

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
WASHINGTON, D.C. 20555

March 30, 1989

**NRC INFORMATION NOTICE NO. 89-35: LOSS AND THEFT OF UNSECURED LICENSED MATERIAL**

Addressees:

All U.S. Nuclear Regulatory Commission (NRC) byproduct, source and special nuclear material licensees.

Purpose:

This notice is intended to alert recipients to the circumstances leading to loss of licensed materials at several licensed institutions. It is expected that licensees will review this information for applicability to their own procedures for controlling access to licensed materials, distribute the notice to members of the radiation safety staff, and consider actions, if appropriate, to preclude similar situations from occurring at their facilities. However, suggestions contained in this notice do not constitute any new NRC requirements, and no written response is required.

Description of Circumstances:

The following selected cases are used to illustrate losses and thefts of unsecured material.

**Case 1:** In November 1988, a hospital received a one-curie gadolinium-153 sealed source for installation into a diagnostic device. The device containing the source was temporarily stored in the hospital's nuclear medicine laboratory. When the technician returned on another day to retrieve and install the sealed source, the sealed source and its shipping container were missing. Subsequent investigation revealed that the nuclear medicine laboratory was frequently left unlocked and unsecured during the day. In addition, housekeeping staff who had keys to the nuclear medicine laboratory had not been given specific instructions on recognition of radioactive materials in storage or the precautions to take when entering areas where radioactive materials were stored. The sealed source was never found. The hospital's corrective actions included the installation of automatic door closers and push button locks for daytime control, and separate key-controlled locks for off-hour access, with keys issued to a limited number of nuclear medicine department personnel. Further, housekeeping staff members were trained to recognize radiation postings and shipping labels and instructed in actions to take when containers or packages bearing these labels were encountered.

**Case 2:** In August 1988, a nuclear medicine technologist at another hospital discovered that an older set of dose calibrator reference sources had been substituted for the current, higher-activity reference sources. Investigation revealed that the missing reference sources had been stored in a routinely locked nuclear medicine laboratory, and that the substituted reference sources had been stored in a separate locked area. Further investigation revealed a large staff turnover in the preceding year, and no firm policy for key return by the hospital. Corrective actions included immediately changing locks and establishing a policy that an employee's final paycheck would be withheld until all keys were returned or accounted for. The sources in question were never found.

**Case 3:** In May 1988, there were two cases where radioactive material at an academic research laboratory had been inadvertently placed in normal trash, and subsequently buried in a municipal sanitary landfill. In the first instance, 500 microcuries of phosphorus-32 that had been delivered to a research laboratory was discarded to normal trash. In the second instance, less than one microcurie each of tritium, carbon-14, and iodine-125 were removed from a research laboratory by a custodian and placed in clean trash and also ended up in a sanitary landfill. Because these examples were repetitive violations from a previous inspection, NRC assessed a civil penalty of \$1,125 against the licensee.

**Case 4:** In July 1988, the radiation safety staff at yet another institution determined that a 0.8-millicurie cesium-137 sealed source was missing during an inventory of sealed sources. The source had last been seen when the manufacturer's service engineers had undertaken maintenance of a Positron Emission Tomography (PET) imaging device. Despite extensive inquiries, searches, and widespread publicity in the local community, and within the hospital, the sealed source was never found. NRC inspections prompted certain corrective actions, such as the adoption of a policy requiring individuals to sign for radioactive sources taken from storage and to assume personal responsibility for their return.

**Case 5:** In July 1988, a researcher at the same institution as in Case 4 above left a package containing 10 millicuries of sulfur-35 in an unsecured storage area generally accessible to any person in the research building. The radioactive material disappeared and was never found. Corrective actions included retraining and notifying principal investigators of their responsibilities for radioactive material in their possession, and developing an extensive training program for housekeeping staff members on how to recognize radiation postings and shipping labels, and what to do if containers or packages bearing these labels were encountered.

**Case 6:** In May 1988, an industrial licensee lost a moisture-density gauge containing 40 millicuries of americium-241 and 8.3 millicuries of cesium-137. The gauge had been loaded into a pickup truck. It is believed that the loss occurred when the truck tailgate fell open, and the bottom of the transport

case and gauge came apart from the top of the case. A part of the transport case was found at the intersection of two roads. The licensee's radiation safety officer notified NRC, the County Sheriff's Department, and the State Department of Emergency Services and Transportation. Sixty to one-hundred people were searching the area by nightfall. The licensee also notified the local TV and radio stations and local newspaper. The County Sheriff's Department found the gauge the following day about five miles from where it was believed to be lost.

NRC considered escalated enforcement action and a civil penalty for this case, but determined that it was not warranted because the licensee took immediate and exemplary action in reporting the event, attempting to determine the whereabouts of the lost gauge, and in implementing corrective actions to prevent recurrence.

