



UCSB RADIOACTIVE WASTE PROCEDURES



SOLID WASTE

DEFINITION

Solid waste consists of dry materials (typically paper, plastics, glassware and gloves) contaminated with radioactivity.

PROHIBITED MATERIALS

Although small amounts of damp materials may be present, solid waste must not contain any freestanding liquids. (Free standing liquid is that amount that can readily run, and thus could easily be emptied from centrifuge tubes, pipettes, et cetera; it is not droplets retained in containers by surface tension or capillary action.)

Massive items (motors, centrifuges and heads, et cetera) that cannot be compacted shall not be placed in the solid waste receptacles. (Please contact Radiation Safety for specific disposal procedures.)

Solid waste must not contain hazardous chemicals and materials (EPA-RCRA) such as lead pigs, stock vials with remaining activity, or sealed sources. (Please contact Radiation Safety for specific disposal procedures.)

CONTROLLED MATERIALS

Small quantities of non-integral radioactive solids (e.g., dust, powders, fibers) must be sealed within plastic bags or plastic containers such as centrifuge tubes before being placed into solid waste receptacles. Please contact Radiation Safety when disposal of larger quantities of such materials is necessary.

Sharp objects, such as razor blades, needles, and broken glass, must be placed within puncture resistant containers before being placed into waste receptacles.

Biohazardous materials must be sterilized before being placed into waste receptacles. (Under no circumstances are animals, associated excreta, or tissue samples to be placed into solid waste receptacles.)

RADIONUCLIDE SEGREGATION

All solid waste must be segregated into three classes of receptacles, based upon the half-lives of contaminating radionuclides:

" $T_{1/2} < 14$ days" Radionuclides with half-lives of 14 days and less (e.g., P-32, In-111, etc.). *All radioactive markings and symbols must be removed or obliterated.*

" $T_{1/2} < 90$ days" Radionuclides with half-lives of 90 days and less (e.g., S-35, I-125, Cr-51, P-33, etc.) whether alone or combined with shorter-lived isotopes from multiple label experiments. *All radioactive markings and symbols must be removed or obliterated.*

"All Isotopes" Radionuclides with half-lives greater than 90 days (e.g., H-3, C-14, etc.), whether alone or combined with shorter-lived isotopes from multiple label experiments



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LIQUID WASTE

DEFINITION

Liquid waste may consist of a variety of chemical constituents; provided that the waste is homogeneous, is "pourable," and is segregated by radioactive half-life.

PROHIBITED MATERIALS

Although small amounts of non-soluble materials may be unavoidably present, liquid waste should generally not contain solid materials, especially plastic laboratory equipment such as pipette tips, microcentrifuge tubes, etc. (Please indicate on the waste pickup form if waste does contain solids and/or precipitates.)

CONTROLLED MATERIALS

Biohazardous liquids must be sterilized before being placed into waste containers. (Under no circumstances are animal excreta or homogenized tissue samples to be placed into liquid waste containers; these should be disposed of according to animal disposal policies.)

Small volumes of high concentration radioactive liquids (e.g., stock solutions) should not be placed into liquid waste containers. Instead, such liquids should be capped and stored separately for disposal by Radiation Safety.

CHEMICAL/ PHYSICAL SEGREGATION

We strongly discourage the generation of radioactive organic solutions and/or hazardous materials (EPA-RCRA). When generation of such organic/hazardous waste solutions is unavoidable, it is preferable to segregate them from non-hazardous aqueous solutions.

Note: Although polymerized acrylamide may be present, liquid waste containing such material must meet the basic standards of being homogeneous and pourable; solutions that are not homogeneous may be returned to generators for separation.

In all cases, radioactive waste must be fully and accurately described on waste pickup forms.

RADIONUCLIDE SEGREGATION

All liquid waste must be segregated based upon the half-lives of dissolved radionuclides:

" $T_{1/2} < 14$ days" Radionuclides with half-lives of 14 days and less (e.g., P-32, In-111, etc.).

" $T_{1/2} < 90$ days" Radionuclides with half-lives of 90 days and less (e.g., S-35, I-125, Cr-51, P-33, etc.) whether alone or combined with shorter-lived isotopes from multiple label experiments.

"All Isotopes" Radionuclides with half-lives greater than 90 days (e.g., H-3, C-14, etc.).



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ANIMAL WASTE

DEFINITION

Animal waste consists of carcasses, tissue samples, and excreta that may contain radioactive materials. (Animal waste does not include microscopic tissue sections or slides.)

VOLUNTARY SEGREGATION

Animal waste may be voluntarily segregated on the basis of radionuclides and their concentrations:

"Non-Radioactive" Animal Waste: Contains H-3 and/or C-14 at a concentration of less than 0.05 uCi/ gram, averaged over the entire mass of the animal carcass, tissue, and/or excreta. Such waste may be disposed of through regular Campus procedures and animal waste contractors, provided that written records are maintained of pertinent radionuclides, activities, waste masses, and disposal dates.

Radioactive Animal Waste: All animal waste that does not qualify as non-radioactive on the basis of H-3 and C-14 concentrations.

PREPARATION FOR RADIOACTIVE DISPOSAL

Animal waste must be carefully prepared before pickup by Radiation Safety Personnel:

- All Biohazardous waste must be sterilized;
- All waste must be double bagged or placed inside airtight plastic containers;
- All waste must be either completely frozen or dry at the time of pickup.

MISCELLANEOUS

Contact the Radiation Safety Office for detailed instructions concerning the disposal of radioactive materials that do not fall within the categories defined here.

One broad class of such waste includes items like lead pigs, stock vials (with or without remaining activity), high concentration solutions (~100 uCi l ml), and radioactive sealed sources. Most such items can be disposed of by Radiation Safety without-charge to generators.



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SCINTILLATION WASTE

DEFINITION

Scintillation waste consists of liquid scintillation cocktails (including dissolved or suspended samples), auto radiography enhancement solutions, and associated containers such as counting vials.

Campus policy defines all scintillation media to be "hazardous" and/or "radioactive" waste, regardless of statements by manufacturers and non-detectability of radioactivity. All such waste must be disposed of through the Radiation Safety Office.

SEGREGATION

All scintillation waste should be segregated into two classes based upon the particular dissolved radionuclides:

C-14 and H-3 may be grouped together.

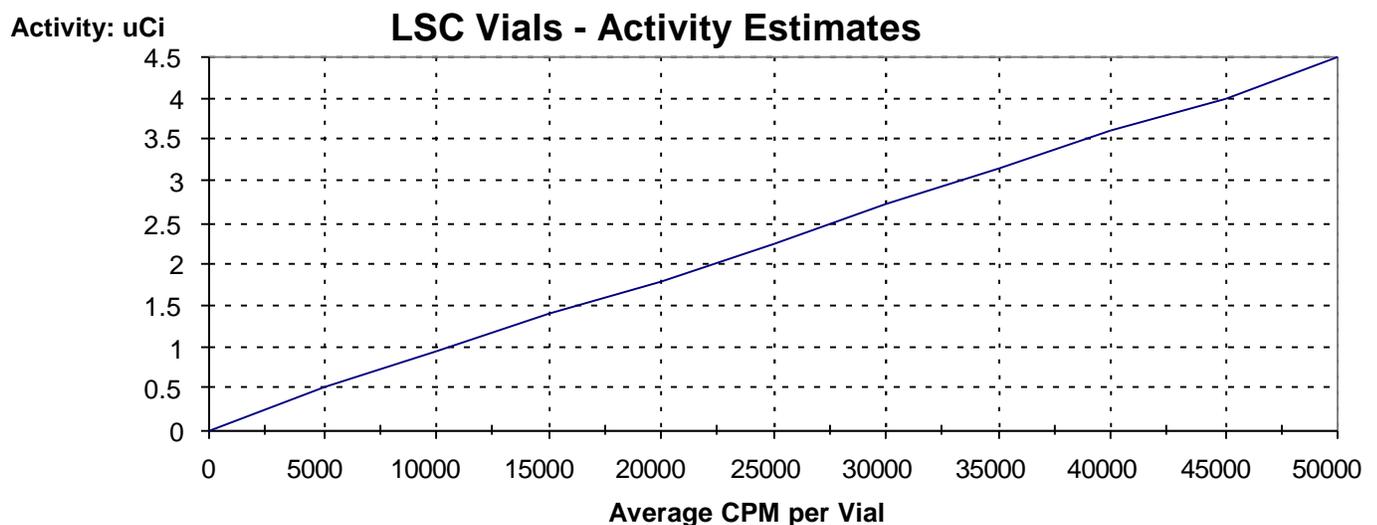
Keep short lived isotopes (e.g., P-32, In-111, etc.) separate.

All other isotopes should be grouped together.

PACKAGING AND ACTIVITY ESTIMATES

Scintillation waste shall be packaged for pickup as either vials in the original trays, bulk vials in plastic lined fiberboard boxes, or bulk liquids in original containers or impermeable carboys supplied by the Radiation Safety Office.

Qualifying scintillation media for disposal as simple, hazardous waste requires accurate activity estimates. Please consult the following chart when preparing waste forms



NOTE: assumes 50% LSC efficiency