

Mr. Ray Harris, Licensing
Pennsylvania Power and Light
2 North Ninth Street
Allentown, Pennsylvania 18101

Dear Mr. Harris:

The Nuclear Regulatory Commission is preparing an information notice entitled "Potential for Loss of Post-LOCA Recirculation Capability Due to Insulation Debris Blockage."

A copy of the latest draft of this information notice is enclosed for your review and comment.

Comments, particularly those dealing with the facts presented in the information notice, received by March 29, 1988 will be considered in the preparation of the final version.

Sincerely,

Carl H. Berlinger, Chief
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Enclosure: Draft NRC Information
Notice NO. 88-XX

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Although at this time the exact cause for the degradation of the foil covering on the insulation at Susquehanna is not known, several possibilities exist. These include temperature, humidity, and the effects of radiation on the neoprene-type adhesive used in the bonding process.

Licensees who use Alpha Maritex or similar insulation coverings inside containment are alerted to be aware of the potential delamination of exterior coatings, especially when large amounts of this type of insulation have been used.

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, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: L. Zerr, NRR
(301) 492-1177

Attachments:

EAB:NR	EAB:NR	C:EA:NR	TECH:ED	C:OGCB:NR	D:DOEA:NR
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

MARCH XX, 1988

NRC INFORMATION NOTICE NO. 88-XX: POTENTIAL FOR LOSS OF POST-LOCA
RECIRCULATION CAPABILITY DUE TO
INSULATION DEBRIS BLOCKAGE

Addressees:

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

Purpose:

This notice alerts addressees to a potentially generic safety concern regarding debris that could block containment emergency sump screens in a pressurized water reactor (PWR) or debris that could block emergency core spray pump or residual heat removal (RHR) pump strainers in a boiling water reactor (BWR).

It is expected that addressees will review this information for applicability to their facilities and consider actions, as appropriate, to preclude similar problems from occurring at their facilities. 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 14, Pennsylvania Power & Light (the licensee) notified the Nuclear Regulatory Commission of a 10 CFR Part 21 reportable item concerning deterioration of drywell insulation and the potential for the aluminum foil coating of the insulation to block ECCS strainers during a loss-of-coolant accident (LOCA).

On March 5, while the unit was shut down for a refueling outage, the licensee inspected the Susquehanna Unit 2 drywell. The licensee observed extensive delamination of the aluminum foil coating on the surface of the fiberglass insulation used on valve bodies, and pipe hangers and in other difficult-to-insulate areas. The aluminum foil covering is 1-mil thick and is bonded to the outer covering of Alpha Maritex fiberglass cloth (style #2025/9480 HT) that is used as a covering for Temp-Mat insulation. An upperbound estimate is that 5000 square feet of this insulation is used in more than 300 different locations within the drywell.

The licensee estimates that 50 percent of the insulation has undergone some amount of degradation. This is the first time the licensee has observed degradation to this extent, although some degradation had been noticed earlier.

Alpha Associates, Inc. supplied this product to the licensee through Bechtel. However, during a conversation with representatives of Alpha Associates, Inc., they indicated that there are other suppliers of the same or similar insulation and that its use may be wide spread.

Discussion:

In PWRs the containment emergency sumps provide for the collection of reactor coolant and chemically reactive spray solutions following a LOCA, thus serving as water sources to effect long-term recirculation for the residual heat removal, emergency core cooling, and containment atmosphere cleanup. In a BWR, the suppression pool, in conjunction with the drywell downcomers, serves as the water source for effecting long-term recirculation cooling.

Debris, whether from a LOCA or just transported by the event, has the potential to block sump debris interceptors and sump outlets, resulting in degradation or loss of recirculation flow margin. At Susquehanna, the ECCS core spray pump suction screens have a cross-sectional area of 18.3 square feet, while the residual heat removal pump suction screens each have a 43.8 square-foot cross-sectional area, in comparison to the several thousand square foot area of the insulation covering potentially available to block recirculation flow.

The staff addressed some concerns along these lines in resolving USI A-43, "Containment Emergency Sump Performance." In particular, the staff's technical findings, as given in Generic Letter 85-22, contained the following main points:

- ° Plant insulation surveys, development of methods for estimating debris generation and transport, debris transport experiments, and information provided as public comments on the staff's findings have shown that debris-blockage effects depend on the types and quantities of insulation employed, the primary system layout within containment, and post-LOCA recirculation flow rates. It was concluded that a single generic solution is not possible, but rather that debris-blockage effects are governed by plant-specific design features and post-LOCA recirculation flow requirement.
- ° The current 50 percent screen blockage assumption given in Regulatory Guide (RG) 1.82, "Sumps for Emergency Core Cooling and Containment Spray Systems," should be replaced with a more comprehensive requirement to assess debris effects on a plant-specific basis. The 50-percent-screen-blockage-assumption does not require a plant-specific evaluation of the debris-blockage potential and usually will result in a non-conservative analysis for screen-blockage effects.

The buoyancy, transport, and head loss characteristics of reflective metallic insulation and construction materials have been investigated, and the results are summarized in NUREG/CR-3616, "Transport and Screen Blockage Characteristics of Reflective Metallic Insulation Materials." Briefly, the tests showed that thin metallic foils could be transported at low flow velocities and that flow blockage could occur at the lower portion of the screen because foils readily flipped on the screen when they reached it.

Although at this time the exact cause for the degradation of the foil covering on the insulation at Susquehanna is not known, several possibilities exist. These include temperature, humidity, and the effects of radiation on the neoprene-type adhesive used in the bonding process.

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