

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
WASHINGTON, D.C. 20555

July 10, 1978

IE Circular No. 78-13

OPERABILITY OF SERVICE WATER PUMPS

Description of Circumstances:

On January 11, 1978, Salem Generating Station Unit No. 1, a 4-loop Westinghouse PWR with once-through cooling located on the Delaware River, experienced high strainer differential pressures and the loss of four of six installed service water pumps within a period of approximately thirty minutes. At the time of this occurrence, the river surface was covered with a layer of frazil (slush) ice to an unknown depth.

Each service water pump discharge is equipped with an R. P. Adams VDWS-68 automatic self-cleaning strainer. The indication of failure was high strainer differential pressure. Subsequent investigation showed that each of the four strainers had broken shear pins in the backwash shaft which caused the self-cleaning feature to become inoperable. The internals of the strainers revealed no unusual debris which could have caused differential pressures high enough to shear the pins.

Each service water pump takes suction near the bottom of individual bays in the intake structure. Examination of the bays revealed that silt had accumulated to significant heights between the traveling screen and pump suction in each of the bays associated with failed strainers. The combined effects of high silt "walls," low river water level, and the surface ice, probably caused the pump suction to receive only ice-entrained water. This mixture then caused the strainers to clog and shear the backwash shear pins due to the high differential pressures. By the time the strainers were opened for inspection, the ice had melted.

The safety significance of this event stems from the potential, under a unique set of environmental circumstances, for a complete loss of service water.

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Corrective actions included the establishment of a periodic surveillance program to ensure that silt levels in the service water bays do not reach a level sufficiently high to cause recurrence of this event.

Holders of operating licenses or construction permits for power reactors who receive this Circular should review the service water design and postulated conditions in the ultimate heat sink to ensure that a similar combination of surface ice, water level, and forebay silting could not precipitate inoperability of the service water system. If such conditions are credible, a program to monitor the conditions at the service water intake structure should be implemented and procedures established for corrective action to be taken under normal and emergency conditions.

No written response to this Circular is required. If you require additional information regarding this matter, contact the Director of the appropriate NRC Regional Office.

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LISTING OF IE CIRCULARS ISSUED IN 1978

Circular No.	Subject	Date of Issue	Issued To
78-01	Loss of Well Logging Source	4/5/78	All Holders of Well Logging Source Licenses
78-02	Proper Lubricating Oil for Terry Turbines	4/20/78	All Holders of Reactor OLS or CPs
78-03	Packaging Greater Than Type A Quantities of Low Specific Activity Radioactive Material for Transport	5/12/78	All Holders of Reactor OLS, CPs, Fuel Cycle, Priority I Material and Waste Disposal Licenses
78-04	Installation Error That Could Prevent Closing of Fire Doors	5/15/78	All Holders of Reactor OLS or CPs
78-05	Inadvertent Safety Injection During Cooldown	5/23/78	All Holders of Reactor OLS or CPs
78-06	Potential Common Mode Flooding of ECCS Equipment Rooms at BWR Facilities	5/23/78	All Holders of Reactor OLS or CPs
78-07	Damaged Components of a Bergen-Paterson Series 25000 Hydraulic Test Stand	5/31/78	All Holders of Reactor OLS or CPs
78-08	Environmental Qualification of Safety Related Equipment at Nuclear Power Plants	5/31/78	All Holders of Reactor OLS or CPs
78-09	Arcing of General Electric Company Size 2 Contactors	6/5/78	All Holders of CPs

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LISTING OF IE CIRCULARS ISSUED IN 1978

Circular No.	Subject	Date of Issue	Issued to
78-10	Control of Sealed Sources Used in Radiation Therapy	6/14/78	All Medical Licensees in Categories G and G1
78-11	Recirculation M-G Set Overspeed Stops	6/15/78	All Holders of BWR OLs or CPs
78-12	HPCI Turbine Control Value Lift Rod Bending	6/30/78	All Holders of BWR OL's or CPs except as listed in Encl. 2

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