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

August 9, 1988

NRC INFORMATION NOTICE NO. 88-04, SUPPLEMENT 1: INADEQUATE QUALIFICATION AND DOCUMENTATION OF FIRE BARRIER PENETRATION SEALS

Addressees:

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

Purpose:

This information notice supplement is being provided to alert addressees to problems caused by potential misapplication of silicone foam material used in penetration openings at nuclear power plants. 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:

Diablo Canyon. Since August 9, 1979, Diablo Canyon has experienced four fires in which the penetration seal material ignited and burned:

- On May 10, 1988, during the performance of a diesel generator 24-hour load test, the Dow Corning silicone foam material, through which the diesel generator exhaust pipe passes, caught fire. The penetration design provides for isolation of the foam from the pipe by metal-clad insulation. This insulation was degraded by the pressure oscillations from repeated thermal expansion and contraction of the pipe. The licensee observed dense smoke and two- to three-foot flames coming from the penetration seal material.

- On February 11, 1983, after 1.7 hours of diesel engine operation, the penetration seal material for another diesel generator exhaust pipe was involved in rapid combustion.

- On September 21, 1982, during a diesel generator 24-hour load test, the penetration seal material burned under similar circumstances. One measurement with a pyrometer indicated that the exhaust pipe temperature was about 600°F.

- On August 9, 1979, the penetration seal material burned under similar circumstances.

Davis-Besse. On March 25, 1986, the licensee, Toledo Edison, reported that the silicone foam sealant in a fire barrier penetration in the main steam line room appeared to have baked and pulled away from the pipe (Licensee Event Report 50-346/86-17). This penetration was filled with low-density silicone foam (SF-20), which is rated for a maximum temperature of 425°F. The main steam lines normally operate near 600°F. The licensee's corrective actions were to stuff ceramic fiber (Kaowool) into the seal for increased fire resistance and to expand the existing fire watch. The licensee determined that a high-temperature boot seal could not be properly installed because of interferences. The licensee revised the fire barrier penetration test from a check that a seal is intact to a comparison of an as-built seal to a fire-tested seal configuration.

Discussion:

The NRC requirements and guidelines for fire barrier penetration seals are contained in various documents, including Appendix R to 10 CFR 50, Appendix A to Branch Technical Position (BTP) APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976," and NUREG-0800, Standard Review Plan. These requirements and guidelines are summarized in Appendix A of Information Notice No. 88-04, "Inadequate Qualification and Documentation of Fire Barrier Penetration Seals." In addition, as stated in Section D.1 (I) of Appendix A to BTP APCSB 9.5-1, "Interior wall and structural components, thermal insulation materials and radiation shielding materials and sound-proofing should be noncombustible."

The silicone foam seal material in the diesel generator exhaust pipe penetrations at Diablo Canyon was used as replacement material for the combustible foam plastic-type seals, which were involved in the 1975 fire at the Browns Ferry nuclear power plant. In addition to diesel generator exhaust pipe penetrations, some main steamline penetrations may be sealed with this material. The material is apparently designed to withstand maximum ambient temperatures of 400°F and temporary exposure to 500°F, but not long-term exposure to higher temperatures. Although the measurement at Diablo Canyon in 1982 indicated a pipe temperature of about 600°F, average pipe temperatures are probably much higher.

The licensee for Diablo Canyon determined that only six penetrations (all associated with diesel generator exhaust pipes) potentially exposed the silicone foam penetration seal material to high temperatures. For these penetration openings, the licensee plans to install a penetration seal material designed to withstand long-term exposure to high temperatures.

This subject is also discussed in Information Notice No. 88-56, "Potential Problems With Silicone Foam Fire Barrier Penetration Seals." The present notice is being issued separately to highlight the potential misapplication

of silicone foam sealant material for uses in which the sealant must withstand significant exposure to high temperature. Information Notice No. 88-56 focuses on nonconforming conditions of silicone foam sealing materials that have been found in inspections of fire barriers.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact one of the technical contacts 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 Contacts: Chuck Ramsey, RV
(415) 943-3767

Dennis Kubicki, NRR
(301) 492-0825

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-59	Main Steam Isolation Valve Guide Rail Failure at Waterford Unit 3	8/9/88	All holders of OLs or CPs for nuclear power reactors.
88-58	Potential Problems with ASEA Brown Boveri ITE-51L Time-Overcurrent Relays	8/8/88	All holders of OLs or CPs for nuclear power reactors.
88-57	Potential Loss of Safe Shutdown Equipment Due to Premature Silicon Controlled Rectifier Failure	8/8/88	All holders of OLs or CPs for nuclear power reactors.
88-56	Potential Problems with Silicone Foam Fire Barrier Penetration Seals	8/4/88	All holders of OLs or CPs for nuclear power reactors.
88-55	Potential Problems Caused by Single Failure of an Engineered Safety Feature Swing Bus	8/3/88	All holders of OLs or CPs for nuclear power reactors.
88-54	Failure of Circuit Breaker Following Installation of Amptector Direct Trip Attachment	7/28/88	All holders of OLs or CPs for nuclear power reactors.
88-53	Licensee Violations of NRC Regulations, Which Led to Medical Diagnostic Misadministrations	7/28/88	All manufacturers and distributors of radiopharmaceuticals for human use, nuclear pharmacies, and medical licensees.
88-52	Failure of Intrauterine Tandem of Fletcher Applicator Brachytherapy Devices During Patient Treatment	7/27/88	Medical licensees.

OL = Operating License
CP = Construction Permit

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*Transmitted by Region V by memo dated June 6, 1988

*SEE PREVIOUS CONCURRENCES

	D/DOEA:NRR	*C/OGCB:DOEA:NRR	*RPB:ARM	*RV
	CERossi	CHBerlinger	TechEd	CRamsey
	08/4/88	07/29/88	07/21/88	07/22/88
*OGCB:DOEA:NRR	*ECEB:DEST:NRR	*C/ECEB:DEST:NRR	*EAD/DEST:NRR	*D/DEST:NRR
CVHodge	DKubicki	CMcCracken	JRichardson	LShao
07/22/88	07/22/88	07/21/88	07/26/88	07/29/88

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