

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

June 1, 1990

NRC INFORMATION NOTICE NO. 90-39: RECENT PROBLEMS WITH SERVICE WATER SYSTEMS

Addressees:

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

Purpose:

This information notice is intended to alert addressees to potential problems resulting from the failure of service water systems to provide an adequate and reliable supply of cooling water to safety-related structures, systems, and components. 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.

Description of Circumstances:

On March 9, 1990, the licensee for the Clinton power plant reported problems with the distribution of flow in the essential service water system. The staff of the Nuclear Regulatory Commission (NRC) described those problems in Information Notice 90-26, "Inadequate Flow of Essential Service Water to Room Coolers and Heat Exchangers for Engineered Safety-Feature Systems." Recently, service water system problems have been identified at seven other nuclear power plants.

On March 14, 1990, while both units were at full power, the licensee for the Surry power plant performed a quarterly test on one of three diesel-driven emergency service water pumps. After the diesel engine failed to start, the licensee found that the dampers in the air supplies to all three engines were closed. The engines started immediately when the dampers were opened.

At the Peach Bottom power plant, the emergency service water system is shared by Units 2 and 3 and is supplied with water from the Susquehanna River. On March 2, 1990, the NRC staff completed a safety system functional inspection of the emergency service water system. The inspectors identified certain concerns related to the capability of the system to perform its intended function. In response, the licensee completed tests and an analysis of the system and concluded that the system was operable with Unit 3 at power while Unit 2 was in its scheduled mid-cycle outage with its emergency service water loads isolated. On March 21, 1990, the licensee reported that emergency service water flows to

9005240320 Z A

EDR-110

various Unit 2 components were inadequate for design basis conditions due to accumulations of silt and corrosion products in the emergency service water piping. Corrective actions by the licensee included inspection and cleaning of piping and heat exchangers, throttling of the flow to the emergency diesel generators to allow more flow to other components, and isolation of the flow to redundant Unit 2 room coolers for emergency core cooling systems again to allow more flow to other components. The licensee concluded that these actions assured the operability of the emergency service water system with both Units 2 and 3 in operation. An enhanced surveillance and test program for the emergency service water system was implemented pending completion of replacement of emergency service water piping for Unit 2 during the next refueling outage.

On March 23, 1990, while the River Bend power plant was in an outage, Region IV reported continuing service water problems at the plant. Use of acidic well water when the system was first filled resulted in severe corrosion problems. Water chemistry was corrected, and the acidic attack has stopped. However, microbiologically-induced corrosion has been present and is continuing. From ultrasonic measurements, the licensee believes that the pitting rate is 24 mils per year. The licensee plans to chemically clean the system or replace piping as necessary.

During December, 1988, the licensee for the Haddam Neck power plant found that the flow of service water to all four of the containment air coolers was unacceptably low. The low flow was caused by a uniform buildup of silt and corrosion products in the tubes of the coolers. After the licensee cleaned the tubes, the flow increased by approximately 50 percent. On March 26, 1990, during the current refueling outage, the licensee found that service water flow to one of the two emergency diesel generators was less than the manufacturer's recommended value and that the heat removal rate for all of the containment air coolers was several percent less than the value assumed in the accident analysis for the plant. The licensee intends to correct these problems before returning to power.

In June, 1989, during a self-initiated assessment of the service water system, the licensee for the Farley power plant identified a potential design inadequacy concerning the flow of service water to safety-related loads during certain accident scenarios. The licensee reported the potential inadequacy and implemented compensatory measures pending further evaluation. On March 27, 1990, the licensee reported that their evaluation confirmed that during the accident scenarios, service water flow to some safety-related loads would not be adequate without operator action. The licensee has revised procedures as necessary to alert operators to the need for action if such events were to occur.

