

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

March 5, 1991

**NRC INFORMATION NOTICE NO. 91-14: RECENT SAFETY-RELATED INCIDENTS AT  
LARGE IRRADIATORS**

Addressees:

All Nuclear Regulatory Commission (NRC) licensees authorized to possess and use sealed sources at large irradiators.

Background:

This issue was previously addressed in NRC Information Notice No. 89-82, "Recent Safety-Related Incidents at Large Irradiators" (attached). Because of the significance and frequency of recurrence of these incidents, NRC believes this issue should be reiterated.

Purpose:

This information notice is intended to remind recipients of the potential for large irradiators to deliver life-threatening radiation doses when safety and security systems are bypassed or preventive maintenance programs are ignored. It is expected that licensees will review this information, distribute and review it with all facility workers and radiation staff to prevent similar incidents from occurring at their facility. Licensees are also expected to consider actions, if appropriate, to ensure that adequate preventative maintenance and proper safety training programs with periodic retraining exists. However, suggestions contained in this notice do not constitute any new NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Several incidents of overexposure, resulting in loss of life, occurred outside of the United States as a result of bypassing safety and security systems and not following safety and operating procedures. However, at the facility of an Agreement State licensee, a worker avoided overexposure by following proper safety and operating instructions and procedures. In another instance, during an inspection of an NRC licensee, violations noted, including the bypassing of safety systems and the willful misleading of NRC during the subsequent investigations, resulted in proposed civil penalties. A more detailed description of these incidents is provided in Attachment 1.

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Discussion:

As shown in Attachment 1, beliefs such as "no risk because the machine is turned off" and actions such as using numerous ways to bypass safety and security systems demonstrate a lack of knowledge of the nature of radiation, as well as its danger. All supervisory personnel, particularly the radiation safety officer, are reminded of their responsibility to ensure safe operation at their facilities. The incidents described in the attachment demonstrate the importance of:

1. Not bypassing interlocks and other safety systems
2. Following all authorized operating procedures
3. Training all involved personnel in safety and operational procedures, with periodic retraining, stressing the need for operators to promptly notify their supervisors when unusual or conflicting signals arise on control systems
4. Maintaining all equipment in good working condition and promptly repairing or replacing any defective or nonfunctional equipment
5. Complying with all regulatory requirements and license conditions

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.



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

Technical Contact: Susan L. Greene, NMSS  
(301) 492-0686

Attachments:

1. NRC Information Notice 89-82
2. Attachment 1
3. List of Recently Issued NMSS Information Notices
4. List of Recently Issued NRC Information Notices

## DESCRIPTION OF INCIDENTS AT LARGE IRRADIATOR FACILITIES

Case 1. (340,000 Ci Co-60 Irradiator in Israel) A transport jam occurred, causing the transport mechanism to stop, the "source-down" signal to come on, and the gamma alarm to sound. The sounding of the gamma alarm was considered unusual. Acting against operating and safety instructions, the operator did not notify his supervisor and instead handled the situation on his own. He turned the alarm system off by disconnecting the console cables, defeated the door interlock by cycling the power switch, unlocked the door, and entered the radiation room. He did not check the Geiger counter he carried before entering the radiation room, and consequently was unaware that the instrument was not operational.

Seeing torn cartons, but unable to see that the source rack remained up because it was resting on the edge of a carton, the operator got a cart and began removing the damaged cartons. After about a minute, he began to feel a burning sensation in his eyes and left the room. Since the operator was not wearing his film badge, the whole body dose for the 1 1/2 to 2 minutes he was in the radiation room was estimated to be about 1,000 to 1,500 rads. The source rack was later released and lowered to the pool under the direction of the supplier, and no further overexposures were reported. The operator died from radiation exposure due to acute radiation syndrome effects 36 days after the accident.

Case 2. (18,000 Ci Co-60 Irradiator in El Salvador) The sounding of the source transit alarm alerted the night shift operator (Worker A) that the source was neither fully up nor fully down as a result of a fault condition, which should have caused the source rack to be automatically lowered to the pool. He followed the reset procedure at the control panel, however had no success in stopping the alarm and releasing the door. He tried to free the source rack by detaching the normal regulated air supply and applying overpressure to force the source rack into the fully raised position (a procedure not recommended by the supplier). This attempt also failed. The worker was eventually able to stop the alarm, but the general failure light and the "source-up" light remained on. He then manipulated the microswitch system to produce a "source-down" light.

