

Disposal of Specific Articles Containing Radioactive Materials

Procedure: 8.24
Version 1.0
Effective Date: 10/14/2014

A. Purpose

To ensure that all exit signs containing tritium (H-3) and smoke detectors containing Americium 241 (Am-241) are disposed of safely and correctly in accordance with NYSDEC, NYSDOH and USNRC regulations.

B. Applicability/Scope

1. Disposal of known manufactured articles containing radioactive materials
2. Identification of found or existing manufactured articles that are suspected of containing radioactive materials
3. Safe handling of manufactured articles containing radioactive materials

C. Definitions

1. Radioactive Material: Any chemical element, naturally occurring or manmade, that is in an unstable atomic configuration and emits ionizing radiant or particle energy.
2. Manufactured article: A commercially produced item designed and used for a specific purpose which is not altered during the course of that use unless it is an intrinsic part of the process the article was designed for (ex. A light bulb filament burning out over the course of use.)
 - a. For the purposes of this policy, the manufactured articles referenced are exit signs containing H-3 and smoke detectors containing Am-241
3. NRC: United States Nuclear Regulatory Commission
4. Sodium Iodide (NaI) Detector: Uses a sodium iodide crystal to scintillate for gamma ray radiation and displays the results in counts per minute.

D. Responsibilities

It shall be the responsibility of all Contractors, Project Managers, Facilities Operations and Environmental Health and Safety personnel to ensure this policy and procedure is adhered to. All personnel handling the articles governed under this policy must be made aware of the specific hazards associated with handling, transporting, and storing radioactive material containing smoke detectors and exit signs.

E. Procedures

1. Exit Signs

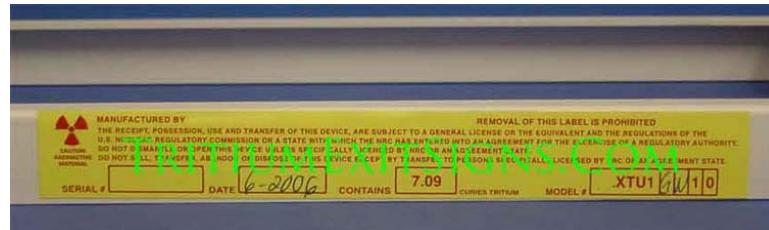
Unpowered exit signs can contain radioactive materials in the form of a gas that contains tritium (H-3). These signs may contain as much as 27 curies when assembled. Disposal of these signs is governed by United States Nuclear Regulatory Commission (NRC) regulations, 10 CFR 31.5.

- a. Determine if the exit sign contains H-3
 - i. Exit signs with a wired or battery-based power source do not contain H-3 and should be disposed of in accordance with university policy.
 - ii. Exit signs containing H-3 will have a bright green or red glow under low light conditions.
 - iii. Exit signs containing H-3 will normally have one or more radioactive materials warning labels and or markings on them, including a radioactive warning sign in

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the shape of a trefoil (see below). Absence of this marking does not eliminate the possibility of an exit sign containing radioactive materials.



- b. Once a sign has been determined to be radioactive.
 - i. Determine if the sign is ready for removal. Signs over approximately 16 years old will be likely candidates for removal. When a sign is past its service life it will no longer be suitable for use. This can be recognized in practice as the sign failing to provide enough light to be clearly seen in a dark room.
 - ii. If the sign is suitable to be removed **CONTACT RADIATION SAFETY IMMEDIATELY (212-305-0303 OR 212-854-8749). DO NOT ATTEMPT TO REMOVE WITHOUT RADIATION SAFETY PERSONNEL PRESENT.** These signs may pose a risk of radioactive contamination if the tube(s) is broken. Radiation Safety will take possession of the device after it has been safely removed. A Hazardous Materials Specialist will coordinate shipment with an appropriate vendor.
 - iii. If a sign is still in service, a member of the Radiation Safety or Hazardous Materials teams should be contacted. An additional assessment will be made to ensure that the sign is intact and does not pose a contamination hazard.
- 2. Smoke Detectors
 - a. Determine if the smoke detector contains Am-241
 - i. Any smoke detector that contains an Am-241 source will be prominently marked with a trefoil as well as the activity of the enclosed source

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- ii. Am-241-containing signs may or may not have battery power sources, this is not an indicator of the type of smoke detector.
- iii. If there is any question as to whether or not a smoke detector contains radioactive material, contact a member of the Hazardous Materials or Radiation Safety teams (212-305-0303 or 212-854-8749). If the detector portion of the smoke detector is surveyed using a NaI detector, the small amounts of x-ray radiation emitted by the Am-241 should be detectable.
- b. Do not under any circumstances attempt to tamper with or otherwise disassemble the smoke detector. This is both a health hazard and renders the smoke detector un-shippable as a device. These devices should be placed into a poly bag and sealed for further evaluation by a member of the Hazardous Materials or Radiation Safety Team.
- c. All radioactive smoke detectors should be surrendered to a member of the Hazardous Materials or Radiation Safety teams for disposal.

F. Emergency Contacts

EH&S Morningside Campus – 212-854-8749
EH&S Columbia University Medical Center – 212-305-0303
Nevis Laboratory – 914-591-8100
Lamont-Doherty Safety Department – 845-365-8822

G. Medical Surveillance:

N/A

H. Record Keeping

N/A

I. Appendices

N/A

J. Forms

N/A

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K. References

10 CFR 31.5 Certain detecting, measuring, gauging, or controlling devices and certain devices for producing light or an ionizing atmosphere.

L. Acknowledgements

N/A