August 14, 1997

Mr. George A. Hunger, Jr.
Director-Licensing, MC 62A-1
PECO Energy Company
Nuclear Group Headquarters
Correspondence Control Desk
P.O. Box No. 195
Wayne, PA 19087-0195

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) RELATED TO EMERGENCY CORE COOLING SYSTEM (ECCS) PUMP SUCTION STRAINER MODIFICATIONS, PEACH BOTTOM ATOMIC POWER STATION (PBAPS), UNITS 2 AND 3 (TAC NOS. M98684 AND M98685)

Dear Mr. Hunger:

PECO Energy Company (PECO Energy) submitted a May 5, 1997, letter to the NRC requesting license amendments to obtain NRC approval for PECO Energy to install replacement ECCS pump suction strainers at PBAPS Units 2 and 3. NRC approval is necessary because PECO Energy determined that the proposed strainer modifications constituted an Unreviewed Safety Question. We determined that we need additional information to complete our evaluation. Our RAI is enclosed. Please contact me at (301) 415-1423 if you have any questions.

Sincerely,
/s/
L. Mark Padovan, Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-277/278

Enclosure: RAI

cc w/encl: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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REQUEST FOR ADDITIONAL INFORMATION

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

ECCS PUMP SUCTION STRAINER MODIFICATIONS

Please provide the following information:

1. Did you submit net positive suction head (NPSH) calculations to the staff during the power rerate review? If so, please provide the NPSH calculations submittal date.

2. Please provide NPSH calculations, if you did not previously submit the NPSH calculations to the NRC. The calculations should include the working equation used to calculate NPSH, the NPSH required and available, and all assumptions and losses considered. Provide a time-dependent NPSH-required versus NPSH-available curve, if available. This curve would be similar to the curves that the Dresden, Pilgrim, and Monticello licensees recently provided to the NRC.

3. In the Current Design Basis section of your May 5, 1997, letter, you indicated that "The available NPSH margins for the RHR and CS pumps are currently defined as 9.6 feet for RHR and 8 feet for CS with system flow rates of 9500 gpm for RHR and 3125 gpm for Core Spray." This margin does not appear to be consistent with the margins discussed in your July 20, 1994, letter responding to staff Requests for Additional Information. Response 2 of your July 20, 1994, letter indicates that "the NPSH margin for the RHR pumps was reduced from 8.8 feet for the current conditions to 8.1 feet for power rerate. The NPSH margin for the core spray pumps was reduced from 9.9 feet for tne current conditions to 9.2 feet for power rerate." Please explain the discrepancy between your two letters.

4. In the NPSH Margin section of your May 5, 1997, letter, you indicated that "...the proposed design basis for sizing the new replacement strainers is to limit the head loss of a fully fouled strainer to 2 feet less than the NPSH margin for each ECCS pump for those accident conditions specified above." What amount of containment overpressure credit does this reduction in margin relate?

ENCLOSURE

UNION OF
CONCERNED
SCIENTISTS

August 5, 1997

Mr. L. Joseph Callan
Executive Director for Operations
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: FIRE PENETRATION SEAL QUESTIONS

Dear Mr. Callan:

Per my FAX dated August 1, 1997, and our telephone conversation on that date, I am respectfully submitting questions on fire penetration seals on behalf of Mr. Paul Gunter of the Nuclear Information & Resource Service and UCS. Our intention was to submit questions to you on Monday, August 4, 1997, but we were unable to meet our schedule.

Mr. Gunter and I would like to arrange a public meeting with you to discuss the issues raised by these questions. The purpose of such a meeting would be to reach a common understanding of the fire penetration seal concerns and agree upon a course of action to resolve these concerns.

While our fire penetration seal concerns apply to the Salem Generating Station, we recognize that they are unlikely to be resolved prior to the restart of that facility. Since the concerns also apply to many nuclear power plants which are currently operating, we concede that the concerns need not be a restart constraint for Salem Unit 2.

We look forward to pursuing resolution of these concerns with you.

Sincerely,

David A. Lochbaum
Nuclear Safety Engineer

cc: Paul Gunter
NIRS

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Attachment

NIRS / UCS Fire Penetration Seal Questions

NONCOMBUSTIBILITY OF FIRE PENETRATION SEALS

10 CFR Part 50, Appendix R Subpart III.M, "Fire barrier cable penetration seal qualification," states:

> "Penetration seal designs shall utilize only noncombustible materials and shall be qualified by tests that are comparable to tests used to rate fire barriers."

10 CFR Part 50, Appendix A, General Design Criterion 3, "Fire protection," states:

> "Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room."

Guidance on the NRC staff's intention for "wherever practical" appear in Standard Review Plan Section 9.5.1, "Fire Protection Program," Rev. 3, July 1981:

> "The following specific criteria provide information, recommendations, and guidance and in general describe a basis acceptable to the staff that may be used to meet the requirements of §50.48, GDC 3 and 5:
>
> a. Branch Technical Position (BTP) CMEB 9.5-1 as it related to the design provisions given to implement the fire protection program."