Worker A disabled the door interlock system by rapidly cycling the buttons on the radiation monitor panel, while turning the key in the door switch (another procedure not recommended by the supplier), thus simulating the detection of normal background radiation in the radiation room by the fixed monitor and succeeded in opening the door. He then shut off the power supply to the facility and entered the radiation room believing that, as with unpowered X-ray equipment, there would be no continuing radiation. Without first checking the radiation levels with a portable radiation instrument, he began to remove the deformed product boxes that had jammed. At this point he noticed that the

descent of the source rack was prevented by the slack cable of the hoist mechanism. Unable to free the rack by himself, he left the radiation room and turned the power back on, noticing that the failure light was "on" and the "source-down" light was intermittent, but that no alarm was sounding.

Worker A then enlisted Workers B and C to help free the source rack. They had no experience or knowledge of the irradiation facility. After assuring Workers B and C that there was no risk as the machine was turned off, the three men entered the radiation room and began removing the jammed product boxes, while standing directly in front of the source rack. As the product boxes were removed and the source rack was lowered to the surface of the water, the workers noticed the blue glow in the pool from Cerenkov radiation. Worker A was surprised at this and after fully lowering the source rack, he told the others to exit quickly. When leaving the radiation room, Worker A was questioned by Worker B as to the use of the portable radiation monitor that was located some distance from the irradiator. He explained that the instrument was for radiation detection and measurement, but that it had not been necessary to use it.

Worker A became ill minutes after leaving the radiation room and was taken to the hospital. Workers B and C later became ill and also went to the hospital. The company was unaware of the accident for several days because the workers were incorrectly diagnosed as having food poisoning. It was later discovered that some of the source pencils had fallen from the source rack into the pool and that one of the pencils had fallen into the radiation room. At least four more persons were overexposed before the circumstances of the accident were fully realized.

Worker A was hospitalized for extensive radiation burns to his legs and feet and gastrointestinal and hematopoietic radiation syndrome. His right leg was amputated and, 197 days after the accident, Worker A died as a result of his radiation exposure.

Worker B was treated for symptoms of acute radiation exposure and severe burns. After the amputation of both legs, he was transferred to a rehabilitation facility 221 days after the accident.

Worker C suffered less severe symptoms of radiation exposure and remained on sick leave from work for 199 days after the accident. Long term effects to these workers may include eye damage from radiation exposure. A more detailed description of the incident can be found in IAEA, Vienna, 1990 STI/PUB/847.<sup>1</sup>

<sup>1</sup>STI/PUB/847, IAEA Vienna, 1990. Copies can be obtained for reference and training tools from UNIPUB, 4611-F Assembly Drive, Lanham, MD 20706-4391

Case 3. (3.5 million Ci Co-60 Irradiator in an Agreement State) The operator noticed that the product had received an unacceptably low dose. He shut down cell operations and, with the source position monitor indicating that the sources were down and the in-cell radiation monitor showing radiation levels at zero, he entered the cell with a portable radiation survey instrument. He noticed elevated radiation levels between 1-2 mR/hr on the survey instrument and aborted his attempt to enter the cell. The operator restricted the area and notified supervisory personnel. Investigation into the cause of the elevated radiation readings revealed that one of the source racks was not fully down and that the top of the rack was about 1½ feet from the top of the pool. An inspection of the winch mechanism indicated that the cable brake had failed to stop the winch allowing the cable to completely unwind. As a result, the source rack was raised instead of lowered with the continuing rotation of the winch mechanism. The source rack was then manually lowered into the pool. It was determined that deterioration of the wiring in the Geiger-Muller tube of the cell monitor due to radiation exposure was the cause of this system failing to warn of the elevated radiation levels in the radiation room. The necessary repairs were made to the control panel and the cell monitor and procedures instituted to upgrade the safety systems of the facility. The operator followed safety and operating procedures during the incident and avoided overexposure by correctly using the portable survey instrument.

