



LONG ISLAND LIGHTING COMPANY

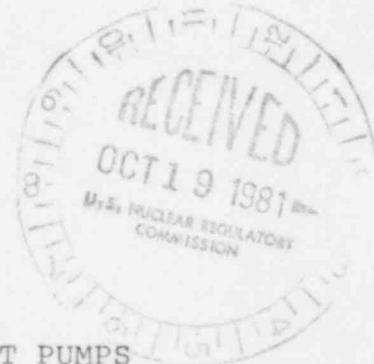
SHOREHAM NUCLEAR POWER STATION

P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

October 13, 1981

SNRC-626

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555



GUIDELINES FOR
LONG-TERM OPERABILITY OF DEEP DRAFT PUMPS
LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION - UNIT 1
DOCKET NO. 50-322

Dear Sir:

In accordance with your request for information concerning our program for demonstration of operability of our safety related deep draft pumps the following is provided.

In response to IE Bulletin 79-15 via SNRC-448 dated September 11, 1979 with supplement SNRC-436, dated October 9, 1979 we informed the commission that Shoreham utilizes only four (4) safety-related deep draft pumps, located in the service water system, for cooling multiple systems throughout the plant. These pumps were manufactured by the Bingham Willamette Company and identified as type 16X26C-VM-2 stage. The individual pump rated capacity as installed is 8600 gpm at 157 ft. head with a speed of 1190 rpm. The bell lip to discharge flange center line is thirty-nine (39) feet.

The Shoreham service water pumps are situated in the main intake structure on Long Island Sound. The pumps are secured to the floor via mounting flanges, and are seismically restrained at three (3) locations: near top of motor, below mounting flange, and near the bottom of the pump.

Bingham Willamette designed the pumps to be rigid resulting in a column of half-inch thick aluminum bronze twenty (20) inches in diameter. This column size in combination with seismic restraints at three (3) locations, near top of motor, below mounting flange and near the bell, eliminates any concern for column flexibility. The internal shaft is guided by cutless

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rubber bushings at a maximum spacing of 80 inches with journal bearings located on top at the discharge head and at the lowest point of the shaft below the impeller eliminating the concerns for shaft flexibility. The column is designed with metal to metal non-gasketed joints such that no elaborate alignment procedures are necessary on installation. Bingham Willamette has designed the rotor such that its first critical speed is 42% higher than the operating speed of the pump. It is, therefore, not anticipated that there are natural frequencies associated with the pump assembly which occur near the operating speed of the pump.

All service water pumps are located within the Shoreham screenwell structure. All assembly, installation and alignment of pumps and drivers was accomplished in strict accord with the manufacturer's instruction manual and as directed by the on-site manufacturer's field representative. Any adjustments performed during this activity was either performed by the manufacturer's representative personally or under his direction. The activities associated with the above included verifying all shaft sections for straightness by taking runout readings. Those sections out of tolerance were corrected by the manufacturer's representative. In order to ensure proper alignment during installation and routine maintenance, pump parts have been marked so that they are reassembled consistently in the same arrangement. Split pins were installed on each pump segment flange to assure that all future assemblies would be exactly as performed at the factory. All couplings and associated hardware used on assembly are specified as high precision by Bingham Willamette. Pump to motor coupling runout readings were taken after assembly and required to be repeated subsequent to any reassembly. Column assembly alignment is verified by proper fit-up with the seismic restraints and by rabbit-fits designed into the column flange faces.

As part of our overall test program associated with the service water pumps, a complete hydraulic model test program has been conducted for the main intake structure at Shoreham by Lasalle Hydraulics Laboratory. A scale model of a typical intake bay was constructed and all pertinent pumps, pipes and supports were included. The matrix of operating conditions investigated bounded all flow rate and tide level combinations which could be anticipated for any and all modes of pump operation. The results of the model program indicated that there were no irregularities of a magnitude or frequency which could be detrimental to the operation of the pumps.

The present test program as implemented and planned at Shoreham provides an intensive sequence of events which is designed to

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demonstrate that the service water pumps and system are acceptable and totally capable of performing the intended functions.

As a minimum, the specific pump acceptance test program consists of the following.

- o Alignment of motor and pump is performed in accordance with manufacturer's requirements.
- o The motor is run-in uncoupled with vibration levels taken and compared to defined acceptance criteria.
- o The pump and motor are coupled with proper lift established in accordance with the manufacturer's procedure and requirements.
- o The pump and motor are run-in in the coupled state and vibration levels are again taken and compared to defined acceptance criteria.
- o The pressure and flow characteristics will be determined at selected levels and compared to the manufacturer's supplied pump-head curves.

To date, no problems with excessive vibration or bearing wear have been encountered. The signatory coupled vibration levels determined during pump acceptance tests are being monitored during the startup program for any change. The startup activities which have placed these pumps in test will continue through the fuel load date of September 1982 with the pumps operationally rotated during this period. If any operational problems exist, including an unacceptable increase in vibration levels, they will be uncovered during this period. Included in the above mentioned startup activity are flushing of the entire safety related service water system, system hydraulic test program, and the system preoperational test. The pumps will also be utilized to provide the necessary heat sink for heat exchangers serving multiple systems such as diesel generators, Residual Heat Removal System (RHR), Reactor Closed Loop Cooling Water System (RBCLCW), etc. during the testing of those systems.

As a basic component required for both normal plant operation and safety related function, the service water pumps will be in continual operation on a rotated basis after fuel load has taken place; normally, only 2 pumps are required to be in operation

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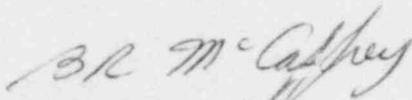
at any one time. Vibration monitors mounted on the pump motors provide a readout to the control room, as well as alarms, should the vibration level advance beyond a predetermined acceptable limit. Periodic monitoring of the vibration levels will provide indication of bearing wear and possible progression at an undesirable rate. The permissible rates are based upon a percentage increase above the vibration signatures taken during the pump acceptance test program and in accordance with values provided by the manufacturer.

It is LILCO's position that the long-term operability of the Shoreham service water pumps has been built into these pumps through thoroughness of design, model testing and the present startup test program. The reliability of these pumps will be proven on a continuous basis during startup and commercial operation.

We do not believe that the test program proposed by the commission will provide any significant enhancement over that which has already been implemented at Shoreham. To do so at this point in our service water system startup sequence could severely impact our overall Startup Test Program and place our fuel load date in jeopardy.

We trust that the above has been responsive to your request. Should you desire additional information, please do not hesitate to contact us.

Very truly yours,



B. R. McCaffrey
Manager - Project Engineering
Shoreham Nuclear Power Station

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