Approved: _____
Chairman - RHSC

WORCESTER POLYTECHNIC INSTITUTE
HEALTH PHYSICS PROCEDURE HP-12
LABORATORY SURVEYS

1. PURPOSE:

To ensure laboratory compliance with the RHSC Radiation Regulations and the Code of Federal Regulations Part 10, Chapter 20.

2. FREQUENCY:

This procedure shall be performed monthly.

3. MATERIALS, TOOLS, AND EQUIPMENT:

3.1. Form(s):

3.1.1. Worcester Polytechnic Institute Laboratory Survey Check List (HPF_06)

3.2. Filter paper, or another appropriate material

3.3. Alcohol

3.4. G-M tube survey meter

3.5. Gas-flow proportional counter or equivalent detection equipment

4. PRECAUTIONS:

4.1. Ensure that all health physics practices are followed throughout the survey.

4.2. Take all necessary precautions to avoid the spread of possible contamination.

4.3. Perform an operability check on all instrumentation used. Ensure that the instrumentation has been calibrated within the proper time limit.

4.4. Utilize the concepts of time, distance, and shielding to maintain exposure as low as reasonably achievable.

5. INSTRUCTIONS:

5.1. Enter the Radioisotope User, the location of the laboratory, the surveyor, and the date of the survey on the form.

5.2. Use a G-M tube survey meter to detect external exposures, to detect contaminated surfaces, and to detect exposure to external areas of the lab.

5.3. Perform swipe tests.

5.3.1. Use filter paper, or another suitable material of high wet strength and absorbent capacity. If necessary, moisten the filter paper with alcohol.

5.3.2. Take at least four swipes per laboratory.

5.3.2.1. Take one swipe at the laboratory entrance.

5.3.2.2. Take another at the center of the room.

5.3.2.3. Take the other swipes at varying locations within the laboratory.

5.3.2.4. Take each swipe using an S-shaped motion over an area of 100 cm^2.

5.3.2.5. Record on the swipe container the radioisotope user and the location of each swipe.

5.3.3. Analyze each swipe using either a gas-flow proportional counting system or equivalent detection equipment.

5.3.3.1. Allow the swipes to dry prior to counting to prevent the shielding of alpha and beta radiation.

5.3.3.2. Calibrate the equipment prior to counting the swipes using alpha and beta calibrated sources.

5.3.3.3. Take a background count.

5.3.3.4. Investigate alpha counts 3 cpm above background or beta/gamma counts 10 cpm above background.

5.4. Inspect the laboratory.

5.4.1. Determine compliance or noncompliance with the items listed on the form (see section 5.5.).

5.4.2. Correct easily correctable violations at the time of the survey.

5.4.3. Indicate violations in the comments section at the bottom of the form.

5.4.4. Report immediately to the Radioisotope User and to the RHSC any conditions or situations that are an imminent danger to persons or to property, or that are a gross violation of radiation safety rules and procedures.

5.5. Requirements for compliance:

5.5.1. Proper signs

The following signs shall be posted on the door of any room designated as a restricted area (all areas containing radioisotopes or radiation facilities):

5.5.1.1. A sign identifying the class of the restricted area and bearing the radiation caution symbol (High Radiation Area, Radiation Area, or Radioactive Materials Area). Note: If the laboratory is classified as a "Radiation Area" or a "High Radiation Area," the following forms are required:

* RHSC Rules and Regulations
* 10 CFR 20
* Any required licenses

5.5.1.2. A sign bearing the name and telephone number of the staff member responsible for the laboratory.

5.5.1.3. A sign prohibiting eating, drinking or smoking in the laboratory.

5.5.1.4. NRC Form 3 (may be posted within the laboratory).

5.5.2. Control

Access to restricted areas shall be controlled by locks.

5.5.3. Storage area

5.5.3.1. Radiation sources shall be stored such that the maximum radiation intensity at any accessible place on the outside of the storage space will result in a dose no greater than 2 mRem in any one hour and no greater than 100 mRem in one week.

5.5.3.2. The area shall be controlled, posted, and secured.

5.5.4. Radioactive waste

5.5.4.1. Area controlled and posted.

5.5.4.2. Waste properly placed in appropriate containers.

5.5.4.3. Waste containers properly labeled.

5.5.4.4. Waste disposed of in accordance with 10CFR20.

5.5.4.5. Waste disposal records up to date.

5.5.5. Hood flow satisfactory

5.5.5.1. Applicability:

5.5.5.1.1. If inhalation of the radioactive isotope is possible (gaseous products, finely powdered materials, boiling solutions, etc.).

5.5.5.1.2. If volatile radionuclides are used.

5.5.5.1.3. If volatile substances may be generated with the radionuclides.

5.5.5.2. Requirements:

5.5.5.2.1. Adequate hood flow vented directly to the outside.

5.5.5.2.2. Hood discharge in compliance with 10CFR20.

5.5.5.2.3. Hood used throughout the experiment.

5.5.6. Proper labeling

5.5.6.1. Source containers labeled with "Caution - Radioactive Material," the radiation warning symbol, the radionuclide, and the activity.

5.5.6.2. The following equipment labeled with "Caution - Radioactive Materials" and the radiation warning symbol:

* Waste containers
* Equipment containing radioactive materials or contaminated with radioactivity
* Hoods where radioactive materials are used or stored

5.5.7. Inventory: receipt and disposal records completed and up to date.

5.5.8. Monitoring instrument

5.5.8.1. Capable of detecting the radiation emitted.

5.5.8.2. Readily available

5.5.8.3. Operational

5.5.8.4. In proper calibration

5.5.8.5. Free from surface radioactive contamination

5.5.9. Review of handling procedures

5.5.9.1. Personnel monitoring devices worn.

5.5.9.2. The bench tops and floors covered with materials easily decontaminated or removed (i.e., absorbent paper with waterproof backing, strippable paints, tile or linoleum floor coverings, etc.).

5.5.9.3. Proper techniques used

5.5.9.3.1. Mechanical pipetting

5.5.9.3.2. Hot samples handled with tongs

5.5.9.3.3. Solutions in double containers

5.5.9.3.4. Protective clothing worn (i.e., gloves, lab coats, etc.)

5.5.9.3.5. Time, distance, and shielding concepts utilized

5.5.9.4. Records of surveys completed and up to date.

6. RESTORATION:

None

7. REFERENCES:

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7.1. University of Massachusetts Lowell "Guidelines for Laboratory Surveys"

7.2. Radiation, Health, and Safeguards Committee Radiation Regulations

7.3. Code of Federal Regulations Part 10, Chapter 20