Case 4. (1.3 million Ci Co-60 Irradiator in NRC Jurisdiction) During an inspection and subsequent investigation at an irradiator facility, NRC identified the following violations, including but not limited to: (1) failing to promptly and effectively repair the lock on the personnel-access door to the irradiator cell; (2) modifying a procedure without first obtaining NRC approval (i.e., replacing a safety component in the irradiator start-up system), as was required in the license; and (3) the deliberate bypassing of administrative procedures and safety interlock and physical barriers to gain entry to the irradiator cell by climbing over the irradiator cell access door. An NRC investigation also determined that senior licensee management knew of the violations and made incomplete and inaccurate statements to the NRC during an enforcement conference and the subsequent investigations involving the circumstances of these violations. The potential for extremely high radiation exposures and the licensee's lack of candor with NRC raised questions about the ability and willingness of the licensee to comply with NRC requirements. NRC considered these violations of the safety requirements to be serious and proposed a civil penalty of \$13,000 be assessed against the licensee. Senior management involved in this incident are no longer associated with the facility. The licensee has instituted a Quality Assurance program and additional training requirements.

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

December 7, 1989

**NRC INFORMATION NOTICE NO. 89-82: RECENT SAFETY-RELATED INCIDENTS AT  
LARGE IRRADIATORS**

Addressees:

All U.S. Nuclear Regulatory Commission (NRC) licensees authorized to possess and use sealed sources at large irradiators.

Purpose:

This notice is intended to inform recipients of recent safety-related incidents at large irradiators and emphasizes the need for proper management actions and attention to preventive maintenance programs. This notice also serves to remind licensees of other safety-related incidents at irradiators covered in Information Notice 87-29. It is expected that licensees will review this information, distribute the notice to responsible radiation safety staff, and consider actions, if appropriate, to ensure both proper preventive maintenance programs and proper management actions 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:

A description of each of the following events is provided in Attachment 1. In summary, these events included:

- ° Deliberate bypass of the radiation monitor interlock system and another safety system designed to protect individuals from radiation-produced noxious gases.
- ° Significant contamination of pool water remaining unnoticed, which could have been detected sooner, had the pool water been continuously circulated and monitored through the demineralizer.
- ° An uncontrolled descent of a shipping cask into an irradiator pool, due to brake malfunction on a lifting crane.
- ° Leaks in the irradiator pool caused by localized caustic stress corrosion in pool liner welds.

Discussion:

Licensees are reminded of the importance of ensuring the safe performance of licensed activities in accordance with NRC regulations and the requirements of their licenses. Irradiators with high activity sealed sources are capable of delivering life-threatening exposures in a short period of time. Therefore, compliance with regulatory requirements and proper equipment maintenance is critical to safe operation.

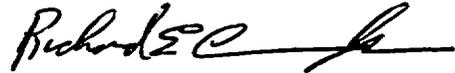
Event Nos. 1, 2 and 3 on Attachment 1 illustrate a failure by management to assure that proper safety and maintenance procedures are followed. In June 1987, NRC brought to the attention of irradiator licensees other incidents that were caused by similar management practices. (See Attachment 2). Event No. 4 on Attachment 1 is included in this notice to remind licensees of the possibility of pool leakage, the need to investigate the causes of such occurrences, and their responsibility to take appropriate corrective action.

In view of the current and past incidents at irradiator facilities, it is strongly recommended that supervisory personnel be reminded of their responsibilities to evaluate potential safety hazards and assure safe operation at their facilities. The incidents described in Attachment 1 demonstrate the importance of:

1. Not bypassing interlock systems and other safety systems.
2. Adhering to regulatory requirements, license conditions and authorized operating procedures.
3. Continuously using demineralizers equipped with radiation monitors, or alternatively, frequently monitoring pool water conductivity and radioactivity concentration.
4. Properly maintaining equipment used with or incident to handling licensed materials.
5. Taking appropriate and effective action when operational abnormalities are observed.

Licensees are reminded that NRC must review and approve operating and emergency procedures prior to implementation at irradiator facilities. Licensees are also reminded that operating procedures approved by NRC during the licensing process are incorporated by reference into the license as requirements. Such operating procedures cannot be modified without prior approval. If you have developed alternate procedures that could be used temporarily to keep your facility operating during maintenance intervals, you must file an amendment with NRC regional offices, for review and approval, before such procedures can be used at your facility.

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  
Office of Nuclear Material Safety  
and Safeguards

Technical Contact: Tony Huffert, NMSS  
(301) 492-0529

Attachments:

1. Events That Occurred at Large Irradiator Facilities
2. Information Notice No. 87-29
3. List of Recently Issued NMSS Information Notices
4. List of Recently Issued NRC Information Notices

RECORD NOTE:

Event No. 1 occurred at Isomedix, Inc. (Docket Nos. 030-08985 and 030-19752) at their Parsippany, NJ and Northboro, MA plants in August 1987.

Event No. 2 occurred at Radiation Sterilizers, Inc. (State of GA licensee) at the Decatur, GA plant in June 1988.

Event No. 3 occurred at Radiation Sterilizers, Inc. (State of GA licensee) at the Decatur, GA plant in July 1989.

Event No. 4 occurred at the Defense Nuclear Agency's Armed Forces Radiobiology Research Institute (Docket No. 030-06931) in Bethesda, MD in April 1989.

EVENTS THAT OCCURRED AT LARGE IRRADIATOR FACILITIES

1. A licensee deliberately bypassed the radiation monitor interlock systems and substituted an administrative procedure for the engineered safeguard provided by the radiation monitor interlock. The substituted cell entry procedure was implemented without NRC review, approval and incorporation in the license. The alternate procedures did not constitute an entry control device that functioned automatically to prevent inadvertent entry and did not comply with the requirements of 10 CFR Subsection 20.203(c)(6)(i). In addition, the licensee installed jumper cables to bypass ventilation system interlock which were designed to automatically protect individuals from noxious gases produced as a result of irradiation.

Because of the extremely high radiation exposures that could result if interlock are not operational, NRC concluded this incident was a very serious violation of safety requirements. The licensee was not allowed to operate the irradiator until all safety systems were fully operational. This violation of NRC requirements, along with other safety-related violations, resulted in NRC proposing a substantial civil penalty.

2. Leaking cesium-137 source capsules contaminated pool water at Radiation Sterilizers, Inc.'s (RSI's) Decatur, GA plant and remained undetected for an extended period of time, because the licensee did not use the pool water monitoring system associated with the demineralizer. The contamination problem was finally discovered when the licensee took discrete samples and performed radiation surveys of the pool water, after activation of the radiation-level monitoring system, which had automatically locked the sources in the safe storage position, due to excessive radiation levels while the sources were in the stored position.

Failure to continuously use the demineralizer/pool-water monitoring system was contrary to the licensing Agency's understanding of the operations. Had the demineralizer been operated continuously, pool water contamination possibly could have been detected earlier and enabled the licensee to begin mitigating the contamination.

The facility has been shut down since June 1988. The U.S. Department of Energy (DOE), its contractors, and the State of Georgia are managing decontamination efforts at the site, which have been estimated to cost several million dollars so far. The DOE and RSI are also in the process of removing all the Waste Encapsulation Storage Facility sources from the RSI facilities at Decatur, Georgia and Westerville, Ohio and shipping them to DOE.

EVENTS THAT OCCURRED AT LARGE IRRADIATOR FACILITIES

(continued)

The State of Georgia and DOE are conducting investigations of other aspects and lessons learned as a result of this event. NRC has been periodically providing information in the NMSS Licensee Newsletter on the status of the DOE investigation into the cause of the source leakage. Licensees will be sent further information when it becomes available.

3. A contractor providing lifting crane services at a licensed facility was moving a shipping cask from the source storage pool to a mezzanine area, when the cask made an uncontrolled descent of approximately 19 feet. The cask stopped its descent approximately five feet below the surface, only after an operator activated a manual brake. No personnel were injured and there was no damage to, or contamination of, the licensee's facility or equipment as a result of this event. However, had the cask not been secured quickly, it could have damaged the radioactive sources in the pool or the pool itself.

This incident was a result of improper brake adjustment of the crane hoist. The crane brake was subsequently repaired and recertified for normal operations in accordance with current Occupational Safety and Health Administration regulations. Braking system inspection and adjustment, as well as functional load testing, are now established daily procedures before crane operation.

4. A licensee experienced a loss of pool water for several weeks that was approximately three times higher than expected from evaporative losses. The licensee performed tests to characterize the nature and quantity of the water loss and began daily assays of the pool water to determine compliance with release limits for unrestricted areas. Suspecting a leak in the irradiator pool, the licensee inspected the stainless steel liner and found localized caustic stress corrosion in many welds.

Apparently, welds made during construction of the facility in 1968 were not in accordance with industry standards. Thus, these faulty welds were subject to caustic stress corrosion which resulted in the recent pool water losses.

The facility has been shut down pending completion of repairs.

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

June 26, 1987

**NRC INFORMATION NOTICE NO. 87-29: RECENT SAFETY-RELATED INCIDENTS AT  
LARGE IRRADIATORS**

Addressees:

All NRC licensees authorized to possess and use sealed sources in large irradiators.

Purpose:

This notice is being issued to inform recipients of recent safety-related incidents at large irradiators, which could have been prevented by proper management actions and attention to preventative maintenance programs. It is suggested that recipients review this information and their procedures and consider actions, if appropriate, to ensure both proper preventative maintenance programs and proper management actions at their facilities. However, suggestions contained in this Information Notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

A description of each of six events is provided in Attachment 1. In summary, these events included:

- o hose failure resulting in a leak, failure to report the incident to NRC, and deliberate cover-up of this incident when NRC tried to investigate, leading to company fines and personnel probation;
- o intentional bypass of safety interlocks, resulting in license suspension and other enforcement actions by NRC;
- o improper pipe routing and inadequate piping material, which broke and caused partial loss of pool water;
- o source unable to retract to its fully shielded position, due to a frozen solenoid valve;
- o a stuck source plaque, due to failure to promptly replace a frayed lift cable; and
- o a stuck source plaque, due to interference from the product carriers and shroud.

**Discussion:**

These incidents illustrate a failure by management to assure that proper safety and maintenance procedures are followed. It is suggested that supervisory personnel, particularly the Radiation Protection Officer and maintenance personnel, be reminded of their responsibilities to assure safe operation at their facilities. The incidents discussed in Attachment 1 demonstrate the importance of:

1. prompt reporting of incidents to the NRC, as required by regulations or license conditions
2. safety training and periodic retraining of personnel
3. not bypassing interlock systems or other safety systems
4. attention to proper plumbing installation and use of appropriate piping material
5. proper maintenance of cables, carrier systems, and other components that could prevent radioactive sources from being retracted to a shielded position.

No specific actions or written response is required by this Information Notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.

Richard E. Cunningham, Director  
Division of Fuel Cycle, Medical,  
Academic, and Commercial Use Safety  
Office of Nuclear Material Safety  
and Safeguards

Technical Contact: Bruce Carrico, NMSS  
(301) 427-4280

**Attachments:**

1. Events That Occurred at Large Irradiator Facilities
2. List of Recently Issued NRC Information Notices

EVENTS THAT OCCURRED AT LARGE IRRADIATOR FACILITIES

1. While the licensee was attempting to decontaminate pool water because of a leaking source, a hose on a filtration system ruptured. Contaminated pool water was then pumped onto the facility floor and leaked outside into the surrounding soil. The licensee failed to report the incident to NRC, and made deliberate efforts to prevent NRC's discovery of this incident.  
  
Subsequently, the licensee was indicted by a Federal Court. A conviction resulted in a \$35,000 fine for the company and two years probation for a management employee. Licensee failure to make required reports prevents the NRC from performing its radiological health and safety function and from making a timely assessment of the nature and severity of an incident.
2. A licensee deliberately bypassed the safety interlock systems. The NRC subsequently learned that licensee personnel had willfully violated requirements, and that senior licensee management knew, or should have known, of these violations. When NRC attempted to inspect and investigate these suspected violations, senior licensee management knowingly provided false information to the NRC. Subsequent enforcement action included suspension of the license.
3. A water line fractured in the pool circulation system which resulted in the loss of 5 feet of pool water. The line break led to a loss of shielding water because the intake and outlet pipes were misaligned during maintenance. The pipe break appears to have occurred because the pipe was made of polyvinyl chloride, designed for cold water, rather than for the heated water temperatures typical for the irradiator. The piping was replaced with polypropylene pipe.
4. A night shift operator noticed that the travel time for the source to reach the fully unshielded position was excessive. After completing the next phase of irradiation, the source would not retract to the fully shielded position, even using emergency equipment. The operator discovered that the solenoid valve, that was supposed to retract the source to a shielded position, was frozen due to weather conditions. The valve was in a room above the irradiator facility. The operator went there and turned on a room heater to thaw out the valve so that it would operate. The operator violated license requirements to (1) notify the Radiation Safety Officer (RSO) that the source had not returned to its shielded position because of the frozen valve, and (2) obtain RSO permission to enter and heat the room housing the valve.
5. A licensee had identified a frayed lift cable a few days previously, but instead of immediately replacing the cable, the licensee decided to wait for scheduled maintenance. The cable jammed and froze the source plaque in a less than fully shielded position. Employees cut the cables and let the source plaque free-fall into the pool. The incident could have been prevented by replacing the frayed cable immediately, and selecting cable material with fray-resistant qualities.

