

Item 6



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

June 25, 1980

TO ALL MEDICAL AND ACADEMIC LICENSEES

There are a number of steps licensees engaged in nuclear medicine practice and biomedical research can take under NRC rules to substantially reduce, and in some cases eliminate, the need to send radioactive waste to commercial low-level waste disposal facilities. By taking advantage of these alternatives and following good waste management practices, licensees can often reduce the risk of having their programs impacted through further curtailment of commercial waste disposal facilities. Some of the more important steps that can be taken are to:

1. Segregate radioactive waste from non-radioactive waste to reduce unnecessary volume. This simply requires a little time and discipline in the laboratory.
2. Hold waste with short-lived radionuclides in storage for decay to background levels, then dispose of it in the ordinary trash. This procedure requires a license amendment. (See Enclosure 1 for information to be submitted with the amendment request).
3. Release certain materials into the sanitary sewage system in accordance with 10 CFR Part 20.303. No license amendment is required but 10 CFR Part 20.303 should be carefully reviewed to stay within limits.

Judicious use of these three steps can substantially reduce the volume of waste shipped to burial grounds. Some nuclear medicine laboratories using only short-lived radionuclides can eliminate waste shipments.

Waste from biomedical research is generally somewhat more difficult to manage. Two of the most common problems are disposal of liquid scintillation counting waste (LSCW) and animal carcasses. The most frequently used radioisotopes in both are tritium and carbon-14. LSCW presents a particularly troublesome problem due to the flammability and toxicity of the solvents. Disposal of LSCW has been given special consideration by NRC. The staff has investigated alternatives to managing these wastes and the results have been published in NUREG-0656.

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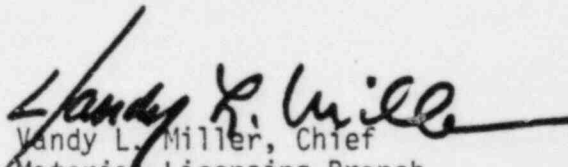
Consideration should be given to disposal by incineration for LSCW and laboratory animals containing small amounts of tritium and carbon-14. This method requires a license amendment; 10 CFR Part 20.305 contains the provisions for incineration. Enclosure 2 identifies the information to be submitted with an amendment request for incineration.

There are other provisions in the regulations that cover waste disposal. We have mentioned only the few that are most easily and commonly used. Other regulatory provisions include:

1. Disposal by burial in soil in accordance with 10 CFR 20.304 (A proposed rule change is under consideration to delete this provision. It will likely be replaced by a provision which requires specific approval by license amendment for burial).
2. Release as effluents to unrestricted areas pursuant to 10 CFR Part 20.106. In keeping with the ALARA concept, this method should normally be used only for releases incident to the procedures involved.

We suggest that you review and consider alternatives to commercial land burial for the management of your low-level radioactive waste. Implementation of some of these alternatives may require an amendment to your license. Amendment requests should be submitted to the Material Licensing Branch through the use of normal channels. Specific licensing questions concerning NUREG-0656 should be directed to the Material Licensing Branch (301) 427-4232. Copies of the NUREG-0656 may be obtained from the Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

Sincerely,

  
Vandy L. Miller, Chief  
Material Licensing Branch  
Division of Fuel Cycle and  
Material Safety

Enclosures:

1. Information to be submitted When Requesting Amendment to Dispose of Radioactive Waste by Decay-In-Storage.
2. Information Required for Commission Approval of Treatment or Disposal by Incineration.

Information to be Submitted When Requesting Amendment to Dispose  
of Radioactive Waste by Decay-In-Storage Method

This is in reference to your request for information concerning authorization to dispose of radioactive waste via decay-in-storage. In order to approve such an amendment request, we need the following information:

1. Please submit a diagram of the area where the waste will be decayed-in-storage. Show the type, location, and thickness of shielding that you will have available in this area on your diagram. Your storage area should be large enough to handle an accumulation of used Tc-99m generators as well as other solid waste.

Identify adjacent unrestricted areas located across the walls from the storage area and show that adequate steps have been taken to assure that radiation levels do not exceed the limits specified in 10 CFR 20.105 (enclosed).

2. Describe your security measures for the decay-in-storage area.
3. Confirm that radiation levels in this area will be surveyed and recorded at least weekly.
4. Describe your procedures for monitoring the waste to assure that it has decayed to background levels prior to disposal. As a minimum, your description should include these points:
  - a. Monitor the waste in a low background area.
  - b. Monitor with a low level GM type survey meter as appropriate for contamination surveys. Use the most sensitive scale.
  - c. Remove all shielding prior to monitoring.
  - d. Maintain records of these surveys as required under 10 CFR 20.
5. Note that decay-in-storage may not be a practical method of disposal for Tc-99m generators. These generators may contain long-lived radioisotopic contaminants. If you intend to dispose of generators by this method, you should include procedures for segregating the generator columns so that they may be monitored separately.

