EMERGENCY CONTACT INFORMATION

Office of Environmental Health and Safety…………………………………….577-1200
Wayne State University Police Department……………………………………577-2222

Radiation Emergency Response

If this emergency involves a fire, explosion, or any other situation where your life or health is in immediate danger, evacuate the area and contact the WSU Police Department at 577-2222 from a safe location. While on the phone with the police dispatcher, be sure to let them know:

- The location of the emergency
- The nature of the emergency
- The types of hazardous materials involved (radiation, biohazards, or chemicals)
- Your name
- Your current location

Stay at the phone until help arrives. Emergency response personnel will want to make sure you are not injured, and may need your help to properly address the situation. DO NOT LEAVE THE AREA UNTIL HELP ARRIVES!

If the situation permits, secure your radioactive and other hazardous material as best you can prior to evacuating the lab. Return radioactive material to the storage area, place hazardous liquids in spill trays or pans, and pour bleach on infectious material. Shut off any gas appliances, centrifuges, fume hoods, and other lab equipment. Close windows and doors as you are vacating the area.

If the emergency involves a personal contamination, DO NOT LEAVE THE LAB unless a situation exists which places your life is in immediate danger. During work hours (Mon - Fri 8:30 am to 5 pm) call all the OEHS Health Physics staff at 577-1200, and make sure the person answering the phone understands the situation involves a personal contamination with radioactive material. If there is no response or during after hours contact the WSU Police Department at 577-2222.

When evaluating a contamination, perform a complete survey of your person to determine the areas of contamination. If the radioisotope can be detected with a survey instrument, take note of the count rate of the area of contamination to assist the health physicist upon arrival. Contaminated clothing should be removed as quickly as possible and placed in a bag or other container to prevent the spread of contamination. You may begin to decontaminate skin and hair by GENTLY washing with liquid soap and warm water. DO NOT SCRUB, USE ABRASIVES OR OTHER CHEMICALS TO DECONTAMINATE SKIN. If gentle washing with soap and water fails to remove the contamination, the Health Physicist will assist with further decontamination. Perform an area survey to determine the extent of contamination, and take care not to spread contamination or become contaminated. If possible, begin to mark the perimeters of the contaminated areas. Above all else, STAY IN THE AREA and wait for the Health Physics staff to arrive.

If a member of the lab is experiencing a medical emergency and radioactive material is involved, PROVIDE FIRST AID WITHOUT REGARD TO THE RADIOACTIVE CONTAMINATION!

Research labs at Wayne State University do not use quantities of radioactive material that create an immediate danger to the life or health of a first responder. If the situation permits, the injured person may be decontaminated, or moved out of the contaminated area. Call the WSU Police at 577-2222, and make sure the dispatcher is aware that the situation involves both a medical emergency and radioactive material.

Radiation Incidents/Emergencies

When reporting a radiation incident, please be prepared to provide the following information to the Health Physics staff or other emergency responder:

- Radionuclide involved
- Amount of radioactivity
- Chemical form of released material, other hazardous chemicals involved
- Volume or released material
- Location of incident (building and room number)
Some radiological incidents involve serious risk to life, health or property. In the event of serious injury coupled with exposure to radiation, fire, explosion, major release of health threatening materials or serious radiation exposure, an ambulance may be dispatched, and victims will be transported to a hospital for treatment. Upon arrival at the hospital, the victims(s) will be met by appropriate radiation safety personnel who will monitor the treatment and decontamination procedure.
Introduction

This Laboratory Guide includes condensed versions of important sections of the WSU Radiation Safety Manual. It is provided to laboratory personnel as a convenient reference to aid in maintaining a radiation work area that is safe and in compliance with the applicable regulations. IT IS NOT A SUBSTITUTE FOR THE RADIATION SAFETY MANUAL! This Guide is not meant to be an exhaustive reference, and users should refer to the full text of the Radiation Safety Manual for complete guidance on specific practices and procedures. If any of the material in this Guide is interpreted to be in conflict with the Radiation Safety Manual, the language of the Manual will be used for determining compliance with the mandates of the WSU Radiation Safety Committee.

This Guide is intended to be “user-friendly,” therefore the Health Physics staff would appreciate your input concerning its usefulness. Please use the comment page at the back of the Guide to suggest changes or make comments. Thank you for your assistance with improving the WSU Radiation Safety Program!

New Approvals and Amendments to Existing Approvals

Approval for the use of radioactive materials and radiation-generating machines is given by the Radiation Safety Committee for a period of three years, and is reviewed annually. Approval may be obtained by submitting a brief application describing the machine and/or requested material and quantity to be used, the location, individuals who will handle the material, the training and experience of the applicant, the training of workers, the protective equipment to be used (if any), monitoring equipment, a brief description of experimental procedures with emphasis on potential safety concerns, and waste disposal information. Applicants must have faculty status, assistant professor or greater, experienced in the use of radioactive materials and must be trained by Health Physics prior to approval. The application will be reviewed by RSC members, wherein approval may be granted.

New applications are required for the use of a new radionuclide, for a change in experimental procedures which have an impact on safety, a change in chemical or physical form of a material previously approved, and for substantial increases in the quantity. Amendments to current approvals are given for slight increases in quantity or moderate changes in chemical form, and may be obtained by submitting an Application for Amendment stating the desired change and the reason for the change, and referencing to the original approved application to be amended. Applications for approval or amendments should be directed to the WSU Radiation Safety Officer.

Radiation Safety Audits

The Health Physics staff performs at least annual audits of laboratories where ionizing radiation is used or stored. These in-house audits are designed to closely emulate the audits performed by regulatory agencies, and are intended to be used as a tool to assist the Approval Holder in maintaining safety and regulatory compliance in the lab. The following sections outline items that the USNRC and the State of Michigan concentrate on when they perform Licensee compliance inspections. This list is not exhaustive, and only describes a minimum level of compliance that is routinely checked during the audits conducted by the Health Physics staff. The WSU Radiation Safety Manual contains additional information on safety and regulatory compliance issues, and fully reflects the mandates of the Radiation Safety Committee.

Radiation Safety Training

It is mandatory that all workers, including principal investigators, be certified prior to the use of radioactive materials. Certification is obtained by attending the introductory Health Physics training class and passing the radiation safety examination. All radiation users/handlers, including principal investigators, must attend both the radiation safety and RCRA training class, since it is impossible to use radioactive materials without also using chemicals routinely or intermittently. Annual retraining is required for all users of radioactive materials (including principal investigators). Registration is required in advance for introductory safety training classes; dates of available training sessions may be obtained by calling the OEHIS (577-1200) or visiting the OEHIS Web Page, http://www.oehs.wayne.edu. Annual retraining can be accomplished by completing an online training at www.oehs.wayne.edu.

Individuals who frequent areas where radioactive materials are present and radiation workers must be trained by the principal investigator according to the functions performed. This training may be evaluated...
during inspections, either by discussions with individuals present or by written records, if they are used. A checklist has been developed which may be used to assist with the clarity and uniformity of the principal investigator training records. The checklist is included in the back of this Guide.

**Laboratory Postings and Good Housekeeping**

Every area where radioactive material is used or stored must be posted with 1) a Caution: Radioactive Material sign on each entrance; 2) a copy of NRC Form 3 – “Notice to Employees”; and 3) a license and regulations location notice. The notice addressing the location of WSU’s Material License and the associated regulations should be located on either the entry door or on the NRC Form 3. If any of these postings are missing or illegible, the Health Physics staff will be happy to replace them for you. A copy of the NRC Form 3 is in the back of this Guide.

Every area where radiation-generating machines are used must be posted with 1) a Caution: X-Ray Radiation sign on each entrance; 2) a copy of the State of Michigan “Notice to Employees”; and 3) a copy of the State of Michigan Machine Registration Form. If any of these postings are missing or illegible, the Health Physics staff will be happy to replace them for you. A copy of the State of Michigan “Notice to Employees” is in the back of this Guide.

A printed copy of the WSU Radiation Safety Manual or lab guide must be available for reference by all radiation workers. The location of the Radiation Safety Manual or lab guide should be a topic of the lab-specific training for your workers.

Work areas, trays, racks, stock solutions, tools, equipment, etc., which contain radioactive material or are contaminated must be identified with radioactive materials label tape. It is not reasonable to expect that each tube or vial be labeled, but the container, tray or rack that holds them must be labeled. (For example, scintillation vials do not need to be individually labeled, but the tray or box that they are stored in must have the above described label). The “rule of thumb” is that if there is radiation above the background in or on something, it must be labeled.

Laboratory work areas must be kept clean and uncluttered. Messy work areas can hide contamination and often are the root cause of accidents. Fume hoods that are filled with clutter may not work properly due to poor air flow. A tidy lab makes a good first impression on a regulatory inspector, and is essential for maintaining a safe workplace.

**Lab Security**

The USNRC and the State of Michigan consider sources of ionizing radiation to be secure if they are safe from loss, unauthorized use, or theft. Lab doors must be CLOSED and LOCKED if radioactive material is present (including radioactive waste and contaminated lab items) and there are no trained radiation workers available in the room to supervise the material. Keys for radiation generating machines should be in the control of the Approval Holder at all times. Under no circumstances should a key be left unsupervised in a radiation generating machine. Failure to maintain security over sources of ionizing radiation is a serious offense; material and machines that are left unsecured will be subject to confiscation and lock-out and the responsible Approval will be terminated.

Storage of radioactive materials shall be in secured or locked cabinets, refrigerators, freezers or waste areas, unless attended by the licensee. Radioactive materials shall be stored in sealed containers in such a way as to prevent accidental spillage or breakage, and to prevent release into the air. If the radionuclide requires shielding, it shall be stored in shielded containers in order to prevent doses to personnel accessing the storage areas.

**Inventory Control and Recordkeeping**

Any receipt of radioactive materials must be authorized by the Health Physics staff. All requisitions should be sent to the purchasing department directly, who will contact Health Physics to obtain authorization to order. Purchasing must be given the name of the approved user ordering the material, account number, element and mass number, chemical form, activity and company from which the radioisotope will be purchased. You must specify to the buyer or secretary preparing the paperwork that it is Radioactive
Material that you are ordering. Do not accept a Limited Purchase Order (LPO) for radioactive material orders as radioactive material must be purchased on a regular Purchase Order (PO) or an Emergency Purchase Order (EPO). A standing order with a company may be set up for a specific radioisotope for a specified time period. The laboratory must call Health Physics prior to placing the call to the company for request of shipment on the standing PO number.

Shipments of radioactive materials must be delivered directly to Health Physics. The shipping boxes and outer pigs are monitored for contamination by the Health Physics staff, and the survey records are maintained for review. The inner stock vial must be surveyed for contamination by the receiving laboratory within three hours of receipt. This survey must be performed as a swipe-test for contamination, processed through a liquid scintillation counter or gamma counter (as appropriate). The contamination survey must be recorded on the use log and survey form, see appendix O at the end of this guide.

Health Physics generates a use log and survey form for each new stock vial of radioactive material delivered to the laboratory. The new form must be started when a stock vial is received, and the form must be updated each time material is drawn from the vial. Also the surveys after use of the material must be recorded on this form. The form may be kept in the Radiation Safety Logbook, and must be available for inspection at all times.

Health Physics maintains a database of all radioactive materials and radiation generating machines at Wayne State. Health Physics has its records inspected by the Radiation Safety Committee, the USNRC and the State of Michigan in the same routine manner as your lab records are inspected by the Health Physics staff. In order to keep the University “inspection ready” at all times, your cooperation is needed to help us maintain a complete and accurate inventory of the radioactive material and radiation-generating machines on campus. Health Physics provides a Radioactive Material Inventory with each in-coming shipment of radioactive material. Please use this form to perform regular physical inventories of your material, and send updates to Health Physics each time you dispose of a stock vial. An example of an inventory update is in the back of this Guide.

Transfer of radioactive material between investigators of different projects must be approved by the Radiation Safety Officer prior to the transfer. Radioactive materials must never be transferred to individuals who have not been approved by the Radiation Safety Committee.

Any person who wishes to accept a donation of radioactive material or a radiation generating machine must first receive written authorization from the Radiation Safety Committee and the Radiation Safety Officer. This requirement also applies to those who wish to transfer their radioactive material or radiation generating machines from another institution. Please be aware that something which starts out being “free” may eventually cost the University several thousand dollars to dispose of (which is usually why it was offered for donation in the first place). Individuals found to be in possession of unauthorized sources of ionizing radiation will have the material / machine confiscated, and will be responsible for the full cost of disposal.

**Shielding, Contamination Control, and Personal Protective Equipment**

At a minimum, 3/8” plexiglas shielding is required for sources of medium-energy beta radiation (³²P and ⁸⁶Rb), and an appropriate thickness of lead shielding will be required for sources of gamma and x-ray radiation. For low-energy photon emitters like ¹²⁵I, lead foil may be appropriate, while higher-energy gamma emitters like ⁵¹Cr may require a thick lead sheet or bricks. Health Physics has surplus shielding material available for use by the research community. Please contact the Health Physicist or Health Physics Specialist for help with shielding design.

Any work involving liquid forms of radioactive material must be performed in a spill tray, pan, or over an absorbent pad. Keeping a stack of paper towels within reach at the bench will allow the worker to easily and quickly absorb a small spill. Work with volatile chemical forms, powders or gasses must be performed in a calibrated fume hood. If your fume hood has not been calibrated by OEHS in the last year, please inform the Health Physics staff and we will make sure it gets calibrated.

The goal of any radiation safety program is to prevent personal contamination and maintain a work environment where exposure to workers is As Low As Reasonable Achievable (ALARA). Lab coats and gloves must be worn at all times when working with or handling radioactive material. Lab workers should
also wear proper attire in the lab, such as long skirts or pants, socks and closed-toed shoes. Shorts and sandals leave a great deal of bare skin exposed, and is an unacceptable chemical and radioactive contamination hazard.

Many of the radioisotopes used in biomedical research are low-energy beta emitters, which do not pose an external radiation hazard. However, these isotopes can cause a serious exposure to live tissue if ingested or inhaled and great care must be taken to prevent an internal contamination. The USNRC and the Health Physics staff are very strict about keeping food and beverages out of radiation laboratories. The full text of the WSU Laboratory Food and Drink Policy is in the Radiation Safety Manual, but the bottom line is that if any type of consumable item or eating utensil is found in a radioactive material laboratory, it will be immediately confiscated. The Approval Holder will be issued a written warning, which will be copied to the Radiation Safety Committee. Repeat offences will lead to the termination of the Approval to Use Radioactive Material.

Contamination Surveys

Radiation safety surveys must be conducted after each use of radioactive materials, and on a monthly basis in each laboratory where radioactive materials are stored. Appropriate detection equipment must be used for each radionuclide monitored. Examples are as follows:

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Type</th>
<th>Energy (MeV)</th>
<th>Detection Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^3$H</td>
<td>Beta</td>
<td>.015</td>
<td>Liquid Scintillation Counter (Wipe/Smear Samples)</td>
</tr>
<tr>
<td>$^{14}$C</td>
<td>Beta</td>
<td>.156</td>
<td>Liquid Scintillation Counter (Wipe/Smear Samples)</td>
</tr>
<tr>
<td>$^{35}$S</td>
<td>Beta</td>
<td>.168</td>
<td>Wipe Test or Survey Meter with Beta Pancake G-M Probe</td>
</tr>
<tr>
<td>$^{33}$P</td>
<td>Beta</td>
<td>.228</td>
<td>Wipe Test or Survey Meter with Beta Pancake G-M Probe</td>
</tr>
<tr>
<td>$^{32}$P</td>
<td>Beta</td>
<td>1.71</td>
<td>Survey Meter with Beta Pancake G-M Probe</td>
</tr>
<tr>
<td>$^{125}$I</td>
<td>Gamma</td>
<td>.035</td>
<td>Gamma Counter Wipe Survey or Survey Meter with Low Energy Gamma Probe</td>
</tr>
<tr>
<td>$^{51}$Cr</td>
<td>Gamma</td>
<td>.320</td>
<td>Gamma Counter Wipe Survey or Survey Meter with Beta Pancake G-M Probe</td>
</tr>
</tbody>
</table>

1. Use a survey meter rather than liquid scintillation counter for monitoring all nuclides except $^3$H, $^{14}$C and $^{60}$Ni. Survey meters detect both removable and non-removable contamination, whereas wipes and liquid scintillation counting detect only removable contamination. $^3$H cannot be detected by a common survey meter, so liquid scintillation counting is the only method to conduct a survey for that radionuclide. Other low-energy beta emitters may be detected by a Geiger-Muller detector if sufficient quantities are present. A wipe test is strongly recommended for detecting $^{35}$S and $^{33}$P.

2. You must survey in all areas where radioisotopes are used, stored or disposed, and the floors adjacent to those areas. This includes centrifuges, incubators, cold rooms, sealing equipment, pipetters and any other equipment which has been used for radioisotope work.

1. Make a record of all laboratory surveys. The record should refer to a room drawing, see appendix M at the end of this guide, marks to identify where you surveyed, radionuclides surveyed for, equipment identification, background of the equipment, efficiency for each nuclide monitored, and results of the survey. After use surveys are to be recorded on the Use Log form, and the monthly surveys are to be recorded on the Monthly Survey form, see appendix N at the end of this guide. Results include area of contamination, nuclide, CPM reading and efficiency or DPM, uCi amount and corrective action taken. To convert CPM to uCi, the following equation should be used:

\[
\frac{(\text{CPM} - \text{Background})}{\text{Efficiency}} = \text{DPM} \\
\frac{\text{DPM}}{2.22 \times 10^6} = \text{uCi}
\]
To monitor for $^3$H and $^{14}$C, wipes of the area must be taken. Follow these steps:

a. Use a cotton tip applicator dipped in methanol or water to wipe the work area being checked. You may wipe a large area, then count. If you find contamination, take wipes of smaller areas until you localize the contamination.

b. Place the cotton tip applicator in a liquid scintillation vial.
c. Add 10 -15 ml. of counting cocktail.
d. Let the sample absorb for 30 minutes.
e. Count in a liquid scintillation counter for 1 minute.
f. Record the results on the laboratory survey record.

To monitor all other radioisotopes, use a survey meter with the correct probe. Follow these steps:

a. Turn the meter on and first check the batteries by looking at the battery check reading. If the batteries are low, replace them before surveying. You may survey with the audio on or off. However, significant rate changes are easily detected by the audio.

b. Set the meter to read on the lowest possible setting, e.g., .1X or 1X the count rate. Set the response to fast response.

c. Check and record the background reading. (Note: Fast response mode gives an accurate background range, which is needed to determine when contamination is present.)

d. Slowly scan the area to be surveyed with the probe. Hold the probe about half an inch above the areas to maximize detection.

e. If the needle reads above twice (rule of thumb for surveying) background, switch the response to slow response to accurately quantify the contamination. Check the suspected source of contamination from more than one direction to confirm the source of the response. The meter response may be due to waste, samples or other radioactive materials in the area, not to contamination.

f. Record the results of the survey on the record form.

g. Decontaminate or dispose of the contamination in the radioactive waste. If the contaminated area or equipment cannot be decontaminated, shield and label the contamination with the nuclide, date and activity in DPM or uCi.

h. Remember to turn the meter off after each use to save batteries.

i. If major contamination is found, report immediately to the principal investigator.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Documented Survey Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radioisotope used in experiment</td>
<td>After each use AND at least monthly</td>
</tr>
<tr>
<td>Radioisotope not used in experiment</td>
<td>At least monthly</td>
</tr>
<tr>
<td>No Radioisotopes in storage</td>
<td>None</td>
</tr>
</tbody>
</table>

Please understand checking for contamination with the survey meter and/or wipe tests should be done after each use of the material.

The limit for removable contamination is 220 dpm/100 cm². An instrument reading greater than 50 counts over background should be treated as a contamination. Radioactive contamination found at or above this level must be decontaminated, or shielded and labeled. (Therefore, one of the advantages of using disposable lab paper on the benches is that one only has to dispose of the contaminated area of the paper in the radioactive waste, rather than decontaminating or shielding.)
Personnel Dosimetry and Bioassay

Dosimetry, in the form of either a whole body badge, finger ring, or both, will be issued to workers using energetic forms of ionizing radiation. Dosimeters are exchanged quarterly, and in some locations, monthly. Each individual is responsible for seeing that his/her badge has the current dosimeter within the holder. Body badges are to be worn between the neck and waist on the outermost layer of protective clothing. Finger rings are to be worn on the dominate hand under the glove, with the name label facing the palm.

These badges provide legal documentation of external radiation exposure received while working with radioactive materials at a given facility. They are not to leave your immediate work area; they are not to be taken home or to any other location, since non-occupational exposures may occur (e.g., a dentist’s office or another laboratory). Badges are heat and light sensitive, and if left in a car where the temperature may be high, a false exposure will be recorded. It will then become difficult to distinguish a true radiation dose from a dose caused by exposure to excessive heat or light. Care should be taken to make sure that badges do not become contaminated with radioactive materials. Lost or misplaced badges should be reported immediately to the Health Physics staff in order to receive a replacement. Under no circumstances should workers wear a dosimeter belonging to another individual.

When terminating employment with the University, badges must be returned to Health Physics. If badges are not returned and proper notification of termination of employment/study has not occurred, it is a violation of regulatory requirements. It is important to return your badge at the proper time. Delays in processing and reading the badge may invalidate the results. Chances of the badge being lost are increased with late badge returns.

Individuals performing or observing iodination where one millicurie or more of $^{125}$I is used are required to obtain a thyroid scan after the iodination. A baseline thyroid scan should be conducted on workers who have not previously used these kinds of $^{125}$I at Wayne State University. Individuals must receive a thyroid scan bioassay with at the Health Physics office between 6 and 72 hours after each iodination or use of millicurie quantities of free radioiodine.

Individuals handling or observing the use of 100 mCi or more of tritium ($^3$H) must submit a urine sample to Health Physics for bioassay within 24 hours of the experiment. A urine sample must be submitted after each use of 100 mCi or more. Contact the Health Physicist for further details concerning urine bioassays. Individuals handling or observing the use of 10 mCi or more of $^{32}$P must submit a urine sample to Health Physics for bioassay between 12 and 48 hours of use. A urine sample must be submitted after each use of 10 mCi or more. Contact the Health Physicist for further details concerning urine bioassays.

Radioactive Waste

Due to the problems in radioactive waste management and legal requirements, no radioactive waste may be removed from a laboratory without proper packaging, proof of a contamination survey or complete information on the waste tag. Chronic failure to thoroughly prepare radioactive waste for removal and transport may result in suspension of permission to use radioactive materials.

1. Read and understand the Wayne State University Waste Disposal Guide. This document should be located in your laboratory.
2. If you need an empty container, but have no waste to be picked up, photocopy the form in the Waste Disposal Guide. Requests for waste containers or removal may only be made on our OEHS office website: www.oehs.wayne.edu
3. As soon as you receive the containers in your lab, fill out the bottom part of the of the waste tag. This information identifies your laboratory, including room number, building name, phone number, principal investigator and the signature of a radiation worker.
4. You must separate all radioisotopes into individual waste containers. If the protocol requires the use of two radioisotopes which become inseparable, please contact Health Physics.
5. You must separate the solids and the liquids. Under no circumstance should liquids be placed in the solid waste or solid material placed in the liquid waste. Items must have all free liquid removed prior to being placed in the solid waste container. Stock vials may be opened and placed directly in the dry waste.

6. You must have secondary containment for your liquid radioactive waste container(s), in case of a leak, spillage, or rupture of the container.

7. Record the isotope, activity, date and initials every time material is added to the waste container(s). Each pair of gloves or pipette tip need not be manifested, but there should be an entry for each experiment or day that material is added.

8. Be sure to list the chemical components of the liquid waste on the waste tag in the space provided. Put the chemical name followed by the percent by volume or other units to quantify that chemical. Chemical names must be fully written out; chemical formulas are not acceptable. This helps the OEHS determine how to package and dispose of the waste.

9. Fill the liquid container(s) no more than 3/4 full. Overfilling the containers presents a hazard to the lab workers and OEHS personnel. When the container is ready for disposal, visit our website www.oehs.wayne.edu to request a pickup. Please complete the form fully for each solid, liquid, animal or vial waste item you want picked up, and put the isotope and activity for each container.

10. Mixed waste is a waste that is both radioactive and chemically hazardous. This includes scintillation vial waste that contains flammable cocktail or liquids that contain more than 15% of a hazardous chemical waste. (We will be glad to help you determine whether your liquid waste is classified as a mixed waste.) All mixed wastes other than scintillation wastes must have a green Hazardous Waste Disposal Tag in addition to the yellow Radioactive Waste Tag, and the proper name of the waste chemical (no chemical formulae, please) must appear on the green tag as soon as the first drop of waste is placed in the container.

Note: Waste items that are overfilled, contaminated on the outside, have incomplete tag information or are improperly packaged will not be picked up until the problem is corrected.
Laboratory Specific Training Form (APPENDIX L)