6. A source plaque became stuck in the exposed position. Conveyors stopped, the source DOWN light came on, but cell radiation levels remained high. Cable slack data indicated that the plaque was stuck about five and a half feet down from its full-up position. The RSO attempted some raising and lowering maneuvers, but the plaque then stuck in a full-up position. The RSO, able to run the product containers out of the cell, saw some were misaligned on the carrier. The RSO notified a State Inspector, who arrived in the afternoon. It was determined that the plaque cable was off its pulley. The bottom of a splice in the cable was resting on the lip of the tube leading to the cell. After the cable was set on its pulley, the cable was guided through the tube, and the plaque was lowered, until it caught again.
- A borrowed radiation-resistant camera arrived the next morning. An adequate view of the plaque was obtained by midnight. Apparently the stationary aluminum shroud between product containers and plaque had been deflected and caught on the plaque frame. The plaque was carefully raised and dropped to break the jam. On the second try, the plaque broke free and dropped into the pool. Analysis revealed that a product container had probably tipped onto the shroud, causing interference with the plaque.

This incident was apparently caused by inadequate design of the shroud. This led to the shroud deforming, which interfered with plaque motion. Inadequate maintenance contributed to the problem. The cable should have been replaced instead of spliced. A few months later, the entire source hoist mechanism failed and had to be replaced. This failure occurred when the source plaque was submerged.

Attachment 2  
IN 89-82  
December 7, 1989  
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LIST OF RECENTLY ISSUED  
NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
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.
89-46	Confidentiality of Exercise Scenarios	05/11/89	All holders of licenses for fuel cycle facilities and byproduct material licensees having an approved emergency response plan.
89-37	Proposed Amendments to 40 CFR Part 61, Air Emission Standards for Radionuclides	04/04/89	All U.S. NRC licensees.
89-35	Loss and Theft of Unsecured Licensed Material	03/30/89	All U.S. NRC byproduct, source and special nuclear material licensees.
89-34	Disposal of Americium Well-Logging Sources	03/30/89	All holders of U.S. NRC specific licenses authorizing well-logging activities.
89-25	Unauthorized Transfer of Ownership or Control of Licensed Activities	03/07/89	All NRC source, byproduct, and special nuclear material licensees.

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-59, Supp. 1	Suppliers of Potentially Misrepresented Fasteners	12/6/89	All holders of OLs or CPs for nuclear power reactors.
89-81	Inadequate Control of Temporary Modifications to Safety-Related Systems	12/6/89	All holders of OLs or CPs for nuclear power reactors.
89-80	Potential for Water Hammer, Thermal Stratification, and Steam Binding in High-Pressure Coolant Injection Piping	12/1/89	All holders of OLs or CPs for nuclear power reactors.
89-79	Degraded Coatings and Corrosion of Steel Containment Vessels	12/1/89	All holders of OLs or CPs for LWRs.
89-56, Supp. 1	Questionable Certification of Material Supplied to the Defense Department by Nuclear Suppliers	11/22/89	All holders of OLs or CPs for nuclear power reactors.
89-78	Failure of Packing Nuts on One-Inch Uranium Hexafluoride Cylinder Valves	11/22/89	All 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.
89-77	Debris in Containment Emergency Sumps and Incorrect Screen Configurations	11/21/89	All holders of OLs or CPs for PWRs.
89-76	Biofouling Agent: Zebra Mussel	11/21/89	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
CP = Construction Permit

LIST OF RECENTLY ISSUED  
NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-03	Management of Wastes Contaminated with Radioactive Materials ("Red Bag" Waste and Ordinary Trash)	01/07/91	All medical licensees.
91-02	Brachytherapy Source Management	01/07/91	All Nuclear Regulatory Commission (NRC) medical licensees authorized to use byproduct material for medical purposes.
90-82	Requirements for Use of Nuclear Regulatory Commission-(NRC-)Approved Transport Packages for Shipment of Type A Quantities of Radioactive Materials.	12/31/90	All registered users of NRC-approved packages.
90-81	Fitness for Duty	12/24/90	All U.S. Nuclear Regulatory Commission (NRC) and non-power reactor licensees.
90-75	Denial of Access to Current Low-Level Radioactive Waste Disposal Facilities	12/5/90	All Michigan holders of NRC licenses.
90-71	Effective Use of Radiation Safety Committees to Exercise Control Over Medical Use Programs	11/6/90	All NRC licensees authorized to use byproduct material for medical purposes.
90-70	Pump Explosions Involving Ammonium Nitrate	11/6/90	All uranium fuel fabrication and conversion facilities.
90-38, Supp. 1	License and Fee Requirements for Processing Financial Assurance Submittals for Decommissioning	11/6/90	All fuel facility and materials licensees.

