Radiation Safety Program
Ohio Department of Health Laboratory

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Emergency Contacts

Radiation Safety Officer (RSO): Katherine Grandfield - Laboratory: 614-728-0391

Assistant RSO: Steve York - Office: 614-728-0393

ODHL Bureau Chief: Rose Gearhart - Office: 614-644-4632

Laboratory Administration Office Main Desk: 614-644-2563

ODH Laboratory Emergency Call-back Number: 614-644-2563

For Medical Emergencies: Mount Carmel East Medical Center Emergency Room
6001 East Broad Street
Columbus, Ohio 43213
Emergency Department: 614-234-6010

Radiation Safety Program
Ohio Department of Health Laboratory

Purpose: The Ohio Department of Health Laboratory (ODHL) Radiation Safety Program has been prepared and established as the guide for radiation protection and control in this laboratory. ODHL has been issued a license by the Ohio Department of Health, Bureau of Radiation Protection (ODH BRP) for the procurement, possession and usage of radioactive materials in laboratory testing protocols. Continuation of this license requires that ODHL maintain an effective radiation safety program.

Principle: The Ohio Department of Health Laboratory (ODHL) Radiation Safety Program provides information to applicable personnel and the public regarding the organization and management of radioactive materials in use by this laboratory. It identifies regulations set forth by the Ohio Department of Health (ODH) and United States Nuclear Regulatory Commission (NRC) and policies developed by this laboratory as safe, reasonable and enforceable. The manual is designed to conform closely to the Code of Federal Regulations (10CFR20) – "Standards for Protection Against Radiation" and similar regulations of the ODH as specified in the Ohio Administrative Code (OAC) Chapters 3701:38 and 3701:40. On-line sources of these regulations are provided below:

- 10 CFR 20: http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/
- OAC 3701:38: http://codes.ohio.gov/oac/3701%3A1-38
- OAC 3701-40: http://codes.ohio.gov/oac/3701%3A1-40

1.0. Introduction

1.1. The ODH Laboratory is regulated under a Service Provider License granted by the Ohio Radioactive Materials Licensing Program.

1.2. A copy of the "ODH License For Radioactive Material" is provided in Appendix A.

1.3. This is defined to mean a license issued by the Director of the Ohio Department of Health pursuant to Ohio Administrative Code (OAC) 3701:1-40 and is characterized by a listing of the following specific items:

1.3.1. Radionuclides
1.3.2. Chemical/physical form
1.3.3. Possession Limits
1.3.4. Radiation Safety Officer
1.3.5. Authorized Use
1.3.6. Authorized locations

1.4. Radioactive material, as defined in OAC 3701:1-38-01, has the following authorized uses in this laboratory:

1.4.1. For receipt and possession incident to laboratory analysis of environmental samples; and
1.4.2. To be used for instrument calibration and laboratory QC.

1.5. The main goal of the Radiation Safety Program is to minimize exposure to radioactive materials, and to the radiation levels they may produce, to a level that is AS LOW AS REASONABLY ACHEIVABLE (ALARA). As provided in the NRC Regulatory Guides 8.10 and 10.2, three objectives of the ALARA program are:

1.5.1. Reduce occupational exposure to levels as low as reasonable achievable through good radiation planning and practice;
1.5.2. Reduce radiation exposure to the public as low as reasonable achievable; and
1.5.3. Management commitment to encourage good radiation safety planning, by establishing and enforcing radiation safety practice, and to remain vigilant to improving the radiation safety program.

2.0. Roles and Responsibilities

2.1. Radiation Safety Officer (RSO) - OAC 3701:1-40-15(A)(3)

2.1.1. The ODHL Radiation Safety Program is administered by the Radiation Safety Officer (RSO). The RSO is assigned the responsibility and authority to administer and enforce applicable regulations set forth by the Nuclear Regulatory Commission (NRC) and the Ohio Department of Health (ODH).

2.1.2. The RSO is charged with making institutional decisions regarding all aspects of the radiation safety program. The RSO has authority to halt any activity judged to be a threat to safety, health or the environment; or a violation of regulations or conditions of the ODHL Radioactive Materials License. The RSO reports to the Bureau Chief of the Ohio Department of Health Laboratory.

2.1.3. The RSO's duties and responsibilities include ensuring radiological safety and compliance with Ohio BRP and US DOT regulations and the conditions of the license. These duties and responsibilities include the following:

2.1.3.1. Ensure that licensed material possessed by the licensee is limited to the types and quantities of licensed material listed on the license;
2.1.3.2. Maintain documentation that demonstrates that the dose to individual members of the public does not exceed the limit specified in OAC 3701:1-38-13;
2.1.3.3. Ensure security of radioactive material;
2.1.3.4. Post documents as required by OAC 3701:1-38-10(A) and OAC 3701:1-38-23(E);
2.1.3.5. Ensure that licensed material is transported in accordance with applicable BRP and US DOT requirements;
2.1.3.6. Ensure that radiation exposures are ALARA;
2.1.3.7. Oversee all activities involving radioactive material, including monitoring and surveys of all areas in which radioactive material is possessed or possessed and used;
2.1.3.8. Act as liaison with Bureau and other regulatory authorities;
2.1.3.9. Provide necessary information on all aspects of radiation protection to personnel at all levels of responsibility, pursuant to OAC 3701:1-38, and any other applicable regulations;
2.1.3.10. Oversee proper delivery, receipt, and conduct of radiation surveys for all shipments of radioactive material arriving at or leaving from the institution, as well as packaging and labeling all radioactive material leaving the institution;
2.1.3.11. Distribute and process personnel radiation monitoring equipment, determine the need for and evaluate bioassays, monitor personnel radiation exposure and bioassay records for trends and high exposures, notify individuals and their supervisors of radiation exposures approaching established limits, and recommend remedial action;

2.1.3.12. Conduct training programs and otherwise instruct personnel in the proper procedures for handling radioactive material prior to possession or possession and use, both at periodic intervals (refresher training), and as required by changes in procedures, equipment, regulations, etc.;
2.1.3.13. Supervise and coordinate the radioactive waste disposal program, including effluent monitoring and recordkeeping on waste storage and disposal records;
2.1.3.14. Oversee the storage of radioactive material not in current use, including waste;
2.1.3.15. Perform or arrange for leak tests on all sealed sources and calibration of radiation survey instruments;
2.1.3.16. Maintain an inventory of all radioisotopes possessed under the license and limit the quantity to the amounts authorized by the license;
2.1.3.17. Immediately terminate any unsafe condition or activity that is found to be a threat to public health and safety or property;
2.1.3.18. Supervise decontamination and recovery operations; and
2.1.3.19. Maintain other records not specifically designated above (e.g., records of receipts, transfers, and surveys as required by OAC 3701:1-40-21 and OAC 3701:1-38-20.

2.1.4. The Ohio BRP indicates that to demonstrate adequate training and experience, the RSO should have:
2.1.4.1. As a minimum, a college degree at the bachelor level, or equivalent training and experience in physical, chemical, biological sciences or engineering.
2.1.4.2. Training and experience commensurate with the scope of proposed activities. Training should include the following subjects:
2.1.4.2.1. Radiation Protection Principles;
2.1.4.2.2. Characteristics of Ionizing Radiation;
2.1.4.2.3. Units of Radiation Dose and Quantities;
2.1.4.2.4. Radiation Detection Instrumentation;
2.1.4.2.5. Biological Hazards of Exposure to Radiation (appropriate to types and forms of radioactive material to be used);
2.1.4.2.6. Regulatory Requirements and Standards; and
2.1.4.2.7. Hands-on use of Radioactive Materials.
2.1.4.3. The amount of training and experience needed will depend upon the type, form, quantity and proposed use of the licensed material requested and should be sufficient to identify and control the anticipated radiation hazards.
2.1.4.4. The RSO designee should have obtained the above training in a formal course designed for RSOs presented by an academic institution, commercial radiation safety consulting company, or a professional organization of radiation protection experts.

2.2. Assistant Radiation Safety Officer (ARSO)
2.2.1. In addition to the RSO, an Assistant Radiation Safety Officer (ARSO) has been appointed and can perform the duties of the RSO in his/her absence. Under supervision of the RSO, this individual may act as a designee of the RSO in the performance of surveys, inspections and radiation badge exchange.
2.2.2. Qualifications for the ARSO are the same as those indicted above for RSO.

2.3. Authorized Users

2.3.1. Individuals successfully completing the training requirements as specified by this program and any requirements of the material use license, shall be designated "Authorized User" by the ODHL Radiation Safety Officer.

2.3.2. Only Authorized Users may use or otherwise handle radioactive sources licensed to the ODHL.

2.3.3. All individuals who will be using radioisotope or any other form of ionizing radiation must provide a summary of their past experience and training in handling radioactive materials to the RSO. A copy of the form "Education, Training, and Experience Using Radioactive Materials (RAM)" is provided in Appendix B.

2.3.4. All individuals who will be using radioisotope or any other form of ionizing radiation must also complete initial Radiation Safety Training and annual Radiation Safety Refresher Training covering the topics listed in Section 3.0. Radiation Safety Training Requirements below and provide documentation to the RSO. A copy of the form "Radiation Safety Training for Authorized Users" is provided in Appendix C.

2.3.5. Authorized users are responsible for ensuring the health and safety of all personnel in the laboratory and the general public in regard to licensed radioactive material. They must ensure that the procedures used to accomplish analytical or research testing are as safe as possible. Specifically, they are responsible for:

2.3.5.1. Completing required radiation safety training prior to handling radioactive materials;

2.3.5.2. Participate in the personnel monitoring program, if necessary;

2.3.5.3. Obtain written RSO approval before ordering radioisotopes;

2.3.5.4. Securing written RSO approval before transferring radioisotopes to another site and ensuring safe transfer;

2.3.5.5. Monitoring laboratory conditions as often as necessary to assure their exposure to radiation is ALARA;

2.3.5.6. Labeling of all areas and laboratory equipment with proper warning signs, and assure all documentation is accurate and up to date;

2.3.5.7. Properly disposing of radioactive wastes and preventing accumulation of excessive quantities of waste in the laboratory; and

2.3.5.8. Notifying the RSO when there is any change of personnel, procedures or lab techniques, or physical facilities from those previously approved.

2.4. Non-Authorized Users

2.4.1. All other personnel (technical, administrative, housekeeping) stationed in the Radiation Chemistry Laboratory or who enter laboratories containing radioactive materials are not permitted to handle or use radioactive materials in any form at any time.

3.0. Radiation Safety Training Requirements

3.1. Authorized Users working directly with radioisotopes will receive the following training:

3.1.1. Initial safety training is provided by reviewing the DVD "Radiation Safety" by Nevada Technologies. Refresher safety training is provided by reviewing the DVD "Radiation Safety Refresher" by Nevada Technologies. See the RSO for access to either of these resources. Training topics included:

3.1.1.2. General Information:

3.1.1.2.1. Radiation safety;

3.1.1.2.2. Radiation vs. contamination;

3.1.1.2.3. Internal vs. external exposure;
3.1.1.2.4. Biological effects of radiation;
3.1.1.2.5. ALARA concept;
3.1.1.2.6. Use of time, distance, and shielding to minimize exposure;
3.1.1.2.7. Regulatory requirements;
3.1.1.2.8. Instrumentation; and
3.1.1.2.9. Other topics, as applicable.

3.1.1.3. Laboratory Safety and Use of Radioisotopes:
3.1.1.3.1. Control procedures for obtaining permission to use radioactive materials at the facility;
3.1.1.3.2. Protective clothing and what laboratory apparel to wear and what equipment to use;
3.1.1.3.3. Authorized users;
3.1.1.3.4. Limitations and conditions relative to handling unsealed licensed material and what laboratory equipment to use when working with such material;
3.1.1.3.5. Routine survey and monitoring procedures to be followed for contamination control, including where and how contaminated materials are to be handled and stored;
3.1.1.3.6. Emergency procedures concerning spills, fires, release of material, and/or accidental contamination of personnel;
3.1.1.3.7. Decontamination procedures to use and who to contact in case of an emergency;
3.1.1.3.8. Instructions concerning transfer of licensed materials between rooms, halls, or corridors, if applicable;
3.1.1.3.9. Requirements for storage, labeling of containers and identification of areas where licensed materials are used;
3.1.1.3.10. Personnel monitoring devices to use, where to obtain them, and exchange procedures and exposure results;
3.1.1.3.11. Waste disposal procedures to follow, limitations for disposal of liquid or solid wastes; and
3.1.1.3.12. Records to be maintained on use and disposal of licensed materials.

3.1.2. In rules adopted under Chapter 3748 of the Ohio Revised Code, the Ohio Department of Health has established standards for employee protection when working directly with radiation which must be reviewed annually. This is provided in Appendix D "Ohio Department of Health Notice to Employees".

3.1.3. Frequency of Training
3.2.3.1. Before assuming duties in the vicinity of radioactive materials.
3.2.3.2. Whenever there is a significant change in duties, regulations, or the terms of the license.
3.2.3.3. Annually (refresher training).

3.1.4. Documentation of Radiation Safety Training
3.2.4.1. Initial, six month, and annual refresher training shall be documented on the "Radiation Safety Training for Authorized Users" forms in Appendix E.

3.2. Non-Authorized Users as indicated in Section 2.4 above are encouraged to voluntarily review the information provided through the new Ohio Department of Health "RADUCATION" website, sponsored by the Department's Bureau of Radiation Protection (BRP).

3.2.1. The site provides information and resources about radiation, its' uses and regulations, and its' impact on people and the environment:

http://www.odh.ohio.gov/odhprograms/rp/Raducation/RADUCATION.aspx

3.2.2. Additional information is made available on request regarding:

3.2.2.1. Specific meaning and intent of radiation signage and labels;

3.2.2.2. Routine safety procedures for working near radioactive materials;

3.2.2.3. Procedures to be followed in the event of an emergency involving radioactive materials; and

3.2.3. Housekeeping personnel are also informed specifically as to which waste cans to empty, or which areas to enter or avoid.

