



BOSTON EDISON

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

NRCB 93-02, Supplement 1

June 17, 1994
BECO Ltr. 94- 072

E. T. Boulette, PhD
Senior Vice President - Nuclear

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 owners 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. This letter updates our sixty day response (Reference BECO Ltr. 94-042, dated April 14, 1994) and documents completion of the requested interim actions of NRC Bulletin 93-02, Supplement 1. Revision bars identify the updated information.

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 and was completed on May 15, 1994, with the exception of one SRO on loan to INPO.

Training for appropriate Emergency Response Personnel was conducted on April 20, 1994. Included in this group were the Emergency Directors and Emergency Plant Managers.

9406270208 940617
PDR ADDCK 05000293
G PDR

JEH

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, currently 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. Indications of suction strainer plugging are available to the operator and include pump flow and reactor water level indications in the Control Room.

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", were revised and issued on May 17, 1994, 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.

Pilgrim Station procedures for the High Pressure Coolant Injection (HPCI) System and Reactor Core Isolation Cooling (RCIC) System were reviewed and found satisfactory. The EOPs direct the HPCI pump suction to be from the Condensate Storage Tanks (CST) that are not equipped with strainers or to bypass the Suppression Pool/CST transfer function when the CST is available. The RCIC System is not part of the ECCS. Regardless, the EOPs direct the RCIC pump suction to be from the CST or to bypass the Suppression Pool/CST transfer function when the CST is available.

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°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°F) or post accident condition (166°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 strainers for the RHR and Core Spray Systems. 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.

The Pilgrim torus is maintained clean. 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. 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.

E.T. Boulette
E.T. Boulette, PhD

Commonwealth of Massachusetts)
County of Plymouth)

Then personally appeared before me, E.T. Boulette, who is duly sworn, did state that he is Senior Vice President - Nuclear 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: MAR 4 - 1999
DATE

RLC/lam/9439

Gerald G. Whitney
NOTARY PUBLIC

GERALD G. WHITNEY, Notary Public
My Commission Expires March 4, 1999



cc: Mr. Thomas T. Martin
Regional Administrator, Region I
475 Allendale Road
King of Prussia, PA 19406

Mr. R. B. Eaton
Div. of Reactor Projects I/II
Office of NRR - USNRC
One White Flint North - Mail Stop 14D1
11555 Rockville Pike
Rockville, MD 20852

Sr. NRC Resident Inspector
Pilgrim Nuclear Power Station