

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

July 12, 1999

**NRC INFORMATION NOTICE 99-24: BROAD-SCOPE LICENSEES' RESPONSIBILITIES
FOR REVIEWING AND APPROVING UNREGISTERED
SEALED SOURCES AND DEVICES**

Addressees:

All medical licensees of broad-scope and master materials licensees.

Purpose:

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to NRC's expectations about their uses of either sealed sources or devices which are not listed in the registry of radiation safety information on sealed sources and devices. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate, to address these issues. However, suggestions contained in this information notice are not new NRC requirements; therefore no specific action nor written response is required.

Description of Circumstances:

With the advent of new investigational studies using intravascular brachytherapy radiation treatments to prevent restenosis of coronary and peripheral arteries after balloon angioplasty, there has been a significant increase in the use of unregistered sealed sources and/or devices. There has also been a marked increase in reported patient misadministrations and other events relating to device failures. After two reported patient misadministrations in early 1998, discussed in detail in NRC Information Notice 98-10, there have been additional patient misadministrations, and events reported. NRC is concerned by the unexpectedly high rate of reported events for a relatively small number of unregistered sources and/or devices being used in these trials.

A primary contributing factor in these events, was the failure of the broad-scope licensees to perform appropriate radiation safety reviews of the sources and/or devices, the treatment protocols, and the procedures to be used in the clinical trials. These reviews directly contribute to the safe use of material, and must be performed to provide your radiation safety committee with the information necessary to properly evaluate your participation in the proposed human research trial.

NRC has granted broad scope licensees the authority to use sealed sources and/or devices that you have fabricated or obtained from vendors without prior NRC or Agreement State review

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and registration. However, you also have the responsibility for conducting these activities responsibly and safely. For example, 10 CFR 33.13(c)(3)(iii) requires the review and approval of these safety evaluations by the radiation safety committee, for Type A specific licensees of broad-scope.

If you fabricate and use source(s) and/or device(s) of your own design, then it is clearly your responsibility to review the source(s) and/or device(s) and determine if they can be safely used for their intended use(s). This includes developing and enforcing any procedures or restrictions deemed necessary for the safe use of the source/device. Equally important, but frequently overlooked, are your responsibilities for performing these same essential radiation safety reviews when using unregistered source(s)/device(s) obtained from external suppliers, such as the sponsors of clinical trials.

Discussion:

What are the responsibilities of my Radiation Safety Committee (RSC) when reviewing an application for approval of a specific medical use of sealed source(s) and/or device(s)?

The requirements for radiation safety evaluations, reviews and approvals are set forth in 10 CFR 33.13(c)(3)(ii) and 10 CFR 33.13(c)(3)(iii) for Type A specific license of broad scope. Thus, your radiation safety committee is required to insure that a proper radiation safety evaluation commensurate with the intended use of the source(s) and/or devices have been performed.

How do I determine whether or not I need to perform a radiation safety evaluation of a source or device?

Check if the source and/or device is presently listed in NRC's Registry of Sealed Sources and devices as approved for your intended use. The registry can be accessed online through the NRC web page or at the following URL address:
<http://www.hsrdr.ornl.gov/nrc/ssdr/ssdrindx.htm>.

If it is registered by NRC or an Agreement State and is approved for the intended use, then no radiation safety evaluation by your institution is required.

If either the source and/or device has not been registered or, the source and/or device has not been approved for your intended use, then, to use this source/device, you must perform the appropriate radiation safety evaluation and submit it for approval to your RSC.

Caution: You must insure that both source and device are registered, approved for use together, and approved for your intended use. In at least one case a source is approved for intravascular brachytherapy use. However, the corresponding manual afterloading device for this source is not approved for intravascular brachytherapy. In such instances, you must perform the necessary evaluation of the device, including any impact on the radiation safety of using the source in the device, and submit your evaluation to your RSC for approval.

Is there guidance available on how to perform a review?

The requirements for performing these evaluations by the NRC and Agreement States are set forth in 10 CFR 32.210. The guidance for performing these reviews is contained in NUREG-1556, Vol. 3, "Consolidated Guidance About Materials Licenses - Applications for Sealed Source and Device Evaluation and Registration." The applicable guidance is summarized in the following questions and answers for both sources and devices. The full content of the NUREG is on the NRC web site at the following URL address:
<http://www.nrc.gov/NRC/nucmat.html>.

We expect a review that determines if a source/device can be safely used for its intended use at your institution. This review should be commensurate with the level of risk that could be reasonably anticipated from the source/device for your intended use and likely accident conditions. Since the guidance covers all types of reviews, you may not need to conform to the same rigorous review process that is referenced.

It is your responsibility to perform this review, obtain any necessary design and test information from the vendor and, if needed, conduct operational or other tests to discover and evaluate potential radiation safety hazards.

The results of this review, along with any necessary conditions or limitations on use, should be submitted to your radiation safety committee or radiological safety officer, for approval. We have found that it is useful to develop appropriate written administrative procedures for the conduct of reviews and the approval or disapproval of the intended use by your radiation safety committee.

How do I perform the radiation safety review for sealed sources?

Evaluate the likely environments to which the source will be subjected in normal use and in likely accident conditions. Normal use and likely accident conditions should include use, handling, storage, and transportation. Particular attention should be given to the chemical and physical environments to which the source is exposed, such as normal saline, various body fluids, sterilization procedures (temperature extremes), and mechanical stresses that may be placed on the source (particularly by any devices used to contain and effect source exposures). Perform this radiation safety evaluation of the source, commensurate with any perceived risks from the failure of, or damage to, the source encapsulation.

To properly conduct this source evaluation, you will almost certainly require detailed design and construction information from the source vendor. Vendor test data, if available, could significantly reduce the effort required to perform the necessary radiation safety evaluation. However, if essential design or test data are unavailable, you may have to choose between more extensive testing or withholding approval of the proposed use. It is also your responsibility to verify the accuracy of the data used to achieve the prescribed treatment dose values through either: (1) direct measurement with an appropriately calibrated measurement system; or, (2) a thorough review of the vendor's calibration procedures. A thorough knowledge of the radiation profiles from the source and any device within which it is used is essential. Specific conditions of use should be developed to ensure personnel exposures do not exceed 10 CFR Part 20 limits.

How do I perform the radiation safety review for devices?

A safety evaluation must also be performed for a device used to contain, shield, and control exposures of the source. The scope and depth of this evaluation should be commensurate with the risks from failure of the device. The evaluation must also consider any operational limitations inherent in the device design that could lead to unintended exposures to radiation. This would require, at a minimum, sufficiently detailed design and construction data to allow a full understanding of the construction and operation of the device and its components and safety features.

Integrity of the source/device under normal conditions does not necessarily mean the product will perform its intended function after being subjected to an accident or unusual conditions. Under accident or unusual conditions, the design should still ensure that the byproduct material is not dispersed, the source remains within the protective source housing, and the shielding integrity is not comprised. Items that need to be considered in this evaluation include:

- a. Use of dissimilar materials that are incompatible and could cause corrosion (i.e., aluminum and stainless steel in a marine or saline environment) is avoided;
- b. The materials used in the construction are not degraded by exposure to radiation or other conditions of use;
- c. Fixed shielding cannot be easily moved or become dislodged;
- d. All moving parts [including the source(s)] have adequate spacing to ensure they will not bind during use. This would include use conditions, such as bending of the source transport system, and any external forces that could be applied to the device and/or transport system during use;
- e. If applicable, the device can be locked in a closed (safe) condition, but not in an open (unsafe) condition;
- f. Indicators are present that clearly identify whether the source(s) is exposed or in a safely shielded condition;
- g. Safety interlocks, barriers, or guards are used sufficient to prevent accidental exposures in excess of those specified in the regulations;
- h. If pneumatic or hydraulic systems are used, there are appropriate filtration, relief valves, and operating pressures;
- i. The device is designed to be fail-safe (i.e., loss of power or a failure in the system would return the source to, or leave it in, the fully shielded position); and,
- j. If applicable, the device is hermetically sealed from foreign materials or moisture.

I completed my safety evaluation and discovered design weaknesses or other risk factors that could pose radiation safety hazards during the anticipated conditions of use. What do I do?

One or more of the following options will usually be available to you:

- a. Withhold authorization for the requested use;
- b. Correct any discovered design limitations or defects; or,
- c. Adopt mandatory written procedures and/or limitations on the use of the source to compensate for, or avoid, any radiation safety hazards discovered.

I intend to participate in a clinical trial under an approved Food and Drug Administration (FDA) Investigative Device Exemption (IDE). Doesn't the FDA's IDE review and approval process eliminate the need for me to perform a corresponding sealed source device review?

No, the FDA IDE review does not substitute for sealed source and/or device safety reviews. IDE or 510K device approvals do not satisfy the requirements in 10 CFR Part 30 and, in turn, 10 CFR Part 32.

The FDA review process focuses on the medical safety and efficacy of the entire protocol, including any sources and/or devices used, with respect to the patient. The NRC review and approval process takes a more broad review of the radiation safety of the device. In particular the NRC review focuses on the protection of workers and general public as well as the protection of the patient from unintentional radiation exposures from such devices.

The FDA reviews devices under several different processes, such as the IDE process for human research applications, the 510K, or pre-market approval (PMA) processes for routine patient treatments, as appropriate, to ensure its regulatory requirements are met. Similarly, NRC and/or Agreement State reviews are performed to ensure that the Commission's regulatory requirements are satisfied.

Dual FDA and NRC reviews are regularly performed for sources and devices for routine medical use. After a device is reviewed and approved under the 510k, or similar process by the FDA, it must then be reviewed and registered by NRC or an Agreement State, before medical licensees of limited specific scope can be authorized for their use by NRC or a broad scope licensee is relieved of performing its own radiation safety evaluations.

What are my options if I either do not have or, do not wish to commit, the resources necessary to perform these full radiation safety evaluations?

If NRC broad-scope licensees do not wish to become involved in the radiation safety evaluation of unregistered sources and/or devices in medical applications, then they can elect to restrict their use of sealed sources of byproduct materials and/or devices to those that have been reviewed by NRC or an Agreement State and listed in the Registry as approved for the licensee's intended use.

The use of either a registered source or a device for a use that is similar to, but not the same as, an approved use, may be a feasible alternative. If your proposed use differs little from the approved use, then the necessary radiation safety review could be fairly simple.

Why this emphasis on performance of proper radiation safety reviews of sealed sources and devices by broad scope licensees at this time?

NRC has observed a considerable increase in patient misadministrations and other events related to the use of unregistered sealed sources and devices in the new intravascular brachytherapy clinical trials. In nearly all of these events, a failure on the part of the licensee's RSC to require an appropriate radiation safety evaluation of source/device used was at least a contributing factor. We have observed that our broad scope licensees seem to rely too heavily on the source/device vendor to provide most, if not all, of the information necessary for the radiation safety committee to properly perform a radiation safety review of the source/device.

For example, in the patient misadministrations cited in NRC Information Notice 98-10, if our broad-scope licensee had, before the event, performed the device evaluation that was performed after the event, and presented the reported corrective actions to its radiation safety committee as recommended conditions for approval of the intended use, this would have constituted the type of review and RSC approval process expected of such a licensee and the event might well have been prevented.

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



Donald A. Cool, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical Contact: Robert L. Ayres, NMSS
301- 415-5746
E-mail: rxa1@nrc.gov

