CENTRAL FILES

POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT NO. 3 NUCLEAR POWER PLANT
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50-286

August 2, 1978
IP-DQ-2238

Boyce H. Grier, Director
Office of Inspection and Enforcement
Region 1
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Grier:

This letter is provided in response to IE Bulletin No. 78-08 dated June 12, 1978, which discussed an overexposure incident due to an accessible portion of the fuel transfer tube at a power reactor. The actions required by the subject bulletin were taken in view of possible gaps or deficiencies in shielding surrounding the fuel transfer tube at Indian Point 3 Nuclear Power Plant.

1. A review of shielding design for plant areas adjacent to the fuel transfer tube was performed and there were no sections of the fuel transfer tube accessible without shielding. The shielding review revealed a one to two inch wide area at the joint between the fuel transfer tube and the containment wall where there was a potential for streaming. The areas affected would be directly above and below the fuel transfer tube.

2. The affected areas were barricaded with solid plywood barriers to prevent entry into these areas during fuel transfer. Some of the barriers were provided with locked doors to allow entry after the completion of fuel transfer.

3. The barricades were posted as potential high radiation areas.

4. A survey was conducted on July 3, 1978 during the transfer of the first fuel assembly in order to determine the existence or extent of any streaming. The method of survey was primarily by the posting of pocket ion chambers (dosimeters) in order to eliminate any potential for personnel overexposure during the survey. The results of the survey indicated a maximum reading of 27 mR per fuel assembly transfer. This survey point was on the 68 foot elevation inside containment, directly above the joint between the fuel transfer tube and the containment wall. The point was within a barricaded area.

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Assuming a maximum transfer rate of six fuel assemblies per hour, this would correspond to 162 mR per hour. The instantaneous exposure rate is approximately 3.2 R/hr., assuming 30 seconds per fuel transfer.

There will be a permanent solution either to restrict access or to provide additional shielding of the fuel transfer tube prior to the next refueling.

Very truly yours,

J. P. Bayne
Resident Manager

DQ/rbb

cc: Director of Nuclear Reactor Regulation
Attn: Mr. William McDonald, Director (2 copies)
Office of Management Information & Program Control
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dr. Ernst Volgenau (40 copies)
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D. C. 20555

IE Circular No. 78-16
Date: July 26, 1978

LIMITORQUE VALVE ACTUATORS

At Rancho Seco, a Limitorque Type SMB-2 motor-driven valve actuator in a safety feature system failed to function. The failure resulted from clutch wear which was due to manual operation of the valve and improper heat treatment of the clutch parts. Other SMB valve actuators at Rancho Seco had been subjected to undue clutch wear, but were still operable. Based on information obtained from the licensee and from Limitorque Corporation, undue wear appears to be limited to Type SMB-0, 1, 2, and 3 valve actuators equipped with 3600 rpm motors.

The type SMB valve actuator is provided with a handwheel so that the valve can be actuated manually in the event that power is unavailable. To shift from motor drive to handwheel drive, the operator must manually position a clutch so that the motor is disengaged from the drive train and the handwheel is engaged. The clutch latches into this position and cannot be manually repositioned. The next time that the motor is energized, the latch releases automatically and a spring repositions the clutch so that the motor engages the drive train.

When the clutch is repositioned, a pair of lugs on the motor-side of the clutch engages a pair of lugs on the valve-side. At the instant the lugs engage, the lugs on the motor-side are being accelerated to full speed and the lugs on the valve-side are stationary. Before the motor is energized, the relative position of the lugs is random. This initial position determines the depth of engagement or bite at the instant the lugs make contact. When a full bite occurs, no damage is caused to the lugs. When a grazing bite occurs, the edges of the lugs are chipped or upset. After the edges are sufficiently rounded, the clutch will not engage and hold for motor actuation.

The licensee estimated that the failure of the Type SMB-2 valve actuator occurred after it had been clutched 25 to 100 times. The valve which failed to function at Rancho Seco (SFV-25003) is operated by the actuator and is a safety features valve in a line connecting the borated water storage tank to a high pressure safety injection pump and a decay heat removal (low head safety injection) pump. The valve actuator is wired so that the valve which it controls will drive to the fully open or fully closed position once the motor is energized.

SFV-25003 is used for various routine operations during refueling, e.g., adding borated water to the primary cooling system. In these instances, the operator uses SFV-25003 as a throttle valve. To do this, the valve must be actuated manually giving rise to the potential damage to the lugs as described above. This would not occur with the type of valve actuator that is clutched with the motor at rest. Likewise, a separate throttle valve for supplying borated water during routine operation would preclude the need for manual operation of the subject valve actuator.

