

- ◆ **Treat bulk liquids to prevent gas formation.** Microorganisms should be killed using bleach or another method. If you plan to combine chemicals that can react to produce excessive heat or gas, consult our program prior to producing the waste.
- ◆ **Biological material must be packaged to prevent leakage and stored in a freezer prior to pick-up unless prior arrangements have been made with Radiation Safety.** Blood contaminated items should be considered biological waste and packaged accordingly.
- ◆ **If you use a Plexiglas shielding enclosure, place waste boxes on blue pads** outside of the Plexiglas shielding prior to pick up if space permits. If not, periodically survey the Plexiglas enclosure for contamination.

INSTRUCTIONS FOR COMPLETING A RADIOACTIVE WASTE TICKET

A Radioactive Waste Ticket must be completed for each container of waste generated. The completed waste ticket must list radionuclides, activity, and waste type as well as other pertinent waste information. Please enter all information. The ticket should be emailed to ehs-radwaste@virginia.edu.

The following information is supplied to assist in completing the waste ticket:

1. A space for the **signature** of the individual completing the waste ticket is located at the bottom of the form. No waste will be picked up if the signature is missing. The signature confirms that the required survey of the waste container surfaces has been completed and verifies that all information on the waste ticket is correct.
2. **Survey the outside of the waste containers before requesting a waste pick-up and record this information on the waste ticket in the space provided.** In accordance with DOT regulations, all radioactive waste containers must be certified free of removable surface contamination exceeding 2,200 dpm/100 cm². Inform the Radiation Safety Program technicians when they arrive to pick up the waste if the survey results are greater than background. Contaminated waste containers will be encapsulated in plastic bags by Radiation Safety Program technicians prior to removal.

A space is provided for reporting the **measured pH** of bulk liquid samples. The pH must be measured using pH paper or other measuring device. Incorrect pH readings will be investigated by Radiation Safety Program technicians.

26.0 Emergency Procedures

Spills of quantities of radioactive material normally present in laboratories at the University present little or no immediate external exposure hazard. Of greater concern is the possibility of internal and external contamination of personnel and the spread of contamination into uncontrolled areas. **Immediate action should be taken to prevent the spread of contamination unless an injured person requires immediate medical attention, volatile radioactive materials are present, or unacceptable external radiation exposure rates exist.**

Radioactive spills during weekdays between 8 am and 5 pm, should be handled in the following manner:

If a radioactive emergency involves a fire, injury or risk to personnel or property, call 911. Radiation Safety Program will be notified.

If there is no fire, injury or risk to personnel or property, confine the spill to the smallest area possible by using paper towels or other absorbent materials and dispose of as radioactive waste. Do not allow spilled radioactive material to enter any floor drains, if possible. Call the Radiation Safety Program at 434-982-4919 for assistance, not 911.

For **radioactive spills** which occur during **evening hours, weekends, or holidays**:

Call 911 for the appropriate emergency services in the event of a radioactive emergency that involves fire, injury or risk to personnel or property. Tell the dispatcher that the emergency involves radioactive material. Radiation Safety Program will be notified.

If there is no fire, injury or risk to personnel or property, contact the Radiation Safety Program at 434-924-3190 for assistance, not 911.

Be prepared to give the operator the following information: Lab location and call back phone number(s), radioisotope and activity, a brief description of the incident.

If you remain in the laboratory, keep the call back phone free in case Radiation Safety Program staff needs to contact you. If you must leave the lab, call the Radiation Safety Program from your new location. Only leave the lab if required by the emergency or requested by emergency response personnel.

Minor spills are those which do **NOT** result in:

- ◆ external personnel contamination
- ◆ radioactive material ingestion
- ◆ unacceptable external radiation exposure
- ◆ loss of use of laboratory facilities

1. Notify persons in the area that a spill has occurred.
2. Prevent the spread of contamination by covering the spill with absorbent paper. (Paper should be dampened if solids are spilled).