Checklist for Worker Training in Radiation Laboratories

This form needs to be filled by every radiation worker who may work with radioactive material and should be reviewed and signed by the principal investigator and the radiation worker. Please write down your responses indicating Yes/No / NA. The form should be maintained in record along with the training certificates in the lab.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I have attended and passed the Basic Radiation Safety Course / RGM training /Irradiator/ General Awareness of Radiation Training. <strong>This training must be refreshed annually.</strong></td>
</tr>
<tr>
<td>2.</td>
<td>WSU’s Laboratory Standard/Chemical Hygiene training has been completed. (RCRA). <strong>This training must be refreshed annually.</strong></td>
</tr>
<tr>
<td>3.</td>
<td>WSU’s Blood borne Pathogen Training has been completed. <strong>This training must be refreshed annually.</strong></td>
</tr>
<tr>
<td>4.</td>
<td>I have been instructed as to the type and location of all the radioactive materials and/or radiation producing machines in my lab(s).</td>
</tr>
<tr>
<td>5.</td>
<td>I have read and understand the Radiation Safety Manual or Lab Guide.</td>
</tr>
<tr>
<td>6.</td>
<td>I have been instructed as to how to record the radioactive material inventory, survey methods, and contamination survey requirements to minimize radiation exposure.</td>
</tr>
<tr>
<td>7.</td>
<td>Security requirements for radioactive material have been reviewed.</td>
</tr>
<tr>
<td>8.</td>
<td>The occupational exposure limits for radiation have been reviewed.</td>
</tr>
<tr>
<td>9.</td>
<td>Radiation warning symbols and their meanings have been reviewed.</td>
</tr>
<tr>
<td>10.</td>
<td>The locations of radioactive materials, hazardous chemicals and biohazardous agents present in the laboratory have been pointed out.</td>
</tr>
<tr>
<td>11.</td>
<td>The relative risks of being near to or using the hazardous agents present in the laboratory have been reviewed with the worker.</td>
</tr>
<tr>
<td>12.</td>
<td>The location and types of wastes and containers for the wastes have been identified.</td>
</tr>
<tr>
<td>13.</td>
<td>The emergency procedures have been reviewed with the worker. This information includes the location of emergency spill kits, emergency response telephone numbers and immediate persons to contact in the laboratory if an emergency arises.</td>
</tr>
<tr>
<td>14.</td>
<td>I have been instructed in the proper use of all equipments/experimental protocols that I may work/operate, including the use of operational checks, and the proper function of appropriate interlocks, if any exist. (Lab specific Radioisotope/Irradiator /X-ray users)</td>
</tr>
</tbody>
</table>

Instructor Name   ____________________________ Date ____________

Worker Consent: I certify that I have been provided with and understand the information indicated above. I understand that this is a certification of principal investigator training and informed consent, and does not constitute a waiver of my rights. I understand that I am responsible for adhering to all safety practices, laws, rules and guidelines.

<table>
<thead>
<tr>
<th>Worker – Print Name</th>
<th>Title/Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

**Principal Investigator:** I certify that the above information was reviewed with or provided to the above certified worker.

<table>
<thead>
<tr>
<th>Principal Investigator Signature</th>
<th>Date</th>
</tr>
</thead>
</table>
INSTRUCTIONS FOR PRINCIPAL INVESTIGATORS REGARDING THE CHECKLIST FOR TRAINING WORKERS IN RADIATION LABORATORIES

1. Individuals frequenting an area where radioactive materials are used, stored or disposed should receive principal investigator training annually. This training must be documented with this checklist.

2. Training is function specific and site specific, meaning the content and depth of training is related to the duties of the person and the scope of the hazards present in the work area.

3. Exposure limits must be explained to workers. For persons who are not certified radiation workers, the exposure limits are General Public, or 100 mrem per year. For radiation workers, the limits are the occupational limits set forth in the 10 CFR 20 laws, or 5 rem per year TEDE (whole body), 50 rem per year TODE (organ), 15 rem per year to the lens of the eye, 50 rem per year for the skin of the whole body and/or extremities. Radiation workers must have received introductory safety training at the OEHS, and must attend annual refreshers for radiation and hazardous waste.

4. Copies of the training records may be kept in the safety notebook.

5. Security and control of radioactive materials must be provided at all times, either with persons present or locking or securing to prevent tampering or unauthorized use or removal. Persons who are not radiation workers may provide this control if they are appropriately trained by the PI and/or the OEHS radiation safety training class.

6. This document serves as informed consent of the worker.
APPENDIXM

**Colllunikamn Smvey Room Diagram Form**

The following diagram must be completed to accurately represent the layout of the laboratory, including benches, sinks, roods, refrigerators, freezers, waste containers, etc. This form is to be used in conjunction with the after-use and monthly survey forms provided, and kept in the lab along with these records.

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Survey Room Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

These include and label each: Bench, Hook, Floor, Refrigerator, or other unit numerically.

