

EH&S FACT SHEET

Environment, Health and Safety Information for the Berkeley Campus

Guidelines for Classifying Radioactive Sources as “Sealed Sources”

Introduction

At UC Berkeley, Radiation Use Authorizations (RUAs) are categorized as being one of three types: an “unsealed” radioactive material RUA, a “sealed” radioactive source RUA, or a “radiation producing machine” RUA. Depending on the RUA type, people who wish to be listed on the RUA are required to complete different types of initial training. In the case of radioactive material RUAs, if an RUA authorizes use of any radioactive material that is considered “unsealed,” then the RUA is categorized as an “unsealed” radioactive material RUA (this includes RUAs that authorize both “sealed” and “unsealed” radioactive material. Both training and radioactive materials handling requirements will depend on how the RUA is classified.

Generally speaking, sealed sources consist of:

“Any radioactive material encapsulated in such a way that it cannot be released under the severest conditions likely to be encountered during normal use” (i.e., permanently sealed in a capsule or closely bonded, in a solid form in such a manner that the radioactive material will not be released under the most severe conditions likely to be encountered in the transportation, use, or storage of the source. (UC Berkeley Radiation Safety Manual, Appendix J, <http://www.ehs.berkeley.edu/rs/130-radiation-safety-resources.html>).

“Sealed” Sources

1) “Sealed” Sources - For the purpose of categorizing radioactive material RUAs and determining the required handling and training, UC Berkeley treats all of the following types of radioactive material as “sealed” sources.

Note: Modification of sealed sources should never be undertaken without thorough review of the planned work by EH&S and modification of the RUA to describe the process and safety precautions. In addition, any modification of a sealed source may cause it to be reclassified as “unsealed” radioactive material.

a. “Check sources”, typically fabricated by depositing a small quantity (exempt or licensed) of radioactive material in the well of a plastic disk. The well is often filled with an epoxy, sealing the radioactive material inside the disk.

b. Sources that the manufacturer has classified according to ANSI/HPS N43.6-1997 or ISO-2919:1999(E).

c. Sources where the manufacturer has submitted information on the source model’s design, construction, and testing to regulatory authorities and been granted a Sealed Source & Device registry sheet and registration number (SS&D); e.g., CA0208D104S.



d. Sources in a gauge, instrument or other device where the manufacturer states that the source is a sealed source. (Devices containing sealed sources are also often registered by their manufacturer and a Sealed Source & Device registry sheet and registration number (SS&D); e.g., CA0208D104S). Examples include:

- Soil density and moisture gauges
- Industrial radiography devices
- XRF analyzers (e.g., Am-241)
- Self-shielded irradiators (e.g., Cs-137)

e. Any source or device, including those that are “Generally Licensed,” where the manufacturer specifies periodic leak testing (e.g., Po-210 static eliminator bars, Ni-63 GC foils).



“Unsealed Sources”

2) “Unsealed Sources” - For the purpose of categorizing radioactive material RUAs and determining the required handling and training, UC Berkeley treats all of the following types of radioactive material as “unsealed sources”:

- a. Sources fabricated by depositing a quantity (exempt or licensed) of radioactive material on a disk (even if radioactive material is covered with a Mylar or other film), unless it is accompanied by an SS&D that states the source is considered a sealed source.
- b. Sealed ampoules containing dispersible (liquid, gas, or powder) radioactive material.
- c. Any solid material in a form that could leach or otherwise become dispersible (e.g. flakes, powder, crystals, solid uranium chunks).
- d. Electroplated sources or foils containing quantity (exempt or licensed) of radioactive material.
- e. Assorted items containing radioactive material (e.g., watches, alarm clocks, Fiesta ware, tritium dials, accelerator targets, etc.).

3) On a case-by-case basis: Solid chunks of activated or other radioactive material that, even under extreme conditions, are not susceptible to crumbling, flaking, being inhaled, or causing contamination during the life of the material (considering potential deterioration) may be classified as “sealed sources.” The Radiation Safety Officer (RSO) has the ultimate responsibility for the classification of radioactive sources for the purpose of determining the RUA category and the required training of RUA personnel.

For additional questions or guidance, please contact EH&S at radsafety@berkeley.edu.