> "Openings through fire barriers for pipe, conduit, and cable trays which separate fire areas should be sealed or closed to provide a fire resistance rating as least equal to that required of the barrier itself. Penetration designs should utilize only noncombustible materials and should be qualified by tests."

According to NRR Office Letter No. 2, "Standard Review Plans for Safety Evaluations," dated August 12, 1975, "the SRPs [Standard Review Plans] represent the integrated result of the hundreds of conscious choices made by the staff and by the nuclear industry in developing design criteria and design requirements for nuclear power plants. Now that the plans are published and in use, they represent the most definitive basis available for specifying NRC's interpretation of an 'acceptable level of safety' for light water reactor facilities."

The NRC staff is presently revising the Standard Review Plan. In the draft version of SRP 9.5.1 (Standard Review Plan Section 9.5.1, "Fire Protection Program," Draft Rev. 4, April 1996), the staff proposes to <u>expand</u> "wherever practical" to include the fire barriers themselves in addition to the fire penetration seals:

> "The following specific criteria provide information, recommendations, and guidance and in general describe a basis acceptable to the staff that may be used to meet the requirements of 10 CFR §50.48, GDC 3 and 5:

NIRS / UCS Fire Penetration Seal Questions

a. Branch Technical Position (BTP) SPLB 9.5-1 as it related to the design provisions given to implement the fire protection program."

> "Openings through fire barriers for pipe, conduit, and cable trays which separate fire areas should be sealed or closed to provide a fire resistance rating at least equal to that required of the barrier itself. Structural fire barriers (e.g. walls, floors, ceilings), including penetration designs, should utilize only noncombustible materials and should be qualified by tests in accordance with the applicable sections of NFPA 251 and ASTM E119."

Mr. William H. Ruland of NRC Region I staff indicated that the 1976 version of the Branch Technical Position attached to the 1981 and 1996 SRP 9.5.1 does not contain the fire penetration seal noncombustibility requirement.

Q1 **What is the historical background on NRCs analyses used to develop and include "noncombustible materials" in its guidance documents and regulations?**

The NRC staff has recently been resolving a comparable issue involving Thermo-lag fire barrier material which is combustible. In a letter from Conrad E. McCracken, Chief - Plant Systems Branch, Nuclear Regulatory Commission, to Alex Marion, Manager - Technical Division, Nuclear Energy Institute, "Thermo-Lag 330-1 Combustibility Evaluation Methodology Plant Screening Guide," dated March 13, 1995, the NRC staff maintained the position that noncombustible materials must be used:

> "On the basis of its combustibility tests and review, the staff concluded that Thermo-Lag 330-1 fire barrier material has combustible characteristics similar to those of other nuclear power plant combustible materials, such as fire-retardant plywood and cable jackets. The staff also concluded that the NEI method does not provide a level of fire safety equivalent to that specified by existing NRC fire protection regulations and guidelines. Therefore, the staff will not accept the use of the NEI guide to justify the use of Thermo-Lag materials where noncombustible materials are specified by NRC fire protection requirements or to assess the combustibility hazards presented by Thermo-Lag materials."

Thus, noncombustibility of fire penetration seals appears to be an implicit requirement of 10 CFR §50.48 and Appendix A GDC 3 and to be an explicit requirement of Appendix R III.M.

Q2 **How does the NRC staff reconcile the guidance in SRP 9.5.1 and the position taken on Thermo-lag with its recent claims that fire penetration seals need not be noncombustible?**

NIRS / UCS Fire Penetration Seal Questions

APPLICABILITY OF APPENDIX R, SUBPART III.M

In a letter from Chairman Jackson to Senator Biden dated July 29, 1997, the NRC explained that Appendix R Subpart III.M only applied to nuclear plants licensed prior to January 1, 1979, which had an open item on fire barrier penetration seals at that time.

Q3 **What are the nuclear plants for which Appendix R Subpart III.M applies?**

The NRC staff has recently claimed that noncombustibility is a requirement of Appendix R, Subpart III.M, but not of 10 CFR §50.48 and Appendix A GDC 3. If this position is correct, then noncombustible fire penetration seals are only prohibited at some, but not all, older nuclear plants. Newer nuclear plants (i.e., those licensed after the Browns Ferry fire of 1975) can use combustible fire penetration seals according to NRC claims.

Q4 **Is it credible that the NRC's fire protection requirements would really have become less rigorous for nuclear power plants licensed after the Browns Ferry fire?**

NIRS / UCS Fire Penetration Seal Questions

TECHNICAL BASIS FOR NONCOMBUSTIBLE FIRE PENETRATION SEAL MATERIAL

In a letter from Chairman Jackson to Senator Biden dated July 29, 1997, the NRC explained that "the NRC staff plans to propose a rule change that would eliminate the Appendix R requirement that penetration seal materials be noncombustible since there is no technical basis for it."

