

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

November 21, 1989

**NRC INFORMATION NOTICE NO. 89-77: DEBRIS IN CONTAINMENT EMERGENCY SUMPS
AND INCORRECT SCREEN CONFIGURATIONS**

Addressees:

All holders of operating licenses or construction permits for pressurized water reactors (PWRs).

Purpose:

This information notice is intended to alert addressees to potential problems resulting from inadequate housekeeping and insufficient surveillance of containment emergency recirculation sumps. 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:

During the recovery period after a loss-of-coolant accident, following injection of emergency coolant from the refueling water storage tank, water is collected within the containment emergency recirculation sump to be pumped back into the reactor coolant system. The emergency sump structures are designed to provide for a continuous flow of water to the recirculation pumps by preventing the entry of air or debris, thereby protecting the recirculation pumps from damage due to loss of net positive suction head or entrained solid material. To provide guidance for sump designs, the NRC staff issued Regulatory Guide 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident," dated June 1974, which was revised in November 1985. Regulatory Guide 1.82 emphasizes the need for inservice inspection of emergency core cooling sump components, including debris interceptors, vortex suppressors, and sump outlets. The staff also expressed the need for emergency sumps to be protected from debris in Standard Review Plan 6.2.2 and Generic Letter 85-22, "Potential for Loss of Post-LOCA Recirculation Capability Due to Insulation Debris Blockage." PWR standard technical specifications and the technical specifications of many plants require visual inspection of the containment emergency sump and verification that the suction inlets to the recirculation pumps are not restricted by debris. Sump components, including trash racks and screens, must also be inspected. The surveillance interval is typically 18 months.

On June 16, 1988, following a recirculation flow verification test, loose parts and debris were found in the containment sump, the recirculation pumps, and the suction piping of Surry Units 1 and 2. Some of the items were large enough to

8911150013 **ZA**

JDR-11C

have caused pump damage or flow degradation. In addition, some of the sump screens were found to have gaps, which could have allowed additional loose material to enter the sump. One screen was found to be missing. Following investigation of the event by the licensee and the NRC staff, the licensee incorporated sump surveillance requirements similar to those of PWR standard technical specifications into their plant procedures. The NRC issued a notice of violation and proposed imposition of a \$50,000 civil penalty.

On July 8, 1989, the licensee for the Trojan facility discovered numerous items in the containment sump. The NRC was informed of this condition on July 12, 1989. On July 14, 1989, after containment had been closed out, an NRC inspector and the licensee found additional debris. On July 17, 1989, the top sump screen and portions of the inner screen were found to be missing. On July 19, 1989, the NRC identified additional missing and damaged inner sump screens. Debris had previously been found in the Trojan sump during a 1988 outage. In 1980, a residual heat removal pump was jammed by a welding rod between the impeller and the casing ring demonstrating the potential safety significance of loose debris in the containment emergency sump. The Trojan Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. The licensee's inspection procedures for the containment emergency sump did not have adequate inspection criteria. The NRC issued a notice of violation and proposed imposition of a \$280,000 fine for a severity level II violation.

As a result of the problems identified at the Trojan facility, the NRC resident inspector recently performed an inspection of the Diablo Canyon sump and sump screens, including a comparison of the design drawing to the actual arrangement of the sump screens. Debris was found in the Unit 1 and Unit 2 sumps, and the sump screen arrangement on the design drawing was found to be incorrect. The sump screens were not configured in accordance with the FSAR drawing. The Diablo Canyon Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. Initial findings indicate that plant procedures for sump inspection were not sufficient or detailed enough to assure adequate inspections.

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: Walton Jensen, NRR
(301) 492-1190

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-76	Biofouling Agent: Zebra Mussel	11/21/89	All holders of OLs or CPs for nuclear power reactors.
89-75	Falsification of Welder Qualifications for Contractor Employees	11/20/89	All holders of OLs or CPs for nuclear power reactors.
89-74	Clarification of Transportation Requirements Applicable to Return of Spent Radiopharmacy Dosages from Users to Suppliers	11/7/89	All manufacturers and distributors of radiopharmaceuticals for medical use, nuclear pharmacies, and medical licensees.
89-73	Potential Overpressurization of Low Pressure Systems	11/1/89	All holders of OLs or CPs for nuclear power reactors.
89-72	Failure of Licensed Senior Operators to Classify Emergency Events Properly	10/24/89	All holders of OLs or CPs for nuclear power reactors.
89-71	Diversion of the Residual Heat Removal Pump Seal Cooling Water Flow During Recirculation Operation Following a Loss-of-Coolant Accident	10/19/89	All holders of OLs or CPs for nuclear power reactors.
89-70	Possible Indications of Misrepresented Vendor Products	10/11/89	All holders of OLs or CPs for nuclear power reactors.
89-69	Loss of Thermal Margin Caused by Channel Box Bow	9/29/89	All holders of OLs or CPs for BWRs.
89-68	Evaluation of Instrument Setpoints During Modifications	9/25/89	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
 CP = Construction Permit

have caused pump damage or flow degradation. In addition, some of the sump screens were found to have gaps, which could have allowed additional loose material to enter the sump. One screen was found to be missing. Following investigation of the event by the licensee and the NRC staff, the licensee incorporated sump surveillance requirements similar to those of PWR standard technical specifications into their plant procedures. The NRC issued a notice of violation and proposed imposition of a \$50,000 civil penalty.

On July 8, 1989, the licensee for the Trojan facility discovered numerous items in the containment sump. The NRC was informed of this condition on July 12, 1989. On July 14, 1989, after containment had been closed out, an NRC inspector and the licensee found additional debris. On July 17, 1989, the top sump screen and portions of the inner screen were found to be missing. On July 19, 1989, the NRC identified additional missing and damaged inner sump screens. Debris had previously been found in the Trojan sump during a 1988 outage. In 1980, a residual heat removal pump was jammed by a welding rod between the impeller and the casing ring demonstrating the potential safety significance of loose debris in the containment emergency sump. The Trojan Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. The licensee's inspection procedures for the containment emergency sump did not have adequate inspection criteria. The NRC issued a notice of violation and proposed imposition of a \$280,000 fine for a severity level II violation.

As a result of the problems identified at the Trojan facility, the NRC resident inspector recently performed an inspection of the Diablo Canyon sump and sump screens, including a comparison of the design drawing to the actual arrangement of the sump screens. Debris was found in the Unit 1 and Unit 2 sumps, and the sump screen arrangement on the design drawing was found to be incorrect. The sump screens were not configured in accordance with the FSAR drawing. The Diablo Canyon Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. Initial findings indicate that plant procedures for sump inspection were not sufficient or detailed enough to assure adequate inspections.

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: Walton Jensen, NRR
(301) 492-1190

Attachment: List of Recently Issued NRC Information Notices

*SEE PREVIOUS PAGE FOR CONCURRENCE

EAB:NRR	EAB:NRR	TECH:EDITOR	OE	RP:RII	C:RP:RV
*WJensen:db	RLobel	*	*JLieberman	*PFrederickson	*MMendonca
11/1/89	11/8/89	11/1/89	11/8/89	11/8/89	11/8/89

*C:EAB:NRR	*C:OGCB:NRR
CJHaughney	CHBerlinger
11/9/89	11/9/89

D:DOEA-NRR
CERossi
11/19/89

On June 16, 1988, following a recirculation flow verification test, loose parts and debris were found in the containment sump, the recirculation pumps, and the suction piping of Surry Units 1 and 2. Some of the items were large enough to have caused pump damage or flow degradation. In addition, some of the sump screens were found to have gaps, which could have allowed additional loose material to enter the sump. One screen was found to be missing. Following investigation of the event by the licensee and the NRC staff, the licensee incorporated sump surveillance requirements similar to those of PWR standard technical specifications into their plant procedures. The NRC issued a notice of violation and proposed imposition of a \$50,000 civil penalty.

On July 8, 1989, the licensee for the Trojan facility discovered numerous items in the containment sump. The NRC was informed of this condition on July 12, 1989. On July 14, 1989, after containment had been closed out, an NRC inspector and the licensee found additional debris. On July 17, 1989, the top sump screen and portions of the inner screen were found to be missing. On July 19, 1989, the NRC identified additional missing and damaged inner sump screens. Debris had previously been found in the Trojan sump during a 1988 outage. In 1980, a residual heat removal pump was jammed by a welding rod between the impeller and the casing ring demonstrating the potential safety significance of loose debris in the containment emergency sump. The Trojan Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. The licensee's inspection procedures for the containment emergency sump did not have adequate inspection criteria. The NRC issued a notice of violation and proposed imposition of a \$280,000 fine for a severity level II violation.

As a result of the problems identified at the Trojan facility, the NRC resident inspector performed an inspection on October 17, 1989, of the Diablo Canyon Unit 1 sump and sump screens, including a comparison of the design drawing to the actual arrangement of the sump screens. Debris was found in the Unit 1 and Unit 2 sumps, and the sump screen arrangement on the design drawing was found to be incorrect. The Unit 1 sump screens were not configured in accordance with the FSAR drawing. The Diablo Canyon Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. Initial findings indicate that plant procedures for sump inspection were not sufficient or detailed to assure adequate inspections.

