SSINS No.: 6835
IN 86-81

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

September 15, 1986

IE INFORMATION NOTICE NO. 86-81: BROKEN INNER-EXTERNAL CLOSURE SPRINGS ON ATWOOD & MORRILL MAIN STEAM ISOLATION VALVES

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is provided to inform recipients of a potentially significant safety problem that could result from broken inner-external closure springs on main steam isolation valves (MSIVs) manufactured by Atwood & Morrill Co., Inc. The springs that failed were manufactured by Duer Spring and Manufacturing Co. Quench cracks, which apparently developed during the manufacturing process, caused the springs to fail.

It is expected that the recipients review the information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem from occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

During an inspection of MSIVs following low-pressure seat leakage tests at Enrico Fermi Unit 2 in May 1986, the licensee observed that four inner-external closure springs were broken into two-to-seven pieces. The licensee analyzed two of the broken springs and determined the failure to be quench cracking caused by the heat treatment process during manufacturing. There are eight MSIVs with eight inner-external and eight outer-external closure springs per valve. All outer-external closure springs were found intact and undamaged. All 64 external springs were from the same heat number (#8067703). The external closure-spring assemblies (inner and outer) perform a safety function to close the MSIVs.

Discussion:

Springs from Duer Spring and Manufacturing Co. were supplied to PWR and BWR nuclear power plants on MSIVs manufactured by Atwood & Morrill. The external closing springs that failed at Fermi 2 were the inner springs around the valve yoke rods. The following effects on valve operation could occur with one or more springs failing:

1. Slower closing time with steam in the normal forward flow direction. For BWRs, General Electric estimates the closure time would increase from the Technical Specification requirements of 3 to 5 seconds but will remain under 10 seconds.

2. Increased difficulty in meeting low-pressure seat leakage test requirements in BWR units.

3. Valve closure with steam in the reverse flow direction in PWR units could be adversely affected since the springs provide the only external closing assistance. Internal closing assistance is provided by the use of a pilot poppet design in these valves.

The spring manufacturer also performed laboratory metallographic examination of the failed springs and verified that the failure was the result of quench cracking. Atwood & Morrill and Duer Spring have recommended that at the first available opportunity all the external closing springs on all MSIVs be cleaned and magnetic particle testing be performed. Duer has provided an inspection procedure.

Atwood & Morrill is issuing a letter to all affected customers concerning this event which recommends that the above actions be taken. The Atwood & Morrill list of affected units is attached. In addition, General Electric has issued a service information letter, SIL No. 442 dated July 18, 1986, to owners of affected BWRs recommending a visual inspection and, in some cases, load tests. The NRC has reviewed the two procedures and has determined that either recommendation is adequate for BWRs. For PWRs, only the Atwood & Morrill recommendations are appropriate. However, consideration should be given to visual inspections of the springs following any cycling of the valve until completion of the Atwood & Morrill recommended inspection.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

E. L. Jordan

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: J. C. Stone, IE
(301) 492-9044

Attachments:
1. List of affected plants as identified by Atwood & Morrill
2. List of Recently Issued IE Information Notices

ATWOOD & MORRILL CO., INC.

Main Steam Isolation Valves
Furnished With External Closing Springs
Manufactured by Duer Spring & Manuf. Co.

PWR UNITS

Utility	Station	Quantity and Valve Size	
Duke Power Co.	Catawba 1 & 2	8 34-inch	
Duke Power Co.	McGuire 1 & 2	8 32-inch	
Duke Power Co.	Perkins 1, 2, & 3	12 32-inch	Units Cancelled
Duke Power Co.	Cherokee 1, 2, & 3	12 32-inch	Units Cancelled
Houston Lighting & Power	South Texas Project 1 & 2	8 32-inch	
South Carolina Elec & Gas	Virgil Summer 1	3 32-inch	
TVA	Bellefonte 1 & 2	8 32-inch	
TVA	Sequoyah 1 & 2	8 32-inch	
TVA	Watts Bar 1 & 2	8 32-inch	

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Main Steam Isolation Valves
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BWR UNITS

Utility	Station	Quantiy & Valve Size	
Boston Edison	Pilgrim 1	8 20-inch	
Cleveland Elec. Illuminating	Perry 1 & 2	16 26-inch	
Detroit Edison	Enrico Fermi 2	8 26-inch	
Georgia Power	Hatch 1	8 24-inch	
Gulf States Util.	River Bend 1	8 24-inch	
Houston Lighting & Power	Allens Creek 1	8 24-inch	Unit cancelled
Illinois Power	Clinton 1	8 24-inch	
Jersey Central Power & Light	Oyster Creek 1	4 24-inch	
Mississippi Power & Light	Grand Gulf 1 & 2	16 28-inch	
Niagara Mohawk Power Corp.	Nine Mile Point 1	2 24-inch	
Northern States Power Co.	Monticello	8 18-inch	
Pennsylvania Power & Light	Susquehanna 1 & 2	16 26-inch	
Philadelphia Electric	Limerick 1 & 2	16 26-inch	
Philadelphia Electric	Peach Bottom 2 & 3	16 26-inch	
Public Service Elec & Gas	Hope Creek 1 & 2	16 26-inch	Unit 2 cancelled

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Main Steam Isolation Valves
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BWR UNITS

Utility	Station	Quantiy & Valve Size		
TVA	Browns Ferry 1, 2, & 3	24	26-inch	
TVA	Hartsville A1, A2, B1 & B2	32	26-inch	Units B1 & B2 Cancelled
TVA	Phipps Bend 1 & 2	16	26-inch	Units cancelled

Attachment 2
IN 86-81
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LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-80	Unit Startup With Degraded High Pressure Safety Injection System	9/12/86	All power reactor facilities holding an OL or CP
86-79	Degradation Or Loss Of Charging Systems At PWR Nuclear Power Plants Using Swing-Pump Designs	9/2/86	All power reactor facilities holding an OL or CP
86-78	Scram Solenoid Pilot Valve (SSPV) Rebuild Kit Problems	9/2/86	All BWR facilities holding an OL or CP
86-77	Computer Program Error Report Handling	8/28/86	All power reactor facilities holding an OL or CP and nuclear fuel manufacturing facilities
86-76	Problems Noted In Control Room Emergency Ventilation Systems	8/28/86	All power reactor facilities holding an OL or CP
86-75	Incorrect Maintenance Procedure On Traversing Incore Probe Lines	8/21/86	All power reactor facilities holding an OL or CP
86-74	Reduction Of Reactor Coolant Inventory Because Of Misalignment Of RHR Valves	8/20/86	All BWR facilities holding an OL or CP
86-73	Recent Emergency Diesel Generator Problems	8/20/86	All power reactor facilities holding an OL or CP
86-72	Failure 17-7 PH Stainless Steel Springs In Valcor Valves Due to Hydrogen Embrittlement	8/19/86	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit