

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
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NRC INFORMATION NOTICE 2005-01: HALON FIRE-EXTINGUISHING SYSTEM PIPING
INCORRECTLY CONNECTED

ADDRESSEES

All holders of operating licenses for nuclear reactors (except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel), research and test reactors, and fuel cycle facilities.

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to inform addressees of the potential generic issue of incorrectly connected piping in the halon fire-extinguishing systems. 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 January 12, 2005, the Callaway and Wolf Creek licensees notified the NRC Operations Center (Event Notifications 41326 and 41327) of incorrectly connected piping in the halon fire-extinguishing systems at both facilities. The piping to the manual-pneumatic actuators in the halon systems protecting safety-related equipment was found to be reversed. The licensees implemented compensatory measures until the actuation piping was reconnected in the proper configuration.

After reviewing the above events and as a result of being questioned by NRC inspectors, the licensees of other nuclear power reactors checked the condition of the halon systems at their facilities. Several licensees also found discrepancies in the configuration of the halon systems.

DISCUSSION

The halon fire-extinguishing system is used at many nuclear facilities to protect plant equipment and rooms from the effects of a fire. Halon extinguishes the fire by interfering with the combustion chemical reaction. A typical halon system has a bottle or series of bottles to deliver the appropriate amount of gas to extinguish a fire. During the actuation sequence, the opening of the manual-pneumatic actuator allows bottle pressure to pressurize the pilot manifold. Pressurization of the pilot manifold causes the bottle cylinder valve or valves (for multi-bottle systems) to open and allows the flow of halon into the distribution manifold and into the protected enclosure.

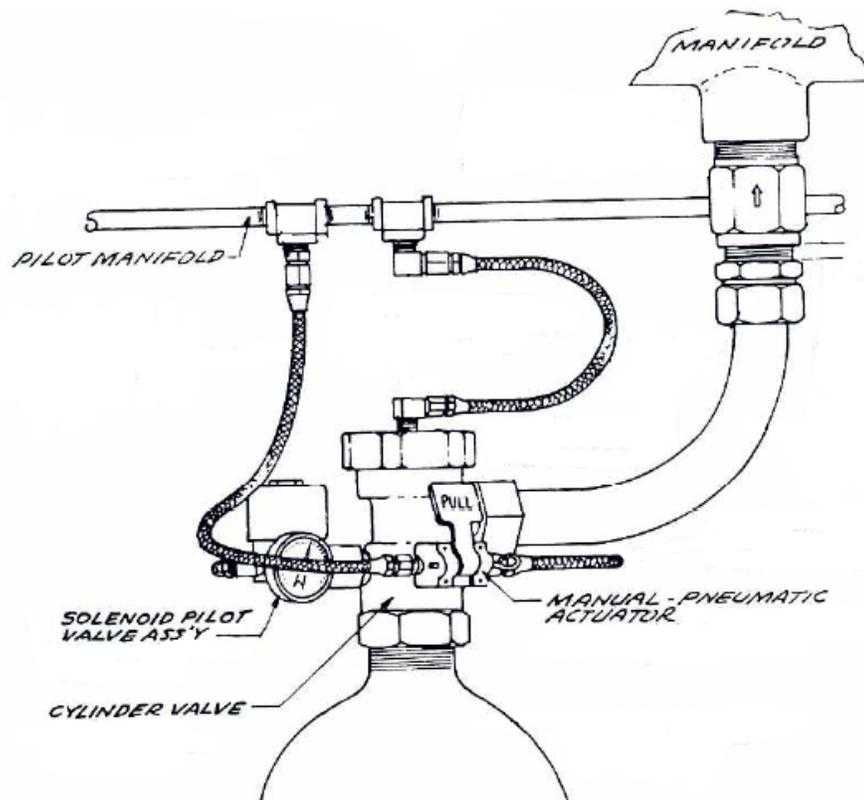
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Typically, each of the manual-pneumatic actuators have ports marked A and B, (see Figure 1). The ports have specific requirements for connection to the pilot manifold (from port A) and to the solenoid pilot valve assembly (from port B). In the improper configurations recently identified, the actuation piping to ports A and B was reversed. Figure 2 is a diagram of a correctly configured actuator.

Figure 1 - Manual-Pneumatic Actuator



Figure 2 - Diagram of Actuator Setup



Improper configurations of the halon fire-extinguishing system could have adverse effects on the system. The Callaway and Wolf Creek licensees contacted the vendor (Chemetron) to assist in the assessment of the halon system with the piping to the actuator reversed. On January 26, 2005, an NRC fire protection specialist observed the vendor perform a series of tests with the actuator piped in both the correct and reversed configuration. With the piping to the actuator reversed and based on the internal non-symmetric construction of the actuator, there was an approximate 2-second delay in the opening of the cylinder valve. This would result in a 2-second delay in the delivery of halon gas to the affected equipment.

GENERIC IMPLICATIONS

Based on the above discussion, both carbon dioxide and halon fire-extinguishing systems that are not properly configured have the potential to impact the extinguishing capability of the system. Thorough inspection of the systems and adequate postmaintenance testing procedures can help to ensure that the systems are properly configured.

CONTACT

This information notice requires no specific action or written response. Please direct any questions about this matter to the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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Note: NRC generic communications may be found on the NRC public website, <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.