SSINS No.: 6835
IN 85-03, Supplement 1

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

April 9, 1985

IE INFORMATION NOTICE NO. 85-03, SUPPLEMENT 1: SEPARATION OF PRIMARY REACTOR COOLANT PUMP SHAFT AND IMPELLER

Addressees:

All pressurized water power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice provides additional information regarding the primary reactor coolant pump impeller separation from the pump shaft, discussed in IE Information Notice 85-03. New information as well as additional background information is provided herein. Specifically, the description of the event circumstances is modified, an additional pump shaft failure is described, and the probable cause of the failure at Palisades is discussed.

It is expected that recipients will 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 notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Discussion:

IE Information Notice 85-03 described an event at the Palisades Nuclear Plant involving the separation of the primary reactor coolant pump impeller from the pump shaft during operation. That notice stated that electric current to the pump increased by approximately 10 to 15 percent in the 3-hour period prior to securing the pump. Subsequent information received from the licensee indicates this current increase did not occur.

An event potentially leading to pump impeller stoppage occurred at Prairie Island on June 11, 1981. In that event, the reactor coolant pump shaft vibration and seal leakoff increased. Subsequent pump inspection found a crack extending 270 to 300 degrees of arc around the shaft. The Palisades event (September 16, 1984); the Prairie Island event (June 2, 1981), and the Surry 1 event (November, 1973), mentioned in IE Notice 85-03, were all accompanied by (1) indication of reactor coolant pump seal failure and (2) higher than normal pump shaft vibration.

The postulated cause of the Palisades' cap screw failure was fatigue brought about by preload on the bolts insufficient to resist cyclic loading. This is believed to have been caused by the poor surface condition of the capscrew threads. This condition resulted in the specified torque values not being sufficient to properly preload the cap screws that join the impeller to the shaft in 1971. This situation suggests two points that should be stressed. First, the failure described in IN 85-03 was not caused by improper disassembly and reassembly of the reactor coolant pump; rather, the problem apparently occurred during initial assembly. Second, the cause of under tightening of the cap screws was the poor (rough) surface condition of the screw threads themselves. Thus, use of the torque to measure axial bolt loading was, in this case, misleading.

No specific action or written response to this information notice is required. If you need additional information 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 Contact: Bill Jones, IE
(301) 492-7613

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 85-03, Supplement 1
April 9, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-28	Partial Loss Of AC Power And Diesel Generator Degradation	4/9/85	All power reactor facilities holding and OL or CP
85-27	Notifications To The NRC Operations Center And Reporting Events In Licensee Event Reports	4/3/85	All power reactor facilities holding an OL or CP
85-26	Vacuum Relief System For Boiling Water Reactor Mark I And Mark II Containments	4/2/85	All BWR facilities having a Mark I or Mark II containment and holding an OL or CP
85-25	Consideration Of Thermal Conditions In The Design And Installation Of Supports For Diesel Generator Exhaust Silencers	4/2/85	All power reactor facilities holding an OL or CP
85-24	Failures Of Protective Coatings In Pipes And Heat Exchangers	3/26/85	All power reactor facilities holding an OL or CP
85-23	Inadequate Surveillance And Postmaintenance And Post-modification System Testing	3/22/85	All power reactor facilities holding an OL or CP
85-22	Failure Of Limitorque Motor-Operated Valves Resulting From Incorrect Installation Of Pinon Gear	3/21/85	All power reactor facilities holding an OL or CP
85-21	Main Steam Isolation Valve Closure Logic	3/18/85	All PWR facilities holding an OL or CP
85-20	Motor-Operated Valve Failures Due To Hammering Effect	3/12/85	All power reactor facilities holding an OL or CP
85-19	Alleged Falsification Of Certifications And Alteration Of Markings On Piping, Valves And Fittings	3/11/85	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit