

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

January 30, 1990

NRC INFORMATION NOTICE NO. 90-07: NEW INFORMATION REGARDING INSULATION
MATERIAL PERFORMANCE AND DEBRIS
BLOCKAGE OF PWR CONTAINMENT SUMPS

Addressees:

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

Purpose:

This information notice is intended to alert addressees to new information concerning performance of insulating materials in post-loss-of-coolant-accident (LOCA) environments within pressurized water reactor (PWR) containment sumps when such materials become debris which may block the sump. 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:

By letter (Attachment 1) dated October 19, 1989, the NRC staff was informed by Performance Contracting, Inc. of the results of recently conducted tests on Owens-Corning NUKON fiberglass insulating material. The tests were conducted by Performance Contracting, Inc. at the request of a European customer in order to further investigate the potential for containment sump blockage due to insulating material debris in the "long-term" following a LOCA. "Long-term" was defined as one day to 30 days duration following LOCA initiation. Similar tests were previously conducted by the Swedish Nuclear Power Inspectorate on NUKON and M.I.T. insulating materials. The results obtained were comparable to those discussed in the attached letter.

The NRC staff previously considered containment sump performance including debris blockage concerns under Unresolved Safety Issue (USI) A-43. USI A-43 was resolved in 1985 with the issuance of several NUREGs and Revision 1 to Regulatory Guide 1.82. However, no specific actions were required by licensees. The NRC staff focus was on the short-term effects of containment sump blockage assuming chemically neutral cooling water at room temperature.

Performance Contracting, Inc. reported that the recent tests were conducted on NUKON insulation material with water at a temperature of 180°F and pH of 9.1 for a 7-day period. The results indicated that head loss across the insulation

material increases significantly after about 24 hours due to a reduction in flow area caused by compaction of the fiberglass material at elevated pH conditions. On the basis of discussions with Owens-Corning, this is consistent with what would be anticipated, because devitrification of fiberglass occurs under alkaline conditions.

Assuming that full cooling water (residual heat removal) flow is necessary to ensure adequate post-LOCA heat removal capacity for 24 hours and beyond after accident initiation, the effect of the increased pressure loss and associated flow reduction, caused by compaction of insulation material debris, may have an effect on the post-LOCA cooling performance. Additional tests conducted with water at the same temperature, but with a chemically neutral pH as is the case in boiling water reactor (BWR) plants, did not result in an increase in head loss. Thus, the phenomenon observed during these tests appears to be relevant to plants with alkaline sump conditions.

Discussion:

Because some plants may potentially have alkaline post-LOCA sump conditions, addressees are being made aware of this new information regarding the potential for increased containment sump blockage caused by compaction of fiberglass insulation debris under high pH conditions so that they may assess the impact on their plant-specific licensing basis post-LOCA sump performance and reactor cooling analyses. Performance Contracting, Inc. indicated that a test report of the newly performed tests is available for use by interested licensees.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts 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 Contacts: J. Wermiel, NRR
(301) 492-0870

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(301) 492-0823

Attachments:

1. Letter from Gordon H. Hart (Performance Contracting, Inc.) to Dr. Thomas E. Murley (NRC) dated October 19, 1989
2. List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
90-06	Potential for Loss of Shutdown Cooling While at Low Reactor Coolant Levels	1/29/90	All holders of OLs or CPs for nuclear power reactors.
90-05	Inter-System Discharge of Reactor Coolant	1/29/90	All holders of OLs or CPs for nuclear power reactors.
90-04	Cracking of the Upper Shell-to-Transition Cone Girth Welds in Steam Generators	1/26/90	All holders of OLs or CPs for Westinghouse-designed and Combustion Engineering-designed nuclear power reactors.
90-03	Malfunction of Borg-Warner Bolted Bonnet Check Valves Caused by Failure of the Swing Arm	1/23/90	All holders of OLs or CPs for nuclear power reactors.
90-02	Potential Degradation of Secondary Containment	1/22/90	All holders of OLs or CPs for BWRs.
90-01	Importance of Proper Response to Self-Identified Violations by Licensees	1/12/90	All holders of NRC materials licenses.
89-90	Pressurizer Safety Valve Lift Setpoint Shift	12/28/89	All holders of OLs or CPs for PWRs.
89-89	Event Notification Worksheets	12/26/89	All holders of OLs or CPs for nuclear power reactors.
89-88	Recent NRC-Sponsored Testing of Motor-Operated Valves	12/26/89	All holders of OLs or CPs for nuclear power reactors.
89-87	Disabling of Emergency Diesel Generators by Their Neutral Ground-Fault Protection Circuitry	12/19/89	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
 CP = Construction Permit