

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

September 22, 1992

NRC INFORMATION NOTICE 92-69: WATER LEAKAGE FROM YARD AREA THROUGH
CONDUITS INTO BUILDINGS

Addressees

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

Purpose

The U.S. Nuclear Regulatory Commission is issuing this information notice to alert addressees to problems resulting from large amounts of water leaking into the reactor building through electrical conduits. 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

On November 19, 1991, following a thunderstorm, the licensee for the Grand Gulf Nuclear Station observed a significant amount of rain water entering the auxiliary building through electrical conduits. Most of the leakage was from around one conduit cover plate; a number of other conduit cover plates were dripping water. The conduits originated in a large manhole located in the adjacent yard area through which the licensee had routed many electric cables by way of an underground conduit. The licensee found that the sump pump in this manhole was not operating, probably because of heavy rainfall on the circuit box, which tripped the circuit breaker for the pump. Water then collected in the manhole and flowed through the conduits which were routed into the auxiliary building. These conduits were to have internal seals near the wall of the auxiliary building and upstream of the leaking conduit cover plates. The licensee found that some seals were below or downstream of the conduit cover plates. Water that leaked from the conduits collected on the floor, ran through a doorway into the division I switchgear room, and passed through floor drains to the radwaste collection tank. About 30,000 gallons of water collected in these tanks. Water marks indicated the maximum water level on the floor was about 1 inch. No safety systems were affected.

On December 22, 1991, a 36-inch fiberglass auxiliary circulating water line failed at the Perry Nuclear Power Plant. The failure was in a non-isolable section located in a yard area above grade just before the line enters the heater bay building. An estimated 2.9 million gallons of water was pumped out of the break. A small percentage of this amount entered the auxiliary

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building, the heater bay, the service water pump house, and the emergency service water (ESW) pump house. Two electrical manholes had previously leaked during rains and were not designed to be leak tight against standing water. Conduits in these manholes formed a direct path into the buildings where the cables enter. In particular, water entered the ESW pump house through a series of conduits and ran down a cable into a compartment of a motor control center (MCC), causing a short circuit in a space heater transformer. This MCC also contained safety-related equipment, which was not damaged.

Discussion

In both instances, large quantities of water entered buildings and areas within the buildings that contain safety-related equipment. The leak path through yard manholes and connecting electrical conduits was not explicitly considered in the safety analysis. At Grand Gulf, although seals installed in manholes and conduits were not required to be leak tight against water intrusion, the licensee found them to be deficient with respect to a design drawing. These conduits were sealed. The licensee for Perry also sealed the conduits. The licensees did not inspect seals or perform tests that would detect the absence or deterioration of installed seals.

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 Office of Nuclear Reactor Regulation (NRR) project manager.


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

Technical contact: J. Carter, NRR
(301) 504-1153

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-29, Supp. 1	Deficiencies Identified During Electrical Distribution System Functional Inspections	09/14/92	All holders of OLs or CPs for nuclear power reactors.
92-68	Potentially Substandard Slip-On, Welding Neck, and Blind Flanges	09/10/92	All holders of OLs or CPs for nuclear power reactors.
92-67	Deficiency in Design Modifications to Address Failures of Hiller Actuators Upon A Gradual Loss of Air Pressure	09/10/92	All holders of OLs or CPs for nuclear power reactors.
92-66	Access Denied to NRC Inspectors at Five Star Products, Inc. and Construction Products Research, Fairfield, Connecticut	09/01/92	All holders of OLs or CPs for nuclear power reactors and all recipients of NUREG-0040, "Licensee, Contractor and Vendor Inspection Status Report" (White Book).
92-65	Safety System Problems Caused by Modifications That Were Not Adequately Reviewed and Tested	09/03/92	All holders of OLs or CPs for nuclear power reactors.
92-64	Nozzle Ring Settings on Low Pressure Water-Relief Valves	08/28/92	All holders of OLs or CPs for nuclear power reactors.
92-63	Cracked Insulators in ASL Dry Type Transformers Manufactured by Westinghouse Electric Corporation	08/26/92	All holders of OLs or CPs for nuclear power reactors.
92-62	Emergency Response Information Requirements for Radioactive Material Shipments	08/24/92	All U.S. Nuclear Regulatory Commission licensees.

