

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

January 28, 1994

**NRC INFORMATION NOTICE NO. 94-06: POTENTIAL FAILURE OF LONG-TERM EMERGENCY
NITROGEN SUPPLY FOR THE AUTOMATIC
DEPRESSURIZATION SYSTEM VALVES**

Addressees

All holders of operating licenses or construction permits for boiling water reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees of the potential failure of the long-term nitrogen supply for the automatic depressurization system valves following a loss-of-coolant accident (LOCA). It is expected that recipients will review this information notice 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

In January 1993, during a review of the components that form the pressure boundary of the of the safety-related portion of the nitrogen supply system at the Fitzpatrick Nuclear Power Plant, the licensee found that certain parts of the drywell cooler air-operated dampers and their associated solenoid valves were made of Buna-N, an elastomer material that is not suitable for high-temperature conditions. These air dampers and solenoid valves are supplied by the same nitrogen header that provides the 100-day nitrogen supply for the automatic depressurization system (ADS) valves. Consequently, the failure of the Buna-N parts as a result of high temperatures that would exist following a LOCA could lead to depressurization of the nitrogen system and consequent inability to provide the 100-day supply of nitrogen to the ADS valves. The short-term operability of the ADS valves following a LOCA would be maintained because the ADS valves also are supplied by nitrogen accumulators and supply lines that are separated from the main nitrogen header by check valves.

The licensee found that there was a sufficient number of components with Buna-N materials supplied by the nitrogen header, and that their combined failure at high temperature could lead to a total leakage rate greater than the available nitrogen header makeup rate. These components consisted of 12 drywell cooler air-operated damper actuators, the 12 associated actuator

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pressure regulators, and 5 solenoid valves on separate components. These solenoid valves were located on two core spray testable check valves, two reactor vessel head vent valves, and on the actuator pneumatic control line for the drywell cooler air actuated dampers.

Discussion

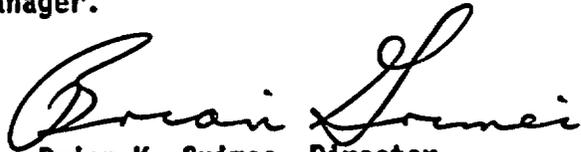
The problem was caused by the inadequate design of modifications that were made in 1985 to upgrade the ADS pneumatic supply. The original nitrogen supply system at Fitzpatrick was designed to provide the pneumatic supply to both safety-related and non-safety-related instruments and controls, including the ADS valves inside the drywell. The accumulators were included in the original design to ensure a safety grade pneumatic supply to the safety-related features. However, these accumulators only have a capacity sufficient to open the ADS valves five times at design pressure following a LOCA. In 1985 the licensee added an NRC-required modification to the nitrogen supply system, which provides a 100-day post-LOCA pneumatic supply to the ADS valves (Item II.K.3.28 of NUREG-0737, "Clarification of TMI Action Plan Requirements"). However, the licensee did not upgrade all of the non-safety-related components connected to the nitrogen header or provide isolation of portions of the system that could fail.

Following the discovery of the unsuitable materials, the licensee performed an evaluation to justify continued plant operation until a planned shutdown on February 26, 1993. Since then the licensee has taken the following corrective actions to limit the potential nitrogen leak rate to an acceptable value:

- Provided a modification to fix the drywell cooler inlet dampers in the open position, isolate the nitrogen supply to these dampers, and replace the drywell cooler outlet damper solenoid valves with qualified valves.
- Isolated the nitrogen supply to the core spray testable check valves.
- Replaced the solenoid valves on the reactor head vent isolation valves with environmentally qualified isolation valves.
- Modified the annunciator response procedures to require isolation of the air-operated damper actuators and the opening of a backup nitrogen header supply valve if a low header pressure alarm is received.

Evaluations and calculations show that, with the actions taken that are required by the annunciator procedures cited above, leakage through all 12 air-operated dampers and the solenoid valves on the associated pneumatic supply lines would be within the nitrogen header makeup capacity.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.



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

Technical contact: David H. Shum, NRR
(301) 504-2860

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List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
93-85, Rev. 1	Problems with X-Relays in DB- and DHP-Type Circuit Breakers Manufactured by Westinghouse	01/20/94	All holders of OLs or CPs for nuclear power reactors.
94-05	Potential Failure of Steam Generator Tubes with Kinetically Welded Sleeves	01/19/94	All holders of OLs or CPs for pressurized water reactors (PWRs).
94-04	Digital Integrated Circuit Sockets with Intermittent Contact	01/14/94	All NRC licensees except licensed operators.
94-03	Deficiencies Identified during Service Water System Operational Performance Inspections	01/11/94	All holders of OLs or CPs for nuclear power reactors.
94-02	Inoperability of General Electric Magne-Blast Breaker Because of Misalignment of Close-Latch Spring	01/07/94	All holders of OLs or CPs for nuclear power reactors.
94-01	Turbine Blade Failures Caused by Torsional Excitation from Electrical System Disturbance	01/07/94	All holders of OLs or CPs for nuclear power reactors.
93-101	Jet Pump Hold-Down Beam Failure	12/17/93	All holders of OLs or CPs for boiling-water reactors.
93-100	Reporting Requirements for Bankruptcy	12/22/93	All U.S. Nuclear Regulatory Commission licensees.
91-29, Supp. 2	Potential Deficiencies Found During Electrical Distribution System Functional Inspections	12/22/93	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
 CP = Construction Permit

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Original signed by
Brian K. Grimes

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Office of Nuclear Reactor Regulation

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DATE:	10/01/93	10/04/93	10/12/93	11/23/93	12/30/93
C:OGCB:DORS	D:DORS:NRR				
GHMarcus*	BKGrimes				
01/04/94	01/24/94				

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NAME:	DCKirkpatrick	DGable	DHShum	CEMcCracken	ACThadani
DATE:	10/01/93 ^{OK DCK} 1/4/94	10/04/93	10/12/93	11/23/93	12/30/93

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DATE:	10/01/93	10/04/93	10/12/93	11/23/93	12 ⁸⁰ /93

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