

Date: Mon, 01 Mar 1999 12:41:27 -0600  
From: Meredith Brown <racer@lanl.gov>  
Subject: Blue Alert: Fire Damper Installation and Maintenance Testing

Connie Arnwine, 423-241-3134 ORNL Lessons Learned Program

\*\*\*\*\*  
OFFICIAL USE ONLY

**TITLE: Inadequate Installation and Post-Maintenance Testing Instructions for Fire Fusible Link Actuated Fire Dampers**

IDENTIFIER: B-1999-OR-LMERX10-0301 DATE: March 1, 1999

**LESSONS LEARNED STATEMENT:** The process of installing new or replacement equipment should include steps to verify the equipment operates within its design/functional requirements after the installation is complete.

**DISCUSSION:** Two safety-related battery rooms are located adjacent to each other and are separated by a fire wall having two fire doors, each door having a self-actuating louver system. The louvers are normally open to equalize air pressure between the two rooms in the event of a tornado. The louvers close in the event of a fire in either room. This action is actuated by spring pressure that is normally restrained by a temperature sensitive fusible link. The doors and their installed louvers systems are built and tested to National Fire Protection Association (NFPA) and Underwriters Laboratory (UL) standards.

Both of these fire door louvers were new and had been installed approximately 10 days. These new louvers were installed as part of corrective actions for a previous occurrence (ORO-ORNL-X10HFIR-1998-021) where the fusible link in one of the louvers had failed and the louver had closed. During rounds, a plant operator noted that west unit of the two newly installed louvers was in the closed position. The condition was reported to the Shift Supervisor. A work package was prepared to replace the west louver with a spare. After removal of west louver, inspection revealed that its frame was slightly bent, causing the closure mechanism to bind in the channel frame. This indicated that the screws used to mount the louver frame to the door had been over-tightened, distorting the frame. This, in turn, prevented satisfactory operation of the vanes. When the mounting screws were adjusted, the louvers operated correctly. The screws on the east louver unit were also adjusted to ensure operability of its vanes. Operability was determined by manually opening and closing the louver vanes using a small louver handle at the bottom of the frame.

**ANALYSIS:** The vanes on the west louver unit could not be moved easily due to over-tightening of the mounting screws. This was attributed to inadequate installation instructions from the louver manufacturer. The installation instructions from the manufacturer were contained in the work package, but did not provide any caution regarding tension of the mounting screws except for the statement, "tighten the phillips head screws by hand." These instructions were not complete enough to assure

successful installation of the louvers. The post maintenance test in the work package for installation of the new louvers should have included an open and close operability test after installation. This was not done because the installation personnel understood the safety function for the louvers was to be open in the event of a tornado and that the fusible link was correctly installed such that fire barrier criteria was met. The louvers were exercised prior to their installation and were found to operate correctly. However, after installed, the binding resulted in a condition where closure of the louver could not be assured had a real demand been present. It could not be determined by inspection why the west louver closed after it was initially installed. The fusible link was found to be intact.

**RESOLUTION/RECOMMENDED ACTIONS:**

1. Identify fire louvers and dampers in safety-related or life-safety applications.
2. Inspect identified dampers to assure their installation was proper and there is no binding of the vanes that would prevent their proper operation.
3. Preparers of work package instructions for installation of repaired, new, or replacement equipment should provide a comprehensive and unambiguous set of instructions focused on assuring the installation process itself does not degrade the equipment or render it inoperable.
4. Preparers of work package instructions should have a complete understanding of all operability requirements for the equipment being installed and should require post maintenance testing instructions which assure these requirements are being met.

ORIGINATOR: W. F. Barnes, 423-574-8484, Lockheed Martin Energy Research Corporation

VALIDATOR: M. A. Linn, 423-574-4617 Lockheed Martin Energy Research Corporation

CONTACT: Connie Arnwine, 423-241-3134, ORNL Lessons Learned Program

PRIORITY DESCRIPTOR: Blue / Information

DOE Functional Category: Fire Protection

LMER Functional Category: Fire Protection

KEYWORDS: installation, post-maintenance testing, fire dampers, fire louvers, fusible link

REFERENCES: ORO--ORNL-X10HFIR-1998-0031

**FOLLOW-UP ACTION:** Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report, please notify Connie Arnwine at 423-241-3134 or e-mail a93@ornl.gov of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.