The Perry power plant has three emergency diesel generators and three service water pumps for Unit 1. The pumps take suction on the forebay which receives lake water through two traveling trash screens which are installed in parallel. On April 3, 1990, Unit 1 was operating at full power when a gasket failed on the discharge strainer for emergency service water pump A. Water spraying from the strainer wetted several components including a control power transformer and the motors for traveling screen A and screen wash pump A. Emergency service water pump A and the emergency diesel generator that it cools were


declared inoperable. Further, screen wash pump B had been technically inoperable since November, 1989, pending delivery and installation of parts. However, emergency service water pump B was operating and screen B was clear.

At the Fitzpatrick power plant, on April 11, 1990, while the unit was in a refueling outage, the licensee reported that silt had been found in check valves in emergency service water lines to the seal coolers for two pumps in the residual heat removal system. The licensee concluded that the silt could have prevented the residual heat removal system from fulfilling its safety function.

Discussion:

On July 18, 1989, the NRC staff issued Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," to all holders of operating licenses and construction permits for nuclear power plants. The letter addressed continuing problems with service water systems in meeting the requirements of General Design Criteria 44, 45, and 46 in Appendix A of 10 CFR 50 and Section XI, "Test Control," in Appendix B of 10 CFR 50. On April 4, 1990, the NRC staff issued Supplement 1 to the generic letter. The supplement contains questions from the industry that were posed during workshops held in Philadelphia, Atlanta, Chicago, and Denver and the answers that were provided by representatives of the NRC.

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: Roger W. Woodruff, NRR  
(301) 492-1180

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
90-38	Requirements for Processing Financial Assurance Submittals for Decommissioning	5/29/90	All fuel facility and materials licensees.
90-37	Sheared Pinion Gear-to-Shaft Keys in Limitorque Motor Actuators	5/24/90	All holders of OLs or CPs for nuclear power reactors.
90-36	Apparent Falsification of State of Connecticut Weight Certificates	5/24/90	All holders of OLs or CPs for nuclear power reactors, and 10 CFR 70 licensees.
90-35	Transportation of Type A Quantities of Non-Fissile Radioactive Materials	5/24/90	All U.S. NRC licensees.
90-34	Response to False Siren Activations	5/10/90	All holders of OLs or CPs for nuclear power reactors.
90-33	Sources of Unexpected Occupational Radiation Exposures at Spent Fuel Pools	5/9/90	All holders of OLs or CPs for nuclear power reactors.
90-32	Surface Crack and Subsurface Indications in the Head of A Reactor Vessel Head	5/3/90	All holders of OLs or CPs for nuclear power reactors.
90-31	Update on Waste Form and High Integrity Container Topical Report Review Status, Identification of Problems with Cement Solidification, and Reporting of Waste Mishaps	5/4/90	All holders of OLs or CPs for nuclear power reactors, fuel cycle licensees, and certain by-product materials licensees.
90-30	Ultrasonic Inspection Techniques for Dissimilar Metal Welds	5/1/90	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
CP = Construction Permit

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE, \$300

FIRST CLASS MAIL  
POSTAGE & FEES PAID  
USNRC  
PERMIT No. G-57

declared inoperable. Further, screen wash pump B had been technically inoperable since November, 1989, pending delivery and installation of parts. However, emergency service water pump B was operating and screen B was clear.

At the Fitzpatrick power plant, on April 11, 1990, while the unit was in a refueling outage, the licensee reported that silt had been found in check valves in emergency service water lines to the seal coolers for two pumps in the residual heat removal system. The licensee concluded that the silt could have prevented the residual heat removal system from fulfilling its safety function.

Discussion:

On July 18, 1989, the NRC staff issued Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," to all holders of operating licenses and construction permits for nuclear power plants. The letter addressed continuing problems with service water systems in meeting the requirements of General Design Criteria 44, 45, and 46 in Appendix A of 10 CFR 50 and Section XI, "Test Control," in Appendix B of 10 CFR 50. On April 4, 1990, the NRC staff issued Supplement 1 to the generic letter. The supplement contains questions from the industry that were posed during workshops held in Philadelphia, Atlanta, Chicago, and Denver and the answers that were provided by representatives of the NRC.

