SSINS No.: 6835
IN 85-38

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

May 21, 1985

IE INFORMATION NOTICE NO. 85-38: LOOSE PARTS OBSTRUCT CONTROL ROD DRIVE MECHANISM

Addressees:

All utilities with pressurized water reactor (PWR) nuclear power facilities designed by Babcock & Wilcox (B&W) and holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is provided to alert recipients of a potentially significant problem pertaining to loose parts that can obstruct and prevent motion inside of control rod drive mechanisms . It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

In 1981 at the Davis-Besse Nuclear Plant, a locking spring broke in a control rod drive mechanism (CRDM) in core location C-7 and became wedged against the control rod, preventing it from operating. The cause was not determined at that time. During the 1984 outage, the locking springs were inspected and none appeared broken or in the wrong position. On March 16, 1985, the control rod in core location E-3 would not drop into the core on demand and had to be driven downward by control room personnel. This control rod was tested during an outage on March 21, 1985, and jammed after three cycles of operation.

Inside of this CRDM were foreign objects and a broken locking spring. The foreign objects were pieces of a set screw from the handling tool used during the 1984 outage that had lodged in the CRDM and prevented the drive screws from being disengaged. The locking spring (a flat tee-shaped device with a riveted tab) was broken at the tee and the upper rivet hole. The upper portion of the broken spring was not found and is believed to be inside of the CRDM.

Further examination of all of the mechanisms revealed a broken locking spring in core location M-5. In addition, four springs were not in their normal locking position. During operation there is no means of detecting broken springs or foreign objects in the CRDM. Exercising the control rod will allow loose pieces to move.

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The most likely cause of the spring failures is that the unit went into service with some of the locking springs not in their correct position. The present assembly procedure has the maintenance technician determining that the spring is in the correct position by "feel" through a long handling tool. If this process is not successful, the reactor will be placed in operation with the spring out of position. When the control rod is fully withdrawn, an out-of-position spring will hit the inside of the torque tube cap and snap when sufficiently loaded. This was confirmed by the appearance of the spring failures which were brittle, intergranular fractures. In addition, examination of the inside of the cap showed a gouge in the tapered portion near the bottom and an indentation on the bottom surface.

Spring failures are considered to be a potential common mode failure that could affect the reactor trip function because (1) four springs at Davis Besse were found not to be in their normal position and two others were broken; (2) the likelihood for out-of-position springs to be broken when the control rod is fully withdrawn; and (3) the potential for a broken spring to cause the control rod to jam.

The corrective action by Davis-Besse Nuclear Plant was to replace all of the out-of-position spring assemblies and to verify by visual examination that the springs were in their correct positions. Consideration is being given to adding this verification as a regular part of the maintenance procedures. The B&W Owners Group has notified their members that there were failed locking springs at Davis-Besse in the control rod drive mechanisms.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: P. Cortland, IE
301-492-4175

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 85-38
May 21, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-37	Chemical Cleaning Of Steam Generator At Milestone 2	5/14/85	All pressure water reactor facilities holding an OL or CP
84-55 Sup. 1	Seal Table Leaks At PWRs	5/14/85	All power reactor facilities holding an OL or CP
85-20 Sup. 1	Motor-Operated Valve Failures Due To Hammering Effect	5/14/85	All power reactor facilities holding an OL or CP
85-36	Malfunction Of A Dry-Storage, Panoramic, Gamma Exposure Irradiator	5/9/85	All licensees possessing gamma irradiators
84-52 Sup. 1	Inadequate Material Procurement Controls On The Part Of Licensees And Vendors	5/8/85	All power reactor facilities holding an OL or CP
85-35	Failure Of Air Check Valves To Seat	4/30/85	All power reactor facilities holding an OL or CP
85-34	Heat Tracing Contributes To Corrosion Failure Of Stainless Steel Piping	4/30/85	All power reactor facilities holding an OL or CP
84-84 Rev. 1	Deficiencies In Ferro-Resonant Transformers	4/24/85	All power reactor facilities holding an OL or CP
85-33	Undersized Nozzle-To-Shell Welded Joints In Tanks And Heat Exchangers Constructed Under The Rules Of The ASME Boiler And Pressure Vessel Code	4/22/85	All power reactor facilities holding an OL or CP
85-32	Recent Engine Failures Of Emergency Diesel Generators	4/22/85	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit