

RI-13

RI-13 RADIOISOTOPE ACQUISITION AND DISPOSITION

PURPOSE

This procedure specifies measures for the control of radioactive materials from initial acquisition to final disposition. It describes the prerequisites for acquiring radioactive materials. It specifies the procedures and forms for surveying and reporting the receipt of packages of radioactive materials, for maintaining radioactive inventory records, and for reporting all transfers and disposals of radioactive materials. Radioactive waste categories are described, along with acceptable methods for segregation, packaging, labeling and reporting the disposal of such wastes.

RULES AND REGULATIONS

Radioactive materials and ionizing producing machines may be used for any legitimate educational, clinical or research purpose. However, they may be purchased, or otherwise obtained, only by individuals specifically authorized by the Radiation Safety Committee. **The use of radioactive materials or ionizing producing machines is conditional upon compliance with specific procedures established by the Committee.**

The receipt of any radioactive material or radiation producing machine, regardless of the manner in which it is obtained must be reported promptly to the RCO on a form provided for that purpose.

Each user of radioactive material or ionizing producing machine shall maintain a complete record of all acquisitions, uses, transfers and disposals of such materials and provide this data to the RCO in a timely manner. **Before any radioactive material or ionizing producing machine may be transferred to another principal user, or to another organization, authorization must be obtained from the RCO.**

Radioactive waste materials must be properly segregated, packaged and labeled by the user prior to collection for disposal. For the safety of all personnel involved in radioactive waste disposal, users must take all reasonable precautions to deactivate, detoxify and neutralize hazardous waste materials. All radioactive waste materials must be prepared and labeled properly before they will be picked up for disposal; wastes improperly prepared or labeled may be returned to the user for reprocessing or repackaging under the supervision of the RCO.

DEFINITIONS

"**Animal**" waste means carcasses or parts of animals administered radioactive materials; it also includes collected excreta and combustible bedding materials, e.g. shavings or sawdust.

"**Aqueous**" means a liquid that is soluble or readily dispersible in water and which **contains no chemicals classified as toxic or hazardous**; within the CSU regulations for release of radioactivity, aqueous liquid wastes may be discarded to the sewer.

"**Compactible**" waste means any solid, nonputrescible, dry waste, e.g. paper, plastics, glassware and metals, that does not contain any compressed gases, pyrophoric or other hazardous materials, including lead.

"**Flammable**" for purposes of this procedure, means any combustible, flammable or ignitable liquid.

"**LS media**" means any mixture of solvents and fluors used for liquid scintillation counting.

"**NHNT**" means nonhazardous, nontoxic, non-flammable media that may be classified as an aqueous liquid for disposal.

"**Pathogenic**" means any material potentially containing pathogenic organisms, toxins, infectious agents, etc.

"**Sharps**" means needles and syringes, glass pipets, broken glass, or any other objects that might puncture the plastic liner of the waste container.

"**Toxic**" refers to any material that is toxic or poisonous to humans.

RADIOISOTOPE INVENTORY RECORDS

Purchase Orders

All purchases of radioactive materials must be initiated on a Requisition submitted to the Purchasing Department. The requisition must contain the name of the principal user and an accurate description of the radioactive material, including the isotope (e.g. P-32) and the total activity, e.g. millicuries, **not just a catalog number**. For CIS orders, the subcode 3900 must be used. If the order is for an authorized isotope and quantity, the order will be processed promptly; otherwise the requisition may be returned to the purchaser until proper authorization is obtained. (Example: NEG-009C, S-35, 5 millicuries, Methionine, John Doe)

Radioactive Material Control Records

A serially numbered form is used for tracking radioactive material from the time it arrives at the University until it is transferred or disposed of as waste. For radioactive materials acquired through normal purchasing channels, the forms for reporting the contamination survey of a package, for verification of its contents and for reporting the disposition of the material will be initiated by the RCO. For materials acquired by any other means, the user is responsible for promptly notifying the RCO and providing the information necessary to initiate the form(s).

Package Arrival Report (RF-13A) (Completed by RCO)

When radioactive material is received, the record is initiated by entering the identification of the user, the material, and the results of the external survey of the package. The RF-13A form is forwarded with the package to the user. The individual receiving the package in the laboratory will sign the form signifying receipt of the material.

Fill out the form completely. If the information asked for does not apply to the procedure put N/A. This may apply to the count time for survey instruments or to the CF (calibration factor) if the instrument is directly calibrated for exposure.

The "Inv #" is assigned by the RCO computer data base. **For material that is received directly by the laboratory, the RCO must be contacted for an "Inv #" and a copy of form RF-13A is required to be sent to the RCO.** The "Exposure Rate Survey Results" and "Contamination Survey Results" are calculated using the table. The "Model" and "Serial Number" are located on the instrument. The "Calibration Date" and "Calibration Factor" should be located on the side of the instrument. The "Efficiency" will have to be determined for the instrument used to count the wipe. The following calculations are used to calculate the "Efficiency", "Net Count Rate", "Contamination Level" and "Exposure Rate".

$$\begin{aligned} & \text{"Efficiency" (cpm/dpm):} \\ & (\text{Standard cpm})/(\text{Standard dpm}) \end{aligned}$$

$$\begin{aligned} & \text{"Net Count Rate" (cpm):} \\ & \text{Total Count Rate (cpm) - Background (cpm)} \end{aligned}$$

$$\begin{aligned} & \text{"Contamination Level" (dpm/cm}^2\text{):} \\ & (\text{Net Count Rate / Efficiency}) / (\text{Area Wiped (cm}^2\text{)}) \end{aligned}$$

$$\begin{aligned} & \text{"Exposure Rate" (mR/hr):} \\ & \text{Net Count Rate / CF} \end{aligned}$$

If the exposure rate is < 0.5 mR/hr at the surface, check the appropriate box under "Exposure Rate Survey Results". If the exposure rate is > 0.5 mR/hr, write the

exposure rate in the space provided. If the exposure rate is > 0.5 mR/hr an exposure rate at 1 meter also has to be measured and recorded on the form.

For the "Contamination Survey Results" at least 300 cm^2 of the package must be wiped. If the wipe test is $< 20 \text{ dpm/cm}^2$ (beta and gamma emitting nuclides only. Alpha emitting nuclides have a limit 2 dpm/cm^2), check the box under "Contamination Survey Results". If the wipe test is $> 20 \text{ dpm/cm}^2$, write the results in the space provided and contact the RCO immediately. Make sure the person performing the survey signs and dates the form.

Receipt and Verification (RF-13B) (Completed by User)

Each new acquisition of radioactive material is reported on the "RADIOISOTOPE RECEIPT AND VERIFICATION" form (RF-13B). This form is for the user to survey the inner container and packing materials for contamination according to the instructions provided on the form. Any damage to or leakage from the package must be reported immediately to the RCO. Any discrepancy in the package contents is to be noted on the form, but **no radioactive materials are to be returned to the vendor without notification of the RCO**. The survey data and verification of the package contents are to be recorded and the form returned promptly to the RCO.

The calculations given for RF-13A can be used for this form. Check to make sure that the package contains only 1 item and check the appropriate box on the form and put 0 after "This package contains". If the package contains more than 1 item, record the number of items in the package, check the box, obtain Inv. #(s) for the other items and record the Inv. #(s) (Nos.) on the form. Check to make sure that the inventory number is in one container, check the appropriate box on the form and put 1 after "This inventory item is in". If the inventory number is in two containers, check the box and put the number of containers the inventory number is in after "This inventory item is in". For "PACKAGE RECEIVED IN GOOD PHYSICAL CONDITION?" either circle "Yes" or describe the condition. If the package is damaged this also needs to be noted. If the package has contamination, but is below the limits, note this on the form. If the package has contamination on the interior, check "Yes" for "DID INTERIOR WIPE TESTS SHOW CONTAMINATION?" otherwise check "No". Make sure the person surveying the package signs and dates the form.

Disposition Record (RF-13C)

The disposition of radioactive material is to be recorded on the "RADIOISOTOPE DISPOSITION RECORD". To avoid incomplete records and possible oversights, the disposition of material should be recorded on the disposition form. However, the material will not be removed from the computerized inventory until the waste material is removed from the lab.

To minimize errors in calculation of the activity used or disposed of at various times, **dispositions should be reported as percentages or activities of the original quantity**, without regard to the radioactive decay or subsequent dilutions. Quantities should not be reported as actual activities, e.g. microcuries or millicuries, when decay corrections are performed. The reported dispositions must account for the original quantity within a reasonable degree of accuracy or the form will be returned to the user for correction.

For sewer releases (S category), the "Waste Tag No., Location, Name of Recipient" would be the location of the approved disposal sink. The "S" category would be circled and the "Amount", the units, the " $\mu\text{Ci/ml}$ " before pouring is initiated, the "Initials" of the individual pouring the material and the "Date" must be completed.

For transfers (T category) the "Waste Tag No., Location, Name of Recipient" would be the PU or institution receiving the material. The "T" category would be circled and the "Amount", the units, the "Initials" of the individual transferring the material and the "Date" must be completed. Transfers must be approved by the RCO before the transfer is initiated.

For waste containers (A, D, F, N categories), the "Waste Tag No., Location, Name of Recipient" would be the RCO approved waste container number. The appropriate category would be circled and the "Amount", the units, the "Initials" of the individual placing the waste in the waste container and the "Date" must be completed.

For location of the material in the laboratory, the "Waste Tag No., Location, Name of Recipient" would be location where the material is stored. The "A" category would be circled and the "Amount", the units, the "Container Description", the "Initials" of the individual placing the material in the storage location and the "Date" must be completed. If material is removed from the storage location, the "R" category would be circled and the "Amount", the units, the "Initials" of the individual removing the material from the storage location and the "Date" must be completed.

Transfers to Other University Users

Radioactive materials may be transferred between principal users provided that the user possessing the material has checked with the RCO to verify the authorization of the receiving user and that the transfer is reported properly. The first user must record the transfer on the original "RADIOISOTOPE DISPOSITION RECORD" (RF-13C) and the receiving user must initiate a new form to record the disposition of the material. The Inv. # for the new Principal User is the same as the original Inv. #.

Radioactive materials transferred by vehicle across public roads must be packaged and labeled in accordance with US Department of Transportation regulations. Follow the instructions in RI-14, "SHIPMENT OF LIMITED QUANTITIES OF RADIOISOTOPES."

Transfers to Non-University Users

The user who wishes to send radioactive material to another institution must notify the RCO of the intended transfer. **The user must not transfer any material until specific approval is received from the RCO.** The RCO must obtain written confirmation of the other institution's license before the transfer is made and must verify that the material is shipped in accordance with the regulations of the US Dept. of Transportation. Refer to "SHIPMENT OF LIMITED QUANTITIES OF RADIOISOTOPES" (RI-14) for instructions.

Radioisotope Package Sticker (RF-13E)

Once the RCO has completed RF-13A, the RF-13E sticker will be placed on the package to insure the package has been surveyed and added to the inventory of the PU.

Radioisotope Inventory Record (RF-13G)

The "RADIOISOTOPE INVENTORY RECORD" (RF-13G) is an optional form to aid radiation users in accounting for storage of radioisotopes. Each "RADIOISOTOPE INVENTORY RECORD" sheet should be used for only one storage location (e.g. freezer 1 or storage room 16B). When radioactive material is added to or removed from a storage location, this can be reflected on form RF-13G. This is especially helpful when a shipment is split into working solutions and the solutions are stored in several containers. The addition "A" of an inventory number would be circled and the appropriate information completed on form RF-13C. Once the inventory number is completely removed from the storage location, the "R" category can be circled.

HAZARDOUS CHEMICALS AND MIXED WASTES

When radioactivity is mixed with any material classified by the US Environmental Protection Agency as hazardous (ignitable, corrosive, reactive or toxic), the result is a "**mixed waste**". Disposal of mixed wastes is extremely difficult and expensive. The use of flammable LS media and other hazardous chemicals that result in mixed wastes must be justified in writing and approved by the Radiation Safety Committee.

Any waste container of mixed waste must have an RF-13I label. The date when the first drop or piece of mixed waste is put into the container has to be entered into the "Accumulation Start Date". The "Generator's Full Name and Department" must also be entered. An acceptable generator can only be an individual that has certified

CSU module-3 training and has certified CSU hazardous waste training. The hazardous material (other than radionuclides) has to be entered on the "Request for Disposal" section on the back of the form as required by the CSU Hazardous Chemical Waste System Manual.

DISPOSAL PROCEDURES

Empty Containers

If an empty radioisotope container is not contaminated, it should be disposed of as nonradioactive trash. **All radiation symbols and warning labels must be obliterated before an empty container is discarded.** Discarded lead containers cannot be disposed through the regular waste and therefore must be kept separate.

Uncontaminated Dry Wastes

Whenever possible, potentially contaminated waste materials, e.g. gloves, absorbent paper, etc., should be surveyed before disposal. **If the absence of radioactive contamination can be verified, remove or obliterate all radiation labels and discard the material as ordinary trash.**

Since tritium (^3H) cannot be detected by direct survey, materials potentially contaminated with tritium must be surveyed by wipe tests or assumed to be contaminated. For other low-energy beta emitters, e.g. ^{14}C , ^{35}S , etc., direct surveys are possible on directly accessible surfaces, but may miss contamination embedded in absorbent materials. For high-energy beta (e.g. ^{32}P), x-ray (e.g. ^{125}I) or gamma (e.g. ^{24}Na) emitters, direct surveys with appropriate instruments can usually detect contamination even when embedded in absorbent material.

Compactable Dry Radioactive Wastes

Solid wastes containing no hazardous, toxic, putrescible or pyrophoric materials, no compressed gases and no free liquids are collected and handled as compactable dry waste. The RCO will provide a covered metal or plastic pail of an appropriate size. The RCO will also provide labels and plastic bag liners. Any solid wastes that would be dangerous if compacted must be segregated and clearly labeled. Syringes, needles, pipets, etc. must be placed in standard "sharps" or other puncture-proof containers. Wastes containing *only* nuclides with half-lives of less than 100 days and no "RADIOACTIVE MATERIAL" labels shall be packaged separately for disposal by radioactive decay. As materials are added to a container, the "INV #" should be recorded on the "RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL" form (RF-13D) and the required information on the "RADIOISOTOPE DISPOSITION RECORD" (RF-13C).

Disposal to the Sewer System

Liquid radioactive wastes should be released to the sanitary sewer if they meet any one of the following criteria:

1) Small quantities of radionuclides that are readily soluble or dispersible in water, and contain non-toxic or non-hazardous substances, may be released to the sewer without prior approval of the RCO provided that they are not above the concentration limits set by the State for sewer discharge (section 4 table II, RI-10), that they have a half-life <16 days and that the release is recorded on the "RADIOISOTOPE DISPOSITION RECORD" (RF-13C) for subsequent summarization on the "RADIOISOTOPE MONTHLY SEWER DISPOSAL RECORD" (RF-13H). **Release of radioactive material with half-lives >16 days must be approved by the RCO.** Any sink to be used for sewage disposal of radioactive materials must be approved by the RCO and shall be identified with a "CAUTION RADIOACTIVE MATERIAL" label on the drain trap as well as on the top of the sink.

2) Waste water from washing of contaminated persons or equipment containing more than 0.1 ALI per emergency contamination incident may be released to the sewer provided that the RCO is contacted after the release and that the total activity released is estimated with reasonable accuracy.

3) Excreta from human patients administered radionuclides for diagnostic or therapeutic purposes may be released directly to the sanitary sewer system regardless of total activity or concentration.

Subject to the preceding criteria, users are encouraged to utilize the sewer for disposal of biological active liquid wastes, for excreta from experimental animals, and for wash water from animal cages, laboratory glassware, etc. Although it is often advantageous or even necessary to collect and store radioactive wastes containing short-lived nuclides in order to take maximum advantage of decay prior to release, no such benefit is obtained by collection and storage of long-lived nuclides.

Liquid Waste Collection and Segregation

Any radioactive liquid wastes that cannot be released to the sanitary sewer system under the criteria specified above are to be segregated and collected for disposal by the RCO. Separate containers are to be provided for materials, which would be incompatible if placed in the same container, e.g. aqueous solutions and organic solvents, as well as for nuclides with different half-lives. **All liquid waste containers must have the "Request for Disposal" section completed on the back of the form.**

Liquid waste containers are to be non-breakable, e.g. plastic jugs or metal cans, capable of a leak tight closure (leave at least 1 inch of head space in the containers)

and are to be placed in a secondary container of sufficient volume to collect all of the liquid in the event of a leak in the primary container (waste bucket with liner). The RCO has 5-gallon carboys for liquid waste. A secondary container is also included with the 5-gallon carboy (leave at least 1 inch of head space in the carboy). Aqueous wastes must be neutralized to prevent violent chemical reactions when the wastes are transferred. Organic solvents and other hazardous materials must be clearly and completely identified to permit safe handling and disposal. No solid objects are to be placed in any liquid waste container and the materials must be sufficiently fluid to be poured from the container, even after storage for decay.

Biologically active materials are to be deactivated or detoxified at the time they are placed in the waste containers. A chlorine disinfectant (e.g. Chlorox brand liquid bleach) should be added to putrescible liquid wastes to retard putrefaction; the quantity depends on the concentration of organic material in the waste. Care must also be taken to avoid a reaction between the waste and the disinfectant. Bleach solutions will volatilize some radionuclides such as ^{35}S . Contact the Hazardous waste coordinator and the Biosafety Officer at Environmental Health Services for any questions.

Frequent additions to a liquid waste container from a single inventory item are required to be recorded and summed on the "RADIOISOTOPE DISPOSITION RECORD" (RF-13C). The total activity of each inventory number and the assay date of the radionuclide activity shall be recorded on the "RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL" form (RF-13F) before the container can be accepted for final disposal.

Liquid Scintillation Media and Vials

Users are required to use nonhazardous, nontoxic (NHNT) LS media to the maximum extent that is compatible with research requirements. The use of flammable or otherwise hazardous LS media must be justified in writing and approved by the Radiation Safety Committee.

Used vials are to be securely capped and are to be segregated, according to the LS medium and the radionuclides they contain, into one of the following categories:

- 1) Vials containing only "NHNT" media, half-life dependent.
- 2) Any hazardous cocktail containing only ^3H and/or ^{14}C
- 3) Any hazardous cocktail containing only ^3H , ^{14}C and/or short-lived nuclides, (half-lives <100 days) should be further segregated by nuclides.
- 4) Any hazardous cocktail containing long-lived nuclides other than ^3H or ^{14}C .

"RADIOACTIVE MATERIAL" labels should be obliterated or removed from all vials, trays, bags and boxes of vials before they are transferred to the RCO for disposal. No other waste material should be placed in waste containers containing vials. All vial waste containers must have the "Request for Disposal" section completed on the back of the form.

Animal Wastes

The RCO has very limited space for storage of animal wastes. The user generating animal wastes must provide sufficient freezer space for storage of such wastes for at least one month before collection. Notify the RCO when animal wastes are awaiting collection; the RCO will make arrangements for packing and picking up the waste.

Animal packaging requires a mixture of absorbent and lime as required by the RCO. Large animals should be dismembered so that each package contains no more than 10 kg. No other material, e.g. plastic containers, glassware, syringes, needles, etc. may be packaged with animal waste. Combustible bedding materials, e.g. shavings or sawdust, may be collected in standard waste containers.

SPECIAL WASTES

Any radioactive wastes not included in the above categories, or exhibiting unusual hazards, or requiring special precautions of any kind, are handled under special arrangements with the RCO. Costs associated with handling, packaging, and/or disposal of abnormal radioactive wastes may be charged to the principal user with approval of the RSC. Whenever unusual wastes are anticipated, the user should contact the RCO to plan for disposal before the wastes are generated.

LABELING OF RADIOACTIVE WASTES AND WASTE DISPOSAL FORMS

All containers in which radioactive wastes are collected must be labeled "CAUTION -RADIOACTIVE MATERIAL" or "CAUTION - RADIOACTIVE WASTE". Packages in which radioactive wastes are stored or transported must be labeled with a "RADIOACTIVE WASTE TAG". The tag must be completed and attached to each radioactive package before it will be accepted for disposal. Include on the tag the "ISOTOPE"(s) , the activity(s) "AMOUNT"(s) of the isotope(s), the "PAIL #", "ASSAY DATE"(s) relative to the activity in the waste container, the principal user "PU" and the "TYPE" of waste in the container. The back of the tag may be used if additional room is needed. The "RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL FORM" (RF-13F) must also be filled out completely and sent to the RCO for approval before the waste will be picked up.

- 1) Each package may contain only one material category of waste and must be labeled with its own tag and have its own "RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL FORM" (RF-13F) on bright yellow paper.**

- 2) Remove or obliterate any radioactive materials stickers in the waste.
- 3) Complete the waste tag as discussed above.
- 4) **Principal User:** The person under whose name the project is registered with the RCO.
- 5) **Department:** The department that the PU works in.
- 6) **Date:** The date the form was completed or submitted to the RCO
- 7) **Person Preparing Form:** This is a person officially assigned to the project who is qualified to work with the radioactive materials in the waste. This person must have taken and passed module-3.
- 8) **Phone:** The telephone number of the individual completing the form.
- 9) **Laboratory Code:** Available to the lab for tracking / recording purposes.
- 10) **Total No. of Pails:** The number of pails to be disposed under this request.
- 11) **Sheet_of_:** If additional sheets are required.
- 12) **Location of Waste:** The building and room where the waste may be picked up. Only labs officially listed in the project description should be listed. RAM waste will not be picked up from closets, storage rooms, machinery rooms or other unsecured areas.
- 13) **Phone:** Telephone number where waste is located.
- 14) **Special Handling:** Attach a sheet if RCO personnel should be aware of any special precautions concerning the waste. Wipe test results may also be attached. Mark "YES" on the form, or mark "N/A" if this line is not applicable.
- 15) **Pail Type:** Mark the type of pail that the waste is in.
- 16) **Pail No.:** The number on a small yellow tag near where the bail is attached.
- 17) **Waste Class:** Check the boxes appropriate to the waste. Long and short half-life is divided at 100 days.
- 18) **Isotope Table:** List the individual inventory information in the waste. This is easily determined by using the RF-13C form. The "DATE" should be the assay

date activity. Mark the activity units clearly. List the Inv. #, % of original activity for the radioactive material in the pail. Each inventory number should be entered only once with a total activity. If the Inv. # will be totally disposed once the waste is picked up by the RCO, check the INV # Totally Disposed box. The back of the form has additional space for this information.

- 19) Waste Volume/Weight:** Record the volume of the *waste* in gallons (gal.). If the waste is liquid, record only the volume of the liquid and not the volume of the containers. Record the weight of the waste exclusive of the container. The tare weight of an empty 5 gallon metal pail with lid, liner and lock rings is ~1.4 lbs. The tare weight of an empty 5 gallon plastic pail with lid and liner is ~2.4 lbs.
- 20) Highest Exposure Rate at Surface:** Measure the highest exposure rate at the surface of the pail. **DO NOT list "cpm"**. Use the calibration information on the side of the survey meter to record the exposure rate. **Tritium only labs without survey meters** may list "N/A". **DO NOT** list as "background" or "2 x background", etc. (See calculations in previous section)
- 21) Highest Wipe Activity:** List the highest wipe net activity found. Five wipes should be taken: [1] Lid (~700 cm²); [2] Upper half of pail (~1550 cm²); [3] Lower half of pail (~1550 cm²); [4] Bottom (~700 cm²); [5] Background. **DO NOT** list in "cpm". The following equation should be used to calculate net dpm/cm².

$$\frac{\text{Sample cpm} - \text{Background cpm}}{\text{Efficiency of the detector (cpm/dpm)} * \text{Area of Wipe (cm}^2\text{)}}$$

- 22) Describe Waste:** Briefly indicate the contents of the pail. (Example: Paper, plastic and glass lab trash or 145 ea. 7 mL plastic LSC vials or Rat dissection waste.)
- 23) Sharps:** Sharps (broken glass, needles etc.) must be packaged in a puncture proof container to prevent tearing of the pail liner and to protect RCO personnel that inspect and/or repackage the waste for final disposal. Circle "YES" if sharps are contained. Otherwise circle "NO" if the waste does not contain sharps.
- 24) Replacement Pail:** Circle "YES" if you need an identical pail. Attach a note if you need additional types of pails. Otherwise circle "NO".
- 25) BioHazards:** BioHazards or infectious waste must be disinfected before placing it in the pail. The method of disinfecting (e.g., autoclave, Clorox etc.) must be stated along with the person that certified that it is no longer a BioHazard. Consult the CSU Biosafety Manual, or contact EHS for help.

26) **Liquid or Mixed Waste:** Complete the "Request for Disposal" section on the back of the form as required (see previous comments)

27) **Generator's Certification:** The principal user or an individual authorized by the RSC must certify by his/her signature that the listed information is correct. For individuals other than the principal user, form RF-13J must be completed and submitted to the RCO for approval by the RSC.

Packages that are incompletely or inadequately labeled, or that in any other way do not comply with the criteria contained in this procedure, will not be accepted for disposal.

PAIL MARKINGS

The following markings are on the pails in various combinations for waste material:

Green = Half-life <100 days
Yellow = Half-life >100 days
Blue = Liquid
Black = Dry-Solid
Red = Mixed Waste (Hazardous and Radioactive)
White = Non-Hazardous Waste (Radioactive Only)

WASTE COLLECTION

Radioactive wastes of all types are collected on regularly scheduled days. Otherwise, users must call the RCO to request pickup of the waste. To avoid running out of space in waste containers, it is important to request pickup several days before the container will actually be filled. The RCO cannot guarantee waste collection on unscheduled days.

PROTOCOL FOR DISPOSAL OF SHORT-LIVED WASTE - IN-LABORATORY PROCESSING

1. Laboratory waste should be stored for decay 10 half-lives from the most recent Assay date of the inventory number listed within the container contents. I.E. - The most recent date of P-32 Inventory number in the bucket indicates an assay date of August 1 2004. The half-life is 14 days. The waste should be stored 140 days from the most recent assay date, thus the bucket should not be considered for disposal until December 18, 2004.
2. Once the disposal date is set, the waste container can be processed for disposal.

3. Dry waste must be surveyed with a Geiger Counter or appropriate survey meter as the waste is being discarded in regular trash. This requires the worker to wear proper personal protective equipment including eye protection, lab coat, latex gloves, complete coverage of the legs, and close-toed shoes. As the worker is handling/transferring the trash from the radiation waste bucket to the regular trash, the Geiger Counter must be used to survey the inner-most portions of the waste. This would include unraveling any taped or bundled waste as to allow a complete survey of the waste. Levels that are found to exceed 3 std deviations above the mean background should cause the waste to be immediately returned to the container. The container should then be returned back to storage. The worker must also verify that no radiation waste stickers (or labels, lead pigs, liquids, bio-hazard bags, or sharps) are discarded without being completely marked out with a permanent black marker or defaced beyond recognition.
4. Liquid waste must be sampled and counted before it can be discarded in the sewer system. Radioactive waste disposed down the sewer must be reported to the Radiation Control Office on the RF-13H form. A sample should be taken from a bulk liquid carboy of approximately 10 mL. Liquid scintillation cocktail should then be added to an LSC vial and counted. If the sample exceeds the 3rd std. deviation of the mean background, the container should be returned to storage for further decay. If it is less than the upper control limit, the liquid waste can be discarded through the sewer system. Only P-32 waste is permitted to be disposed in this manner. Vial waste must be individually tested prior to disposal in the same manner described above.
5. All in-lab processing of short-lived radioactive waste must be reported to the Radiation Control Office on the RF-13C Form and the RF-13H form if appropriate. The total activity (non-decayed) needs to be reported so that the full amount may be removed from a Principal User's overall inventory. Records of disposals must be retained for 5 years.
6. Please inform the RCO to verify these procedures before conducting in-lab processing of radioactive waste.

The notice on the following two pages can be posted at the radioactive waste collection locations to remind users of the RCO requirements.

RADIOACTIVE WASTE INSTRUCTIONS

POST NEAR THE RADWASTE COLLECTION AREA

ALL USE OF RADIOACTIVE MATERIALS IS CONDITIONAL UPON COMPLIANCE WITH THE FOLLOWING REQUIREMENTS FOR PACKAGING AND LABELING RADIOACTIVE WASTES. NONCOMPLIANCE WILL NOT BE TOLERATED, SINCE IT JEOPARDIZES ALL LEGITIMATE USES. WASTE PACKAGES ARE BEING INSPECTED; **IMPROPERLY PACKAGED OR LABELED WASTES MAY RESULT IN IMMEDIATE CURTAILMENT OF THE USE OF RADIOACTIVE MATERIAL.**

1. COMPLETE FORM RF-13A, IF APPLICABLE, FORMS RF-13B, RF-13C AND FORM RF-13F AND **SEND A COPY TO THE RADIATION CONTROL OFFICE.**
2. ALL RADIOACTIVE WASTES **MUST BE PROPERLY SEGREGATED - BY MATERIALS AND IF POSSIBLE BY NUCLIDES.**
3. ALL **SHARP OBJECTS** MUST BE PLACED IN SEPARATE "SHARPS CONTAINERS".
4. **LEAD** MUST BE KEPT SEPARATE.
5. THE RADIOACTIVE WASTE TAG AND RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL FORM **MUST BE FILLED OUT COMPLETELY AND ACCURATELY, SIGNED AND DATED, BEFORE THE WASTE WILL BE ACCEPTED.**
6. THE ACTIVITY OF EACH NUCLIDE MUST BE ESTIMATED AS ACCURATELY AS POSSIBLE AND MUST BE CLEARLY SPECIFIED AS MILLICURIES OR MICROCURIES.
7. IN ADDITION TO CHECKING THE APPROPRIATE CATEGORIES, THE RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL FORM **MUST INCLUDE A DESCRIPTION OF THE WASTE**
8. **CHEMICAL CONSTITUENTS OF THE WASTE MUST BE IDENTIFIED BY NAME IN THE REQUEST FOR DISPOSAL SECTION. SCINTILLATION FLUORS MUST BE IDENTIFIED BY COMPLETE CHEMICAL COMPOSITION IN THE REQUEST FOR DISPOSAL SECTION.**
9. **OBLITERATE ALL "RADIOACTIVE MATERIAL" TAPE OR LABELS. NOTE THAT "OBLITERATE" MEANS TO "REMOVE ALL TRACES, OR DESTROY COMPLETELY."**
10. SEND THE RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL FORM AT LEAST 2 DAYS BEFORE IT BECOMES URGENT TO THE RCO.

If you have any questions or problems. call the RCO

MIXED WASTE – Any waste container of mixed waste must have an RF-13I label on the container. The date when the first drop or piece of mixed waste is put into the container has to be entered into the “Accumulation Start Date”. The “Generator’s Full Name and Department” must also be entered. An acceptable generator can only be an individual that has certified CSU module-3 training and has certified CSU hazardous waste training. The hazardous material (other than radionuclides) has to be entered as required by the CSU Hazardous Chemical Waste System Manual in the Request for Disposal section.

DRY WASTE – Solid wastes containing no hazardous, toxic, putrescible or pyrophoric materials, no compressed gases and no free liquids or vials. Any solid wastes that would be dangerous if compacted must be segregated and clearly labeled. Wastes containing only nuclides with half-lives of less than 100 days with no “RADIOACTIVE MATERIAL” labels shall be packaged separately to be disposed of by radioactive decay.

LIQUID WASTE – Separate containers are to be provided for materials, which would be incompatible if placed in the same container as well as for nuclides with different half-lives. Liquid waste containers are to be non-breakable, e.g. plastic jugs or metal cans, capable of a leak tight closure and are to be placed in the waste container (waste bucket with liner) provided by the RCO. Leave at least 1 inch of headspace. No solid objects are to be placed in any liquid waste container and the materials must be sufficiently fluid to be poured from the container, even after storage for decay.

BIOLOGICAL WASTE – Biologically active materials are to be deactivated or detoxified. A disinfectant should be added to putrescible liquid wastes to retard putrefaction; the quantity depends on the concentration of organic material in the waste. Care must also be taken to avoid a reaction between the waste and the disinfectant. Bleach solutions will volatilize some radionuclides such as ³⁵S. Contact the RCO and the Biosafety Officer at Environmental Health Services for any questions.

LIQUID SCINTILLATION MEDIA AND VIALS – Vials are to be securely capped and segregated from all other types of waste, according to the LS medium and the radionuclides they contain, into one of the following categories: 1) Vials containing only “NHNT” media, half-life dependent 2) Any hazardous cocktail containing only ³H and/or ¹⁴C 3) Any hazardous cocktail containing ³H, ¹⁴C and/or short-lived nuclides, (half-lives <100 days) 4) Any hazardous cocktail containing long-lived nuclides other than ³H or ¹⁴C.

ANIMAL WASTE – RCO approval of packaging is required for all animal waste. Large animals should be dismembered so that each package contains no more than 10 kg. No other material, e.g. plastic containers, glassware, syringes, needles, etc. may be packaged with animal waste. Combustible bedding materials, e.g. shavings or sawdust, may be collected in separate standard waste container.

SPECIAL WASTE – Any radioactive wastes not included in the above categories, or exhibiting unusual hazards, or requiring special precautions of any kind, are handled under special arrangements with the RCO. Costs associated with handling, packaging, and/or disposal of abnormal radioactive wastes may be charged to the principal user. Whenever unusual wastes are anticipated, the user should contact the RCO to plan for disposal before the wastes are generated.

LABELING AND WASTE DISPOSAL FORMS – As materials are added to a container, the INV# is required to be recorded on this form and the additional required information on the “RADIOISOTOPE DISPOSITION RECORD” (RF-13C). Upon closure of the waste container, complete form RF-13F using the information on the RF-13C forms. A summation for each inventory number is required. Only one entry per inventory number is allowed. All containers in which radioactive wastes are collected must be labeled “CAUTION –RADIOACTIVE MATERIAL” or “CAUTION RADIOACTIVE WASTE”. Packages in which radioactive wastes are stored or transported must be labeled with a “RADIOACTIVE WASTE TAG”. The “RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL FORM” (RF-13F) on bright yellow paper and the hazardous waste “Request for Disposal” section (if mixed) must also be filled out completely and sent to the RCO for approval before the waste will be picked up. **1) Remove or obliterate any radioactive materials stickers in the waste. 2) List the “ISOTOPE”(s), the activity(s) (AMOUNT), (Pail #), assay date(s) (DATE), principal user (PU) and the type of material in the container (TYPE) on the tag and attach securely to the pail. The back of the tag may be used if additional room is needed. 3) Principal User:** The person under whose name the project is registered with the RCO. **4) Date:** date form was completed or submitted to the RCO. **5) Person Preparing Form:** This is a person officially assigned to the project who is qualified to work with the radioactive materials in the waste. This person must have taken and passed module-3. **6) Phone:** Phone number of individual completing form. **7) Laboratory Code:** Available to the lab for tracking/recording purposes. **8) Total No. of Pails:** The number of pails to be disposed under this request. **9) Sheet_of_:** If additional sheets are required. **10) Location of Waste:** The building and room where the waste is located. Only labs officially listed in the project description should be listed. **11) Phone:** Telephone number where waste is located. **12) Special Handling:** Mark “YES” if information is attached otherwise mark “N/A”. **13) Pail Type:** Mark the type of waste container. **14) Pail No.:** The number on a small yellow tag where the bail is attached. **15) Waste Class:** Check the boxes appropriate to the waste. Long and short half-life is divided at 100 days. **16) Isotope Table:** For each INV# record the isotope, the % of the original activity, the assay date and the assay activity. Mark the activity units clearly. If the INV# is totally disposed, check the box. More room is located on the back of the form. **17) Waste Volume/Weight:** Record the volume of the waste in gallons (gal.). If the waste is liquid, record only the volume of the liquid. The tare weight of an empty 5 gallon metal pail with lid, liner and lock rings is ~1.4 lbs. The tare weight of an empty 5 gallon plastic pail with lid and liner is ~2.4 lbs. **18) Highest Exposure Rate at Surface: DO NOT LIST “cpm”.** Use the calibration information on the side of the survey meter to record the exposure rate. **Tritium only labs without survey meters may list “N/A”.** **DO NOT** list as “background” or “2 x background”, etc. **19) Wipe Test:** List the highest wipe net activity found. Five wipes should be taken: [1] Lid (~700 cm²); [2] Upper half of pail (~1550 cm²); [3] Lower half of pail (~1550 cm²); [4] Bottom (~700 cm²); [5] Background. **DO NOT** list in “cpm”. The following equation should be used to calculate net dpm/cm².

Sample cpm - Background cpm

Efficiency of the detector (cpm/dpm) * Area of Wipe (cm²)

20) Describe Waste: Example: Paper, plastic and glass lab trash.. or.. 145 ea. 7 mL plastic LSC vials.. or.. Rat dissection waste. **21) Sharps:** Sharps (broken glass, needles etc.) must be packaged in a puncture proof container to prevent tearing of the pail liner. **22) Replacement Pail:** Circle “YES” if you need an identical pail. Attach a note if you need additional types of pails. Otherwise circle “NO”. **23) BioHazards:** The method of disinfecting must be stated along with the person that certified that it is no longer a BioHazard. **24) Mixed Waste:** See Above. **25) Generator’s Certification:** The principal user or user approved by the RSC must certify by his/her signature that the listed information is correct. **Packages that are incompletely or inadequately labeled, or that in any other way do not comply with the criteria contained in this procedure, will not be accepted for disposal.**

PAIL MARKINGS – The following markings could be found on the pails in various combinations for waste material:

Green = Half-life <100 days

Yellow = Half-life >100 days

Blue = Liquid

Black = Dry-Solid

Red = Mixed Waste (Hazardous and Radioactive)

White = Non-Hazardous Waste (Radioactive Only)

WASTE COLLECTION – Radioactive wastes of all types are collected on regularly scheduled days. Otherwise, users must call the Radiation Control Office to request pickup of the waste. To avoid running out of space in waste containers, it is important to request pickup several days before the container will actually be filled. The RCO cannot guarantee waste collection on unscheduled days

RF-13A RADIOISOTOPE PACKAGE ARRIVAL REPORT

(Please type or print legibly)

Inv #: _____ Principal User: _____

Dept.: _____ Location: _____

PO/DPO #: _____ Nuclide: _____ Initial activity: _____ millicuries

Assay Date: _____ Compound: _____

Exposure Rate Survey Results:

<0.5 mR/hr at surface
 or: _____ mR/hr at surface
 _____ mR/hr at 1 meter
*If >50 at surface or
 if >1 at 1 meter, label
 should be Yellow II or III.*

Contamination Survey Results:

<20 net dpm/cm² direct
 or: _____ net dpm/cm² on wipe
*Above results by survey meter.
 Recipient to be notified by phone
 if contamination is found on wipe
 by liquid scintillation count.*

"RADIOACTIVE" vehicle placards required to transport packages with YELLOW III labels.

INSTRUMENTS	EXPOSURE RATE SURVEY	CONTAMINATION SURVEY
Model (Instrument/Probe)		
Serial Number (Instrument/Probe)		
Calibration Date		
Efficiency or Calibration Factor	CF=	EFF=
Count Time (min.)		
Total Count Rate	cpm	cpm
Background	cpm	cpm
Net Count Rate	cpm	cpm
Area of Wipe (cm ²)	N/A	cm ²
Contamination Level (dpm cm ⁻²) or Exposure or Dose Rate (mR hr ⁻¹ , mrem hr ⁻¹)		dpm cm ⁻²

If incorrect labeling is suspected, or if any contamination is found on the package, notify the recipient promptly. If personal or vehicle contamination is suspected, notify the RCO immediately. Any required notifications to the carrier or regulatory agencies is to be made by the RCO.

Package surveyed by: _____ Date: _____

Package Received by: _____ Date: _____

Original - Initiated and retained by RCO

Copies to send with the package(s): RECEIPT & VERIFICATION form (RF-13B) for each package and/or item.
 DISPOSITION form (RF-13C) for each item number.

RF-13B RADIOISOTOPE RECEIPT AND VERIFICATION

(Please type or print clearly)

Inv. # _____ Principal User: _____

Dept.: _____ Location _____

PO/DPO #: _____ Nuclide: _____ Initial activity: _____ millicuries

Assay Date: _____ Compound: _____

This package contains _____ other items: Nos. _____ - _____

Verify every item and return all RECEIPT & VERIFICATION forms, but ONLY ONE PACKAGE SURVEY is required.

This inventory item is in _____ packages.

Return all attached RECEIPT & VERIFICATION forms. Only one DISPOSITION form (attached) is to be completed.

RECIPIENT: YOUR PROMPT ACTION IS REQUIRED! OPEN THE PACKAGE CAREFULLY AND SURVEY FOR CONTAMINATION. VERIFY THE CONTENTS. COMPLETE AND RETURN THIS FORM.

PACKAGE OPENING INSTRUCTIONS:

1. Assume that container and packaging materials may be contaminated.
2. Open in hood, if possible; wear gloves; work over absorbent paper.
3. Use shielding and tongs for energetic beta or gamma emitters.
4. Monitor thoroughly for contamination, including packaging materials, work area, clothing, hands, etc.
5. **Survey the inner container for removable contamination:**
Wipe with a small piece of filter paper and check the paper for activity. Use liquid scintillation counter for low-energy betas such as ³H, gamma counter for ⁵¹Cr, ¹²⁵I etc. or portable survey meter for energetic beta emitters such as ³²P. Report results below.
6. If packing materials are not contaminated, **OBLITERATE RADIOACTIVE MATERIAL LABELS**; then discard in ordinary trash. Note: "Obliterate" means to remove all traces or destroy completely.
7. Verify that the material description, nuclide and activity listed above are correct, or make corrections as necessary.

INSTRUMENT USED FOR SURVEY	INTERIOR WIPE RESULTS	EXPOSURE RATE AT SURFACE OF RADIOACTIVE MATERIAL
Model (Instrument/Probe)		
Serial Number (Instrument/Probe)		
Calibration Date		
Efficiency or Calibration Factor	EFF=	CF=
Count Time (min. as needed)		
Total Count Rate	cpm	cpm
Background	cpm	cpm
Net Count Rate	cpm	cpm
Area of Wipe (cm ²)	cm ²	N/A
Contamination Level (dpm cm ⁻²) or Exposure or Dose Rate (mR hr ⁻¹ , mrem hr ⁻¹)	dpm cm ⁻²	

PACKAGE RECEIVED IN GOOD PHYSICAL CONDITION? Yes / or describe:

DID INTERIOR WIPE TESTS SHOW CONTAMINATION? Yes No (If Yes, Contact RCO)

Opened, surveyed and verified by: _____ **Date:** _____

Mail to Radiation Control Office, 133 General Services Building

RF-13C RADIOISOTOPE DISPOSITION RECORD

(Please type or print clearly)

Inv. # _____ Principal User: _____ Page _____ of _____

Dept.: _____ Location: _____

PO/Ref. #: _____ Nuclide: _____ Initial activity: _____ millicuries

Assay Date: _____ Description: _____

1. Record all transfers and disposals of the material listed above.
2. **EACH ENTRY SHOULD BE EXPRESSED AS A PERCENTAGE OF THE INITIAL QUANTITY LISTED ABOVE.** Activity units may be used if decay corrected and specified clearly.
3. **For each disposal to a radwaste container or package, THE RADWASTE CONTAINER NUMBER MUST BE ENTERED AND THE TYPE OF WASTE MATERIAL CIRCLED.** The quantities reported on inventory disposition records will be checked against activities entered on radwaste disposal forms.
4. **Transfer to another user or location** must be approved in advance by the RCO and recorded below.
5. **SINK DISPOSAL LIMITS ARE LISTED IN SECTION 4, TABLE II OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT RULES AND REGULATIONS PERTAINING TO RADIATION CONTROL. FOR SINK DISPOSAL, RADIONUCLIDES WITH HALF-LIVES < 16 DAYS MAY BE Poured AT ANY TIME AS LONG AS THE CONCENTRATION BEFORE POURING IS AT OR BELOW THE LIMITS IN SECTION 4, TABLE II. RADIONUCLIDES WITH HALF-LIVES >16 DAYS MAY BE Poured ONLY WITH APPROVAL OF THE RCO AND THE CONCENTRATION HAS TO BE AT OR BELOW THE LIMITS IN SECTION 4, TABLE II.**

Waste Tag No., Location, or Name of Recipient	Category	Amount	Circle Units	Container Description	µCi/ml Sink Disposal	Initials	Date
Receipt Container	Remaining		% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				

Categories

- S= To Sewer
- T= Transfer to another CSU P.U.
- A= Animal Waste
- D= Dry Waste or Sharps
- F= Flammable or other haz. Liq.
- N= NHNT liquid (bulk or vials)
- R= Remaining Inventory (storage)

Long Half-life Material Final Disposal

Disposed through RCO Waste Stream

Short Half-life Material Final Disposal (Both may be checked)

Disposed Through RCO Waste Stream

Decayed in Lab (Documentation Attached Showing Background Levels)

Principal User Signature: _____ Date: _____

Transfers to non-University User: Name of recipient: _____ Location: _____

Date approved by RCO: _____ Inv. # for Recipient of Transfer: _____
 Complete RF-14A for non-University recipients.

When inventory completely disposed, sign the form; mail a copy to the Radiation Control Office, 133 General Services Building

RF-13C RADIOISOTOPE DISPOSITION RECORD (CONTINUED)

(Please type or print clearly)

Inv. # _____ Principal User: _____ Page _____ of _____

Dept.: _____ Location: _____

Waste Tag No., Location, or Name of Recipient	Circle One Category	Amount	Circle Units	Container Description	µCi/ml Sink Disposal	Initials	Date
Categories S = To Sewer T = Transfer to another CSU P.U. A = Animal Waste D = Dry Waste or Sharps F = Flammable or other haz. Liq. N = NHNT liquid (bulk or vials) R = Remaining Inventory (storage)	S T A D F N R		% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
	S T A D F N R		% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
	S T A D F N R		% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
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			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				
			% µCi mCi				

RF-13D RADIOISOTOPE DISPOSAL LOG

(Please type or print clearly)

Instructions: Record individual disposals on this form. Transfer to RF-13C "RADIOACTIVE DISPOSITION RECORD" and, if applicable to RF-13F "RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL". Use this record to keep track of inventory in waste containers or in consolidation containers (containers to collect pipette tips, small plastic containers, plastic bags containing kim wipes etc.).

Waste Container #: _____

Consolidation Container:

INV #	%	Activity μ Ci mCi (Circle)	Date	Initials	%	Activity μ Ci mCi (Circle)	Date	Initials
▶ Total								

▶ Total								

▶ Total								

▶ Total								

▶ Total								

RF-13E RADIOISOTOPE PACKAGE STICKER

(Please type or print clearly)

This sticker is placed on packages of radioisotopes after they have been surveyed to inform personnel that the package may be picked up by the user. Receiving personnel are instructed not to deliver or release a package unless it bears this sticker with signature and date entered. The sticker is printed on self-adhesive paper.

RADIATION SURVEY DONE

Inv. # _____ ACCEPTABLE FOR DELIVERY

By _____ Date _____

RF-13F RADIOACTIVE MATERIALS REQUEST FOR DISPOSAL

RCO USE ONLY
Operating Log #:

(Please type or print clearly, See Back for Additional Information)

Record information for waste containers on this form. RF-13C forms should be used for completing this form. All instructions for completing this form are located in RI-13. Instructions are also located on the back of this form.

Principal User:

Department:

Date:

Person Preparing Form:

Phone:

Laboratory Code:

Total No. of Pails:

Sheet of

Location of Waste:

Phone:

Special Handling Instructions and Additional Information (if any) is Attached? Yes N/A

Pail Type: 5 Gallon Steel 5 Gallon Plastic 30 Gallon Steel 55 Gallon Steel 5 Gallon Carboy(s)

Pail No.	Isotope	INV#	% of Inv #	Assay Date	Assay Activity Disposed mCi μCi	INV # Totally Disposed	Total Volume of Waste (gal)
<input type="text"/>						<input type="checkbox"/>	
Waste Class							Net Weight of Waste (lbs)
Short Half Life <input type="checkbox"/>	Long Half Life <input type="checkbox"/>					<input type="checkbox"/>	
Dry-Solid <input type="checkbox"/>	Liquid <input type="checkbox"/>					<input type="checkbox"/>	
Non-Haz <input type="checkbox"/>	Mixed <input type="checkbox"/>					<input type="checkbox"/>	

Highest Exposure Rate at Surface (mR h⁻¹):

Highest Wipe Activity (net dpm cm⁻²):

Describe Waste

Are Sharps Secured in a Sturdy Container within the Pail? Yes N/A Do you need a Replacement Pail? Yes No

BioHazards Disinfected By:

Method:

If this is a liquid or mixed waste, complete the hazardous waste "REQUEST FOR DISPOSAL" section on the back of this form.

Generator's Certification: I hereby declare that the contents of this consignment are fully and accurately described above.

Printed/Typed Name:

Signature:

Date:

EHS USE ONLY

Approved/Rejected By:

Manifest No.

Storage Location:

Picked Up By:

Date:

Visual Inspection Codes:

QA Inspection Required? YES NO

PASS FAIL

Isotope	INV#	% of Inv #	Assay Date	Assay Activity Disposed mCi μCi	INV # Totally Disposed
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>

Individuals completing this section must be certified as a hazardous waste generator through CSU. The container must be labeled with the words "HAZARDOUS WASTE", the complete list of contents, the accumulation start and end date, volume or weight and department name. See the "Hazardous Chemical Waste System Manual".

REQUEST FOR DISPOSAL

IDENTIFICATION / DESCRIPTION of WASTE CHEMICALS	SOLID LIQUID GAS	pH	NUMBER, SIZE, & TYPE of CONTAINER (EX. 3x1 L. Bottle)	VOLUME or WEIGHT in CONTAINER (EX. 750 ml in each bottle)	TOTAL WEIGHT of EACH WASTE TYPE in POUNDS (lbs) INCLUDING CONTAINER	(RCO USE) DOT / EPA

(RCO Use Only) Proper DOT Shipping Classification:

RF-13G RADIOISOTOPE INVENTORY RECORD FOR LOCATION

(Please type or print clearly)

Principal User: _____ Page _____ of _____

Storage Location: _____

Categories: A = Addition to location; R = Removal from location

(Specific information concerning INV# is located on the corresponding RF-13C form)

Circle One Category	Inv. #	Circle One Category	Inv. #
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	

Principal User Signature: _____

Date: _____

RF-13G RADIOISOTOPE INVENTORY RECORD (CONTINUED)

(Please type or print clearly)

Principal User: _____ Page _____ of _____

Storage Location: _____

Categories: A = Addition to location; R = Removal from location

(Specific information concerning INV# is located on the corresponding RF-13C form)

Circle One Category	Inv. #	Circle One Category	Inv. #
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
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A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	
A R		A R	

Principal User Signature: _____

Date: _____

RF-13H RADIOISOTOPE MONTHLY SEWER DISPOSAL RECORD

(Please type or print clearly)

SINK DISPOSAL LIMITS ARE LISTED IN SECTION 4, TABLE II OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT RULES AND REGULATIONS PERTAINING TO RADIATION CONTROL. FOR SINK DISPOSAL, RADIONUCLIDES WITH HALF-LIVES < 16 DAYS MAY BE Poured AT ANY TIME AS LONG AS THE CONCENTRATION BEFORE POURING IS AT OR BELOW THE LIMITS IN SECTION 4, TABLE II. RADIONUCLIDES WITH HALF-LIVES >16 DAYS MAY BE Poured ONLY WITH APPROVAL OF THE RCO AND THE CONCENTRATION HAS TO BE AT OR BELOW THE LIMITS IN SECTION 4, TABLE II.

Principal User: _____ Month: _____

Dept.: _____ Sink Location: _____

Date Poured	Nuclide	Total Volume Poured (ml)	Activity uCi mCi	Inv. #

Principal User Signature: _____ Date: _____

When completed, sign the form; mail a copy to the Radiation Control Office, 133 General Services Building

(RF-13I) HAZARDOUS WASTE

Contents of Container:

Accumulation Start Date:

Generator's Full Name and Department:

(RF-13I) HAZARDOUS WASTE

Contents of Container:

Accumulation Start Date:

Generator's Full Name and Department:

(RF-13I) HAZARDOUS WASTE

Contents of Container:

Accumulation Start Date:

Generator's Full Name and Department:

RF-13J Radioactive Materials Request for Disposal Signature Release Authorization

(Please type or print clearly)

This document is needed to modify the mandated requirement of Principal User signatures on RF-13F Radioactive Materials Request for Disposal forms.

The Principal User wishing to delegate authorization to sign RF-13F Radioactive Materials Request for Disposal forms to a Qualified User, must have both the Principal User and Qualified User signatures submitted and approved by the Radiation Safety Committee (RSC) before the Qualified User will be granted authorization. However, the RSC reserves the right to deny any and all requests.

This Signature authorization is given on, _____,
Date

by _____, of Colorado State University, department of _____.
Principal User Name *Department Name*

I appoint _____, of Colorado State University,
Qualified User Name

department of _____, to be authorized to sign all Radioactive Materials Request for
Department Name

Disposal forms on my behalf.

Certification:

Principal User:

I hereby give authorization to the stated "Qualified User" to sign all Radioactive Materials Request for Disposal forms. Although signature authority has been delegated to the "Qualified User", **I retain ultimate responsibility for the information on the RF-13F form.**

Signature of **Principal User:** _____ Date: _____

Qualified User:

I hereby understand that I have been given authorization to sign all Radioactive Materials Request for Disposal forms on behalf of the Principal User and will conduct myself in a manner that is not negligent in the rules and regulations set forth by the Federal Government, State of Colorado and Colorado State University.

Signature of **Qualified User:** _____ Date: _____

RF-13K RADIOISOTOPE ORDER FORM

(Please type or print clearly)

Please submit the following radioactive material order. Please input the following information exactly as it appears on this form. Thank You.

Vendor: _____
(e.g. Amersham Biosciences)

Ordered By: _____
(Principal User)

Item: 1 **Quantity:** _____ **Price:** _____

Description: _____
(e.g. "RADIOACTIVE" CFA729 Acetyl CoA, C-14, 10 millicuries)

Item: 2 **Quantity:** _____ **Price:** _____

Description: _____
(e.g. "RADIOACTIVE" CFA729 Acetyl CoA, C-14, 10 millicuries)

Item: 3 **Quantity:** _____ **Price:** _____

Description: _____
(e.g. "RADIOACTIVE" CFA729 Acetyl CoA, C-14, 10 millicuries)

Item: 4 **Quantity:** _____ **Price:** _____

Description: _____
(e.g. "RADIOACTIVE" CFA729 Acetyl CoA, C-14, 10 millicuries)

Account Number: _____ **Subcode:** 3900

Comments: _____

(Required for an open P.O. - e.g. 1 millicurie, P-32 in DCTP Once per month)