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

May 27, 1994

NRC INFORMATION NOTICE 94-37: MISADMINISTRATION CAUSED BY A BENT INTERSTITIAL NEEDLE DURING BRACHYTHERAPY PROCEDURE

Addressees

All U.S. Nuclear Regulatory Commission Medical Licensees authorized to use brachytherapy sources in high-, medium-, and pulsed-dose-rate remote afterloaders.

Purpose

NRC is issuing this information notice to alert NRC licensees of an incident involving an interstitial needle bent inside the patient's body during a high-dose-rate procedure with an Omnitron 2000 brachytherapy system. The bend in the Omnitron interstitial needle, through which the radioactive source travels, prevented the source from retracting beyond the point of the bend. This resulted in the actual radiation dose received by the patient exceeding the prescribed dose by approximately 75 percent. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate. However, suggestions contained in this information notice are not new NRC requirements; therefore, no specific actions nor written response is required.

Description of Circumstances

On January 13, 1994, at the end of an interstitial lung treatment, the source wire containing a 144.3 gigabecquerel (3.9 curie) iridium-192 source failed to retract to the shielded storage position. Members of the medical staff followed appropriate emergency procedures and removed the needle from the patient. Licensee personnel noted a kink in the interstitial needle after removal. Once outside the patient's body, the source retracted into the shielded position. As a result of the stuck source, the dose to the last treatment position was 17.32 gray (Gy) (1732 rads) versus the prescribed dose of 10 Gy (1000 rads). In addition, an area just below the last treatment location received a dose of approximately 14 Gy (1400 rads) versus the 8 Gy (800 rads) intended in the prescribed treatment plan.

The kink in the needle occurred at a location where the interstitial needle extended beyond a biopsy needle to facilitate the insertion. Under this configuration, the biopsy needle acted as a sleeve covering approximately 75 percent of the interstitial needle. The licensee's preliminary conclusion was that the kink at the interface between the interstitial and biopsy needles was caused by a sudden movement of the patient near the end of the treatment. The licensee reached this conclusion on the basis that X-rays taken just before the treatment revealed no unusual conditions and the treatment was uneventful

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until the patient's sudden movement. When the biopsy and interstitial needles were withdrawn from the patient, the kink in the interstitial needle was relieved somewhat, allowing the source to return to the storage position. Early during the needle insertion process, it had been difficult to insert a different Omnitron needle through the patient's rib cage to the treatment site. As a result, licensee physicians opted to use a biopsy needle, through which the interstitial needle was placed in the desired location. Believing that the shielding provided by the biopsy needle would interfere with the delivery of the radiation dose, a physician retracted the biopsy needle to just outside the treatment site.

Discussion

Needles and other accessories to high-dose-rate remote afterloading therapy may be subjected to unusual mechanical stresses during patient treatment. Each patient setup should be carefully evaluated to avoid or minimize the potential for deformation of needles and other guides. In particular, reducing thickness or withdrawing another device in order to preserve dose rate may not be in the best interests of safety. In most instances, any reduction in dose rate may be compensated by a modest increase in treatment time. If the use of extremely thin materials cannot be avoided, licensees should ensure that their operating and emergency procedures are adequate to prevent and mitigate the consequences of mechanical deformations in the path of the source wire. In such circumstances, surgical intervention may be required and should be included in emergency plans as required in NRC Bulletin 93-01.

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.

E. William Brach for

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

Technical contacts: Héctor Bermúdez, RII
(404) 331-7880

James Smith, NMSS
(301) 415-7904

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
94-35	NIOSH Respirator User Notices, "Inadvertent Separation of the Mask-Mounted Regulator (MMR) from the Facepiece on the Mine Safety Appliances (MSA) Company MMR Self-Contained Breathing Apparatus (SCBA) and Status Update"	05/16/94	All holders of OLs or CPs for nuclear power reactors, and all licensed fuel facilities.
94-23	Guidance to Hazardous, Radioactive and Mixed Waste Generators on the Elements of A Waste Minimization Program	03/25/94	All NRC licensees.
94-21	Regulatory Requirements when No Operations are being Performed	03/18/94	All fuel cycle and materials licensees.
94-17	Strontium-90 Eye Applicators: Submission of Quality Management Plan (QMP), Calibration, and Use	03/11/94	All U.S. Nuclear Regulatory Commission Medical Use Licensees.
94-16	Recent Incidents Resulting in Offsite Contamination	03/03/94	All U.S. Nuclear Regulatory Commission material and fuel cycle licensees.
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.

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
94-36	Undetected Accumulation of Gas in Reactor Coolant System	05/24/94	All holders of OLs or CPs for nuclear power reactors.
91-81, Supp. 1	Switchyard Problems that Contribute to Loss of Offsite Power	05/19/94	All holders of OLs or CPs for nuclear power reactors.
94-35	NIOSH Respirator User Notices, "Inadvertent Separation of the Mask-Mounted Regulator (MMR) from the Facepiece on the Mine Safety Appliances (MSA) Company MMR Self-Contained Breathing Apparatus (SCBA) and Status Update"	05/16/94	All holders of OLs or CPs for nuclear power reactors, and all licensed fuel facilities.
94-34	Thermo-Lag 330-660 Flexi-Blanket Ampacity Derating Concerns	05/13/94	All holders of OLs or CPs for nuclear power reactors.
94-33	Capacitor Failures in Westinghouse Eagle 21 Plant Protection Systems	05/09/94	All holders of OLs or CPs for nuclear power reactors.
93-53, Supp. 1	Effect of Hurricane Andrew on Turkey Point Nuclear Generating Station and Lessons Learned	04/29/94	All holders of OLs or CPs for nuclear power reactors.
94-32	Revised Seismic Hazard Estimates	04/29/94	All holders of OLs or CPs for nuclear power reactors.
94-31	Potential Failure of Wilco, Lexan-Type HN-4-L Fire Hose Nozzles	04/14/94	All holders of OLs or CPs for nuclear power reactors.
90-68, Supp. 1	Stress Corrosion Cracking of Reactor Coolant Pump Bolts	04/14/94	All holders of Ol or CPs for pressurized water reactors.

OL = Operating License
CP = Construction Permit

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OFC	IMAB		IMAB		IMAB		Tech Ed		IMOB	
NAME	JASmith		LWCamper★		JEGlenn★		EKraus★		FCCombs★	
DATE	05/12/94		04/25/94		04/26/94		04/22/94		05/02/94	

OFC	OGC	E	DD/IMNS		D/IMNS					
NAME	STreby★		WBrach		CPaperiello					
DATE	05/10/94		05/17/94		05/16/94					

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