits and exceeds the system safety obligation. Six modes of service water system operation were observed and flow rates found to be acceptable. The most critical mode, "Post Accident" was acceptable using only one-fourth of the system's total capability (one Service Water Pump). Service Water Pump performance curves were obtained for each Service Water Pump. Service Water Pump 1B with a new impeller and bowl assembly matched the performance curves exactly, however, the curves of pumps 1A, 1C, and 1D reflect some erosion due to the silt laden river water.

The Service Water Pumps are flow tested quarterly in which they must meet or exceed the Cooper Nuclear Station Technical Specifications. At only one time did two of the Service Water Pumps not meet the flow requirements and this was due to a personnel error in setting the pump lift. The pump lift is adjusted regularly to compensate for pump wear and a flow test is run after each adjustment to verify compliance to the Technical Specifications. The pump lift is adjusted in thousandths of an inch.

A summary of the maintenance history indicates the majority of work performed on the Service Water Pumps is routine. This includes adjusting pump lift and adjustment of the packing gland. Exceptions are noted that some problem was indicated when excessive leakage was noted on one pump from the packing gland. The cause of this problem was that the threaded connections between the shaft tubes, which contains the shaft bearings and the lubricating fluid, failed due to erosion and separated slightly. The pump was still operable. Maintenance procedures have been revised to require inspecting these threaded connections during their normal preventive maintenance activities and there has been no recurrence of this problem.

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Item 5

The only operation problems that have resulted in major repair efforts have been pump erosion due to silt in the water and maintaining gland water flow requirements. Both items were identified early in the program and have been compensated for in our preventive maintenance program or repaired. With regard to the gland water problem, the bearings have been modified as recommended by the manufacturer so that they are grooved to allow sufficient gland water flow. A preventive maintenance schedule has been established which dictates pump disassembly and inspection every 18 months. This number is nominal and if pump performance dictates, the duration before preventive maintenance is extended or decreased.

Item 6

The longest interval that each pump has been available for operation without corrective maintenance is as follows:

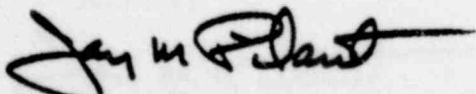
Service Water Pump A	-	14 months
Service Water Pump B	-	19 months
Service Water Pump C	-	26½ months
Service Water Pump D	-	26 months

The Service Water Pumps, as mentioned previously, are continuous operating pumps at full flow. Normal operation is to have (3) pumps running and (1) pump in standby, except during warm weather when (4) pumps are running. The pumps are changed from standby to the running mode regularly so that, during an extended period, all pumps will have identical hours. With this in mind, each pump runs 3/4 of the time. Therefore, a safe assumption is that the longest time of continuous operation is 3/4 the time of its longest time of availability. Again, due to the manner of operating the Service Water Pumps, at the end of its longest continuous operation a planned overhaul of the pump was projected or scheduled.

A review of the above material including operational and maintenance history does not indicate a failure to meet the design specifications. No further corrective action is deemed necessary nor are there any plans for extensive testing to demonstrate the long-term operability of the Service Water Pumps at our facility.

If you have any questions regarding this response, please contact me.

Sincerely,



Jay M. Pilant  
Director of Licensing  
and Quality Assurance

JMP:LCL:cmk

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