

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

January 27, 2003

NRC INFORMATION NOTICE 2003-03: PART 21 - INADEQUATELY STAKED
CAPSCREW RENDERS RESIDUAL HEAT
REMOVAL PUMP INOPERABLE

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to inform addressees of recently observed inadequately staked capscrews on casing wear rings of residual heat removal pumps. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

At Vogtle Electric Generating Plant (VEGP) Unit 2, on October 22, 2002, while the unit was defueled, residual heat removal (RHR) pump A was started for dynamic fill and vent of the RHR system. Moments later, the pump tripped. Personnel found that the pump shaft could not be hand-turned. An investigation determined that a casing wear ring capscrew had come loose and lodged between the impeller and the back casing wear ring. It was found that the pump was last operated on October 11, 2002, when the unit was in Mode 6 (refueling). It is believed that the capscrew came loose and lodged between the impeller and the back casing wear ring as the pump was being placed into standby status on October 11, 2002.

The root cause of this event was determined by the licensee to be the failure of the manufacturer to properly stake the back casing wear ring capscrews. Each capscrew is torqued and staked as a redundant measure to hold the capscrews in place. Although the back casing wear rings had been staked, the staking was inadequate to prevent at least one of the capscrews from backing out of the back casing wear ring after it had lost its torque and become loose. RHR pump B was inspected and found to have a similar condition. Spare back casing wear rings in the warehouse were also inspected and found to have inadequately staked capscrews. Capscrews on the back casing rings of both RHR pumps were properly staked prior to the pumps being returned to service.

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Discussion

The improperly staked capscrews on both RHR pumps represented a condition that could have prevented fulfillment of a safety function of a system needed to remove residual heat. There is also the potential for loose parts to result in unpredictable damage to safety related components for accident mitigation.

Discussions with pump vendor personnel determined that there are approximately 60 of these pumps in service in the nuclear industry, most with several years of service, and that this was the first failure of this type. Additionally, 15 of these pumps, including the 4 pumps in VEGP Units 1 & 2, had undergone a coupling modification in recent years that replaced the back casing ring. However, it is not known if the back casing ring defect is limited to only those casing rings that were procured for the modifications or if the original pump back casing rings also have this defect. Nonetheless, this was the first failure of this type for any of the 60 pumps.

Vendor: Ingersoll-Rand
Model No: 8X20WDF
Back Casing Ring Part No: 6B
Capscrew No: 118C

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate project manager from the NRC's Office of Nuclear Reactor Regulation (NRR).

/RA/

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2003-02	Recent Experience with Reactor Coolant System Leakage and Boric Acid Corrosion	01/16/2003	All holders of operating licenses or construction permits for pressurized water reactors (PWRs).
2003-01	Failure of a Boiling Water Reactor Target Rock Main Steam Safety/Relief Valve	01/15/2003	All holders of operating licenses or construction permits for nuclear power reactors, except those that have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.
2002-35	Changes to 10 CFR Parts 71 and 72 Quality Assurance Programs	12/20/2002	All holders of 10 CFR Part 71 quality assurance program approvals and all 10 CFR Part 72 licensees and certificate holders.
2002-34	Failure of Safety-Related Circuit Breaker External Auxiliary Switches at Columbia Generating Station	11/25/2002	All holders of operating licenses or construction permits for nuclear power reactors.
2002-33	Notification of Permanent Injunction Against Neutron Products Incorporated of Dickerson, Maryland	11/22/2002	All teletherapy and radiation processing licensees.
2002-29 (Errata)	Recent Design Problems in Safety Functions of Pneumatic Systems	11/06/2002	All holders of operating licenses or construction permits for nuclear power reactors.

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