

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

November 28, 1990

NRC INFORMATION NOTICE NO. 90-72: TESTING OF PARALLEL DISC GATE VALVES
IN EUROPE

Addressees:

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

Purpose:

This information notice is intended to alert addressees to the results of tests of parallel disc gate valves by researchers from the United Kingdom (UK) and the Federal Republic of Germany (FRG). 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 do not constitute NRC requirements; therefore, no specific action or written response is required.

Discussion:

On October 15 to 19, 1990, members of the U.S. Nuclear Regulatory Commission (NRC) staff met with nuclear regulatory authorities and industry representatives in the UK and the FRG to discuss the performance of motor-operated valves (MOVs) at nuclear power plants. During these discussions, researchers from both the UK and the FRG described tests of the operation of parallel disc gate valves under high differential pressure and flow conditions. According to the UK and FRG researchers, the tests resulted in internal damage to the gate valves. This damage included abrasion and galling of the disc and seat sliding surfaces. Because of this damage, significantly more thrust was required to operate the valves than was predicted by the commonly-used equation. In some instances, the increased thrust requirements could have exceeded the setting of the MOV torque switch or the capability of the motor operator.

During the meetings, the FRG representatives reported that an improved design for parallel disc gate valves had been developed. This improved design has additional sliding surface area to eliminate the excessive thrust requirements for valve operation. The FRG representatives reported that, as a result of their valve tests, the FRG valve vendors now typically assume a valve friction factor of 0.4 (plus or minus 0.1) in the commonly-used equation to estimate the thrust required to operate the improved valve design. In the United States, a valve friction factor of 0.2 is typically assumed for all parallel disc gate

9011210137

2A

IDR-11C


valves even though little research has been conducted regarding the performance of these valves under conditions of high differential pressure and flow.

A summary of the FRG parallel disc gate valve tests is provided in "Testing of Safety-Related Valves of PWR and BWR Power Plants," by U. Simon, N. Rauffmann, and H. Schafer, which is printed in The American Society of Mechanical Engineers, PVP - Volume 180, Pipeline Dynamics and Valves (1989).

The parallel disc gate valve tests performed by the UK and FRG researchers provided results similar to the results of the NRC-sponsored tests of flexible-wedge gate valves performed by researchers at the Idaho National Engineering Laboratory. As with the tests of parallel disc gate valves performed by UK and FRG researchers, the NRC-sponsored tests revealed that internal damage may occur to the flexible-wedge gate valves when operated under conditions of high differential pressure and flow. Because of this internal damage, the thrust required to operate the flexible-wedge gate valves exceeded the thrust predicted from the commonly-used equation and typical friction factors. The NRC-sponsored test results were discussed at public meetings on February 1, 1989, and April 18, 1990, and are summarized in NRC Information Notice 90-40, "Results of NRC-Sponsored Testing of Motor-Operated Valves."

Licensees and construction permit holders may wish to consider the results of the UK and FRG tests when evaluating the capability of currently-installed parallel disc gate valves and when considering the adequacy of replacement valves.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.


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

Technical Contact: Thomas G. Scarbrough, NRR
(301) 492-0794

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
90-71	Effective Use of Radiation Safety Committees to Exercise Control Over Medical Use Programs	11/6/90	All NRC licensees authorized to use by-product material for medical purposes.
90-70	Pump Explosions Involving Ammonium Nitrate	11/6/90	All uranium fuel fabrication and conversion facilities.
90-38, Supp. 1	License and Fee Requirements for Processing Financial Assurance Submittals for Decommissioning	11/6/90	All fuel facility and materials licensees.
89-30, Supp. 1	High Temperature Environments At Nuclear Power Plants	11/1/90	All holders of OLs or CPs for nuclear power reactors.
90-69	Adequacy of Emergency and Essential Lighting	10/31/90	All holders of OLs or CPs for nuclear power reactors.
90-68	Stress Corrosion Cracking of Reactor Coolant Pump Bolts	10/30/90	All holders of OLs or CPs for pressurized water reactors (PWRs).
90-67	Potential Security Equipment Weaknesses	10/29/90	All holders of OLs or CPs for nuclear power reactors and Category I fuel facilities.
90-66	Incomplete Draining and Drying of Shipping Casks	10/25/90	All holders of OLs for nuclear power reactors and all registered users of NRC approved waste shipping packages.

OL = Operating License
 CP = Construction Permit

valves even though little research has been conducted regarding the performance of these valves under conditions of high differential pressure and flow.

A summary of the FRG parallel disc gate valve tests is provided in "Testing of Safety-Related Valves of PWR and BWR Power Plants," by U. Simon, N. Rauffmann, and H. Schafer, which is printed in The American Society of Mechanical Engineers, PVP - Volume 180, Pipeline Dynamics and Valves (1989).

The parallel disc gate valve tests performed by the UK and FRG researchers provided results similar to the results of the NRC-sponsored tests of flexible-wedge gate valves performed by researchers at the Idaho National Engineering Laboratory. As with the tests of parallel disc gate valves performed by UK and FRG researchers, the NRC-sponsored tests revealed that internal damage may occur to the flexible-wedge gate valves when operated under conditions of high differential pressure and flow. Because of this internal damage, the thrust required to operate the flexible-wedge gate valves exceeded the thrust predicted from the commonly-used equation and typical friction factors. The NRC-sponsored test results were discussed at public meetings on February 1, 1989, and April 18, 1990, and are summarized in NRC Information Notice 90-40, "Results of NRC-Sponsored Testing of Motor-Operated Valves."

