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License DPR-35
Docket 50-293

NRC BULLETIN 93-03: Resolution of Issues Related to
Reactor Vessel Water Level Instrumentation in BWRs

The attachment to this letter provides Boston Edison Company's (BEC0) response to NRC Bulletin 93-03 (NRCB93-03) dated May 28, 1993 and to a NRC request dated April 22, 1993, to provide plans and schedules for corrective actions.

As requested in NRCB 93-03, this response describes the short-term compensatory actions taken and planned hardware modifications to resolve the Bulletin issues. Short-term compensatory actions were completed on June 11, 1993. Hardware modifications will be implemented at the first cold shutdown after July 30, 1993.

E. T. Boulette, PhD

Commonwealth of Massachusetts)
County of Plymouth)

Then personally appeared before me, E. T. Boulette, who being 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 of his knowledge and belief.

My commission expires:

October 5, 1995 Peter M Kahler
DATE NOTARY PUBLIC

BRS/NRC93-03

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ATTACHMENT TO BECO'S RESPONSE TO NRC BULLETIN 93-03

Requested Actions

1. Short Term Compensatory Actions

(a) Within 15 days of the date of this bulletin, each licensee is requested to implement the following measures to ensure that potential level errors caused by reference leg degassing will not result in improper system response or improper operator actions during transients and accident scenarios initiated from reduced pressure conditions (Mode 3):

- (1) Establish enhanced monitoring of all RPV level instruments to provide early detection of level anomalies associated with degassing from the reference legs.
- (2) Develop enhanced procedures or additional restrictions and controls for valve alignments and maintenance that have a potential to drain the RPV during Mode 3.
- (3) Alert operators to potentially confusing or misleading level indication that may occur during accidents or transients initiating from Mode 3. For example, a drain-down event could lead to automatic initiation of high-pressure emergency core cooling systems (ECCS) without automatic system isolation or low-pressure ECCS actuation.

Facilities that are in cold shutdown during this 15 day period are requested to complete the above actions within 15 days of the date of this bulletin or prior to startup, whichever is later.

(b) By July 30, 1993, each licensee is requested to complete augmented operator training on loss of RPV inventory scenarios during Mode 3, including RPV drain-down events and cracks or breaks in piping.

Facilities that are in cold shutdown as of July 30, 1993, are requested to complete this action prior to startup from that shutdown.

Response

Enhanced monitoring has been established to provide early detection of level anomalies associated with degassing from the reference legs. Each of the five reference legs for water level instrumentation is being monitored via the EPIC computer. A computer display has been dedicated to monitor one level instrument per reference leg. This modification will provide early detection of any level anomaly due to degassing from any reference leg.

Procedures have been revised to provide additional restrictions and controls for valve alignments and maintenance that have a potential to drain the vessel during hot shutdown/Mode 3. The concern was previously addressed at Pilgrim Nuclear Power Station in response to INPO SOER 87-2. Interlocks are provided

between the suppression pool suction valves and the shutdown cooling valves on each RHR pump so neither valve can be opened if the other is not closed. Also, similar interlocks are installed between the shutdown cooling valve and the full flow test return valve on each pump. In addition to the interlocks provided by design, procedures also provide control of valve alignments. These procedural controls have been enhanced to ensure the restrictions are maintained by annotating the procedure steps controlling valve alignments. This ensures the administrative controls remain intact.

Training has been completed to alert operators to potentially confusing or misleading level indications that may occur during accidents or transients initiating from the shutdown. The training covered the enhanced monitoring modification, detection of level anomalies, and the Washington Nuclear Plant Unit 2 events.

Augmented operator training on loss of Reactor Pressure vessel inventory scenarios during hot shutdown is in progress using the simulator. This enhanced training, including RPV drain-down events and cracks or breaks in piping, is in progress. We expect to complete this aspect of training by July 30, 1993.

2. Hardware Modifications

Each licensee is requested to implement hardware modifications necessary to ensure the level instrumentation system design is of high functional reliability for long-term operation.

Boston Edison Company is preparing a design modification to prevent the migration of non-condensable gasses down the two reference legs which provide ECCS, PCIS and RPS signals. This will be achieved by maintaining a continuous backflow up the leg during operation. The modification will be implemented during the first cold shutdown after July 30, 1993 and will provide a continuous backfill of the reference leg. It consists of a supply from the control rod drive system through a filter, flow meter, needle valve and two in-series check valves.

This modification addresses the issue of noncondensable gas buildup in the "cold" reference legs of the reactor pressure vessel (RPV) water level instrumentation, and the potential for associated post accident RPV water level instrumentation inaccuracies. The RPV level instrumentation will be monitored for notching during the first shutdown after six months of operation to prove the efficiency of this design.

This design is similar to Millstone Unit 1 hardware modifications, and as such, has already been demonstrated to resolve the reference leg degassing problem.