OL = Operating License
 CP = Construction Permit

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Discussion

In both instances, large quantities of water entered buildings and areas within the buildings that contain safety-related equipment. The leak path through yard manholes and connecting electrical conduits was not explicitly considered in the safety analysis. At Grand Gulf, although seals installed in manholes and conduits were not required to be leak tight against water intrusion, the licensee found them to be deficient with respect to a design drawing. These conduits were sealed. The licensee for Perry also sealed the conduits. The licensees did not inspect seals or perform tests that would detect the absence or deterioration of installed seals.

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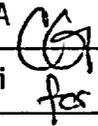
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*SEE PREVIOUS CONCURRENCES

OFC	OEAB:DOEA	ADM:RPB	SC/OEAB:DOEA	PD3-3:ADR3
NAME	JCarter*	JMain*	RDennig*	JHall*
DATE	07/01/92	07/06/92	07/13/92	07/09/92

OFC	PD4-1:ADR4-5	C/OEAB:DOEA	C/OGCB:DOEA	D/DOEA 
NAME	PO'Connor*	AChaffee*	GHMarcus*	CRossi 
DATE	07/09/92	07/13/92	09/15/92	09/17/92

Conduits in these manholes formed a direct path into the buildings where the cables enter. In particular, water entered the ESW pump house through a series of conduits and ran down a cable into a compartment of a motor control center (MCC), causing a short circuit in a space heater transformer. This MCC also contained safety-related equipment, which was not damaged. Corrective actions included sealing conduits to preclude future leakage.

Discussion

In both instances, large quantities of water entered buildings and areas within the buildings that contain safety-related equipment. The leak path through yard manholes and connecting electrical conduits was not explicitly considered in the safety analysis. At Grand Gulf, although seals installed in manholes and conduits were not required to be leak tight against water intrusion, the licensee found them to be deficient with respect to a design drawing. These conduits were sealed. The licensee for Perry also sealed the conduits. The licensees did not inspect seals or perform tests that would detect the absence or deterioration of installed seals.

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DATE	07/01/92	07/06/92	07/13/92	07/09/92

OFC	PD4-1:ADR4-5	C/OEAB:DOEA	C/OGCB:DOEA	D/DOEA
NAME	PO'Connor*	AChaffee*	<i>G. Marcus</i> GPerlinger	CRossi <i>CR</i>
DATE	07/09/92	07/13/92	9/15/92	/ /92

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Discussion

In both instances, large quantities of water entered buildings and areas within the buildings that contain safety-related equipment. The leak path through yard manholes and connecting electrical conduits was not explicitly considered in the safety analysis. The licensees apparently did not inspect all seals installed during construction. Any seals installed in manholes and conduits were not required to be leak tight against water intrusion. The licensees do not routinely inspect seals and do not perform any tests that would detect the absence or deterioration of installed seals.

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NAME	PO'Connor*	AChaffee	CBerlinger	CRossi
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entered the (ESW) pump house through a series of conduits and ran down a cable into a compartment of a motor control center (MCC), causing a space heater transformer to short. This MCC also contained safety related equipment which, however, was not damaged. Corrective actions included sealing conduits to preclude future leakage.

Discussion

In both instances large quantities of water entered buildings and areas within the buildings that contain safety related equipment. The leak path, ie., via yard manholes and connecting electrical conduits, was not explicitly considered in the safety analysis. Inspection of seals installed during construction does not appear to have been comprehensive. Any seals installed in manholes and conduits were not required to be leak tight against water intrusion. The seals are not routinely inspected nor is any testing done that would detect the absence or deterioration of installed seals.

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NAME	JCarter	JMain gm	RDennig	JHa11 JLA
DATE	7/1/92	7/6/92	/ /92	7/9/92

OFC	PD4-1:ADR4-5	C/OEAB:DOEA	C/OGCB:DOEA	D/DOEA
NAME	PO'Connor <i>PO'Connor</i>	AChaffee	CBerlinger	CRossi
DATE	7/9/92	/ /92	/ /92	/ /92