3. Control access to the spill area as soon as possible by posting warnings on all entrances into the room and by closing off the affected area to prevent the spread of contamination.
4. If there is no external exposure to laboratory personnel (i.e. clothing, shoes), put on protective clothing (e.g. gloves, shoe covers) and clean up the spill. Clean up the spill using absorbent paper. If you are unsure how to properly clean up the spill, call the Radiation Safety Program as soon as possible for assistance. Radiation Safety Program staff can offer consultation, equipment and assistance.
5. Carefully fold the absorbent paper with the clean side out and place in a plastic bag for transfer to a radioactive waste container. Put contaminated gloves and any other contaminated disposable material in the bag and then call the Radiation Safety Program to report the incident.
6. If there is radioactive contamination on clothing, shoes, or personnel, call the Radiation Safety Program for assistance as soon as possible. Potentially contaminated personnel must not leave the area until they have been surveyed by either Radiation Safety Program staff or trained laboratory personnel.
7. If radioactive material goes down a floor drain or spills out of the authorized room into unauthorized areas, call the Radiation Safety Program as soon as possible for assistance.
8. Survey the area with an appropriate low-range radiation detector survey meter or other appropriate technique. Check the area around the spill for contamination. Also check hands, clothing, and shoes for contamination. All clean-up surveys must be documented in your Laboratory Survey Records.
9. Allow no one to return to work in the area unless approved by the RSO. A written report must be submitted to the RSO within five (5) working days of the incident for all spills that involve contaminated personnel or involve unauthorized areas.
10. Cooperate with the RSO and Radiation Safety Program staff (e.g., investigation of root cause, provision of requested bioassay samples). Follow the instructions of the RSO and the Radiation Safety Program staff (e.g., decontamination techniques, surveys, provision of bioassay samples, requested documentation).

Major spills of liquids or solids are those that result in:

- ◆ external personnel contamination
- ◆ radioactive material ingestion
- ◆ unacceptable external radiation exposure
- ◆ loss of use of laboratory facilities

1. Notify other personnel in the room where the spill occurs.
2. Clear the area. If appropriate, survey all persons not involved in the spill and vacate the room.
3. Prevent the spread of contamination by covering the spill with absorbent paper (paper should be dampened, if solids are spilled), but do not attempt to clean it

up. To prevent the spread of contamination, limit the movement of all personnel who may be contaminated.

4. Shield the source only if it can be done without further contamination or significant increase in radiation exposure.
5. Close the room and lock or otherwise secure the area to prevent entry. Post the room with a sign to warn anyone trying to enter that a spill of radioactive material has occurred. Stay in the immediate vicinity of the affected room to prevent the spread of contamination and provide the Radiation Safety Program with information and assistance. Control access to the spill area as soon as possible by posting warnings on all entrances to the room and by barricading the affected area to prevent the spread of contamination.
5. Notify the Radiation Safety Program immediately. Radiation Safety Program staff will assist you in planning the decontamination procedures.
6. Survey all personnel who could possibly have been contaminated. Decontaminate personnel by removing contaminated clothing and flushing contaminated skin with lukewarm water and then washing with a mild soap. Begin personnel surveys to determine if individuals are contaminated. Assume that all persons in the affected area may be contaminated. Do not allow anyone to leave the immediate vicinity until Radiation Safety Program staff has confirmed the results of your preliminary surveys.
7. Allow no one to return to work in the area unless approved by the RSO. Radiation Safety Program staff will control access to all areas where the exposure rate is greater than 2 mR/hr. Your detector must be calibrated in units of mR/hr to obtain a measurement in mR/hr; most UVa survey instruments are calibrated in units of CPM. The Radiation Safety Program maintains instruments calibrated to perform exposure rate measurements (mR/hr).
8. With permission and possible assistance by Radiation Safety Program staff, put on protective clothing provided by EHS and begin decontamination and cleanup.
9. All clean-up surveys must be documented in your Laboratory Survey Records.
10. A written report must be submitted to the RSO within five (5) working days of the incident for all spills that involve contaminated personnel or involve unauthorized areas.
11. Cooperate with the RSO and the Radiation Safety Program staff (e.g., investigation of root cause, provision of requested bioassay samples). Follow the instructions of the RSO and the Radiation Safety Program staff (e.g., decontamination techniques, surveys, provision of bioassay samples, requested documentation).

Incidents Involving Radioactive Dusts, Mists, Fumes, Organic Vapors, and Gases

1. Notify all personnel to vacate the room immediately.
2. Shut down ventilation system, if possible, unless it is determined that the room ventilation system needs to be used to clear the air for access purposes.
3. Vacate the room. Seal the area, if possible.

4. Notify the Radiation Safety Program immediately.
5. Ensure that all access doors to the area are closed and posted with radiation warning signs, or post guards (trained) at all access doors to prevent accidental opening of the doors or entry to the area.
6. Survey all persons who could have possibly been contaminated. Decontaminate as directed by the RSO or Radiation Safety Program staff.
7. Promptly report suspected inhalations and ingestions of licensed material to the Radiation Safety Program.
8. Decontaminate the area only when advised and/or supervised by the RSO or Radiation Safety Program staff.
9. Allow no one to return to work in the area unless approved by the RSO or Radiation Safety Program staff.
10. Cooperate with the RSO and Radiation Safety Program staff (e.g., investigation of root cause, provision of requested bioassay samples). Follow the instructions of the RSO and Radiation Safety Program staff (e.g., decontamination techniques, surveys, provision and collection of bioassay samples, requested documentation).

Minor Fires

1. Immediately attempt to put out the fire by approved methods (e.g., fire extinguisher) if other fire hazards or radiation hazards are not present.
2. Notify all persons present to vacate the area and have one individual immediately call the Radiation Safety Program and fire department (as instructed by RSO).
3. Once the fire is out, isolate the area to prevent the spread of possible contamination.
4. Survey all persons involved in combating the fire for possible contamination.
5. Decontaminate personnel by removing contaminated clothing and flushing contaminated skin with lukewarm water, then washing with a mild soap.
6. In consultation with the RSO or Radiation Safety Program staff, determine a plan of decontamination and the types of protective devices and survey equipment that will be necessary to decontaminate the area.
7. Allow no one to return to work in the area unless approved by the RSO or Radiation Safety Program staff.
8. Cooperate with the RSO and Radiation Safety Program staff (e.g., investigation of root cause, provision of requested bioassay samples). Follow the instructions of the RSO and Radiation Safety Program staff (e.g., decontamination techniques, surveys, provision of bioassay samples, requested documentation).

Fires, Explosions, or Major Emergencies

1. Notify all persons in the area to leave immediately.
2. Call 911
3. Notify the Radiation Safety Program and other facility safety personnel.
4. Upon arrival of firefighters, inform them where radioactive materials are stored or where radioisotopes were being used; inform them of the present location of the licensed material and the best possible entrance route to the radiation area,

as well as any precautions to avoid exposure or risk of creating radioactive contamination by use of high-pressure water, etc.

5. Cooperate with the RSO and Radiation Safety Program staff (e.g., investigation of root cause, provision of requested bioassay samples).
6. Allow no one to return to work in the area unless approved by the RSO or Radiation Safety Program staff. Follow the instructions of the RSO and Radiation Safety Program staff (e.g., decontamination techniques, surveys, provision of bioassay samples, requested documentation).

27.0 Laboratory and Equipment Decommissioning

Decontamination is the cleaning and removal of radioactive contamination from equipment and surfaces. Decommissioning is the process of ensuring that all contamination and radioactive material is removed from the area(s) where it was used. Decommissioning also entails the removal of all signs, postings, radioactive material tape, and performance of final swipe surveys that ensure that all equipment and surfaces are free of contamination. An area or piece of equipment must be decontaminated and decommissioned before it is released for unrestricted use.

27.1 Laboratory Decommissioning

If a lab will no longer be used as a radioactive material use area, it must be formally decommissioned by Radiation Safety Program technicians. Please call the Radiation Safety Program to arrange for a lab decommissioning. Under no circumstance shall a lab be vacated, renovated or used by others without proper decommissioning.

27.2 Decommissioning Records

All laboratories and other material use or storage areas are decommissioned in accordance with Radiation Safety Program policies and procedures. The Radiation Safety Program must maintain records of all decommissioned rooms and material use areas.

27.3 Release of Equipment for Unrestricted Use

Any piece of equipment (e.g. centrifuge, HPLC, LSC and similar equipment) that was used for the manipulation or handling of radioactive material must be decontaminated to a level at which any remaining contamination cannot be distinguished from background radiation. A Radiation Safety Program technician will verify adequate decontamination prior to its release for unrestricted use. If you anticipate the need to have equipment decontaminated for use in a non-radioactive area, call the Radiation Safety Program for assistance. Under no circumstance shall any equipment be abandoned, sent to surplus or transferred without proper decommissioning.

27.4 Release of Equipment to Surplus