



**BOSTON EDISON**

Pilgrim Nuclear Power Station  
Rocky Hill Road  
Plymouth, Massachusetts 02360

NRCB 93-02, Supplement 1

April 14, 1994  
BECO Ltr. 94-042

W. C. Rothert  
General Manager Technical

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Docket No. 50-293  
License No. DPR-35

Response to NRC Bulletin 93-02, Supplement 1  
"Debris Plugging of Emergency Core  
Cooling Suction Strainers"

NRC Bulletin 93-02, Supplement 1, requested owner's of Boiling Water Reactors (BWRs) to take interim actions to enhance the capability to prevent or mitigate loss of Emergency Core Cooling System (ECCS) following a Loss of Coolant Accident (LOCA) due to suppression pool strainer clogging. The requested actions along with Boston Edison Company's response are discussed below.

**REQUESTED ACTION**

Provide training and briefings to apprise operators and other appropriate emergency response personnel of the information contained in NRC Bulletin 93-02, Supplement 1, and in the referenced NRC Information Notices regarding the potential for suppression pool strainer clogging.

**RESPONSE:**

The information contained in Bulletin 93-02, Supplement 1 and in the referenced NRC Information Notices regarding the potential for suppression pool strainer clogging was incorporated into the Operator Requalification Training Program. Training is in progress and the estimated completion date for training of Operations personnel is May 14, 1994.

Training for appropriate Emergency Response Personnel is scheduled for completion by April 20, 1994. Included in this group are the Emergency Directors and Emergency Plant Managers.

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#### REQUESTED ACTION

Assure that the Emergency Operating Procedures (EOPs) make the operator aware of possible indications of ECCS strainer clogging and provide guidance on mitigation.

#### RESPONSE

The Pilgrim Station symptom-based Emergency Operating Procedures (EOPs) (flow/logic diagrams) are based on the BWROG Emergency Procedure Guidelines Rev. 4. On loss of the ECCS Pumps (regardless of reason), the EOPs direct the operators to lineup alternate sources of water for reactor cooling/fill if ECCS pumps are not capable of maintaining reactor water level.

#### REQUESTED ACTION

Institute procedures and other measures to provide compensatory actions to prevent, delay, or mitigate a loss of available Net Positive Suction Head (NPSH) margin under LOCA conditions. Such measures should be consistent with providing the design basis emergency system functions for core and containment cooling.

#### RESPONSE

Pilgrim Station Procedures 2.2.19, "Core Spray", and 2.2.20, "Residual Heat Removal", will be revised to provide guidance on identifying the symptoms of strainer clogging and measures to provide compensatory actions to prevent, delay, or mitigate a loss of available NPSH margin under LOCA conditions. The procedures will be revised and are scheduled for issuance by May 13, 1994.

#### BACKGROUND

In 1984, Boston Edison Company requested General Electric Company to perform an analysis to evaluate containment emergency sump (suppression pool) performance in accordance with Regulatory Guide (RG) 1.82.

The primary concern was potential clogging of the Residual Heat Removal (RHR) and Core Spray (CS) Systems suction strainers in the torus (suppression pool) by insulation debris during a design basis LOCA. The evaluation was performed in accordance with the methods in the August 25, 1983 draft of RG 1.82 Rev. 1. The analysis concluded the area of the RHR and CS suction strainers had to be enlarged based on the maximum calculated insulation debris loading. In 1984, six new suction strainers (2 for CS and 4 for RHR) were installed having an open strainer area three times greater than the six strainers removed. The NPSH was evaluated, at 175<sup>o</sup>F, maximum debris loading on the strainers, and no overpressure condition in torus. This temperature is greater than the maximum bulk pool temperature for the worst case transient (160<sup>o</sup>F) or post accident condition (166<sup>o</sup>F). The above actions provided reasonable assurance the NPSH for RHR and CS pump would be appropriate for all conditions.

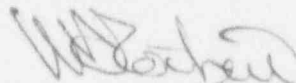
During this same time frame, the insulation on the piping systems located in the drywell was removed and replaced with the blanket type NUCON insulation.

Although some degree of shredding of the NUCON blanket insulation is expected during a design basis LOCA, much of the displaced insulation would consist of complete blanket sections or portions of blanket sections and would not degrade due to alkaline conditions because of the neutral pH of the Pilgrim Station suppression pool.

Unlike the Barseback and Perry Plant design, Pilgrim Station has an enclosed suppression pool (torus). The insulation displaced from the drywell piping during a Design Basis Accident would have to travel a torturous path to reach the water in the suppression pool. Calculations indicate the amount of debris reaching the pool would not be sufficient to result in simultaneous clogging of the six ECCS strainers. As stated in BECO's response to Bulletin 93-02, unlike the open suppression pool of the Mark III Containment, the torus is closed except for vent pipes connecting the torus to the drywell. Procedural controls are in place to provide inventory control when the torus is open. This design in conjunction with the procedural controls minimizes the entry of dust, dirt, and other foreign material into the suppression chamber.

Cleanliness of the torus at Pilgrim Station has been satisfactory. The torus was partially drained and inspected during Refueling Outage (RFO) No. 7 (1986-1988). During RFO No. 8 (1991) the torus was cleaned and inspected utilizing underwater divers and a vacuum pump to remove minor amounts of accumulated sediment and one respirator face mask. The divers were inspecting the condition of the torus in conjunction with NRC Information Notice (IN) 88-82. Ten of the sixteen bays were painted. The remaining 6 bays are scheduled to be cleaned and painted during RFO No. 10. Due to the cleanliness of the suppression pool, further clogging of suction strainers by filtration of pre-existing debris following a design basis LOCA is not considered to be significant for Pilgrim Station.

Based on the above discussion, Pilgrim Station's design, procedural and administrative controls are in place to preclude events similar to those referenced in Bulletin 93-02, Supplement 1.

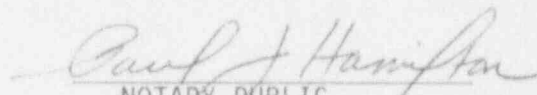


W. C. Rothert

Commonwealth of Massachusetts)  
County of Plymouth)

Then personally appeared before me, W. C. Rothert, who is duly sworn, did state that he is General Manager Technical of Boston Edison Company and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of Boston Edison Company and that the statements in said submittal are true to the best on his knowledge and belief.

My commission expires: January 27, 2000  
DATE



NOTARY PUBLIC

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