

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

September 19, 1991

NRC INFORMATION NOTICE 91-56: POTENTIAL RADIOACTIVE LEAKAGE TO TANK VENTED TO ATMOSPHERE

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 alert addressees to potential problems resulting from the leakage of isolation valves in emergency core cooling system (ECCS) recirculation lines to the safety injection water storage tank, which may be vented to atmosphere. 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

In September 1990, the Consumers Power Company, the licensee for the Palisades Plant, performed a test to measure the leakage through the suction valves from the safety injection and refueling water tank (SIRWT; see Figure 1). The licensee concluded that leakage through the suction valves was not a concern, but that radioactivity could be released through two other leakage paths: through the ECCS recirculation (minimum flow) header to the SIRWT and through the ECCS test header to the SIRWT. The concern arises because the SIRWT is vented to the atmosphere.

During the initial phase of recovery from a loss-of-coolant accident (LOCA), the ECCS recirculation header collects water from the safety injection pump minimum flow lines for return to the SIRWT through the minimum flow recirculation control valves (See Figure 1). During the later recirculation phase of recovery, this header is isolated from the SIRWT by these two independent control valves, which are in series. The test header collects water from the shutdown cooling heat exchangers during ECCS surveillance testing and during SIRWT mixing operations for return to the SIRWT through a manual test valve (See Figure 1). During reactor operation, the manual test valve is locked closed, isolating the test header from the SIRWT.

The leak tightness of these three isolation valves has never been previously verified at the Palisades Plant. The licensee's previous calculations of

9109130099

IDAR-11C

control room and offsite doses from a maximum hypothetical accident did not include such valve leakage. Preliminary estimates indicate that a leak rate of 0.1 gpm, together with other assumed sources, could cause a dose to control room personnel exceeding the limits in General Design Criterion (GDC) 19, "Control Room," 10 CFR Part 50, Appendix A. These limits include a dose of 5 rem to the whole body or an equivalent dose to any part of the body. A leak rate of 1 gpm, together with other assumed sources, could cause a dose to people at the site boundary equal to the limits in 10 CFR Part 100. These limits include a dose of 25 rem to the whole body or 300 rem to the thyroid from iodine exposure.

The licensee does not know the rate of leakage and thus can not determine if prior analyses underestimate the possible accident consequences. The licensee determined that excessive valve leakage could cause consequences to be larger than those from previous assessments and could cause the radiological consequences at the site boundary and to control room operators to exceed the regulatory limits. Therefore, the licensee's safety review committee reviewed this issue and determined it to be an unreviewed safety question. The licensee has submitted a license amendment to the NRC for review. The licensee's justification for continued operation addresses the following factors:

- Current confidence in valve performance and leak tightness
- Conservatism in valve leak rate evaluations
- System design considerations and their mitigating effects
- The low probability of a LOCA with fuel damage and a large fission product release to the containment building
- Conservatism in the present maximum hypothetical accident

The licensee is resolving this concern by eliminating conservative assumptions in leak rate evaluations and current maximum hypothetical accident analyses, implementing procedures to lessen the consequences of valve leakage, evaluating a modification to the manual valve, and including leak rate testing of the minimum flow recirculation control valves as part of the inservice testing program, following modifications scheduled for February 1992.

Discussion

Plants other than Palisades may be vulnerable to an unmonitored release from the safety injection water storage tank during and following a postulated design basis accident. On August 19, 1991, the Omaha Public Power District, the licensee for the Fort Calhoun Nuclear Power Plant, reported a similar concern with respect to the SIRWT suction valves. In addition, References 1 and 2 provide discussion of somewhat similar situations. The NRC staff has reviewed the system design characteristics and the inservice testing programs

of several utilities and has determined that similar conditions, with comparable consequences, may exist at other plant sites. In particular, valves with similar functions are not identified as Category A valves in inservice testing programs.

Inservice testing requirements are specified in 10 CFR 50.55a(g), which references the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. Subsection IWV-2200, "Categories of Valves," stipulates that Category A valves are those valves with functions in which the closed valve seat leakage is limited to a specific amount. The leak test requirements for Category A valves are specified in Section XI, IWV-3420, "Valve Leak Rate Test."