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
99-23	Safety Concerns Related To Repeated Control Unit Failures of the Nucletron Classic Model High-Dose-Rate Remote Afterloading Brachytherapy Devices	7/6/99	All U.S. NRC medical licensees authorized to use brachytherapy sources in Nucletron Classic Model high-dose-rate (HDR) remote afterloaders
99-22	10 CFR 34.43(a)(1): Effective Date for Radiographer Certification and Plans for Enforcement Discretion	6/25/99	Industrial Radiography Licensees
99-20	Contingency Planning for the Year 2000 Computer Problem	6/25/99	All material and fuel cycle licensees and certificate holders
99-18	Update on NRC's Year 2000 Activities for Materials Licensees and Fuel Cycle Licensees and Certificate Holders	6/14/99	All material and fuel cycle licensees and certificate holders
99-16-	Federal Bureau of Investigation's Nuclear Site Security Program	5/28	All U.S. Nuclear Regulatory Commission fuel cycle, power reactor, and non-power reactor licensees
99-11	Incident Involving the Use of Radioactive Iodine-131	4/16/99	All medical use licensees
99-09	Problems Encountered When Manually Editing treatment Data on the Nucletron Microselectron-HDR (New) Model 105-999	3/24/99	All medical licensees authorized to conduct high-dose-rate (HDR) remote after loading brachytherapy treatments
99-06	1998 Enforcement Sanctions as a Result of Deliberate Violations of NRC Employee Protection Requirements	3/19/99	All U. S. Nuclear Regulatory Commission licensees
99-05	Inadvertent Discharge of Carbon Dioxide Fire Protection System and Gas Migration	3/8/99	All holders of licenses for nuclear power, research, and test reactor, and fuel cycle facilities

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99-22	10 CFR 34.43(a)(1); Effective Date for Radiographer Certification and Plans for Enforcement Discretion	7/6/99	Industrial Radiography Licensees
99-21	Recent Plant Events Caused By Human Performance Errors	6/25/99	All holders of licenses for nuclear power, test, and research reactors
99-20	Contingency Planning for the Year 200 Computer Problem	6/25/99	All material and fuel cycle licensees and certificate holders
99-19	Rupture of the Shell Side of a Feedwater Heater at the Point Beach Nuclear Plant	6/23/99	All holders of operating licenses or construction permits for nuclear power reactors
99-18	Update on NRC's Year 2000 Activities for Materials Licensees and Fuel Cycle Licensees and Certificate Holders	6/14/99	All material and fuel cycle licensees and certificate holders
99-17	Problems Associated with Post-Fire Safe-Shutdown Circuit Analyses	6/3/99	All holders of OL for nuclear power reactors, except those who have permanently ceased operations and have certified that the fuel has been permanently removed from the reactor
99-16-	Federal Bureau of Investigation's Nuclear Site Security Program	5/28	All U.S. Nuclear Regulatory Commission fuel cycle, power reactor, and non-power reactor licensees

OL = Operating License
 CP = Construction Permit

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(Orig. signed by)
Donald A. Cool, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical Contact: Robert L. Ayres, NMSS
301- 415-5746
E-mail: rxa1@nrc.gov

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Attachment filed in Jacket

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* See previous concurrence

OFC	MSIB	TechED*	OGC*	MSIB*	D/IMNS
NAME	RAyres/II	EKraus	STreby	LWCamper	DACool
DATE	7/1/99	03/31/99	04/21/99	04/ 27/99	7/1/99

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OFC	MSIB	TechED*	OGC*	MSIB*	D/IMNS
NAME	RAyres/II <i>RJA</i>	EKraus	STreby	LWCamper	<i>WACoel</i>
DATE	2/06/99	03/31/99	04/21/99	04/27/99	07/1/99

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NAME	RAyres/II		EKraus		STreby		LWCamper		DACool	
DATE	6/23/99		03/31/99		04/21/99		04/27/99		05/	/99

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	RAyres/II <i>RZG</i>	EKraus	STreby	LWCamper	DACool
DATE	<i>6/02/99</i>	03/31/99	04/21/99	04/27/99	05/ /99

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5/4/99 CE

OFC	MSIB	TechED*	OGC*	MSIB*	D/IMNS
NAME	RAyres/II	EKraus	STreby	LWCamper	DACool
DATE	<i>5/04/99</i>	03/31/99	04/21/99	04/27/99	05/ /99

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DOCUMENT NAME: A & G(I-1):IN99a-XX.WPD

no legal objection

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OFC	MSIB	E	TechED	OGC	E	MSIB	E	D/IMNS
NAME	RAyres/ ^{AZG}		EKraus ^{BY FAX}	STreby		LW Gardner		DACool
DATE	4/12/199		3/31/199	4/21/199		04/19/199		04/ /199

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