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: Walton Jensen, NRR
(301) 492-1190

Attachment: List of Recently Issued NRC Information Notices

EAB:NRR	EAB:NRR	TECH:EDITOR	NRR/OE	RP:RII	C:RP:RV
*WJensen:db	RLobel	*	JLieberman	PFrederickson	*MMendonca
/89	/89	/89	/89	/89	/89
WJensen	C:OGCB:NRR	D:DOEA:NRR			
11/19/89	CHBerlinger	CERossi			
	11/19/89	11/19/89			

WJensen

On June 16, 1988, following a recirculation flow verification test, loose parts and debris were found in the containment sump, the recirculation pumps, and the suction piping of Surry Units 1 and 2. Some of the items were large enough to have caused pump damage or flow degradation. In addition, some of the sump screens were found to have gaps, which could have allowed additional loose material to enter the sump. One screen was found to be missing. Following investigation of the event by the licensee and the NRC staff, the licensee incorporated sump surveillance requirements similar to those of PWR standard technical specifications into their plant procedures.

On July 8, 1989, the licensee for the Trojan facility discovered numerous items in the containment sump. The NRC was informed of this on July 12, 1989. On July 14, 1989, after containment had been closed out, an NRC inspector and the licensee found additional debris. On July 17, 1989, the top sump screen and portions of the inner screen were found to be missing. On July 19, 1989, the NRC identified additional missing and damaged inner sump screens. Debris had previously been found in the Trojan sump during a 1988 outage. In 1980, a residual heat removal pump was jammed by a welding rod between the impeller and the casing ring demonstrating the potential safety significance of loose debris in the containment emergency sump. The Trojan Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. The licensee's inspection procedures for the containment emergency sump did not have adequate inspection criteria. The NRC issued a notice of violation and proposed imposition of a \$280,000 fine for a severity level II violation.

As a result of the problems identified at the Trojan facility, the NRC resident inspector performed an inspection on October 17, 1989, of the Diablo Canyon Unit 1 sump and sump screens, including a comparison of the design drawing to the actual arrangement of the sump screens. Debris was found in the Unit 1 and Unit 2 sumps, and the sump screen arrangement on the design drawing was found to be incorrect. The Unit 1 sump screens were not configured in accordance with the FSAR drawing, and the Unit 2 sump screens were. The Diablo Canyon Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. Initial findings indicate that plant procedures for sump inspection were not sufficient or detailed to assure adequate inspections.

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: Walton Jensen, NRR
(301) 492-1190

Attachment: ^{RL} List of Recently Issued NRC Information Notices

EAB:NRR	EAB:NRR	TECH:EDITOR	NRR/OE	RP:RLI	C:RP:RV
*WJensen:db	RLobe1	*	JLieberman	PFredrickson	*MMendonca
/ /89	11/8 /89	/ /89	11/17/89	11/18/89	11/18/89
C:EAB:NRR	C:OGCB:NRR	D:DOEA:NRR			
CJHaughney	CHBerlinger	CERossi			
/ /89	/ /89	/ /89			

sump. The Trojan Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens. The NRC issued a notice of violation and proposed imposition of a \$280,000 fine for a severity level II violation.

As a result of the problems identified at the Trojan facility the NRC resident inspector performed an inspection of the Diablo Canyon Unit 1 sump and sump screens, including a comparison of the design drawing to the actual arrangement of the sump screens. Debris was found in the sump, and the design drawing was incorrect regarding the sump screen arrangement. The Unit 1 sump screens were arranged correctly, but the Unit 2 sump screens were not. The Unit 2 screen arrangement followed the specifications in the erroneous design drawing. The Diablo Canyon Technical Specifications contain periodic inspection requirements for the containment emergency sump and sump screens.

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

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

Technical Contact: Walton Jensen, NRR
(301) 492-1190

Attachment: List of Recently Issued NRC Information Notices

EAB:NRR	EAB:NRR	TECH. EDITOR	RP:RII	C:RP:RV
<i>WJensen</i> :db	RLobel	<i>Caluse</i>	P. Frederickson	R. Zimmerman
11/10/89	1/89	11/11/89	1/89	1/89
C:EAB:NRR	C:OGCB:NRR	D:DOEA:NRR		
CJHaughney	CHBerlinger	CERossi		
1/89	1/89	1/89		