Be certain to submit your amendment request in duplicate. Unless your institution is fee exempt, your request should be accompanied by the appropriate amendment fee. Refer to 10 CFR 170.

INFORMATION REQUIRED FOR COMMISSION APPROVAL OF  
TREATMENT OR DISPOSAL BY INCINERATION

Revised October 3, 1979

1. State specifically the isotopes you wish to incinerate. For each isotope listed, you should submit calculations demonstrating that air concentrations of the effluents at the stack are in accordance with the requirements of Section 20.106 of 10 CFR Part 20.
2. Submit the characteristics of the incinerator such as height of the stack, height of and distance to buildings in the surrounding areas, rated airflow of the incinerator in cubic feet per hour or similar units and its proximity to any air intake ducts.
3. The gaseous effluent from the incinerator stack should not exceed the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a twenty-four (24) hour period.
4. In order to be in compliance with the ALARA philosophy stated in Section 20.1(c) of 10 CFR Part 20, the gaseous effluent from the incinerator stack should be a fraction (approximately 10%) of the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a one year period.
5. Describe the method of measurement or estimation of the concentration of radioactive material appearing in ash residue.
6. Describe the procedures for handling and disposing of ash from the incinerator.
7. Describe procedures to be followed to prevent overexposure of personnel during all phases of the operation, including instruction given to personnel handling the combustibles and the ash.
8. Submit evidence that all State and local regulations concerning incineration of radioactive material have been met by your institution.
9. State the maximum number of burns to be performed in any one week and the maximum number of burns per year.

You do not need specific NRC approval in order to incinerate certain categories of radioactive waste. Please review Enclosures 1 and 2 in order to determine whether you may proceed without a specific license amendment. If an amendment is required, be certain to make a complete and detailed submission of all information requested below:

1. Submit the characteristics of the incinerator such as height of the stack, height of and distance to buildings in the surrounding areas, rated airflow of the incinerator in cubic feet per hour or similar units and its proximity to any air intake ducts.
2. State specifically the isotopes and the maximum amount of each isotope that you wish to incinerate per burn. For the combination of isotopes listed, submit calculations to demonstrate that the following conditions have been met:
  - A. The gaseous effluent from the incinerator stack should not exceed the limits specified for air in Appendix B, Table II, 10 CFR Part 20 when averaged over a 24 hour period.
  - B. In order to be in compliance with the ALARA philosophy stated in section 20.1(c), 10 CFR Part 20, the gaseous effluent from the incinerator stack should be a fraction (approximately 10%) of the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a period of one year.

If more than one isotope is involved, your calculations must follow the "sum of ratios" method in the "Note" at the end of Appendix B, 10 CFR Part 20.
3. State the maximum number of burns to be performed in any one week and the maximum number of burns per year.
4.
  - A. Describe your method for measuring or estimating the concentration of radioactive material remaining in the ash residue. Unless you present scientific evidence to the contrary, you must use the most conservative assumption.
  - B. Submit your procedures for collection, handling and disposal of the ash residue, including radiation safety precautions to be observed.
5. Describe procedures to be followed to minimize exposure to personnel during all phases of the operation, including instruction given to personnel handling the combustibles and the ash.
6. Submit evidence (e.g., copies of outgoing and incoming letters) to show that all State and local jurisdictions have been notified of your plans to incinerate radioactive waste and have no objections to them.

Enclosures:

1. 12/1/80 letter to all medical licensees
2. Biomedical Waste Disposal Rule

INFORMATION REQUIRED FOR COMMISSION APPROVAL OF  
TREATMENT OR DISPOSAL BY INCINERATION

Revised January 8, 1981 .

1. State specifically the isotopes you wish to incinerate. For each isotope listed, you should submit calculations demonstrating that air concentrations of the effluents at the stack are in accordance with the requirements of Section 20.106 of 10 CFR Part 20.
2. Submit the characteristics of the incinerator such as height of the stack, height of and distance to buildings in the surrounding areas, rated airflow of the incinerator in cubic feet per hour or similar units and its proximity to any air intake ducts.
3. The gaseous effluent from the incinerator stack should not exceed the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a twenty-four (24) hour period.
4. In order to be in compliance with the ALARA philosophy stated in Section 20.1(c) of 10 CFR Part 20, the gaseous effluent from the incinerator stack should be a fraction (approximately 10%) of the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a one year period.
5. Describe the method of measurement or estimation of the concentration of radioactive material appearing in ash residue.
6. Describe the procedures for handling and disposing of ash from the incinerator.
7. Describe procedures to be followed to prevent overexposure of personnel during all phases of the operation, including instruction given to personnel handling the combustibles and the ash.
- 8a. Submit evidence that all State and local regulations concerning incineration of radioactive material have been met by your institution.
- 8b. Submit evidence that all State and local jurisdictions have been notified of your plans to incinerate radioactive waste.
9. State the maximum number of burns to be performed in any one week and the maximum number of burns per year.