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.

Original Signed by  
Charles E. Rossi

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

Technical Contact: Roger W. Woodruff, NRR  
(301) 492-1180

Attachment: List of Recently Issued NRC Information Notices

Document Name: IN 90-39

\*SEE PREVIOUS CONCURRENCES

EAB:NRR*	TECH ED*	EAB:NRR*	PM:PD11:NRR*	PM:PD12:NRR*	PM:PD14:NRR*
RWoodruff	JMain	PBaranowsky	DLaBarge	GSuh	AWang
5/15/90	5/16/90	5/21/90	5/17/90	5/17/90	5/17/90
PM:PD21:NRR*	PM:PD22:NRR*	PM:PD33:NRR*	PM:PD4:NRR*	PM:PD4:NRR*	C:SPLB:NRR*
SHoffman	BBuckley	TColburn	PO'Connor	WPaulson	CMcCracken
5/17/90	5/16/90	5/17/90	5/16/90	5/17/90	5/18/90
C:EAB:NRR*	C:OGCB:NRR*	D:DOEA:NRR*			
DFischer	CBerlinger	ERossi			
5/21/90	5/23/90	5/23/90			

declared inoperable. Further, screen wash pump B had been technically inoperable since November, 1989, pending delivery and installation of parts. However, emergency service water pump B was operating and screen B was clear.

At the Fitzpatrick power plant, on April 11, 1990, while the unit was in a refueling outage, the licensee reported that silt had been found in check valves in emergency service water lines to the seal coolers for two pumps in the residual heat removal system. The licensee concluded that the silt could have prevented the residual heat removal system from fulfilling its safety function.

Discussion:

On July 18, 1989, the NRC staff issued Generic Letter 89-13 to all holders of operating licenses and construction permits for nuclear power plants. The letter addressed continuing problems with service water systems in meeting the requirements of General Design Criteria 44, 45, and 46 in Appendix A of 10 CFR 50 and Section XI, "Test Control," in Appendix B of 10 CFR 50. On April 4, 1990, NRC issued Supplement 1 to the generic letter. The supplement contains questions from the industry that were posed during workshops held in Philadelphia, Atlanta, Chicago, and Denver and the answers that were provided by representatives of the NRC.

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: Roger W. Woodruff, NRR  
(301) 492-1180

Attachment: List of Recently Issued NRC Information Notices

Document Name: IN - WOODRUFF

CONCURRENCE: \* See previous copy for concurrences

EAB:NRR* RWoodruff 5/15/90	TECH ED* JMain 5/16/90	EAB:NRR* PBaranowsky 5/21/90	PM:PD11:NRR* DLaBarge 5/17/90	PM:PD12:NRR* GSuh 5/17/90	PM:PD14:NRR* AWang 5/17/90
PM:PD21:NRR* SHoffman 5/17/90	PM:PD22:NRR* BBuckley 5/16/90	PM:PD33:NRR* TColburn 5/17/90	PM:PD4:NRR* PO'Connor 5/16/90	PM:PD4:NRR* WPaulson 5/17/90	C:SPLB:NRR* CMcCracken 5/18/90
C:EAB:NRR* DFischer 5/21/90	C:O&CB:NRR CBerlinger 5/23/90	D:DOEA:NRR CERossi 5/ /90			

311a.in

parts. However, emergency service water pump B was operating and screen B was clear.

At the Fitzpatrick power plant, on April 11, 1990, while the unit was in a refueling outage, the licensee reported that silt had been found in check valves in emergency service water lines to the seal coolers for two pumps in the residual heat removal system. The licensee concluded that the silt could have prevented the residual heat removal system from fulfilling its safety function.

