SSINS No.: 6835
IN 87-30

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C.

July 2, 1987

NRC INFORMATION NOTICE NO. 87-30: CRACKING OF SURGE RING BRACKETS IN LARGE GENERAL ELECTRIC COMPANY ELECTRIC MOTORS

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is provided to alert recipients to a potentially significant safety problem that could result in the loss of safety-related equipment, such as residual heat removal (RHR), core spray, and high-pressure pumps that are driven by large, vertical electric motors manufactured by General Electric Company (GE). It is expected that recipients will review this information for applicability and consider actions, as appropriate, to preclude a similar problem at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Background:

Felt blocks are used in large electric motors to keep the windings separated where they loop back at the end of the stator. The blocks are attached to a surge ring that is held in place by L-shaped surge ring brackets welded to the surge ring and bolted to the motor casing. Failure of these surge ring brackets and cracking of the felt blocks allows movement and wear of the end-turns, leading to a reduction in insulation resistance and possible motor failure. In addition, broken pieces of the surge ring bracket may enter the space between the stator and the rotor, resulting in electrical or mechanical motor degradation.

Description of Circumstances:

During the 1985 outage at Peach Bottom Atomic Power Station, Unit 3, broken surge ring brackets were discovered in a 2000-horsepower (hp) RHR pump motor

and a 600-hp core spray pump motor. Attempts to repair the brackets by welding were unsuccessful, and they were removed from the motors at GE's suggestion. The licensee for Peach Bottom is reevaluating the motor design and the need to replace the brackets.

During the week of November 10, 1986, the licensee for Cooper Nuclear Station inspected its 1000-hp RHR pump motors and discovered that three of four motors had broken lower surge ring brackets and cracked upper and lower end-turn felt blocks. In the B motor, five of six lower brackets were fractured. Repairs were made and periodic visual inspections are being conducted.

GE informed the NRC on March 24, 1987 that the equipment affected in BWR plants includes the RHR, core spray, and high-pressure core spray system electric motors. GE recommended that annual inspections be performed until operating experience indicates that this is no longer necessary. At plants where the support brackets have been removed, GE stated that restoration actions should be taken as soon as possible. Although GE notified BWR licensees of the Cooper Station event, it did not notify PWR licensees. A list, which was provided to the NRC by GE, of PWR facilities that have received large, vertical electric motors from GE is attached. It should be noted that other plants could have similar motors.

Discussion:

The surge ring bracket, a 1-inch-wide by 1/8-inch-thick L-shaped piece of carbon steel, has been breaking at the sharp bend. After the bracket breaks, a 1-inch-long portion remains attached to the surge ring by a double fillet weld. If this weld fails, the 1-inch by 1-inch by 1/8-inch piece of steel may move inside the motor. Although tests conducted at Cooper Station showed significant cyclic loading of the bracket when the motor was started, the bracket also was shown to be subject to vibration during steady-state operation.

At Cooper Nuclear Station, surge ring brackets of an improved design, which incorporated a larger bend radius, were installed and the motor insulation system was revarnished to fill and bond the cracks in the felt blocks. The licensee is visually inspecting the brackets on a regular basis. This examination is conducted without disassembling the pump motor, using either a boroscope or a mirror inserted through the existing air vents. GE has recommended a complete disassembly and inspection at 10-year intervals to ensure the continued qualification of these motors.

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.

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Paul Cortland, OSP
(301) 492-7190

Attachments:
1. List of PWR Facilities Known to Have Received Large, Vertical Electric Motors from General Electric Company
2. List of Recently Issued NRC Information Notices

LIST OF PWR FACILITIES KNOWN TO HAVE RECEIVED LARGE, VERTICAL ELECTRIC MOTORS FROM GENERAL ELECTRIC COMPANY

The plant numbers were not identified for multi-unit facilities.

PLANT	MOTOR SIZE IN HORSEPOWER
Arkansas Nuclear One	800
Bellefonte Nuclear Plant	900
Farley Nuclear Plant	600
Harris Nuclear Power Plant	1300
Indian Point Station	400
Millstone Nuclear Power Station	500, 600, 700
North Anna Power Station	400
Palo Verde Nuclear Station	600
Salem Nuclear Generating Station	1000
Seabrook Nuclear Station	600, 800
Sequoyah Nuclear Plant	700
SNUPPS	1750
St. Lucie Plant	500, 600
Turkey Point Plant	500
Vogtle Nuclear Plant	700

Attachment 2
IN 87-30
July 7, 1987

LIST OF RECENTLY ISSUED
INFORMATION NOTICES 1987

Information Notice No.	Subject	Date of Issuance	Issued to
87-29	Recent Safety-Related Incidents at Large Irradiators.	6/26/87	All NRC licensees authorized to possess and use sealed sources in large irradiators.
87-28	Air Systems Problems at U.S. Light Water Reactors	6/22/87	All nuclear power reactor facilities holding an OL or CP.
87-27	Iranian Official Implies Vague Threat to U.S. Resources	6/10/87	All nuclear power reactor facilities holding an OL or CP, research and nonpower reactor facilities, and fuel fabrication and processing facilities using or possessing formula quantities of special nuclear material.
87-26	Cracks In Stiffening Rings on 48-Inch Diameter UF_6 Cylinders.	6/11/87	All uranium fuel fabrication and conversion facilities.
87-25	Potentially Significant Problems Resulting from Human Error Involving Wrong Unit, Wrong Train, or Wrong Component Events.	6/11/87	All nuclear power reactor facilities holding an OL or CP.
87-24	Operational Experience Involving Losses of Electrical Inverters.	6/4/87	All nuclear power reactor facilities holding an OL or CP.
87-23	Loss of Decay Heat Removal During Low Reactor Coolant Level Operation	5/27/87	All PWR facilities holding an OL or CP.
87-22	Operator Licensing Requalification Examinations at Nonpower Reactors	5/22/87	All research and nonpower reactor facilities.

OL = Operating License
CP = Construction Permit

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*SEE PREVIOUS CONCURRENCES

*OSP	*PPMB:ARM	*AC/VIB:DRIS:NRR	*C:OGCB:DOEA	~~D:DOEA~~
PCortland	TechEd	EMerschoff	CEBerlinger	CERossi
6/25/87	6/25/87	6/25/87	6/25/87	6/26/87

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