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 Office of Nuclear Reactor Regulation project manager.

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

Technical contacts: Patricia Campbell, NRR
(301) 492-1311

Brian E. Holian, NRR
(301) 492-1344

Vern Hodge, NRR
(301) 492-1861

Attachments:

1. Figure 1. Partial ECCS Piping Diagram for the Palisades Plant
2. List of References
3. List of Recently Issued NRC Information Notices

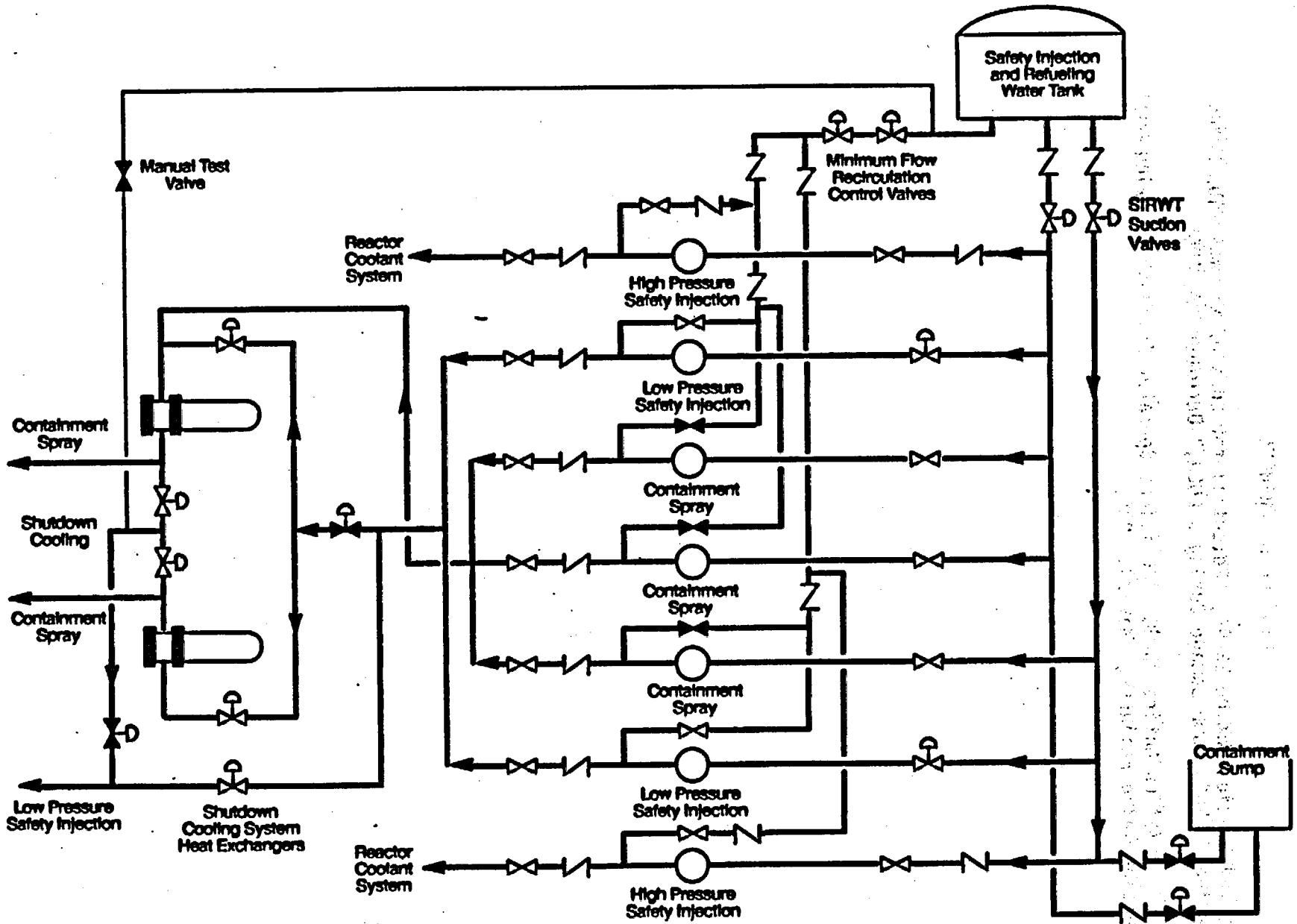


Figure 1. Partial ECCS Piping Diagram for the Pallsades Plant

LIST OF REFERENCES

1. NRC Information Notice 85-94, "Potential for Loss of Minimum Flow Paths Leading to ECCS Pump Damage During a LOCA," December 13, 1985
2. NRC Information Notice 86-38, "Deficient Operator Actions Following Dual Function Valve Failures," May 20, 1986

