UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
LONG ISLAND LIGHTING COMPANY	)	Docket No. 50-322 (OL)
(Shoreham Nuclear Power Station, Unit 1)	)	

RESOLUTION OF SUFFOLK COUNTY
CONTENTION 9 - ECCS PUMP BLOCKAGE

Suffolk County Contention 9 concerns the potential blockage of the ECCS pump suction strainers at the Shoreham Nuclear Power Station during a loss of coolant accident ("LOCA"). Suffolk County ("SC") has alleged that LILCO has not adequately demonstrated that drywell piping and equipment insulation loosened and/or damaged during a postulated LOCA will not unduly degrade the ECCS flow through the pump suction strainers located in the suppression pool. Such blockage during an accident would prevent adequate core cooling and thus would violate 10 C.F.R. 50, Appendix A, General Design Criterion 35. In the County's view, the potential for ECCS suction strainer blockage results from inadequate analysis of the sources, quantities, and characteristics of insulation debris available for blockage during a postulated LOCA. Absent such an analysis, in the view of SC, LILCO's 50 percent blockage design basis of the strainers has not been demonstrated to be appropriate.

On April 13, 1982, LILCO prefiled testimony on SC Contention 9, providing information relative to ECCS suction strainer blockage. On the same day, SC also prefiled testimony on SC Contention 9, detailing the steps which SC believes are necessary in order to demonstrate that the 50 percent blockage design basis for the ECCS suction strainers is appropriate.

LILCO, SC, and NRC Staff consultants have discussed the County's concerns. By this Resolution Agreement, LILCO and the Staff have documented that they have provided certain data to SC which demonstrate the basis for the 50 percent blockage assumption, and LILCO has further agreed to take the steps described below, which respond to the concerns expressed in the SC direct testimony. In the County's view these data and actions document that the 50 percent ECCS strainer blockage design basis is appropriate, and that adequate core cooling capability will exist in the event of a LOCA even with such blockage. Accordingly, SC finds that SC Contention 9 is resolved. As a result, the County, LILCO, and the Staff request the Licensing Board to accept this Resolution to terminate litigation of SC Contention 9. The details of this Resolution and LILCO's agreement to implement the actions specified herein are described below.

Subsequent to the filing of testimony on this contention, SC consultants have reviewed additional documentation regarding the SC concerns. These materials are:

1. From LILCO:

   a. Stone & Webster Specification No. SH1-157, Revision 1, September 25, 1980: "Specification for Furnishing and Installation of Thermal Insulation - Inside Primary Containment".

   b. Topical Report OCF-1: "Nuclear Containment Insulation System", Owens-Corning Fiberglass Corp., January 1979.

2. From NRC Staff:

   NUREG/CR-2403: "Survey of Insulation Used in Nuclear Power Plants and the Potential for Debris Generation", August 1981.

LILCO's prefiled testimony on SC 9 and this additional documentation document the following:

1. LILCO's prefiled testimony describes, in general, the type of insulation used at Shoreham, and the path that would be traversed if insulation in the drywell were to reach the suppression pool. The testimony also describes, albeit only generally, LILCO's justification for ECCS pump suction strainer size (i.e., 50% blockage margin) and location (i.e., 180° separation).

2. The S & W specification for the insulation provides more detailed information on the type of insulation provided by Transco, Incorporated for use at Shoreham. In general, the insulation used for piping and equipment

throughout primary containment is of the metal reflective type. Only on "special piping penetrations, reactor vessel nozzle piping, and piping in the vicinity of pipe rupture restraints" is the metal-encapsulated "temp-mat" insulation used. The "temp-mat" is a borated fiberglass mat manufactured by Pittsburgh-Corning Corp. The encapsulating material is Type 304 austenitic stainless steel, and is constructed so as to prevent exposure of the filler material.

3. The Owens-Corning Topical Report on its fiberglass insulation shows that non-encapsulated fiberglass mats pose little threat to blockage of the ECCS suction strainers. This finding is based on: (1) an analysis of how much insulation could be conservatively postulated to be loosened during a LOCA (e.g., 50 mats each of 2' length) while assuming no physical barriers between piping and strainers (i.e., no allowance for containment layout); and (2) the property characteristics of the fiberglass in water. The Report shows that the fiberglass mats will either float on water, or sink rapidly (2 1/2 - 4 inches per second) to the bottom of the pool if forced to absorb water. Thus, it was concluded in the Report that:

> As relatively few blankets out of the total containment inventory would be available for such interaction, the interference tests performed by Owens-Corning Fiberglass conservatively bound the probable containment sump blockage

> and sump ingestion of blanket material that might occur. . .These tests provide an adequate qualitative indication of the negligible degree of interference with containment spray systems to be anticipated from detached intact or damaged blankets deposited in the containment sumps following pipe ruptures.

4. NUREG/CR-2403 documents a survey of eleven nuclear plants, conducted by Burns & Roe, to identify the types and amounts of insulation used, location within containment, components insulated, material characteristics, and methods of installation. For each plant type surveyed, a preliminary assessment was made of the potential effects of insulation debris generated as the result of a LOCA.

   Included in this survey were two GE plants, Cooper (BWR 4/Mark I) and WPPSS 2 (BWR 5/Mark II). These two plants are generally representative of Shoreham in that the thermal insulation used at Cooper is both metal reflective (70% of total) and metal-encapsulated fiber (30% of total), while the WPPSS 2 unit employs the same Mark II containment design as Shoreham. In both of these plants, the insulation used (metal reflective and metal-encapsulated fiber) was also supplied by Transco, Inc.

Thus, considerable analysis has been performed, independently of LILCO, regarding the potential for insulation blockage of ECCS pump suction strainers. A review of the above documentation shows that:

1. The quality characteristics of non-encapsulated fiberglass

insulation do not threaten strainer blockage; this is pertinent to Shoreham in the event that the metal-encapsulated fiberglass used at Shoreham becomes torn during a LOCA so as to expose the filler material; and,

2. The quantity of insulation estimated to become loosened during a LOCA and to reach the suppression pool in a Mark II containment is sufficiently small to be within the bounds of a 50% blockage design basis.

Given these analyses, SC consultants conclude that the County's concerns regarding ECCS pump blockage are resolved, subject to LILCO's agreement set forth below. The potential for some insulation migration and/or breaking in the vicinity of the suppression pool has been identified through ongoing industry efforts and Staff assessment of this unresolved safety issue (A-43). Thus, SC consultants have requested the following additonal commitments, to which LILCO has agreed:

- LILCO will actively monitor the analyses undertaken as part of the Staff effort to resolve NUREG-0606 Task Action Plan Item A-43, "Containment Emergency Sump Performance."

- LILCO will perform the quantitative analyses, developed as a result of the A-43 effort, if applicable to Shoreham. These analyses will be designed to determine whether potential insulation blockage may exceed the 50 percent margin as currently designed.

- If necessary, LILCO will make appropriate modifications to the use and installation of insulation in the drywell to ensure that potential blockage of the ECCS pump strainers will not exceed the 50 percent margin design basis.

LILCO will supply the County with the result of any analyses performed under the above agreement and shall document for the County any modifications instituted pursuant to the analyses.

Taylor Rumley 8/11/82 Karla J. Letsche 8/11/82

Counsel for (date) Counsel for (date)
LONG ISLAND LIGHTING COMPANY SUFFOLK COUNTY

Bernard M. Bordenick 8/12/82

Counsel for (date)
NUCLEAR REGULATORY COMMISSION
STAFF