

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.

**ML030240029**

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/*

William D. Beckner, Program Director  
Operating Reactor Improvements Program  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Technical contacts: D. Billings, NRR  
301-415-1175  
E-mail: [deb1@nrc.gov](mailto:deb1@nrc.gov)

G. Bedi, NRR  
301-415-1393  
E-mail: [gsb2@nrc.gov](mailto:gsb2@nrc.gov)

J. Zeiler, Region 2  
706-554-9901  
E-mail: [jxz@nrc.gov](mailto:jxz@nrc.gov)

Attachment: List of Recently Issued NRC Information Notices

Discussion

The improperly staked capscrews on both RHR pumps represented a condition that could have prevented fulfilment 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/*

William D. Beckner, Program Director  
 Operating Reactor Improvements Program  
 Division of Regulatory Improvement Programs  
 Office of Nuclear Reactor Regulation

Technical contacts: D. Billings, NRR                      G. Bedi, NRR  
                                  301-415-1175    301-415-1393  
                                  E-mail: [deb1@nrc.gov](mailto:deb1@nrc.gov)    E-mail: [gsb2@nrc.gov](mailto:gsb2@nrc.gov)

J. Zeiler, Region 2  
 706-554-9901  
 E-mail: [jxz@nrc.gov](mailto:jxz@nrc.gov)

Attachment: List of Recently Issued NRC Information Notices

DISTRIBUTION:

ADAMS    IN File

ADAMS ACCESSION NUMBER:

\*See previous concurrence

DOCUMENT NAME: G:\RORP\OES\Staff Folders\Billings\VogCapscrewIN.wpd

OFFICE	OES:RORP:DRIP	Tech Editor	Region II	Region II
NAME	DBillings	PKleene*	JZeiler*	BRBonser*
DATE	/ /2003	01/14/2003	01/21/2003	01/22/2003
OFFICE	DE:EMEB	DE:EMEB	SC:OES:RORP:DRIP	PD:RORP:DRIP
NAME	BSGurjendra	DTerao*	TReis	WDBeckner
DATE	/ /2003	01/23/2003	01/24/2003	01/27/2003

OFFICIAL RECORD COPY

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
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.

**Note:** NRC generic communications may be received in electronic format shortly after they are issued by subscribing to the NRC listserver as follows:

To subscribe send an e-mail to <listproc@nrc.gov >, no subject, and the following command in the message portion:

subscribe gc-nrr firstname lastname