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-55	Failures Caused by An Improperly Adjusted Test Link In 4.16 KV General Electric Switchgear	09/16/91	All holders of OLs or CPs for nuclear power reactors.
85-18, Supp. 1	Failures of Undervoltage Output Circuit Boards In the Westinghouse-Designed Solid State Protection System	09/10/91	All holders of OLs or CPs for Westinghouse (W)-designed nuclear power reactors.
91-54	Foreign Experience Regarding Boron Dilution	09/06/91	All holders of OLs or CPs for pressurized water reactors (PWRs).
89-90, Supp. 2	Pressurizer Safety Valve Lift Setpoint Shift	09/05/91	All holders of OLs or CPs for nuclear power reactors.
91-53	Failure of Remote Shutdown System Instrumentation Because of Incorrectly Installed Components	09/04/91	All holders of OLs or CPs for nuclear power reactors.
91-52	Nonconservative Errors In Overtemperature Delta-Temperature (OTΔT) Setpoint Caused by Improper Gain Settings	08/29/91	All holders of OLs or CPs for Westinghouse (W)-designed nuclear power reactors.
86-14, Supp. 2	Overspeed Trips of AFW, HPCI and RCIC Turbines	08/26/91	All holders of OLs or CPs for nuclear power reactors.
91-51	Inadequate Fuse Control Programs	08/20/91	All holders of OLs or CPs for nuclear power reactors.
91-50	A Review of Water Hammer Events After 1985	08/20/91	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
 CP = Construction Permit

2A

IN 91-XX
August xx, 1991
Page 3 of 3

the licensee for the Fort Calhoun Nuclear Power Plant, reported a similar concern with respect to the SIRWT suction valves. In addition, references 1 and 2 provide discussion of somewhat similar situations. The NRC staff has reviewed the system design characteristics and the inservice testing programs of several utilities and has determined that similar conditions, with comparable consequences, may exist at other plant sites. In particular, valves with similar functions are not identified as Category A valves in inservice testing programs.

Inservice testing requirements are specified in 10 CFR 50.55a(g), which references the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. Subsection IWV-2200, "Categories of Valves," stipulates that Category A valves are those valves with functions in which the closed valve seat leakage is limited to a specific amount. The leak test requirements for Category A valves are specified in Section XI, IWV-3420, "Valve Leak Rate Test."

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 NRR project manager.

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

Technical Contacts: Patricia Campbell, NRR
(301) 492-1311

Brian E. Holian, NRR
(301) 492-1344

Vern Hodge, NRR
(301) 492-1861

Attachments:

1. Figure 1. Partial ECCS Piping Diagram for the Palisades Plant
2. List of References
3. List of Recently Issued NRC Information Notices

Document Name: STOR TANK LKG

*SEE PREVIOUS CONCURRENCES

Concur subject to incorporation of comments.

RPB:PRPB	SRXB:DST	D/DOEA:NRR	
Cunningham	RCJones	CRossi	
08/06/91	08/23/91	08/ /91	
C/OGCB:DOEA:NRR*RPB:ADM		*ADRIII	*D/DRPW:NRR
CHBerlinger	TechEd	JZwolinski	BABoger
08/22/91	06/28/91	07/19/91	07/19/91
*OGCB:DOEA:NRR	*EMEB:DET:NRR	*C/EMEB:DET:NRR	*D/DET:NRR
CVHodge	PCampbell	JNorberg	JRichardson
07/11/91	07/11/91	07/11/91	07/10/91
			*D/PD3-1:DRPW:NRR
			LBMarsh
			07/18/91
			*PD3-1:DRPW:NRR
			BHolian
			07/15/91

of several utilities and has determined that similar conditions, with comparable consequences, may exist at other plant sites. In particular, valves with similar functions are not identified as Category A valves in inservice testing programs.

