

December 13, 2000

MEMORANDUM TO: Stephen Dembek, Chief, Section 2  
Project Directorate !V

FROM: Robert M. Pulsifer, Project Manager, Section 2  
Project Directorate I **/RA/**  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

SUBJECT: BWROG - LOOSE PARTS MONITORING (TAC NO. MA9643)

The enclosed draft request for additional information (RAI) was transmitted by facsimile to Thomas Green of General Electric Company representing the BWROG. Review of the RAI would allow the BWROG to determine and agree upon a schedule to respond to the RAI. This memorandum and the enclosure do not convey a formal request for information or represent an NRC staff position.

Project No. 691

Enclosure: Draft Request for Additional Information

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Project Directorate IV

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Project Manager

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DRAFT REQUEST FOR ADDITIONAL INFORMATION  
ISSUES TO DISCUSS IN THE TELEPHONE CONFERENCE ON LOOSE PARTS  
MONITORING SYSTEMS.

1. The submittal stated that although loose parts monitoring (LPM) systems have detected some loose parts, however, the system has never detected a failed or weakened safety related component.
  - This conclusion is based on the present conditions of the safety-related systems and components, therefore, can this justification be extrapolated to include the material condition of SSCs during 20 year license extensions? Considering license renewals and aging of safety related components and systems, wouldn't the LPM system play an important role in aging management by indicating the failure or weakening of safety-related components.
  
2. The loose parts topical report referenced the EPRI (BWRVIP-06) evaluation in justifying the elimination of the LPM system regulatory requirements. However, the EPRI report (Section 4) stated that, "Only those loose parts which are not detectable and could impact the safe plant operation and shutdown capability are generally considered to be of safety consequence. Loose parts that are detectable due to their observable impact on plant operation would indicate that an abnormal plant condition exists and the plant could be expected to be brought to a safe condition by operator action."
  - Did the EPRI report, which the submittal relied upon heavily, assume that the LPM system will be operable and supplemented with a properly developed and implemented loose parts monitoring program as outlined in RG 1.133?
  - The EPRI evaluation also stated that partial flow blockages of fuel support inlet orifice can lead to initiation of boiling transition or possible channel instabilities. It added that channel instability is less of a concern in the peripheral fuel bundles due to lower power distribution. Since the peripheral bundles have higher lift velocities and smaller orifices, small loose parts are more likely to block fuel channels in the peripheral channels. Did you evaluate whether this assumption holds when cores are being designed for plants licensed for extended power uprate?
  - The submittal stated that the industry incorporated debris filters into the fuel support pieces to provide an extra layer of defense against fuel cladding damage. The debris filters are in the lower tie plate of the fuel bundle. Therefore, do these filters prevent potential blockage of flow through the fuel support piece inlet orifice and prevent potential boiling transition and channel flow instabilities?
  
3. RG 1.133 placed a great emphasize on how the LPM program is developed and implemented? In your survey, did you find any difference in the LPM program employed by licensees that had successfully identified loose parts using the LPM system and those who didn't?

4. Not all US BWRs have LPM systems installed. You also indicated in the submittal that based on BWR operating experience in excess of 500 reactor-years, BWROG concluded that the LPM system has no safety benefit for BWRs. Does this include operating experience from non-US BWRs? Have there been any incidents that the BWROG and GE are aware of, in which US or non US BWRs have experienced difficulties or malfunctioning of the primary system components, jamming of control rod drive systems, or blockage of flow through assemblies due to loose parts irrespective of whether it is detected by the LPM systems?
5. In justifying the elimination of the LPMs, the report stated that the BWROG did not identify any case, when a BWR plant was shutdown to investigate a loose parts monitoring system alarm. However, RG 1.133 specifically stated that if a loose part is detected that licensees use supplemental station information such as plant processing signals, inspections and prior operating history to evaluate the short term and long term safety implication of the detected loose parts, with out taking any action on the plant operation solely based on loose-part detection system. Therefore, the guidelines discourage shutdown of the plant based on the LPM system detection unless the impact of the loose part on safe operation or shutdown of plant can be independently verified.
6. RG 1.133 stated that an earthquake could induce a loose part in the primary system, therefore, it is desirable that the loose-part detection system function following seismic events that do not require plant shutdown. The report did not address whether the LPM system may provide protection after operating basis earthquake or not.
7. The report stated that the LPM system requirement placed undue burden on the licensees without the safety benefits. While the submittal addressed the annual cost burden including the maintenance cost, but it did not discuss the maintenance history of the installed LPM systems. Do typical LPM systems require high maintenance and what is the corresponding exposure burden?