

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

June 10, 1991

NRC INFORMATION NOTICE NO. 91-37: COMPRESSED GAS CYLINDER MISSILE HAZARDS

Addressees:

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

Purpose:

This information notice is intended to alert addressees to an event involving Halon surveillance testing which resulted in an uncontrolled acceleration of the Halon gas cylinder. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On February 26, 1991, biannual surveillance testing of the services building Halon fire suppression system was being performed at the River Bend Station (RBS) in order to verify the Halon content of each of the fire suppression system cylinders. The H-250 cylinders, which are nominally 3 feet long and 16 inches in diameter, are pressurized to 350 psig with 190 pounds of Halon and weigh about 350 pounds when fully charged.

The technicians performing the surveillance disconnected a Halon cylinder from the fire suppression system, removed the cylinder from its rack, and transported the cylinder to the service building restroom/shower area for weighing. At the weighing station, the technicians removed peripheral fittings from the Halon cylinder as required by the surveillance procedure so an accurate weight measurement of the cylinder and its contents could be obtained. While removing these fittings, a technician incorrectly removed one fitting which vented the cylinder valve and caused the cylinder valve to open. The contents of the Halon cylinder rapidly discharged to the atmosphere, causing the Halon cylinder to become an uncontrolled projectile.

Two technicians were injured, one seriously, as a result of this mishap and extensive damage was caused in the shower and restroom area where the work was being done. For example, gouges were made in the tile of a shower wall, ceramic tile was knocked off a concrete floor leaving a two inch deep gouge in the concrete, tiles were knocked off a suspended ceiling, and a hole (approximately one foot square) was made in a six-inch cinder block wall.

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The licensee reviewed the circumstances surrounding this event and determined that the surveillance was not properly conducted. First, after the cylinder had been disconnected from the fire suppression system, the technicians failed to install the anti-recoil plug in the cylinder valve outlet port. Installation of this anti-recoil plug would have prevented the rapid release of Halon that occurred. Second, the fitting that was removed which vented the cylinder valve and caused the cylinder valve to open was a Schraeder valve, which should have been left installed. The surveillance procedure was not very detailed, however, and reliance was placed on the qualifications and training of the individuals performing the surveillance.

Discussion:

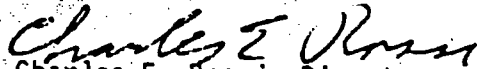
The event that occurred at RBS fortunately did not result in any damage to safety-related equipment. However, compressed gas cylinders are typically located throughout the plant in both safety-related and nonsafety-related areas, and different circumstances could easily have resulted in extensive damage to safety-related equipment. For example, the control room cabinets at RBS contain small spherical Halon cylinders which are subjected to the same biannual surveillance testing as the services building Halon cylinders previously described. The spherical Halon cylinders are pressurized to 360 psig with 25 pounds of Halon and weigh about 50 pounds when fully charged. An uncontrolled acceleration of one of these cylinders in the control room could cause serious injury to control room personnel and significant damage to safety-related equipment located in the control room.

NUREG/CR-3551, "Safety Implications Associated with In-Plant Pressurized Gas Storage and Distribution Systems in Nuclear Power Plants," May 1985 provides additional information related to this topic and cautions that portable compressed gas cylinders can pose a significant missile hazard if not properly controlled. Portable compressed gas cylinders are used throughout nuclear power plants to provide, for example, fire suppression agents, breathing air, nitrogen and hydrogen for instrument calibration and surveillance testing purposes, and gases for various welding applications.

Factors that contributed to the event that occurred at RBS include inadequate procedures and inadequate training and qualification of the technicians performing the surveillance. The licensee provided additional training to individuals who perform maintenance and surveillance on compressed gas cylinders, and additional details were included in the maintenance and surveillance procedures to avoid future mishaps of this nature.

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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 NRR project manager.


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Office of Nuclear Reactor Regulation

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Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-36	Nuclear Plant Staff Working Hours	06/10/91	All holders of OLs or CPs for nuclear power reactors.
91-35	Labeling Requirements for Transporting Multi-Hazard Radioactive Materials	06/07/91	All U.S. Nuclear Regulatory Commission (NRC) licensees.
91-34	Potential Problems in Identifying Causes of Emergency Diesel Generator Malfunctions	06/03/91	All holders of OLs or CPs for nuclear power reactors.
91-33	Reactor Safety Information for States During Exercises and Emergencies	05/31/91	All holders of OLs or CPs for nuclear power reactors.
91-32	Possible Flaws in Certain Piping Systems Fabricated by Associated Piping and Engineering	05/15/91	All holders of OLs or CPs for nuclear power reactors.
91-31	Nonconforming Magnesium Magnetic Particle (14AR) Prepared Bath	05/09/91	All holders of OLs or CPs for nuclear power reactors.
91-30	Inadequate Calibration of Thermoluminescent Dosimeters Utilized to Monitor Extremity Dose at Uranium Processing and Fabrication Facilities	04/23/91	All fuel cycle licensees and other licensees routinely handling unshielded uranium materials.
86-21, Supp. 2	Recognition of American Society of Mechanical Engineers Accreditation Program for N Stamp Holders	04/16/91	All holders of OLs or CPs for nuclear power reactors and all recipients of NUREG-0040, "Licensed Contractor and Vendor Inspection Status Report" (White Book).

OL = Operating License
CP = Construction Permit

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