



DEPARTMENT OF THE NAVY

NAVY ENVIRONMENTAL HEALTH CENTER

2510 WALMER AVENUE

NORFOLK, VIRGINIA 23513-2617

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10 May 90

From: Commanding Officer, Navy Environmental Health Center
To: Distribution List

Subj: NUCLEAR REGULATORY COMMISSION INFORMATION NOTICE NO. 90-14 ACCIDENTAL
DISPOSAL OF RADIOACTIVE MATERIALS

Encl: (1) NRC Information Notice No. 90-14

1. Enclosure (1) is forwarded for your information. You should discuss this notice with appropriate personnel and at your next Radiation Safety Committee meeting.
2. Recommend that you review your radiation safety program to assure that all radioactive material is properly secured against unauthorized removal, and that workers are properly trained in proper safety procedures.
3. Point of contact is LCDR G. I. Snyder, MSC, USN at AUTOVON: 564-4657, Commercial: (804) 444-4657, Ext. 266.


P. J. DURFEE
By direction

Distribution:

| | |
|---|--|
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Subj: INFORMATION CONCERNING THE NAVY RADIOACTIVE MATERIAL PERMIT (NRMP)
PROGRAM

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Copy to:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555

March 6, 1990

NRC INFORMATION NOTICE NO. 90-14: ACCIDENTAL DISPOSAL OF RADIOACTIVE
MATERIALS

Addressees: All U.S. Nuclear Regulatory Commission (NRC) Byproduct Materials Licensees.

Purpose:

This information notice (IN) alerts licensees to recent cases where unauthorized, accidental disposal of radioactive material has occurred, and of the need to avoid storing radioactive materials in places where the materials could inadvertently be disposed of in an unauthorized manner (e.g., unauthorized land burial, incineration, or removal to unrestricted areas). Licensees should review this information for applicability to their programs, distribute it to appropriate personnel and consider actions, as appropriate, to preclude these events from occurring at their facilities. Information contained in this notice does not constitute new NRC requirements.

Description of Circumstances:

Licensees were previously informed of the importance of assuring that access to licensed radioactive material is controlled (IN 89-35, "Loss and Theft of Unsecured Licensed Material," attached.) The following additional cases are examples of events that have occurred since IN 89-35 was issued.

CASE 1. Accidental Incineration of Iodine-131

A licensee reported that radioactive trash containing approximately 1 millicurie of iodine-131 (used for a medical procedure) was removed from a hospital patient's room and incinerated with non-radioactive waste. A follow-up inspection determined that the incinerated material was iodine-131, and that there was a lack of proper training among licensee personnel.

CASE 2. Incineration of Iodine-125 Brachytherapy Seeds

A licensee's Radiation Safety Officer informed the NRC of the apparent loss of control of four iodine-125 seeds, approximately one millicurie of activity each. Twenty seeds had been implanted in a patient in a hospital operating room during a cancer treatment. The surgical materials, coverings, and waste materials were not surveyed, but were put in the infectious waste trash.

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ENCLOSURE (1)

Later, x-rays were taken of the patient's implant site, revealing that only 16 of the 20 seeds were in place. The licensee concluded that the four seeds were incinerated. The manufacturer of the seeds stated that intense heat from burning would break down the titanium capsule that covered the seeds.

CASE 3. Loss of Two Industrial Gauges Containing Strontium-90 Sources

A licensee reported that two density measurement gauges had been inadvertently transferred from its facility to a scrap metal processor. Searches at the scrap dealer failed to locate the devices. The gauges each contained a 13-millicurie strontium-90 sealed source. One gauge was subsequently located by NRC inspectors. NRC imposed a civil penalty for the first lost source, and licensee is still looking for the remaining source.

CASE 4. Loss of a 40-Microcurie Cesium-137 Sealed Source

A licensee reported the loss of a 40 microcurie cesium-137 sealed reference source (part of a liquid scintillation counter) that had been sent inadvertently to a scrap-yard for disposal. The source has not been found.

CASE 5. Lost Density Level Gauge

A licensee informed an NRC regional office that it was unable to locate a generally licensed density gauge, which it previously possessed, despite an on-going intensive search. The gauge contained 50 millicuries of cesium-137, and has not been found.

CASE 6. Steel Furnace Melts Cesium Source

An Agreement State notified the NRC that a cesium-137 source had been inadvertently melted by a steel mill. The mill reported to the State that an outgoing rail shipment of furnace flue dust tripped the plant's radiation monitors. Surveys by a consultant and by a State inspector found radiation levels up to 1 mr/hr on the sides of the railcars. Analysis of samples identified the contaminant as cesium-137.

The NRC is aware of 15 cases, since 1983, of accidental smelting of radioactive sources. Eleven have occurred in the United States. Cesium-137 and cobalt-60 are the primary sources of contamination. In response, many scrapyards and dealers have installed radiation detectors to monitor incoming scrap. In 1986, NRC issued a hazardous scrap warning poster that has been distributed to the ferrous and non-ferrous metal industry.

Discussion:

IN 89-35, "Loss and Theft of Unsecured Licensed Material", issued in March, 1989, reminded licensees of the importance of assuring that access to licensed radioactive material is controlled. This notice cites recent examples of loss of radioactive materials, and indicates that many licensees did not take sufficient actions to address this problem when IN 89-35 was issued.

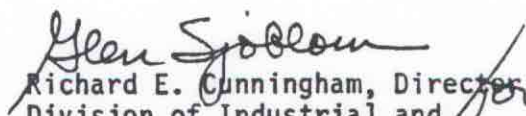


Licenses should review systems for control of licensed material and routinely instruct employees in the actions needed to assure control of licensed material. Particular attention should be paid to instructing workers who may only come in contact with licensed material on an occasional basis, since several of the cited losses were due, in part, to the failure of employees to recognize or appropriately handle licensed material.

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 materials 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.

Licenses are reminded of the importance of ensuring that access to licensed radioactive material is controlled as required by NRC regulations. The incineration, burial, or damage of licensed radioactive material has the potential for causing unnecessary exposures of employees and members of the public. Severe penalties can be imposed for failure to control access to licensed material as required by the NRC regulations. It is suggested that licenses review their programs to assure that all radioactive material is properly secured against unauthorized removal, and that workers are properly trained in proper safety procedures.

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.


Richard E. Cunningham, Director
Division of Industrial and
Medical Nuclear Safety, NMSS

Technical Contact: Jack R. Metzger, NMSS
(301) 492-3424

Attachments:

1. IN 89-35, Loss and Theft of
Unsecured Licensed Material
2. List of Recently Issued NMSS Information Notices
3. List of Recently Issued NRC Information Notices



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.



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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.

Richard E. Cunningham

Richard E. Cunningham, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical Contact: Jack Metzger, NMSS
(301) 492-3424

Attachments:

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

