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

March 3, 1994

NRC INFORMATION NOTICE 94-16: RECENT INCIDENTS RESULTING IN OFFSITE CONTAMINATION

Addressees

All U.S. Nuclear Regulatory Commission material and fuel cycle licensees.

Purpose

NRC is issuing this information notice to alert licensees of recent contamination incidents and their root causes. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, information contained in this notice does not constitute a new requirement, and no specific action nor written response is required.

Description of Circumstances

Recently, NRC responded to three radioactive material contamination incidents, which resulted in contamination of both individuals and personal property, both on and off the licensees' property, and which required access to the contaminated areas to be restricted for more than 24 hours. Two of the cases summarized below occurred at large universities and one occurred at a large medical facility. All have resulted in escalated enforcement actions involving fines.

Case 1: The licensee notified NRC that a contamination event involving phosphorus-32 (P-32) had occurred at the facility, contaminating several floors of a research building. A graduate student, working on the weekend, using P-32, accidentally and unknowingly contaminated the floor of the laboratory with 3.7 to 18.5 megabecquerels (100 to 500 microcuries) of the material. He failed to survey himself or the laboratory before leaving, as required by the licensee's procedures. His actions resulted in the widespread contamination of the laboratory building and of private residences, clothing, and vehicles. The licensee reported the event after it was clear that the research building decontamination work was going to extend beyond 24 hours, and that the facility would have to remain restricted. In the licensee's verbal report, it assured NRC that the contamination was confined to the research building. NRC dispatched a special inspection team to the site, and in the process of conducting confirmatory surveys, off-site contamination was identified. The licensee focused its efforts on the decontamination of the laboratory, and failed to perform an adequate assessment of possible offsite contamination. Contributing causes of this

contamination event were: 1) failure of a student researcher to exercise appropriate precautions in the handling of licensed materials; 2) failure to conduct personnel surveys; 3) inadequate training or supervision by the authorized user; 4) failure to conduct performance-oriented audits of the licensee's authorized users; and 5) failure of the Radiation Safety Staff to properly analyze and respond to the event.

Case 2: NRC became aware of a potential contamination problem and called the licensee to determine if a problem did exist. The licensee confirmed that a contamination event had occurred involving carbon-14 (C-14) in a research building, but that it was confident that no contamination had left the building. NRC dispatched a special inspection team to the site. While the team was traveling to the site, the licensee discovered that the contamination occurred because a researcher, looking for materials for an experiment, unknowingly contaminated himself and some personal effects with C-14. The individual was not aware that he had handled radioactive material because the material was improperly stored in an unrestricted area, in an unmarked container. Surveys conducted by the licensee, NRC, three States, other universities, and a U.S. Department of Energy laboratory, identified that the individual unknowingly spread the contamination throughout the facility, to residences he visited, to automobiles, and to his private residence. In addition, other personnel who had entered the facility contaminated their shoes. Contributing causes of this contamination event were: 1) the improper storage of the material which was caused, in part, by 2) an inadequate inventory system that did not identify the presence of long-lived licensed material in an unrestricted area; 3) improper labelling; and 4) inadequate training for staff responsible for storage.

Case 3: A contamination event occurred when a post-graduate student came into a laboratory to do some work involving P-32, on the weekend. He failed to survey, because of an inoperative survey meter, and left the laboratory, having contaminated himself with P-32. When the contamination was discovered, the licensee focused on the contaminated individual and the laboratory. The licensee called to inform NRC that it was sending a report documenting a P-32 contamination event that had occurred at the facility approximately 10 days earlier. The licensee indicated that there had been personnel contamination, but that no offsite contamination had occurred. NRC dispatched a special inspection team to the facility. Confirmatory surveys conducted by the licensee and this team identified offsite contamination in a church, several residences, and in automobiles. Contributing causes of this event were: 1) the licensee failed to respond properly to a recognized spill; 2) the licensee failed to perform an adequate survey of all the possible locations where the individual had been during the interim period

after the contamination event; 3) the licensee failed to follow proper, established survey procedures; 4) there was inoperative equipment; and 5) inadequate training of staff.

Discussion

In the cases described above, the root cause was one or a combination of the following: (1) inadequate training of the employee in the handling and use of radioactive material; (2) inadequate monitoring of persons and facilities where material was used; and (3) inadequate management oversight of licensed activities.

Training had been provided to the user of the material, in most cases, but it was either inadequate or ignored. Site-specific training should include proper survey techniques and correct response to contamination events, and should be strongly emphasized through retraining programs.

General requirements for monitoring are contained in 10 CFR 20.1501. In specific cases, licensees have not discovered the spread of contamination, because of inadequate surveys, until days, or sometimes weeks, after the original incident occurred. The person using the material did not check for personal contamination before leaving the laboratory, and routine surveys of the area were not conducted in time to prevent widespread contamination.

Regulations also require licensed materials to be properly stored and labeled; proper labeling could have prevented some of the above, by alerting personnel to the existence of radioactive material and to the necessity of following radiation safety procedures and survey requirements.

When a spill does occur, it is important that the licensee respond properly to the event. A rush to resume normal activities should be avoided. The lack of sufficient technical personnel for proper offsite assessment may complicate an already undesirable situation. The possibility of offsite contamination should be considered in the evaluation of a spill or contamination, and in a subsequent decontamination plan.

In two of the cases detailed above, licensees failed to notify the NRC Operations Center within 24 hours, as required by 10 CFR 30.50, after the discovery of an unplanned contamination event that required access to the contaminated area to be restricted for more than 24 hours. The notification requirements of 10 CFR 30.50, 40.60, and 70.50, are in addition to 10 CFR 20.2202, involving personnel exposure and releases of radioactive material. The NRC Operations Center telephone number is (301) 951-0550; it is available 24 hours a day.