Inservice testing requirements are specified in 10 CFR 50.55a(g), which references the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. Subsection IWV-2200, "Categories of Valves," stipulates that Category A valves are those valves with functions in which the closed valve seat leakage is limited to a specific amount. The leak test requirements for Category A valves are specified in Section XI, IWV-3420, "Valve Leak Rate Test."

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 Office of Nuclear Reactor Regulation project manager.

Original Signed by
Charles E. Rossi

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

Technical contacts: Patricia Campbell, NRR
(301) 492-1311

Brian E. Holian, NRR
(301) 492-1344

Vern Hodge, NRR
(301) 492-1861

Attachments:

1. Figure 1. Partial ECCS Piping Diagram for the Palisades Plant
2. List of References
3. List of Recently Issued NRC Information Notices

*SEE PREVIOUS CONCURRENCES

*RPB:PRPB:NRR JCunningham 09/06/91	*SRXB:DST:NRR RCJones 08/23/91	D/DOEA-NRR CERossi 09/13/91		
*C/OGCB:DOEA:NRR CHBerlinger 08/22/91	*RPB:ADM TechEd 06/28/91	*ADRIII JZwolinski 07/19/91	*D/DRPW:NRR BABoger 07/19/91	*D/PD3-1:DRPW:NRR LBMarsh 07/18/91
*OGCB:DOEA:NRR CVHodge 07/11/91	*EMEB:DET:NRR PCampbell 07/11/91	*C/EMEB:DET:NRR JNorberg 07/11/91	*D/DET:NRR JRichardson 07/10/91	*PD3-1:DRPW:NRR BHolian 07/15/91

Document Name: IN 91-55

comparable consequences, may exist at other plant sites. In particular, 10 CFR 50.55a(g) references the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, IWV-2200, "Categories of Valves," which stipulates that Category A valves be used for those functions in which the closed valve seat leakage is limited. The leak test requirements for Category A valves are specified in Section XI, IWV-3420, "Valve Leak Rate Test."

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 NRR project manager.

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

Technical Contacts: Patricia Campbell, NRR
(301) 492-1311

Brian E. Holian, NRR
(301) 492-1344

Vern Hodge, NRR
(301) 492-1861

Attachments:

1. Figure 1. Partial ECCS Piping Diagram for the Palisades Plant
2. List of References
3. List of Recently Issued NRC Information Notices

Document Name: STOR TANK LKG

*SEE PREVIOUS CONCURRENCES

D/DOEA:NRR	C/OGCB:DOEA:NRR*RPB:ADM	D/DRPW:NRR	D/PD3-1:DRPW:NRR
CERossi	CHBerlinger	BABoyer	LBMarsh EC
07/ /91	07/ /91	07/19/91	for 07/18/91
OGCB:DOEA:NRR	EMEB:DET:NRR	C/EMEB:DET:NRR	D/DET:NRR
CVHodge	PCampbell	JNorberg	Richardson
07/11/91	07/11/91	07/11/91	07/10/91

ADRIII for
JZowlinski
7/19/91

Vern Hodge, NRR
(301) 492-1861

Attachments:

1. Figure 1. Partial ECCS Piping Diagram for the Palisades Plant
2. List of References
3. List of Recently Issued NRC Information Notices

Document Name: ~~STOR TANK LKG~~

D/DOEA:NRR	C/OGCB:DOEA:NRR	RPB:ADM	D/DRPW:NRR	D/PD3-1:DRPW:NRR
CERossi	CHBerlinger	TechEd <i>JMang</i>	BABoger	LBMarsh
06/ /91	06/ /91	06/21/91	06/ /91	06/ /91
OGCB:DOEA:NRR	EMEB:DET:NRR	C/EMEB:DET:NRR	D/DET:NRR	PD3-1:DRPW:NRR
CVHodge	PCampbell	JNorberg	JRichardson	BHolian
06/ /91	06/ /91	06/ /91	06/ /91	06/ /91