

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555-0001

June 23, 1998

**NRC INFORMATION NOTICE 98-23: CROSBY RELIEF VALVE SETPOINT DRIFT  
PROBLEMS CAUSED BY CORROSION OF THE  
GUIDE RING**

Addressees

All holders of operating licenses for pressurized water reactors (PWRs), except those licensees who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to potential problems caused by corrosion of the guide rings in relief valves manufactured by Crosby. 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 contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On November 2, 1996, Sequoyah Unit 2 experienced an over pressure condition on the safety injection system as a result of leaking check valves from the reactor coolant system. The safety injection system design pressure is 12.2 MPa (1750 psig) and pressure during the evolution reached approximately 12.9 MPa (1850 psig), at which time at least one relief valve lifted. There were three relief valves in the system that should have prevented system pressure from exceeding 12.6 MPa (1805 psig). One of the relief valves was removed and tested. The relief was found to be out of tolerance and was subsequently replaced. Corrective actions to resolve this condition adverse to quality were discussed in NRC Inspection Report 50-327, 328/97-06 (Accession Number 9708040130).

On September 9, 1997, Sequoyah Unit 2 experienced another over pressure condition on the safety injection system, again as a result of leaking check valves from the reactor coolant system. The three system relief valves should have prevented system pressure from exceeding 12.6 MPa (1805 psig); however, again as a result of relief valve setpoint problems, system pressure approached 12.9 MPa (1850 psig).

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updated on 6/24/98

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During the Sequoyah Unit 2 refueling outage, in October 1997, the three safety injection system relief valves were replaced and approximately 20 other similar Unit 2 relief valves were tested and/or replaced. The licensee disassembled five of the relief valves and performed a detailed root cause analysis of the failures. The licensee noted that most of the valves had little or no internal lubrication present, and this lack of lubrication was a major contributor to the relief valve setpoint drifting problem.

In addition, when the valves were disassembled, two of the relief valves removed from the safety injection system were found to have corrosion on the guide rings. The licensee documented that the guide rings were fabricated from Type 416 stainless steel, which was subject to rust and corrosion if placed in borated water service, at higher than ambient temperatures. In general, the licensee concluded that the Sequoyah relief valve preventive maintenance program needed to be improved and that these relief valves should undergo periodic inspections.

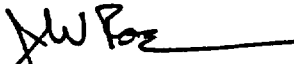
#### Discussion

The Crosby relief valves provide system overpressure protection for various systems throughout the plant. The corrosion problem appeared to be limited to borated water system applications. The corrosion was also limited to the guide ring assembly located in the discharge portion of the valve, which is normally in a dry section of the system.

At Sequoyah Unit 2, the safety injection relief valves had lifted on several occasions, and it appeared that the discharge piping could provide a loop seal and keep water in the discharge ports of the valves. This accounted for the excessive corrosion of the safety injection relief valves and explained why there was very little corrosion of the rest of the relief valves located on other borated water systems.

Most of the Crosby relief valve components subjected to borated water applications at Sequoyah are manufactured from Type 300 series stainless steel. The licensee noted that the relief valve guide rings were manufactured from Type 416 stainless steel, which can corrode if subjected to borated water at elevated temperatures. The licensee and the manufacturer have been reviewing the feasibility of manufacturing guide ring replacements from Type 300 series stainless steel or other corrosion-resistant material, such as Inconel.

This information notice requires no specific action or written response. However, recipients are reminded that they are required by 10 CFR 50.65 to take industry-wide operating experience (including information presented in NRC information notices) into consideration, when practical, when setting goals and performing periodic evaluations. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

  
Jack W. Roe, Acting Director  
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Office of Nuclear Reactor Regulation

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| 98-18                         | Recent Contamination Incidences Resulting from Failure to Perform Adequate Surveys                         | 5/13/98                 | Part 35 Medical Licensees .  |
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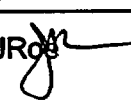
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