Licensees and construction permit holders may wish to consider the results of the UK and FRG tests when evaluating the capability of currently-installed parallel disc gate valves and when considering the adequacy of replacement valves.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

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

Technical Contact: Thomas G. Scarbrough, NRR
(301) 492-0794

Attachment: List of Recently Issued NRC Information Notices

*SEE PREVIOUS CONCURRENCES

D/DOEA:NRR CERossi 11/21/90	*C/OGCB:DOEA:NRR*AD/GPA:IP CHBerlinger 11/19/90	*RPB:ADM TechEd 11/06/90
*OGCB:DOEA:NRR*EMEB:DET:NRR RJKiessel 11/07/90	*EMEB:DET:NRR EJSullivan 11/09/90	*D/DET:NRR JERichardson 11/14/90
	*C/EMEB:DET:NRR LBMars 11/09/90	

Document Name: IN 90-72

valves even though little research has been conducted regarding the performance of these valves under conditions of high differential pressure and flow.

A summary of the FRG parallel disc gate valve tests is provided in "Testing of Safety-Related Valves of PWR and BWR Power Plants," by U. Simon, N. Rauffmann, and H. Schafer, which is printed in The American Society of Mechanical Engineers, PVP - Volume 180, Pipeline Dynamics and Valves (1989).

The parallel disc gate valve tests performed by the UK and FRG researchers provided results similar to the results of the NRC-sponsored tests of flexible-wedge gate valves performed by researchers at the Idaho National Engineering Laboratory. As with the tests of parallel disc gate valves performed by UK and FRG researchers, the NRC-sponsored tests revealed that internal damage may occur to the flexible-wedge gate valves when operated under conditions of high differential pressure and flow. Because of this internal damage, the thrust required to operate the flexible-wedge gate valves exceeded the thrust predicted from the commonly-used equation and typical friction factors. The NRC-sponsored test results were discussed at public meetings on February 1, 1989, and April 18, 1990, and are summarized in NRC Information Notice 90-40, "Results of NRC-Sponsored Testing of Motor-Operated Valves."

Licenses and construction permit holders should be aware of the results of the UK and FRG tests when evaluating the capability of currently-installed parallel disc gate valves and when considering the adequacy of replacement valves.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

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

Technical Contact: Thomas G. Scarbrough, NRR
(301) 492-0794

Attachment: List of Recently Issued NRC Information Notices

Document Name: UK AND FRG MOV TESTING RESULTS

*SEE PREVIOUS CONCURRENCES

D/DOEA:NRR
CERossi
11/ /90

CMB
C/OGCB:DOEA:NRR*AD/GPA:IP
CHBerlinger RHauber
11/19/90 11/16/90

*RPB:ADM
TechEd
11/06/90

*OGCB:DOEA:NRR*EMEB:DET:NRR
RJKiesel TGScarbrough
11/07/90 11/09/90

*EMEB:DET:NRR
EJSullivan
11/09/90

*C/EMEB:DET:NRR
LBMarsh
11/09/90

*D/DET:NRR
JERichardson
11/14/90

valves even though little research has been conducted regarding the performance of these valves under conditions of high differential pressure and flow.

A summary of the FRG parallel disc gate tests is provided in "Testing of Safety-Related Valves of PWR and BWR Power Plants," by U. Simon, N. Rauffmann, and H. Schafer, which is printed in The American Society of Mechanical Engineers, PVP - Volume 180, Pipeline Dynamics and Valves (1989).

The parallel disc gate valve tests performed by the UK and FRG researchers provided results similar to the results of the NRC-sponsored tests of flexible-wedge gate valves performed by researchers at the Idaho National Engineering Laboratory. As with the tests of parallel disc gate valves performed by UK and FRG researchers, the NRC-sponsored tests revealed that internal damage may occur to the flexible-wedge gate valves when operated under conditions of high differential pressure and flow. Because of this internal damage, the thrust required to operate the flexible-wedge gate valves exceeded the thrust predicted from the commonly-used equation and the typically used friction factors. The NRC-sponsored test results were discussed on public meetings on February 1, 1989, and April 18, 1990, and are summarized in NRC Information Notice 90-04, "Results of NRC-Sponsored Testing of Motor-Operated Valves."

Licenses and construction permit holders should be aware of the results of the UK and FRG tests when evaluating the capability of currently installed parallel disc gate valves and when considering the adequacy of replacement valves.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

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

Technical Contact: Thomas G. Scarbrough, NRR
(301) 492-0794

Attachment: List of Recently Issued NRC Information Notices

Document Name: UK AND FRG MOV TESTING RESULTS

*SEE PREVIOUS CONCURRENCES

D/DOEA:NRR
CERossi
11/ /90
OGCB:DOEA:NRR
RJKiesel
11/7/90

EMEB:DET:NRR
TGScarbrough
11/9/90
with editing
changes

C/OGCB:DOEA:NRR
CHBerlinger
11/ /90
EMEB:DET:NRR
EJSullivan
11/9/90

AD/GPA:IP
RHaber
11/16/90
C/EMEB:DET:NRR
LBMarsh
11/9/90
w/ edits

*RPB:ADM
TechEd
11/06/90
D/DET:NRR
JERichardson
11/14/90