Case 7: While processing a request for termination of activities in November 1988, NRC learned that the licensee had improperly conveyed ownership of two nuclear weigh scales, containing about 200 millicuries of cesium-137 each, to a non-licensee, in February 1988. Afterwards, the licensee relinquished responsibility for, and control of, the material. The non-licensee acknowledged that the nuclear devices were part of a purchase agreement, but denied ever taking physical possession of the devices. Though both parties denied any knowledge of what actually happened to the devices, it is apparent that the nuclear weigh scales were dispositioned in some unknown manner during this period and are currently missing. NRC and the licensee have performed extensive radiological surveys, searches, and inquiries regarding the possible disposition of these devices. To date, all efforts to locate the devices or the installed radioactive sources have been unsuccessful.

#### Discussion:

All licensees are reminded of the importance of assuring that access to licensed radioactive material is controlled. The theft or loss of licensed radioactive material has the potential for causing unnecessary exposures of employees and members of the public. For example, sealed sources in Mexico and Brazil which were not properly stored and accounted for caused life-threatening exposures of individuals, and widespread contamination of property. In other cases, lost sources have been hidden under beds, carried in pockets, etc., resulting in the unnecessary exposure of these individuals.

Title 10, Code of Federal Regulations, Part 19, Section 19.12, "Instructions to workers requires that all individuals working in or frequenting any portion of a restricted area shall be kept informed of the storage, transfer, or use of radioactive materials....". Section 20.207 of 10 CFR Part 20, "Storage and Control of Licensed Material in Unrestricted Areas", requires that such material be secured from unauthorized removal, and that materials not in storage in an unrestricted area be under the constant surveillance and immediate control of the licensee.

Control of access to restricted areas must be sufficient to prevent inadvertent entry by unauthorized or unescorted individuals. Training of ancillary personnel authorized for controlled access to restricted areas should be reviewed to assure that the training is sufficient to permit personnel to identify radioactive materials and to take appropriate precautions. If activities require that licensed materials be used or stored in unrestricted areas, licensees are required to maintain immediate control and constant surveillance of the materials or to secure the materials against unauthorized removal. In addition, licensees should review systems for key control, locking of rooms, and internal transfers of licensed material, to assure they are also effective enough to prevent unauthorized removal of the material.

No written response is required by this information notice. If you have any questions about this matter, please contact the appropriate regional office or this office.



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Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
90-09	Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees.	02/05/90	All holders of NRC materials licenses.
90-01*	Importance of Proper Response to Self-Identified Violations by Licensees	01/12/90	All holders of NRC materials licenses.
89-85	EPA's Interim Final Rule on Medical Waste Tracking and Management	12/15/89	All medical, academic, industrial, waste broker, and waste disposal site licensees.
89-82	Recent Safety-Related Incidents at Large Irradiators	12/07/89	All U.S. NRC licensees authorized to possess and use sealed sources at large irradiators.
89-78	Failure of Packing Nuts on One-Inch Uranium Hexafluoride Cylinder Valves	11/22/89	All U.S. NRC licensees authorized to possess and use source material and/or special nuclear material for the heating, emptying, filling, or shipping of uranium hexafluoride in 30- and 48-inch diameter cylinders.
89-60	Maintenance of Teletherapy Units	08/18/89	All U.S. NRC Medical Teletherapy Licensees.
89-47	Potential Problems with Worn or Distorted Hose Clamps on Self-Contained Breathing Apparatus	05/18/89	All holders of operating licenses or construction permits for nuclear power reactors and fuel facilities.

\*Correct Number for 90-01 should be 90010145

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
90-13	Importance of Review and Analysis of Safeguards Event Logs	3/5/90	All holders of OLs or CPs for nuclear power reactors.
90-12	Monitoring or Interruption of Plant Communications	2/28/90	All holders of OLs or CPs for nuclear power reactors.
90-11	Maintenance Deficiency Associated with Solenoid-Operated Valves	2/28/90	All holders of OLs or CPs for nuclear power reactors.
90-10	Primary Water Stress Corrosion Cracking (PWSCC) of Inconel 600	2/23/90	All holders of OLs or CPs for PWRs.
90-09	Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees	2/5/90	All holders of NRC materials licenses.
88-30, Supp. 1	Target Rock Two-Stage SRV Setpoint Drift Update	2/2/90	All holders of OLs or CPs for nuclear power reactors.
90-08	Kr-85 Hazards from Decayed Fuel	2/1/90	All holders of OLs or CPs for nuclear power reactors and holders of licenses for permanently shut-down facilities with fuel on site.
88-23, Supp. 2	Potential for Gas Binding of High-Pressure Safety Injection Pumps During a Loss-of-Coolant Accident	1/31/90	All holders of OLs or CPs for PWRs.

OL = Operating License  
 CP = Construction Permit