

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

February 15, 1991

NRC INFORMATION NOTICE NO. 91-12: POTENTIAL LOSS OF NET POSITIVE SUCTION
HEAD (NPSH) OF STANDBY LIQUID CONTROL
SYSTEM PUMPS

Addressees:

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

Purpose:

This information notice is intended to alert licensees to potential problems with the adequacy of Net Positive Suction Head (NPSH) for Standby Liquid Control System (SLCS) pumps. It is expected that recipients will review this 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 February 11, 1991, a special test of the Standby Liquid Control System was performed at Quad Cities Unit 1, to determine if NPSH would be maintained with the conditions of minimum SLCS tank level and maximum sodium pentaborate solution temperature in the tank. The test was terminated after about 20 minutes following indications of pump cavitation due to loss of NPSH. Following the test, the licensee determined that with the flow rate achieved during the test, the amount of sodium pentaborate necessary to bring the plant to cold shutdown would not be pumped to the reactor vessel with one or both SLCS pumps within the 20 minute period. In light of the test results at Quad Cities, the licensee declared the SLCS at Quad Cities Unit 2, and the operating sister units, Dresden Units 2 and 3, inoperable. Following further evaluation of the test results and engineering analysis, the licensee increased the administratively controlled limit on SLCS tank level and reduced the administratively controlled limit on solution temperature in the SLCS tank at Quad Cities to ensure sufficient NPSH for the SLCS pumps; verified that current limits at Dresden allowed for sufficient NPSH; and declared the pumps at the Quad Cities and Dresden units operable.

The SLCS system is required to provide liquid poison in the event that control rod insertion is inadequate to achieve and maintain a cold shutdown condition. For low probability Anticipated Transient Without Scram (ATWS) events, SLCS pump failure to inject a sufficient amount of solution to shutdown the reactor

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could result in a serious threat to containment integrity. The total volume of poison solution required to assure subcriticality at cold, xenon free conditions in most plants results in a near depletion of the poison storage tank. During the course of poison injection, the tank level decreases resulting in a decrease of available NPSH. Insufficient NPSH can lead to reduced pumping capability or pump failure. While lesser amounts of poison can still maintain the reactor shutdown at hot conditions, there is a poison level below which the reactor would still be producing power. Under such conditions containment integrity can be threatened in the short term.

The basic SLCS design is common to all BWRs and nearly all use similar positive displacement pumps. Consequently, there is a question as to whether adequate testing has been performed at other BWRs to assure that throughout the required range of operating conditions the SLCS pumps will have sufficient NPSH to perform their intended function.

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 NRR project manager.

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

Technical Contact: Mark A. Caruso, NRR
(301) 492-3235

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-11	Inadequate Physical Separation and Electrical Isolation of Non-safety-related Circuits from Reactor Protection System Circuits	02/20/91	All holders of OLs or CPs for W-designed nuclear power reactors.
86-99, Supp. 1	Degradation of Steel Containments	02/14/91	All holders of OLs or CPs for nuclear power reactors.
89-32, Supp. 1	Surveillance Testing of Low-Temperature Overpressure-Protection Systems	02/12/91	All holders of OLs or CPs for nuclear power reactors.
91-10	Summary of Semiannual Program Performance Reports on Fitness-for-Duty (FFD) in the Nuclear Industry	02/12/91	All holders of OLs or CPs for nuclear power reactors.
91-09	Counterfeiting of Crane Valves	02/05/91	All holders of OLs or CPs for nuclear power reactors.
91-08	Medical Examinations for Licensed Operators	02/05/91	All holders of OLs or CPs for nuclear power, test and research reactors.
90-77, Supp. 1	Inadvertent Removal of Fuel Assemblies from the Reactor Core	02/04/91	All holders of OLs or CPs for pressurized-water reactors (PWRs).
91-07	Maintenance Deficiency Associated with General Electric Horizontal Custom 8000 Induction Motors	02/04/91	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
 CP = Construction Permit

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Original Signed by
Charles E. Rossi

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

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Attachment: List of Recently Issued NRC Information Notices

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NAME	:MCaruso	:GHolahan	:CERossi	:	:	:	:
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