Room Location:

Proposal Holder:
### Monthly Contamination Survey Form

The following form MUST be used for documenting the contamination surveys performed each month in every radioactive use lab. This record must be accompanied by the wipe test result printout, if performing wipes, and MUST correspond to the labeled areas of the room diagram of the lab in which the survey was conducted.

#### Survey Details
- **Survey Date:**
- **Build:**
- **Room:**
- **App/Divider Holder:**
- **Silo/Voyor/Last Name/First Name**
- **Position/Title:**

#### Radioisotope Use

- **Radioisotopes used this month:**
  - D: Radionuclides were used
  - N: Radionuclides were NOT used

#### Reagent Information

- **Reagent used:**
  - P: Reagents were provided and used in the lab.

#### Isotopes and Activity

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Activity</th>
<th>Isotope</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-3</td>
<td>P-32</td>
<td>C-14</td>
<td>1-125</td>
</tr>
<tr>
<td>S-35</td>
<td>Cr-51</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Survey Method

- **Survey Method:**
  - Meter / Wipe

#### Instrument Model/Location

- **Instrument model/location:**

#### Results (DPM)

<table>
<thead>
<tr>
<th>Are.</th>
<th>Results (DPM)</th>
<th>Action Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>BKG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Surveyor's Role

- **Surveyor's Name:**
- **Supervisor/Manager:**
- **Date of Survey:**

---

By signing below, the surveyor attests that he/she has read and understands the Radiation Safety Manual and its procedures and requirements for contamination surveys.

**Surveyor’s Signature:**

---

Please Retain the Wipe Test Result Printouts
## APPENDIXO

**Use Log and After-use Contamination Survey Form**

<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>Amount Used (uCi)</th>
<th>Amount Left (uCi)</th>
<th>Survey Method (Circle One)</th>
<th>Label of Areas Surveyed and Results (DP:M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Meter Wipe</td>
<td>Inner Vial</td>
<td>BKG</td>
<td>BKG</td>
<td>BKG</td>
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</tbody>
</table>

Please Retain the Wipe Test Result Printouts
PLEASE ATTACH CONTAMINATION WIPE TEST RESULTS TO THIS FORM!

<table>
<thead>
<tr>
<th>Approval Holder</th>
<th>Curie, M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radionuclide</td>
<td>Chem. Form</td>
</tr>
<tr>
<td>Activity (uCi)</td>
<td>dATP</td>
</tr>
</tbody>
</table>

Use of Inventory Form:
Health Physics will send an update of this form with each order of radioactive material. To report an inventory update, simply write the current undecayed activity in the “Current Activity” column next to the appropriate line item. If the stock vial has been disposed of in radioactive waste, enter a zero in the “Current Activity” column.

By signing and dating this form, you are signifying to Health Physics that a physical inspection of your material has been performed and the inventory adjusted accordingly. The signed forms may be returned to Health Physics via Campus Mail, or by fax at 993-4079. Health Physics will return an update to you via Campus Mail.

Physical Inventory Performed By (Please Print): ___________________________  Signature: ___________________________  Date: ____________

Friday, June 14, 2002
USER COMMENT FORM

Help the Office of Environmental Health and Safety Health Physics staff to serve you better! Please copy and complete this comment form and send it back to the OEHS. Comments may be submitted anonymously, and will allow the Health Physics staff to better evaluate the services provided to the research community.

<table>
<thead>
<tr>
<th>Service Provided</th>
<th>Poor</th>
<th>Fair</th>
<th>Satisfactory</th>
<th>Very Good</th>
<th>Excellent</th>
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<tbody>
<tr>
<td>Initial Training</td>
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<tr>
<td>Annual Training</td>
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<tr>
<td>Lab Audits</td>
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<td>Package Delivery</td>
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<td>Safety Manual</td>
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<td>Lab Guide</td>
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<td>Material Ordering</td>
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<tr>
<td>Waste Disposal</td>
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<td>Dosimetry</td>
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<tr>
<td>Machine Support</td>
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<tr>
<td>Customer Service</td>
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</tbody>
</table>

Please provide additional comments or specifics concerning your ratings of the services provided.

________________________________________________________________________
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Thank you for your assistance! Please address campus mail to:

Office of Environmental Health and Safety
Health Physics / Radiation Safety
5425 Woodward, Suite 300
313-577-1200

Version 2.10 (9/13)