

New Jersey Institute of Technology

RADIATION EMERGENCY PROCEDURES

Major Spills, Involving Radiation Hazards to Personnel

1. Notify all persons not involved in the spill to vacate the room at once. Limit the movement of displaced persons to confine the spread of contamination until they are monitored.
2. If the spill is liquid and the hands are protected, right the container, otherwise use long tongs.
3. If the spill is on the skin, immediately flush thoroughly and monitor.
4. If the spill is on clothing, discard outer or protective clothing at once, monitor and decontaminate ate.
5. Turn off fans, try to avoid creation of airborne contamination.
6. Vacate the room but take care not to track or spread contamination.
7. Notify the **RSO** as soon as possible, if he is not onsite
Call: 609 290-4643
8. Take immediate steps to decontaminate personnel involved as necessary.
9. The RSO will direct the decontamination.
10. Contact the NJIT Department of Public Safety at ext. **3111**. The Department of Public Safety will contact the Director of Health & Environmental Safety.

Minor spills, Involving No radiation Hazard to Personnel

1. Notify all persons in the room and area at once.
2. Survey people which were in the immediate area of the spill.
3. Permit only the minimum number of persons necessary to deal with the spill into the area.
4. Confine the spill immediately.
 - A. Liquid spills
 - a. Don protective gloves
 - b. Drop absorbent on spill.
 - B. Dry spills
 - a. Don protective gloves
 - b. Dampen thoroughly, taking care not to spread contamination. Water may generally be used, except where chemical reaction with the water would generate an air contaminant: oil should be used instead.
5. Decontaminate: make a plan first.
6. A complete history of the accident and subsequent remedial or protective measures should be submitted to the RSO.

Injuries to Personnel, Involving Radiation Hazard

1. Wash minor wounds immediately under running water, spreading the edges of the gash. If at all practical collect and retain cotton sponges, fluids, etc. for analysis.
2. Report all radiation accidents involving personnel wounds, overexposure, ingestion, or inhalation to the RSO as soon as possible.
3. No person involved in a radiation injury should return to work without the approval of the attendant physician and the RSO.
4. Prepare a complete history of the accident and subsequent activity for the RSC.

Accidents Involving Radioactive Dusts, Mists, and Gases

1. Notify all other persons to vacate the room immediately.
2. Hold breath and close air vents.
3. Vacate the room. Seal off area, if possible.
4. Notify the RSO at once.
5. Ascertain that all doors giving access to the room are closed. Post conspicuous warnings or guards to prevent accidental opening of doors.
6. Monitor all persons suspected of contamination. Proceed with decontamination of personnel.
7. Report at once to the RSO all known or suspected ingestions or inhalations of radioactive materials.
8. Collect bioassay samples as directed by the RSO.
9. Decontaminate the area only upon the advice of the RSO. Air sampling should be conducted prior to resuming work in the area.

Radioactive Package Receipt Surveys

Purpose To comply with shipping regulations and radioactive material licenses. Also to prevent contamination in the facility.

Equipment Gamma Counter or LSC
Calibrated dose rate meter
Form 2
Wipe survey materials

Procedure

1. All deliveries must be made through the loading dock. Inspect package for obvious damage or leakage.
2. Place package on bench cover in a secure location.
3. Survey with meter at contact and at three feet
4. Read paperwork to ensure package contents match order.
5. Conduct smear survey according to procedure.
6. Review smear results prior to moving package. If contamination above 1,000 dpm/100 cm² is present, place the package in a plastic bag, store in the radioactive waste cage, and notify health physics.
7. Wear gloves when opening packages. Retain and survey packing material for contamination.
8. Complete radioactive material package survey record, keep a copy, and forward the original to health physics.

Radioactive Package Receipt Record

Date Received _____ Surveyed By _____

Transported By _____

Type of Package cardboard box metal pail

Any visible damage? **NO** **YES** crushed wet opened

Survey Instrument

Model _____ serial # _____

Reading at Contact _____

Reading at 3 ft. _____

Smear Survey - attach LSC printout.

Based on the LSC's minimum efficiency for the isotopes in use at NJIT any wipe showing greater than 200 counts per minute above background should be considered contaminated. Place contaminated package in radioactive waste storage and contact health physics.

Package contaminated? Yes _____ No _____

Describe Radioactive Material (activity, physical form, and quantity)

Entered Into Inventory By: _____ Date: _____

Reviewed By: _____ Date: _____

Procedure for Sealed Source Leak Test

Purpose To verify the integrity of sealed sources of ionizing radiation and thereby indicate the potential for contamination of personnel and facilities, Sealed sources with greater than 100 microcuries of beta/gamma emitters must be tested per 10 CFR Part 35.

Equipment contamination survey meter (beta sensitive)
cotton swabs
plastic bags
liquid scintillation counter

Procedure

1. Label a plastic bag with the serial number, location, isotope and activity of the source to be tested.
2. Survey the area around the source for gross contamination by wiping the outside of the instrument, tabletop, and floor with absorbent paper. Count the wipe sample with the survey meter. If beta contamination greater than 1,000 dpm is present, restrict access to the area and contact the RSO immediately.
3. Wipe the source with a water- moistened cotton swab, or if contained in a shuttered device, the closest accessible surface, and place into the labeled plastic bag.
4. Count the cotton swab* on an instrument calibrated to NIST traceable sources within the past 12 months. Count for a sufficient length of time to ensure a minimum detectable activity of at least 1,000 dpm.
5. Calculate the activity in microcuries using the following formula;

$$\frac{\text{counts per minute} - \text{background counts per minute}}{\text{efficiency}} \times 2.22 \times 10^6$$

6. Record all data in step 1, as well as date of test, instruments used, and surveyors name on Form 3, then submit to the RSO for approval.

Sealed Source Leak Test Record

Source Identification

Manufacturer	Model #	Serial #
Installed in device	Description	
Isotope	Activity	Ref. Date

Ownership

Company	Address
Room	Contact Person

Test Information

Date of Test	Test Method: swab / wipe
Instrument	Background cpm
Instrument efficiency	cpm/dpm 4π

Test results

_____ \pm _____ microcuries

According to 10CFR35.59 if the leakage test reveals the presence of 0.005 microcuries or more of removable contamination the licensee shall: 1) immediately withdraw the sealed source from use; and 2) file a report within 5 days of the leakage test with the appropriate NRC Office.

PASSED _____ FAILED _____

Analyzed by _____ Date _____

Removable Contamination Surveys

Purpose To determine the amount of removable radioactive material on a surface or object. In general, accessible areas greater than 1,000 dpm/100 cm² of removable activity should be decontaminated.

Equipment Liquid scintillation counter, vials, and LSC cocktail
Smears or cotton swabs
disposable gloves

Procedure

1. Place an unused smear or cotton swab into the first vial for background
2. Indicate the location of the wipe sample on a diagram, or by written description.
3. Wipe at least 100 cm² and place directly into a vial in an LSC rack.
4. Change gloves frequently when surveying areas suspected to be highly contaminated. (Inside hoods, exhaust ducts)
5. Fill all vials with LSC cocktail.
6. Load a tritium and carbon -14 unquenched standard at the end of the batch.
7. Run the "lab survey" protocol on the LSC as programmed by the RSO
8. Take appropriate action upon reviewing the results. Contamination on floors or in unrestricted areas above 200 dpm/100 cm² should be cleaned immediately.
9. File results in three ring binder in lab where survey was conducted.

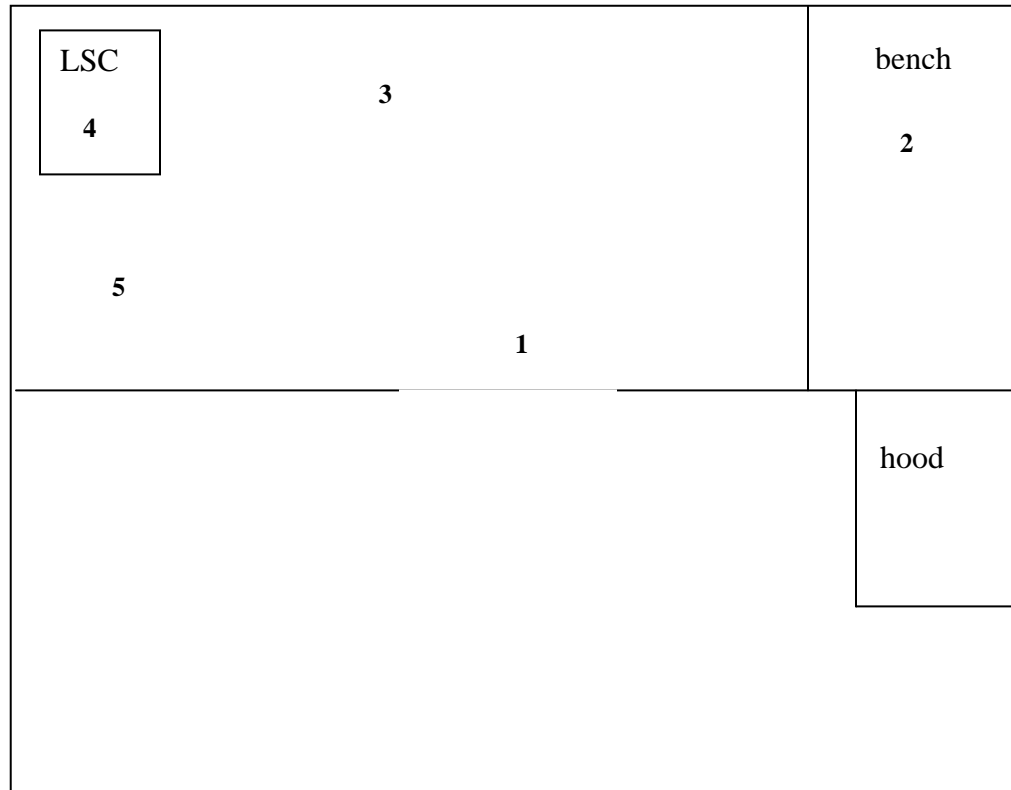
Routine Contamination Survey conducted on

PRINCIPAL USER(S): Xu, L. Axe

Room 223, York Center

ISOTOPES USED: Pb-210

#WIPES: 5



Comments/Results:

Wipe Location	Total Beta Dpm/100 cm ²		
background			
1			
2			
3			
4			
5			

Beta/Gamma Survey

Meter: Ludlum Model 3 sn

Probe: Ludlum Model 44-9 sn

Calibration Due:

NJIT

Radiation Safety Manual

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Dr. Norman J. Van Houten, Director
Department of Health & Environmental Safety