

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555

July 26, 1993

NRC INFORMATION NOTICE 93-59: UNEXPECTED OPENING OF BOTH DOORS IN AN AIRLOCK

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to a potential problem that may result when interlocks which prevent both airlock doors being open at the same time are not in use or not operable. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On February 25, 1993, when the plant was operating at 100-percent power, personnel at River Bend Station inadvertently had both airlock doors open at the same time. The airlock at River Bend is a pneumatic airlock that was designed for either automatic operation actuated by a pushbutton or manual operation using handwheels located on the doors. The original intent was to operate the airlock in the automatic mode, which incorporated both electrical and mechanical interlocks. However, operation in the automatic mode was not reliable and, since 1985, the airlock was operated in the manual mode.

The manual mode incorporates only the mechanical actions associated with turning the handwheel. The electrical interlocks, which had been identified as being for "personnel safety," were not being used, and the licensee did not believe that they were necessary. An operable mechanical interlock allows only one handwheel at a time to be in the open position. Operation of the handwheel (1) positions two pins into keepers, (2) repositions two 3-way ball valves used to inflate/deflate the pneumatic seal, (3) operates a valve that equalizes pressure across the door, and (4) actuates the mechanical interlock.

On February 25, 1993, a licensee employee entering containment closed the outer door (not completely) and turned the handwheel to the closed position. By placing the outer door handwheel in the closed position, the mechanical interlock was satisfied, thereby permitting the handwheel on the inner door to

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be subsequently turned to the open position. This subsequent action deflated the door seal and air rushed from the containment past the employee in the airlock. A supervisor outside the airlock sensed the air flow out of the airlock and alerted the employee in the airlock, who promptly re-inflated the seals on the inner door and then properly (fully) closed the outer door. A second instance on the same day that involved different people nearly resulted in a repeat opening of both doors. An engineer leaving the containment nearly opened the inner door while the outer door was not fully closed. A technician in the airlock had previously turned the handwheel on the outer door to the closed position. In both instances, the lack of an operable door position interlock permitted the handwheel to be turned to the open position.

The licensee has modified the interlock system on the airlocks to incorporate the door closure switch into the circuit to prohibit manual operation of the handwheel when the associated door is not fully closed.

#### Discussion

There have been a number of other instances at other facilities when both doors of a containment airlock were opened; however, only a small fraction occurred during power operation. Nevertheless, each instance represents a potential for a large leak path. Most of the known at-power occurrences were attributed to failure to properly seat the door (due to rebound) or to component failure. In most instances, the time both doors were open was very short. Thus, the actual safety significance was low.

The effects of changing the operating mode of an airlock from automatic to manual may not be limited to a change from the pushbutton operating the handwheel to manually operating the handwheel. Operation in the manual mode may also eliminate some of the design interlock features, such as those that would prevent having both doors open at the same time and assuring that there is no significant pressure differential across an airlock door before it is opened.

Of particular concern in the River Bend event is that part of the interlock system was removed from service, apparently without a fundamental understanding of the function of the electrical interlocks in assuring the integrity of the containment boundary. The safety significance of positive verification of door closure via functioning door position switches was not recognized.

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*Alfred E. Chaffee*

Brian K. Grimes, Director  
Division of Operating Reactors Support  
Office of Nuclear Reactor Regulation

Technical contact: J. Carter, NRR  
(301) 504-1153

Attachment:  
List of recently Issued NRC Information Notice

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
93-58	Nonconservatism in Low-Temperature Overpressure Protection for Pressurized-Water Reactors	07/26/93	All holders of OLs or CPs for pressurized-water reactors.
93-57	Software Problems Involving Digital Control Console Systems at Non-Power Reactors	07/23/93	All holders of OLs or CPs for test and research reactors and nuclear power reactors
93-56	Weakness in Emergency Operating Procedures Found as Result of Steam Generator Tube Rupture	07/22/93	All holders of OLs or CPs for pressurized water reactors.
93-55	Potential Problem with Main Steamline Break Analysis for Main Steam Vaults/Tunnels	07/21/93	All holders of OLs or CPs for pressurized water reactors.
93-54	Motor-Operated Valve Actuator Thrust Variations Measured with A Torque Thrust Cell and A Strain Gage	07/20/93	All holders of OLs or CPs for nuclear power reactors.
93-53	Effect of Hurricane Andrew on Turkey Point Nuclear Generating Station and Lessons Learned	07/20/93	All holders of OLs or CPs for nuclear power reactors.
93-52	Draft NUREG-1477, "Voltage-Based Interim Plugging Criteria for Steam Generator Tubes"	07/14/93	All holders of OLs or CPs for pressurized water reactor (PWRs).
93-51	Repetitive Overspeed Tripping of Turbine-Driven Auxiliary Feed-water Pumps	07/09/93	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
CP = Construction Permit

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original signed by  
A. E. Chaffee

Brian K. Grimes, Director  
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Office of Nuclear Reactor Regulation

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\*See previous concurrence

OFC	OEAB:DORS	SC/OEAB:DORS	PUB:ADM	C/OEAB:DORS
NAME	JCarter*	RDennig*	Tech Ed*	AChaffee*
DATE	05/14/93	05/17/93	04/22/93	05/17/93
OFC	*PDIV-2:ADR4-5	*OGCB:DORS	*C/OGCB:DORS	D/DORS
NAME	EBaker	MHarper	GMarcus	BGrimes <i>all</i>
DATE	06/08/93	06/08/93	07/ /93	07/20/93

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DATE	06/08/93	06/08/93	<del>07</del> /1 /93	06/ /93

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OFC	PDIV-2:ADR4-5	OGCB:DORS	C/OGCB:DORS	D/DORS
NAME	EBaker <i>STB</i>	MHarper <i>mae</i>	GMarcus	BGrimes
DATE	06/8/93	06/08/93	06/ /93	06/ /93

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OFC	PDIV-2:ADR4-5	C/OGCB:DORS	D/DORS
NAME	EBaker	GMarcus	BGrimes
DATE	/ /93	/ /93	/ /93

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DATE	/ /93	/ /93	4/27/93	/ /93

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