Each licensee is responsible for protecting the public health and safety by ensuring that all NRC requirements are met, and any potential hazards are promptly identified, corrected, and, if necessary, reported. This responsibility can only be fulfilled if there is persistent and adequate management oversight of licensed activities.

This information notice requires no specific action nor written response. If you have questions about the information in this notice, please contact the technical contact listed below, or the appropriate regional office.

Carl J. Paperiello, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical contacts: Roy Caniano, RIII
(708) 829-9804

Joseph E. DeCicco, NMSS
(301) 504-2067

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
94-15	Radiation Exposures during an Event Involving a Fixed Nuclear Gauge	03/02/94	All U.S. Nuclear Regulatory Commission licensees authorized to possess, use, manufacture, or distribute industrial nuclear gauges.
94-09	Release of Patients with Residual Radioactivity from Medical Treatment and Control of Areas due to Presence of Patients Containing Radioactivity Following Implementation of Revised 10 CFR Part 20	02/03/94	All U.S. Nuclear Regulatory Commission medical licensees.
94-07	Solubility Criteria for Liquid Effluent Releases to Sanitary Sewerage under the Revised 10 CFR Part 20	01/28/94	All byproduct material and fuel cycle licensees with the exception of licensees authorized solely for sealed sources.
93-100	Reporting Requirements for Bankruptcy	12/22/93	All U.S. Nuclear Regulatory Commission licensees.
93-80	Implementation of the Revised 10 CFR Part 20	10/08/93	All byproduct, source, and special nuclear material licensees.
93-77	Human Errors that Result in Inadvertent Transfers of Special Nuclear Material at Fuel Cycle Facilities	10/04/93	All nuclear fuel cycle licensees.
93-69	Radiography Events at Operating Power Reactors	09/02/93	All holders of OLs or CPs for nuclear power reactors and all radiography licensees.

LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
94-15	Radiation Exposures during an Event Involving a Fixed Nuclear Gauge	03/02/94	All U.S. Nuclear Regulatory Commission licensees authorized to possess, use, manufacture, or distribute industrial nuclear gauges.
94-14	Failure to Implement Requirements for Biennial Medical Examinations and Notification to the NRC of Changes in Licensed Operator Medical Conditions	02/24/94	All holders of OLs or CPs for nuclear power and non-power reactors and all licensed reactor operators and senior reactor operators.
92-36, Supp. 1	Intersystem LOCA Outside Containment	02/22/94	All holders of OLs or CPs for nuclear power reactors.
94-13	Unanticipated and Unintended Movement of Fuel Assemblies and Other Components due to Improper Operation of Refueling Equipment	02/22/94	All holders of OLs or CPs for nuclear power reactors.
94-12	Insights Gained from Resolving Generic Issue 57: Effects of Fire Protection System Actuation on Safety-Related Equipment	02/09/94	All holders of OLs or CPs for nuclear power reactors.
94-11	Turbine Overspeed and Reactor Cooldown during Shutdown Evolution	02/08/94	All holders of OLs or CPs for nuclear power reactors.
94-10	Failure of Motor-Operated Valve Electric Power Train due to Sheared or Dislodged Motor Pinion Gear Key	02/04/94	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

This information notice requires no specific action nor written response. If you have questions about the information in this notice, please contact the technical contact listed below, or the appropriate regional office.

Original signed by

Carl J. Paperiello, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical contacts: Roy Caniano, RIII
(708) 829-9804

Joseph E. DeCicco, NMSS
(301) 504-2067

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

OFC	IMOB	IMOB	IMAB	IMOB	RIII	IMNS	FCSS	IMNS
NAME	JDeCicco	CJones	JGlenn	FCombs	RCaniano	WBrach	RBurnett	CPaperiello
DATE	01/09/94	01/12/94	02/01/94	2/01/94	01/07/94	02/04/94	02/07/94	02/18/94

DOC NAME: IN94-16.JED
OFFICIAL RECORD COPY

This information notice requires no specific action nor written response. If you have questions about the information in this notice, please contact the technical contact listed below, or the appropriate regional office.

Carl J. Paperiello, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical Contacts: Roy Caniano, Region III
(708) 829-9804

Joseph E. DeCicco, NMSS
(301) 504-2067

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

*See previous concurrence

OFC	IMOB		IMOB		IMAB		IMOB		RIII	IMNS	IMNS		FCMS		IMNS	
NAME	JDeCicco *		CJones *		JGlenn *		FCombs *		RCaniano *		WBrach		RBurnett		CPaperiello	
DATE	1/09/94		1/12/94		1/14/94		2/01/94		1/07/94		2/4/94		2/7/94		2/18/94	

C = COVER E = COVER & ENCLOSURE N = NO COPY

OFFICIAL RECORD COPY G:CONTAMIN.IN

promptly identified, corrected, and, if necessary, reported. This responsibility can only be fulfilled if there is persistent and adequate management oversight of licensed activities.

This information notice requires no specific action nor written response. If you have questions about the information in this notice, please contact the technical contact listed below, or the appropriate regional office.

Carl J. Paperiello, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical Contacts: Roy Caniano, Region III
(708) 829-9804

Joseph E. DeCicco, NMSS
(301) 504-2067

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

DISTRIBUTION:
IMOB r/f IMNS r/f NMSS r/f

OFC	IMOB	IMOB	IMAB	IMOB	IMNS:DD	IMNS:D
NAME	JDeCicco	CJones	JGlenn	RCombs	EWBrach	CPaperiello
DATE	01/09/94	1/12/94	1/14/94	2/1/94	/94	/94

C = COVER E = COVER & ENCLOSURE N = NO COPY

OFFICIAL RECORD COPY: g:\filename
CONTAMIN. IN