Limitorque Corporation has a test program in progress for determining the clutch life of Type SMB-0, 1, 2, and 3 valve actuators. Results to date are inconclusive. Pending other resolution of the problem, the licensee has stated that the valve will be stroked with the motor drive to ensure that the clutch has engaged the motor following manual actuation of the valve.

All licensee and construction permit holders should consider:

For Limitorque Type SMB-0, 1, 2, and 3 valve actuators with 3600 rpm motors which are used or will be used in engineered safety systems:

1) The potential for failure of the actuators resulting from manual operation;

2) Means for minimizing manual operation; and

3) Procedures for verifying that the actuator is operable with the motor after manual operation.

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.

ENCLOSURE 2

LIST OF IE CIRCULARS ISSUED IN 1978

Circular No.	Subject	First Date of Issue	Issued To
78-01	Loss of Well Logging Source	4/14/78	All Holders of Well Logging Source Licenses
78-02	Proper Lubricating Oil for Terry Turbines	4/20/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)
78-03	Packaging Greater Than Type A Quantities of Low Specific Activity Radioactive Material for Transport	5/12/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP); and all Fuel Cycle, Priority I Materials and Waste Disposal Licensees
78-04	Installation Errors That Could Prevent Closing of Fire Doors	5/18/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)
78-05	Inadvertent Safety Injection During Cooldown	5/26/78	All PWR Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)

ENCLOSURE 2 (Continued)

LIST OF IE CIRCULARS ISSUED IN 1978

Circular No.	Subject	First Date of Issue	Issued To
78-06	Potential Common Mode Flooding of ECCS Equipment Rooms at BWR Facilities	5/31/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)
78-07	Damaged Components on a Bergen-Paterson Series 25000 Hydraulic Test Stand	5/31/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)
78-08	Environmental Qualification of Safety-Related Electrical Equipment at Nuclear Power Plants	5/31/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)
78-09	Arcing of General Electric Company NEMA Size 2 Contactors	6/8/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)
78-10	Control of Sealed Sources Used in Radiation Therapy	6/14/78	All Institutional Medical Licensees
78-11	Recirculation M-G Set Overspeed Stops	6/15/78	All BWR Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)

ENCLOSURE 2 (Continued)

LIST OF IE CIRCULARS ISSUED IN 1978

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78-12	HPCI Turbine Control Valve Lift Rod Bending	6/30/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP) having a HPCI Terry Turbine
78-13	Inoperability of Multiple Service Water Pumps	7/10/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)
78-14	HPCI Turbine Reversing Chamber Hold Down Bolting	7/17/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP) having a HPCI Terry Turbine excepting Duane Arnold and Monticello
78-15	Tilting Disk Check Valves Fail to Close with Gravity in Vertical Position	7/24/78	All Power Reactor Facilities with an Operating License (OL) or Construction Permit (CP)

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IE Circular No. 78-15
Date: July 24, 1978

TILTING DISK CHECK VALVES FAIL TO CLOSE WITH GRAVITY IN VERTICAL POSITION

The Anchor/Darling Valve Company reported to the NRC on May 23, 1978 a condition at the San Onofre Nuclear Plant where an 8" - 1500# tilting disk check valve failed to close with gravity because it was installed in a vertical rather than a horizontal pipeline. The valve disk was counter weighted to close with the force of gravity when installed in a horizontal pipe. The manufacturer did not determine the reverse flow necessary to close the improperly installed valve. The check valve is located in the Low Pressure Safety Injection System as the first valve inside the containment and may not have closed as required to maintain the containment integrity.

Anchor/Darling has notified all purchasers of such valves and indicated to them possible implications of vertical installations.

It should be noted that similar problems may arise with tilting disk check valves from other manufacturers.

Tilting disk check valves can be designed for either horizontal or vertical piping but not for both. Improperly installed tilting disk check valves will not function properly.

All holders of operating licenses or construction permits should be aware of the potential for malfunction of safety-related systems caused by improperly positioned tilting disk check valves. Consideration should be given to the importance of verifying that all such valves in critical systems are installed only in the orientation specified by the manufacturer.

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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IE Circular No. 78-13
Date: July 10, 1978

INOPERABILITY OF SERVICE WATER PUMPS

Description of Circumstances:

On January 11, 1978, Salem Generating Station Unit No. 1, a four-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.

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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