CENTRAL FILES

SEP 6 1977

Docket No. 50-263
Docket No. 50-282
Docket No. 50-306

Northern States Power Company
ATTN: Mr. Leo Wachter
Vice President
Power Production and System Operation
414 Nicollet Mall
Minneapolis, MN 55401

Gentlemen:

The enclosed IE Circular No. 77-11 is forwarded to you for information. If there are any questions related to your understanding of the suggested actions, please contact this office.

Sincerely,

James G. Keppler
Director

Enclosure: IE Circular No. 77-11

cc w/encl:
Mr. L. R. Eliason, Plant Manager
Mr. F. P. Tierney, Jr., Plant Manager
Central Files
Reproduction Unit NRC 20b
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DATE	9/6/77					

IE Circular No. 77-11
September 6, 1977

LEAKAGE OF CONTAINMENT ISOLATION VALVES WITH RESILIENT SEATS

DESCRIPTION OF CIRCUMSTANCES:

Several licensees have reported difficulty in satisfying leakage test requirements on containment isolation valves with resilient valve seats. The seat materials have been identified as neoprene and ethylene propylene. The licensees reporting difficulty in satisfying the testing requirements had either a 36-inch or 42-inch butterfly valve manufactured by the Henry Pratt Company with neoprene seats or a 24-inch butterfly valve manufactured by the Allis Chalmers Company with ethylene propylene seats.

The cause of the excessive leakage has been determined to be either general degradation of the resiliency characteristics of the seal, cold temperatures and the associated "hardening" of the seal, or a combination of the two.

Testing of these isolation valves is required under 10 CFR 50, Appendix J on an interval defined as each reactor shutdown for refueling, but in no case at an interval greater than 2 years. In all except one of these several cases described herein it was the required testing which defined the leakage path.

In these cases an examination of the resilient valve seat material indicated that the material had hardened and lost some resiliency and showed signs of wear due to valve cycling. Exposure to various environmental conditions such as humidity and temperature have also, in some cases, apparently accelerated the degradation or changed the performance characteristics of the seating material.

In one case, the valve was continuously pressurized as part of a penetration pressurization system and it was determined that the valve leakage was cycling with the outside air temperatures. When the air temperature dropped at night, the valve seat would contract away from the valve and leakage would begin. As temperature increased, the reverse would occur. If this isolation valve had not been under constant pressure monitoring this phenomenon would not have been observed unless a Type C local leak rate test had been performed to check the leakage under both temperature conditions.

The valves involved have been those associated with containment purge and ventilation systems. Preliminary information seems to indicate that for the service these valves see, a life expectancy of the resilient seats is at best about 3 years and may be less, dependent upon specific conditions to which they are subjected.

Actions by the licensees have consisted of several different approaches to assure the continued nearly leak-tight behavior of these large, butterfly isolation valves. Seats are being replaced, seat materials are being tested for resiliency, local testing frequency has been increased, and for the facility where leakage was associated with temperature extremes, an external heat source has been provided.

All holders of operating licenses or construction permits should be aware of the possible limited useful life of the resilient valve seats for use on large, butterfly valves. Certain steps can be taken to minimize the possibility of excessive valve leakage and measures can be taken to quickly detect the leaks if they occur.

These actions may be implemented through the following considerations.

1. Based on available data or manufacturer's recommendations, assess the acceptability of testing frequency and maintenance schedules for existing valves of the type described. If results of the review indicate the need for replacement, schedules for the replacement of resilient seat materials should be developed.

2. Review of expected service conditions to provide assurance that temperature extremes will not adversely affect the leakage rates. The need for shortened intervals of testing should also be considered.

3. For those licensees who have plants under construction, applicants should re-examine the specifications for the design and purchase of similar valves so that their characteristics in service are anticipated and the future maintenance program is considered prior to plant completion.

No written response to this Circular is required; however, as needs or experience indicate there may be further follow-up action. If such follow-up is required the individual licensees will be contacted. If you require additional information regarding this subject, contact the Director of the appropriate NRC Regional office.

Enclosure:
List of IE Circulars
Issued in 1977

Enclosure
IE Circular 77-11
Date: September 6, 1977

LISTING OF IE CIRCULARS ISSUED IN 1977

CIRCULAR NO.	SUBJECT	FIRST DATE OF ISSUE	ISSUED TO
77-01	Malfunctions of Limitorque Valve Operators	1-4-77	All holders of Operating License (OL) or Construction permit(CP)
77-02	Potential Heavy Spring Flooding	2-15-77	All affected holders of OLs
77-02A	Potential Heavy Spring Flooding	2-16-77	All affected holders of CPs
77-03	Fire Inside a Motor Control Center	2-28-77	All holders of OLs and CPs
77-04	Inadequate Lock Assemblies	3-17-77	Safeguard Group I, II, IV, V, Licensees
77-05	Liquid Entrapment in Valve Bonnets	3-24-77	All holders of OLs and CPs
77-06	Effects of Hydraulic Fluid on Electrical Cable	4-1-77	All holders of OL's and CPs
77-07	Short Period During Reactor Startup	4-12-77	Holders of BWR OLs
77-08	Failure of Feedwater Sample Probe	4-13-77	All holders of OLs
77-09	Improper Fuse Coordination In BWR Standby Liquid Control System Control Circuits	5-25-77	All holders of BWR OLs or CPs
77-10	Vacuum Conditions Resulting in Damage to Liquid Process Tanks	7-15-77	All holders of Reactor Operating Licenses