OL = Operating License  
CP = Construction Permit

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-13	Inadequate Testing of Emergency Diesel Generators (EDGs)	03/04/91	All holders of OLs or CPs for nuclear power reactors.
91-12	Potential Loss of Net Positive Suction Head (NPSH) of Standby Liquid Control System Pumps	02/15/91	All holders of OLs or CPs for boiling water reactors (BWRs).
91-11	Inadequate Physical Separation and Electrical Isolation of Non-safety-related Circuits from Reactor Protection System Circuits	02/20/91	All holders of OLs or CPs for W-designed nuclear power reactors.
86-99, Supp. 1	Degradation of Steel Containments	02/14/91	All holders of OLs or CPs for nuclear power reactors.
89-32, Supp. 1	Surveillance Testing of Low-Temperature Overpressure-Protection Systems	02/12/91	All holders of OLs or CPs for nuclear power reactors.
91-10	Summary of Semiannual Program Performance Reports on Fitness-for-Duty (FFD) in the Nuclear Industry	02/12/91	All holders of OLs or CPs for nuclear power reactors.
91-09	Counterfeiting of Crane Valves	02/05/91	All holders of OLs or CPs for nuclear power reactors.
91-08	Medical Examinations for Licensed Operators	02/05/91	All holders of OLs or CPs for nuclear power, test and research reactors.
90-77, Supp. 1	Inadvertent Removal of Fuel Assemblies from the Reactor Core	02/04/91	All holders of OLs or CPs for pressurized-water reactors (PWRs).

OL = Operating License  
CP = Construction Permit

Discussion:

As shown in Attachment 1, beliefs such as "no risk because the machine is turned off" and actions such as using numerous ways to bypass safety and security systems demonstrate a lack of knowledge of the nature of radiation, as well as its danger. All supervisory personnel, particularly the radiation safety officer, are reminded of their responsibility to ensure safe operation at their facilities. The incidents described in the attachment demonstrate the importance of:

1. Not bypassing interlocks and other safety systems
2. Following all authorized operating procedures
3. Training all involved personnel in safety and operational procedures, with periodic retraining, stressing the need for operators to promptly notify their supervisors when unusual or conflicting signals arise on control systems
4. Maintaining all equipment in good working condition and promptly repairing or replacing any defective or nonfunctional equipment
5. Complying with all regulatory requirements and license conditions

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate regional office.

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

Technical Contact:  
Susan L. Greene, NMSS  
(301) 492-0686

- Attachments:
1. NRC Information Notice 89-82
  2. Attachment 1
  3. List of Recently Issued NMSS Information Notices
  4. List of Recently Issued NRC Information Notices

\*See Previous Concurrence  
IMAB\* :Tech Editor\*  
PRathbun :EKraus  
02/11/91 :12/13/90

OFC: IMAB	:IMAB*	:IMOB*	:IMAB*	:DQ/IMNS	:D/IMNS
NAME:SGreene:sg/ht	:MLamastra	:CTrottier	:JEGLEnn	:GSJoblom	:RECunningham
DATE:02/06/91	:02/06/91	:02/06/91	:02/21/91	:02/ /91	:02/25/91

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OFC: IMAB	:IMAB*	:IMOB*	:IMAB	:DD/IMNS	:D/IMNS
NAME:SGreene	:MLamastra	:CTrottier	:JEGlenn	:GSjoblom	:RECunningham
DATE:02/06/91	:02/06/91	:02/06/91	:02/06/91	:02/ /91	:02/ /91

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NAME:SGreene:ht	:MLamastra	:CTrottier	:JEGlenn	:GSjoblom	:RECunningham
DATE:02/6/91	:02/6/91	:02/6/91	:02/ /91	:02/ /91	:02/ /91

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DATE: 02/06/91	: 02/06/91	: 02/06/91	: 02/21/91	: 02/ X91	: 02/28/91