

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

April 24, 1990

NRC INFORMATION NOTICE NO. 90-26: INADEQUATE FLOW OF ESSENTIAL SERVICE WATER TO ROOM COOLERS AND HEAT EXCHANGERS FOR ENGINEERED SAFETY-FEATURE SYSTEMS

Addressees:

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

Purpose:

This information notice is intended to alert addressees to potential problems resulting from using the wrong flow and pressure drop relationship in establishing adequate flow of essential service water to room coolers for engineered safety-feature systems and from failing to establish or maintain balanced flows in essential service water systems. 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 do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On March 9, 1990, the reactor at the Clinton Power Station was in cold shutdown, and the licensee was taking action to implement the recommendations contained in Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." The licensee discovered that the flow of essential service water being supplied to several room coolers serving safety-related equipment was approximately half of the design flow. The safety-related equipment included components in the high-pressure and low-pressure core spray systems, the low-pressure injection system, the residual heat removal system, the standby gas treatment system, the combustible gas control system, and the nuclear protection system. After discovering the problem, the licensee declared these systems to be inoperable. The room coolers were supplied to the Clinton Power Station by American Air Filter, a subsidiary of Snyder General Corporation.

Before initial operation of the Clinton Power Station, the licensee obtained the relationship of the flow and pressure drop on the water side of the room coolers from the supplier. Plant personnel adjusted valving to establish the pressure drop across each room cooler which would provide the design flow. Plant personnel did not actually measure the flow to each room cooler.

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On March 9, 1990, the licensee discovered that the relationship between flow and pressure drop for the room coolers was wrong and that flows of essential service water to the room coolers were too low. Subsequently, the licensee also found that the flows of essential service water to several other coolers and heat exchangers were too low.

To balance the flow of essential service water through the system, plant personnel measured the flow using qualified instrumentation and adjusted flows to the room coolers according to these measurements. In some instances, the adjusted flows to specific components were somewhat less than design flows. However, the licensee is performing analyses to determine whether these flows are acceptable. Modifications to the updated final safety analysis report will be submitted as necessary.

Discussion:

American Air Filter has supplied room coolers to approximately 50 nuclear power plants including the Clinton Power Station. The room coolers consist of bundles of folded tubes with supply and return headers at the ends of the tubes. American Air Filter supplies the room coolers either with or without pairs of cleanout plugs at the bends in the tubes. At design flow, room coolers with cleanout plugs have a significantly greater pressure drop across the tube bundle than room coolers without cleanout plugs.

On April 3, 1990, Illinois Power Company, licensee for the Clinton Power Station, stated in a report submitted to NRC under 10 CFR 21.21 that pressure drop data provided by American Air Filter for 22 of 23 room coolers was incorrect. Twenty-two room coolers had cleanout plugs while the 23rd room cooler did not. On April 5, 1990, Illinois Power Company submitted a licensee event report which indicated that actual flows for the room coolers with cleanout plugs ranged from 10 percent to 80 percent less than the design flows.

The licensee event report also indicated that 7 of 25 cooling components provided by vendors other than American Air Filter and connected to the essential service water system had flows that were less than the design flows. For these cooling components, actual flows ranged from 2 percent to 42 percent less than the design flows. The components include: two residual heat removal (RHR) heat exchangers supplied by General Electric Company, two RHR pump seal coolers supplied by Byron Jackson, a switchgear heat removal condenser supplied by Carrier Corporation, a fuel pool cooling and cleanup heat exchanger supplied by Yuba Heat Exchanger, and a standby gas treatment system radiation monitor cooler supplied by Sentry Equipment Corporation. Other components served by the essential service water system were receiving excess flow. These flows ranged up to 213 percent more than design flows.

Failure to properly balance flows of essential service water during pre-operational testing or failure to maintain balanced flows can lead to degradation of safety-related equipment.

This information notice requires no specific action or written response. If you have questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

Charles E. Rossi
Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Roger W. Woodruff, NRR
(301) 492-1180

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
90-25	Loss of Vital AC Power with Subsequent Reactor Coolant System Heat-Up	4/16/90	All holders of Ols or CPs for nuclear power reactors.
90-24	Transportation of Model Spec 2-T Radiographic Exposure Device	4/10/90	All NRC licensees authorized to use, transport, or operate radiographic exposure devices and source changers.
90-23	Improper Installation of Patel Conduit Seals	4/4/90	All holders of Ols or CPs for nuclear power reactors.
90-22	Unanticipated Equipment Actuations Following Restoration of Power to Rosemount Transmitter Trip Units	3/23/90	All holders of Ols or CPs for nuclear power reactors.
90-21	Potential Failure of Motor-Operated Butterfly Valves to Operate Because Valve Seat Friction was Underestimated	3/22/90	All holders of Ols or CPs for nuclear power reactors.
90-20	Personnel Injuries Resulting from Improper Operation of Radwaste Incinerators	3/22/90	All NRC licensees who process or incinerate radioactive waste.
90-19	Potential Loss of Effective Volume for Containment Recirculation Spray at PWR Facilities	3/14/90	All holders of Ols or CPs for PWRs.
90-18	Potential Problems with Crosby Safety Relief Valves Used on Diesel Generator Air Start Receiver Tanks	3/9/90	All holders of Ols or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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*SEE PREVIOUS PAGE FOR CONCURRENCE

*EAB:NRR RWoodruff 4/10/90	*TECH EDITOR BCalure 4/10/90	*EAB:NRR PBaranowsky 4/12/90	*PM:PD32:NRR JHickman 4/10/90	*C:RVIB WBrach 4/12/90	*C:PB3:RIII RKnop 4/12/90
*C:EAB:NRR PSwetland 4/13/90	*C:OGCB:NRR CBerlinger 4/17/90	D:DOEA-NRR CERossi 4/18/90			

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4/10/90	4/ /90	4/ /90	4/ /90	4/ /90	4/ /90
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* See previous copy for concurrences

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No specific action or written response is required by this information notice. If you have questions about this matter, please contact the technical contact listed below or the Regional Administrator of the appropriate regional office.

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Office of Nuclear Reactor Regulation

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CONCURRENCE:

<i>Paul</i> EAB:NRR RWoodruff 4/10/90	<i>J Main gm</i> TECH EDITOR BCature 4/10/90	<i>MB</i> EAB:MEB FBaranowsky 4/12/90	FM:PD32:NRR JHickman 4/10/90	C:EWB WBrach 4/12/90	<i>Paul Pelke by telephone for R.W.W.</i> C:PB3:RIII RKnop 4/12/90
<i>PS</i> C:EAB:NRR PSwetland 4/13/90	C:OGCB:NRR CBerlinger 4/ /90	D:DOEA:NRR CERossi 4/ /90			