

State of Nebraska  
Department of Health and Human Services (DHHS)  
Radioactive Materials Program

October 14, 2009

IN-2009-NE-01: DHHS RADIOACTIVE MATERIALS PROGRAM INFORMATION NOTICE:  
PERFORMANCE OF REQUIRED SHUTTER CHECKS AND REPORTING OF  
GAUGE SHUTTER FAILURES

**ADDRESSEES**

All DHHS Radioactive Materials Program specific and general fixed gauge materials licensees.

**PURPOSE**

The DHHS Radioactive Materials Program is issuing this Information Notice to alert fixed gauge specific and general licensees about the potential for the failure of shutter closure mechanisms on fixed gauges and the requirements for reporting these events to the DHHS Radioactive Materials Program. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar incidents. Recommendations contained in this Information Notice are not new DHHS Radioactive Materials Program requirements; therefore, neither specific action nor written response is required. Information herein is based upon an Information Notice issued by the State of Ohio in December 2008.

**DESCRIPTION OF CIRCUMSTANCES**

Since 1990, NRC received numerous reports of fixed gauge shutter closure failures occurring during shutter closure checks performed by licensees. The initial reports indicated that the failures of the shutter open/close mechanisms were sudden and unexpected and most resulted in the inability of the licensee to close the shutter on the device. In addition, most of these reports indicated a breakage of some part of the shutter closure mechanism. An investigation of the circumstances surrounding these events indicated several contributing factors:

1. The devices were typically operating in harsh environments with the presence of grit, dust, and other foreign materials which could get into the shutter operating mechanism or otherwise interfere with the movement of the shutter during operation.
2. Previous shutter checks performed prior to the reported failure may have indicated "sticking" or "binding" of the shutter during closure, although the licensee was eventually able to get the shutter closed and reopened.
3. Periodic shutter mechanism checks were not always conducted by licensees as required, were sometimes neglected over a prolonged period of time, and the result was a buildup of foreign material or corrosion within the device and a stuck or frozen shutter which could not be closed. During the investigation of the reported shutter failures, it was also noted that additional mechanical means, such as a pry-bar or hammer, were sometimes used to attempt to move a stuck shutter operating mechanism. Furthermore, Ohio's investigation revealed that many additional similar events had occurred involving fixed gauges, but were not reported as required. These incidents were identified through service and maintenance reports from manufacturers and service providers.

## **DISCUSSION**

Fixed gauges containing licensed radioactive materials are used by specific and general licensees in a wide variety of manufacturing and processing operations to measure parameters such as flow rates, thickness, density, or volume. The shutter on a fixed gauge is a safety feature designed to eliminate or significantly reduce the radiation levels at the opening of a fixed gauge when the shutter is in the closed position. Additionally, shutter closure is necessary to allow licensee or service personnel to perform certain operations or maintenance activities on or near the gauge. Therefore, the inability to close the shutter, due to the presence of corrosion or foreign materials, breakage of the closure mechanism, or some other cause, is considered by DHHS Radioactive Materials Program to be a failure of equipment to operate as designed and for which there is no redundant equipment to perform the required safety function. As such, a DHHS Radioactive Materials Program licensee which possesses a fixed gauge with a shutter that cannot be closed is required to notify DHHS Radioactive Materials Program within twenty-four hours of any such incident, in accordance with 180 NAC 3-026.02. In addition, the licensee is required to follow-up the initial report within 30 days with a written report describing the circumstances which led to the shutter failure and the corrective actions taken. The 30-day follow-up report is required by 180 NAC 3-026.03.

Fixed gauges routinely operate in a continuous mode with the shutter open, exposing the radioactive source inside. A shutter closure check is a periodic maintenance activity to be performed by licensees possessing fixed gauges in accordance with the procedures included in the manufacturer's instructions. The requirement for DHHS Radioactive Materials Program fixed gauge licensees to conduct these checks is found in 180 NAC 3-008.04, item 3.b. for general licensees, and by license condition for specific licensees. Licensees are required to document that the checks have been performed. The typical timeframe for conducting a shutter check is every six months.

Licensees should promptly contact the manufacturer or other licensed service provider for guidance on necessary maintenance or service and whenever the gauge requires repair. At no time should the licensee attempt to apply additional force or pressure to the closure mechanism through the use of pry bars, hammers, or other mechanical means. Use of such methods is prohibited and may cause damage to or breakage of the operating handle or the bolts used in assembly of the device.

DHHS Radioactive Materials Program fixed gauge licensees are advised that DHHS Radioactive Materials Program will place additional emphasis during future inspections on licensee performance of required shutter checks, documentation of the checks, and reporting of equipment failures such as those described in this Information Notice.

## **CONTACTS**

This Information Notice requires no specific licensee action or response. If you have any questions about the information in this notice, please contact one of the technical contacts below:

Bryan Miller, Health Physicist  
DHHS Radioactive Materials Program  
(402) 471-6444  
bryan.miller@nebraska.gov

Jim DeFrain, Health Physicist  
DHHS Radioactive Materials Program  
(402) 471-0171  
jim.defrain@nebraska.gov

Howard Shuman, Health Physicist  
DHHS Radioactive Materials Program  
(402) 471-0304  
howard.shuman@nebraska.gov