

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
OF THE BWR OWNERS GROUP RESPONSE  
TO GENERIC LETTER 89-19

1. DISCUSSION

On September 20, 1989, the NRC staff (hereafter referred to as staff), issued Generic Letter (GL) 89-19 regarding reactor vessel overfill protection. For BWRs, GL 89-19 discusses modifications to prevent a potential core melt event that bypasses containment. The probability of core melt is very low, but the potential consequences can be significant. As a result, GL 89-19 recommends that all BWR plant designs provide automatic reactor vessel overfill protection to mitigate main feedwater overfill events. The GL states that the design for the overfill protection system should be sufficiently separate from the main feedwater (MFW) control system to ensure MFW pump trip on a high water level signal in conjunction with a loss of power, loss of ventilation, or fire in the control portion of the MFW control system.

One of the base documents supporting GL 89-19, is NUREG 1218, "Regulatory Analysis for the Resolution of USI A-47," dated July 1989. Chapter 4 of NUREG 1218 discusses possible General Electric BWR plant design changes. The report communicates the NRC's recognition that the safety benefits gained by providing additional reactor vessel water level redundancy and independence to existing BWR overfill protection systems is not significant. The report also states that modifying existing systems to provide additional channels is not a viable alternative in consideration of the cost/benefit cost analysis. However, of the three plants that do not have automatic overfill protection capability, Oyster Creek is the only plant where modifications are warranted. Subsequently, NRC approved the licensee's proposed design of automatic overfill protection system as recommended in GL 89-19 to be installed at next refueling outage. The remaining two plants are LaCrosse and Big Rock Point which are early vintage with low-power ratings and are located in low-density population areas. The risk reduction for these two plants was estimated to be insignificant and therefore, modifications are not warranted. LaCrosse has been permanently shutdown. The staff also notes that Shoreham is permanently shutdown and is, therefore, not subject to GL 89-19 proposed actions.

In response to GL 89-19 and NUREG 1218, the BWR Owners Group (BWROG) submitted a report entitled "BWROG Response to NRC GL 89-19, "Hardware Change Recommendations," dated April 2, 1991. The BWROG response was reviewed by Idaho National Engineering Laboratory (INEL) under contract to the NRC. The results of the INEL review are documented by "Technical Evaluation Report: Review of the BWR Owners Group Response to Reactor Vessel Overfill Protection; (Generic Letter 89-19)," dated February 1991. The remainder of this Safety Evaluation is the staff's findings and conclusions based on its review of NUREG 1218, the BWROG response, and the INEL Evaluation.

## 2.0 FINDINGS AND CONCLUSIONS

This safety evaluation report (SER) is applicable to Millstone, Unit 1, and the BWR plants identified in NUREG 1218, the BWROG report and the INEL Technical Evaluation Report.

The staff reviewed the INEL Technical Evaluation Report (TER), the BWROG submittal, NUREG 1218 and BWR plant specific submittals. Based on this review, the staff has concluded that it is highly unlikely that a loss of power event or a fire would cause an overflow event by affecting the feedwater control circuitry and defeating the overflow protection since the feedwater control is an energize to actuate system (e.g. the isolation valve will close upon loss-of-power). The staff will confirm in the reviews of all plants that it is unlikely that any single event could disable overflow protection and the feedwater isolation. Based on a comparison of the methodologies and the numeric results obtained in these documents, the staff concurs with the conclusions and bases identified in the INEL TER. The staff also notes that while the INEL evaluation includes no conclusion on bypass capability for the 1-out-of-1 and 1-out-of-2 trip logic overflow protection systems, the existing bypass capability is considered to be acceptable by the staff and is unaffected by the resolution of USI 1-47. The staff's findings are summarized as follows with the understanding that the TER provides the technical basis for the findings.

- (1) Upgrading BWRs with existing automatic reactor vessel overflow protection to the separation and independence criteria identified in GL 89-19, is not warranted based on the cost/safety-benefit analysis.
- (2) As stated in GL 89-19, the staff recommends the following items:
  - (a) that plant procedures and technical specifications, for all BWR plants with reactor vessel overflow protection, include provisions to periodically verify the operability of overflow protection and ensure that automatic overflow protection is available to mitigate main feedwater overfeed events during reactor power operation, and (b) that all BWR plants reassess and modify, if needed, their operating procedures and operator training to assure that operators can mitigate reactor vessel overflow events that may occur via the condensate booster pumps during reduced system pressure operation.

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