

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

June 30, 1989

NRC INFORMATION NOTICE NO. 89-55: DEGRADATION OF CONTAINMENT ISOLATION  
CAPABILITY BY A HIGH-ENERGY LINE BREAK

Addressees:

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

Purpose:

This information notice is being provided to alert addressees to the potential for a high-energy line break (HELB) inside containment causing the failure of piping in a closed system thereby negating one containment isolation barrier and leaving the plant with only a single containment isolation valve to mitigate potential radiological releases. 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:

Millstone Unit 1 is a boiling-water reactor with a Mark I containment. The original design basis for isolation of the reactor building closed cooling water (RBCCW) system required a single barrier outside containment. That is, one check valve was provided in the inlet line to containment while a single remote, manually operated block valve was provided in the return line from containment.

Recently the licensee postulated a scenario in which a recirculation line failure (a HELB) inside containment could cause loss of the RBCCW system integrity. To maintain containment integrity, both RBCCW system isolation valves would have to close; therefore, a single failure of either of these valves would result in the loss of containment integrity. With failure of an RBCCW isolation valve to close, it would be possible for the containment atmosphere to displace water in the RBCCW piping and ultimately vent to the reactor building. Thus, an unanalyzed condition existed which involved potential degraded containment integrity caused by HELBs.

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Discussion:

The RBCCW system was originally considered to be a closed system inside containment and, therefore, part of the containment isolation provisions. That is, the closed system was a supplement to the single isolation valve provided in both the inlet piping and the outlet piping. (Note that the configuration of a single check valve outside containment in the inlet line of the RBCCW system was licensed prior to the formal issuance of the General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50 (GDC) and it does not meet the current implementation of General Design Criterion 57 "Closed System Isolation Valves.") The original safety evaluation did not consider that dynamic effects of HELBs could impact RBCCW system isolation integrity. As a result, the RBCCW system is more properly viewed as a system open to the containment atmosphere under the postulated accident scenario. As such, the applicable regulatory requirements are given by GDC 56 "Primary Containment Isolation" and TMI Action Plan Item II.E.4.2, "Containment Isolation Dependability". It is important that licensees recognize the need to assure adequate protection of systems within containment from pipe whip and jet impingement effects of HELBs when containment integrity must be maintained during and after a postulated accident consistent with the single failure criterion.

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

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

Technical Contact: J. Carter, NRR  
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Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-54	Potential Overpressurization of the Component Cooling Water System	6/23/89	All holders of OLs or CPs for nuclear power reactors.
89-53	Rupture of Extraction Steam Line on High Pressure Turbine	6/13/89	All holders of OLs or CPs for nuclear power reactors.
88-46, Supp. 3	Licensee Report of Defective Refurbished Circuit Breakers	6/8/89	All holders of OLs or CPs for nuclear power reactors.
89-52	Potential Fire Damper Operational Problems	6/8/89	All holders of OLs or CPs for nuclear power reactors.
89-51	Potential Loss of Required Shutdown Margin During Refueling Operations	5/31/89	All holders of OLs or CPs for nuclear power reactors.
88-88, Supp. 1	Degradation of Westinghouse ARD Relays	5/31/89	All holders of OLs or CPs for nuclear power reactors.
89-50	Inadequate Emergency Diesel Generator Fuel Supply	5/30/89	All holders of OLs or CPs for nuclear power reactors.
89-49	Failure to Close Service Water Cross-Connect Isolation Valves	5/22/89	All holders of OLs or CPs for nuclear power reactors.
89-48	Design Deficiency in the Turbine-Driven Auxiliary Feedwater Pump Cooling Water System	5/22/89	All holders of OLs or CPs for nuclear power reactors.
89-47	Potential Problems With Worn or Distorted Hose Clamps on Self-Contained Breathing Apparatus	5/18/89	All holders of OLs or CPs for nuclear power reactors and fuel facilities.

OL = Operating License  
 CP = Construction Permit