SSINS No.: 6835
IN 86-109

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

December 29, 1986

IE INFORMATION NOTICE NO. 86-109: DIAPHRAGM FAILURE IN SCRAM OUTLET VALVE CAUSING ROD INSERTION

Addressees:

All boiling water reactor facilities holding an operating license or a construction permit.

Purpose:

This notice alerts addressees to the potential for a failure of the diaphragm in the scram inlet or outlet valve operator on the control rod drive hydraulic control units. This could result in a single control rod scram while at power. This event highlights the importance of preventive maintenance programs. It is suggested that recipients review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems 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:

During routine full-power operations on September 8, 1986, the Nine Mile Point Unit 1 Nuclear Power Plant experienced a single control rod scram (insertion) when the diaphragm in the air operator of the scram outlet valve failed. The hydraulic control unit was isolated, the failed diaphragm was replaced, and the control rod was returned to its normal operating position in the core.

Investigation revealed that the diaphragm failed because of an aging process that resulted in a radial crack in the rubber (buna-n and nylon material). The licensee initiated a review of its spare parts inventory and past operating experience and contacted the General Electric Company to determine the need for a diaphragm replacement program and to discuss the generic implications of this event.

Discussion:

The related central issues that need to be evaluated are: (1) whether programs to ensure that component shelf life and service life have properly included this diaphragm and other similar components susceptible to aging and (2) whether a failure of the diaphragm on the inlet valve alone (with the outlet valve closed) could cause damage to the control rod drive and possibly stick the control rod in an intermediate position.

The licensee (Niagara Mohawk Power Corporation) had previously changed out the diaphragms in approximately one half of the control rod drive units in 1975-1976, and about 10 more since then. The remaining installed diaphragms are original plant equipment that was purchased prior to 1970. Although spare diaphragm packages contained markings of an "estimated" shelf life of 7 years, preventive maintenance practices and a specific in service or shelf life were apparently not specified for this part when the event occurred. Subsequently, the licensee is in the process of determining a shelf life and service life for the diaphragm.

Damage to a control rod drive resulting in a stuck control rod was previously reported in NRC Information Notice (IN) No. 86-08, "Stuck Control Rod," dated August 15, 1986. That issue involved a closed manual outlet valve that resulted in internal damage to drives at Clinton and Perry due to excessively high internal pressures. In these two cases, the preoperational tests were conducted with a depressurized, or low, reactor coolant system pressure which may have resulted in a high differential pressure across the cylinder tube.

The failure at Nine Mile Point Unit 1 is being reviewed to determine whether an event similar to that discussed in IN 86-08 would be possible as a result of a failed scram inlet valve diaphragm. During a reactor protection system actuation, the inlet and outlet scram valves are opened nearly simultaneously because of the de-energization of the scram pilot valves and venting of the air header. However, in the case of a ruptured diaphragm on the scram inlet valve, it is not certain whether a simultaneous opening of the scram outlet valve would occur. The licensee has contracted for an analysis of this problem but the results are not yet available.

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

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

Technical Contacts: Eric Weiss, IE
(301) 492-9005

Charles S. Marschall,
Resident Inspector, Nine Mile Point NPP
(315) 342-4041

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 86-109
December 29, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-108	Degradation Of Reactor Coolant System Pressure Boundary Resulting From Boric Acid Corrosion	12/29/86	All PWR facilities holding an OL or CP
86-107	Entry Into PWR Cavity With Retractable Incore Detector Thimbles Withdrawn	12/29/86	All power reactor facilities holding an OL or CP
86-106	Feedwater Line Break	12/16/86	All power reactor facilities holding an OL or CP
86-105	Potential For Loss Of Reactor Trip Capability At Intermediate Power Levels	12/19/86	All holders of OL or CP for PWR or BWR
86-104	Unqualified Butt Splice Connectors Identified In Qualified Penetrations	12/16/86	All pressurized and boiling-water reactor facilities holding an OL or CP
86-14 Supplement 1	Overspeed Trips Of AFW, HPCI, And RCIC Turbines	12/17/86	All power reactor facilities holding an OL or CP
86-103	Respirator Coupling Nut Assembly Failures	12/16/86	All power reactor facilities holding an OL or CP and fuel facilities
86-102	Repeated Multiple Failures Of Steam Generator Hydraulic Snubbers Due To Control Valve Sensitivity	12/15/86	All power reactor facilities holding an OL or CP
86-101	Loss Of Decay Heat Removal Due To Loss Of Fluid Levels In Reactor Coolant System	12/12/86	All PWR facilities holding an OL or CP
86-100	Loss Of Offsite Power To Vital Buses At Salem 2	12/12/86	All PWRs or BWRs holding an OL or CP

OL = Operating License
CP = Construction Permit