

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

September 4, 1991

NRC INFORMATION NOTICE 91-53: FAILURE OF REMOTE SHUTDOWN SYSTEM  
INSTRUMENTATION BECAUSE OF INCORRECTLY  
INSTALLED COMPONENTS

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 an event where the remote shutdown system at a nuclear power plant could have failed to perform certain functions because associated components were installed incorrectly. It is expected that licensees 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 May 18, 1991, Entergy Operations, Inc., the licensee for the Waterford Steam Electric Station, performed post-modification testing on a main steam isolation valve (MSIV) at the Waterford 3 reactor with the reactor in Mode 5. The testing included closing the subject valve using fire isolation switch FR-4 in the auxiliary relay room to ensure that the control wiring changes on the MSIV did not affect the function of the switch. If the control room is evacuated because of a fire, the switch is to be used to isolate control circuits for the MSIV and several other components from the control room and to ensure that power is supplied to the components to maintain them in the desired position. When the switch was operated, it travelled past the isolation position, allowing two of the adjacent make-before-break contacts to connect, which shorted the positive contact of one circuit to the negative contact of another circuit. The short circuit caused the power supply breaker for the switch to trip, but the switch was severely damaged by smoke and fire. The licensee quickly extinguished the fire. While replacing the switch, the licensee determined that stop screws that should have been installed when the switch was installed were missing. This allowed the switch to rotate past the intended stopping position. The licensee replaced the failed switch and successfully tested the replacement. The switch is a multideck rotary switch manufactured by Electrosch. The licensee determined that the stop screws

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were supplied with the switch, but installation instructions did not specify that the stop screws be installed in this application. The licensee inspected several other isolation switches in adjacent panels and found another switch with missing stop screws. Further information may be found in NRC Inspection Report 50-382/91-18.

### Discussion

Fire in certain plant areas such as the control room or the cable spreading room can affect the ability to achieve safe shutdown of the plant from the control room. In addition, the control room can become inaccessible for reasons other than a fire. These situations warrant the use of a remote shutdown system to achieve safe shutdown of the plant from a remote shutdown panel or emergency control stations that are independent of the control room. The remote shutdown system includes switches to isolate the control circuits of required safe shutdown equipment from the control room and to transfer controls to either the remote shutdown panel or emergency control stations. Therefore, licensees provide required instrumentation and controls for the remote shutdown system in accordance with the requirements of General Design Criterion (GDC) 19 of Appendix A and Appendix R to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50). The significance of the problem described above is that the remote shutdown capability for the plant may be compromised if the control circuits and transfer switches (for shutdown equipment) fail because they are installed incorrectly. If these switches fail, certain instrumentation and control functions for the remote shutdown system may be lost.

Licensees may not recognize that stop screws have not been installed in the fire isolation (transfer) switches unless the operator challenges the mechanical stops of these switches. Although the switches were tested for MSIV operability during pre-operational testing at Waterford, the effectiveness of the mechanical stops of these switches was apparently never tested.

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, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

Technical contacts: T. Chandrasekaran, NRR  
301-492-0859

C. Douth, NRR  
301-492-0847

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

| Information<br>Notice No. | Subject   | Date of<br>Issuance | Issued to  |
|---------------------------|---|---------------------|--|
| 91-52                     | Nonconservative Errors<br>In Overtemperature Delta-<br>Temperature (OTΔT) Set-<br>point Caused by Improper<br>Gain Settings                               | 08/29/91            | All holders of OLs or CPs<br>for Westinghouse (W)-designed<br>nuclear power reactors.  |
| 86-14,<br>Supp. 2         | Overspeed Trips of AFW,<br>HPCI and RCIC Turbines   | 08/26/91            | All holders of OLs or CPs<br>for nuclear power reactors.   |
| 91-51                     | Inadequate Fuse Control<br>Programs   | 08/20/91            | All holders of OLs or CPs<br>for nuclear power reactors.   |
| 91-50                     | A Review of Water Hammer<br>Events After 1985   | 08/20/91            | All holders of OLs or CPs<br>for nuclear power reactors.   |
| 91-49                     | Enforcement of Safety<br>Requirements for Radiog-<br>raphers  | 08/15/91            | All Nuclear Regulatory Com-<br>mission (NRC) licensees<br>authorized to use sealed<br>sources for industrial<br>radiography. |
| 91-48                     | False Certificates of Con-<br>formance Provided by West-<br>inghouse Electric Supply<br>Company for Refurbished Com-<br>mercial-Grade Circuit<br>Breakers | 08/09/91            | All holders of OLs or CPs<br>for nuclear power reactors.   |
| 91-47                     | Failure of Thermo-Lag<br>Fire Barrier Material to<br>Pass Fire Endurance Test   | 08/06/91            | All holders of OLs or CPs<br>for nuclear power reactors.   |
| 89-56,<br>Supp. 2         | Questionable Certification<br>of Material Supplied to<br>the Defense Department by<br>Nuclear Suppliers   | 07/19/91            | All holders of OLs or CPs<br>for nuclear power reactors.   |
| 91-46                     | Degradation of Emergency<br>Diesel Generator Fuel Oil<br>Delivery Systems   | 07/18/91            | All holders of OLs or CPs<br>for nuclear power reactors.   |

OL = Operating License  
CP = Construction Permit