Discussion:

On July 18, 1989, the NRC staff issued Generic Letter 89-13 to all holders of operating licenses and construction permits for nuclear power plants. The letter addressed continuing problems with service water systems in meeting the requirements of General Design Criteria 44, 45, and 46 in Appendix A of 10 CFR 50 and Section XI, "Test Control," in Appendix B of 10 CFR 50. On April 4, 1990, NRC issued Supplement 1 to the generic letter. The supplement contains questions from the industry that were posed during workshops held in Philadelphia, Atlanta, Chicago, and Denver and the answers that were provided by representatives of the NRC.

This information notice requires no specific action or written response. If you have 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: Roger W. Woodruff, NRR  
(301) 492-1180

Attachment: List of Recently Issued NRC Information Notices

CONCURRENCE: \* See previous copy for concurrences

EAB:NRR*	TECH ED*	EAB:NRR	PM:PD11:NRR*	PM:PD12:NRR*	PM:PD14:NRR*
RWoodruff	JMain	PBaranowsky	DLaBarge	GSuh	AWang
5/ /90	5/ /90	5/21/90	5/ /90	5/ /90	5/ /90
PM:PD21:NRR*	PM:PD22:NRR*	PM:PD33:NRR*	PM:PD4:NRR*	PM:PD4:NRR*	C:SPLB:NRR
SHoffman	BBuckley	TColburn	PO'Connor	WPaulson	CMcCracken
5/ /90	5/ /90	5/ /90	5/ /90	5/ /90	5/18/90
C-EAB:NRR	C:OGCB:NRR	D:DOEA:NRR			
DEscher	CBerlinger	CERossi			
5/1/90	5/ /90	5/ /90			

~~the recent refueling outage at the Cooper power plant, the licensee was doing maintenance on the outlet valve for the RHR heat exchanger. On April 3, 1990, a loose lead on the temperature control valve for the reactor equipment cooling heat exchanger caused the valve to open. As a result, 2000 gallons of service water was spilled in the reactor building.~~

At the Fitzpartick power plant, on April 11, 1990, while the unit was in a refueling outage, the licensee reported that silt had been found in check valves in ESW lines to the seal coolers for two pumps in the RHR system. The licensee concluded that the silt could have prevented the RHR system from fulfilling its safety function.

Discussion:

On July 18, 1989, the NRC staff issued Generic Letter 89-13 to all holders of operating licenses and construction permits for nuclear power plants. The letter addressed continuing problems with service water systems in meeting the requirements of General Design Criteria 44, 45, and 46 in Appendix A of 10 CFR 50 and Section XI, "Test Control," in Appendix B of 10 CFR 50. On April 4, 1990, NRC issued Supplement 1 to the generic letter. The supplement contains questions from the industry that were posed during workshops held in Philadelphia, Atlanta, Chicago, and Denver and the answers that were provided by representatives of the NRC.

This information notice requires no specific action or written response. If you have 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: Roger W. Woodruff, NRR  
 (301) 492-1180

Attachment: List of Recently Issued NRC Information Notices

CONCURRENCE:

EAB:NRR RWoodruff 5/15/90	TECH ED JMain 5/16/90	EAB:NRR PBaranowsky 5/ /90	PM:PD11:NRR LaBarge 5/17/90	PM:PD12:NRR GSuh 5/17/90	PM:PD14:NRR AWang 5/17/90
PM:PD21:NRR SHoffman 5/17/90	PM:PD22:NRR EBuckley 5/16/90	PM:PD33:NRR TColburn 5/17/90	PM:PD4:NRR PO'Connor 5/16/90	PM:PD4:NRR WFlavison 5/17/90	C:SPLB:NRR McCracken 5/ /90
C:EAB:NRR PBaranowsky 5/ /90	C:OGCB:NRR CBerlinger 5/ /90	D:DOEA:NRR CERossi 5/ /90			

*The Cooper event is not appropriate for inclusion in this notice. It does not illustrate a service water generic problem, only a spill that impacted the SW system.*