In SECY-96-146, "Technical Assessment of Fire Barrier Penetration Seals in Nuclear Power Plants," the NRC staff recommended that "the material noncombustible criterion be removed from Appendix R and the SRP."

Q5 **Since the NRC staff has not yet changed the rules and since licensees have not yet applied for or been granted deviations/exemptions from these requirements, is the NRC staff's stated intention to change a regulation really an acceptable (e.g. legal) substitute for the rulemaking process in which the public has at least an opportunity to register opposition?**

The technical basis for the NRC staff's concern about combustible fire penetration seal material is explicitly detailed in a safety evaluation attached to a letter from Robert M. Bernero, Director - Division of BWR Licensing, Nuclear Regulatory Commission, to Edward G. Bauer, Jr., Vice President & General Counsel, Philadelphia Electric Company, "Exemption from Appendix R to 10 CFR 50 Concerning Penetration Seals and Fire Detection," dated November 14, 1986:

> "The staff is concerned that where combustible materials are used in penetration seals, such materials may be ignited and transmit a fire from one fire area to another."

Q6 **Was the NRC staff wrong to believe in 1986 that there <u>was</u> a technical basis for noncombustible fire penetration seal material? Or is the NRC staff wrong to believe now that there <u>is no</u> technical basis?**

Information gathered during the fire endurance test of RTV silicon foam performed by the Underwriters Laboratory of Canada in 1996 indicate that hydrochloric acid (HCL) is a byproduct from the burning foam. The videotape of this test clearly indicated thick smoke from the burning foam on the non-fire side of the simulated penetration.

Q7 **Does the NRC staff have any information which indicates that equipment, particularly electrical components, on the unexposed side of a fire penetration seal with silicon foam will not be adversely affected by the byproducts, including soot and ash? Would not the use of combustible fire penetration seal material introduce a failure mode (i.e., create an unreviewed safety question) that is not present with noncombustible fire penetration seal materials?**

In the NRC Office of Investigation's Official Transcript of Proceedings of the Investigative Interview of Hitoshi Takahasi, Senior Marketing Supervisor Fire Stop Product Line, Dow Corning, dated August 24, 1994, Mr. Takahasi stated that in the 1984 to 1987 time frame he

NIRS / UCS Fire Penetration Seal Questions

responded to a situation at the Perry Nuclear Power Plant where RTV silicon foam had been "abused". Mr. Takahasi testified that "abused" meant "that some air pocket behind had broke out seal where the hydrogen gas kind of accumulated which was seeped out and exploded later on type situation." In the DuraSystems videotape of the three hour fire endurance test conducted by the Underwriters Laboratory of Canada, it is stated that hydrogen gas generated by the two part RTV silicon foam causes the material to "snap" and produce a friction fit.

Q8 **Is NRC away of this event or other events where a fire penetration seal can actually become the ignition source?**

NIRS / UCS Fire Penetration Seal Questions

COMPLEXITY OF LICENSING BASES

In a letter from Chairman Jackson to Senator Biden dated July 29, 1997, the NRC explained that Appendix R Subpart III.M only applied to nuclear plants licensed prior to January 1, 1979, which had an open item on fire barrier penetration seals at that time.

It seems fair to conclude that each operating nuclear power plant has unique licensing requirements based on the regulations in effect at the time and the conditions under which the licenses were issued.

Q9 **How can the NRC staff develop backfit analyses for all operating plants or even a subgroup of operating plants if every plant has unique licensing bases? How can the owners groups and NEI prepare and advocate "generic" industry positions on licensing issues?**

In the NRC Office of Investigation's Official Transcript of Proceedings of the Investigative Interview of Hitoshi Takahasi, Senior Marketing Supervisor Fire Stop Product Line, Dow Corning, dated August 24, 1994, Mr. Takahasi stated:

> "there are so many variables in the fire test itself (ASTM E 118), first of all, design you claim you passed first time around may not necessarily be the single design you subjected to the test and qualified for that design. You could run 100 tests, literally speaking. Literally you can run 100 tests for the same design. If one passes you can qualify that design. So was the situation. What my contention was you are stretching the ability of the product way too thin and it might be almost 50/50 chances of passing or failing, especially if you are careless in doing the installation that might cause some failure."

The Individual Plant Examinations (IPEs) prepared for Salem and other nuclear plants implicitly assumed 100% success of the fire barriers, including fire penetration seals, in preventing a fire in one fire zone/area from affecting an adjacent fire zone/area.

Q10 **Based on information that fire endurance testing conducted under laboratory conditions is not 100% successful and licensee event reports and NRC inspection reports indicating that fire penetration seals are periodically found in a degraded or nonconforming condition, are the IPEs nonconservatively determining fire risk?**