4.0. Facilities and Equipment

4.1. Approved Areas and Definitions

4.1.1. All areas where radioactive materials or radiation producing equipment is to be used or stored must be specifically approved for that purpose by the RSO. Such approval will consider the following aspects:

4.1.1.1. Type of isotope to be used;

4.1.1.2. Volatility and subsequent dispersability of radioactive materials;

4.1.1.3. The particular procedures to be performed in the area; and

4.1.1.4. Additional factors are amount of available bench space, presence of fume hoods, storage and waste handling areas.

4.1.2. The Ohio Department of Health (OAC 3701:1-38-01) defines areas as follows:

4.1.2.1. Unrestricted Area – "an area, access to which is neither limited nor controlled by the licensee."

4.1.2.1.1. This would include areas external to ODH Buildings 4 and 22. Evening and weekend driveway access is limited by a security card scanning system administered for the campus by the Ohio Department of Agriculture.

4.1.2.2. Restricted Area - "an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials."

4.1.2.1.1. This includes all general and lab areas within Buildings 4 and 22. Building and laboratory area access is controlled by a security card scanning system administered for the campus by the Ohio Department of Agriculture.

4.1.2.1.2. This also includes all areas of the Radiation Chemistry Laboratory in which testing is directly performed on a routine or emergency basis.

4.1.2.3. Controlled Area – "an area, outside of a restricted area but inside of the site boundary, access to which can be limited by the licensee for any reason."

4.1.2.3.1. This would include the laboratory loading dock area of Building 22 shared with the Ohio EPA on the second floor. Access may be physically limited by temporary barriers to perform sample receipt or spill clean-up procedures during normal operations or emergency situations.

4.1.2.4. Radiation Area – "an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 REM (0.05 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates."

4.1.2.4.1. This would include secure storage areas labeled as "Caution – High Radiation Area" for accumulating low-level samples prior to disposal. Storage areas include the locked Biotrash storage room in the loading dock area of Building 22 controlled by key access.

4.1.2.4.2. This could include areas of the Radiation Chemistry Laboratory during emergency events. Exposure would be limited by controlling access to the area and transfer of the materials to secured storage within as short a time as possible

4.1.2.5. High Radiation Area – "an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.1 REM (1 mSv) in 1 hour at 30 centimeters from the radiation source or any surface that the radiation penetrates."

4.1.2.4.1. High radiation levels will not be permitted in this facility. Commercial disposal or storage off-site will be arranged as needed during emergencies to prevent accumulation to these levels.

4.1.2.6. Very High Radiation Area – "an area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 RADs (5 Greys) in 1 hour at 1 meter from a radiation source or from any surface that the radiation penetrates.

4.1.2.4.1. Very high radiation areas will not be permitted or encountered in this facility.

4.2. Equipment

4.2.1. Each laboratory area utilizing high energy beta, gamma, or x-ray radiation will have available a portable survey meter available to monitor work and storage areas before, during and following an experiment.

4.2.1.1. The RSO maintains an inventory of all survey meters and ensures that such equipment is calibrated on an annual basis. See "Radiation Survey Equipment List" in Appendix F.

4.2.2. Any equipment used with radioactive materials (refrigerators, ovens, centrifuges, etc.) is not to be removed from its authorized area until demonstrated to be free of contamination. No potentially contaminated equipment will be repaired by maintenance or other personnel without first being demonstrated to be free of contamination prior to servicing. These regulations also apply to any equipment being returned to the manufacturer for servicing.

5.0. Material Receipt and Accountability

5.1. Ordering Licensed Radioactive Materials – Standards, check sources, proficiency tests, etc.

5.1.1. All purchase requisitions for radioactive materials must be submitted to the RSO for approval prior to placing any order. This is vital to ensure that all materials will be properly received, and that licensed quantity limits will not be exceeded.

5.1.2. All packages containing purchased radioactive materials will be delivered to the ODHL loading dock area during regular business hours (8:00 am - 4:30 pm, Monday– Friday). No shipment of purchased radioisotopes will be accepted by ODHL during off-hours.

5.1.2.1. When a package of radioactive materials arrives on campus, receiving personnel will visually inspect the package for signs of damage together with the shipping representative, but will not handle it.

5.1.2.1.1. If the package is damaged, the RSO must be immediately notified. The RSO (or his or her designee) will survey the package, the receiving area, the carrier's vehicle, and all personnel who handled the package to assess the existence and extent of contamination.

5.1.2.1.2. If there are no signs of damage (wet, torn or opened package), receiving personnel will sign for its receipt. They will then immediately notify the RSO of its presence in the building.

5.1.2.2. The RSO or his or her designee, will proceed to the Receiving Area, survey the package and record the readings on a Shipment Receipt Form for Radioactive Materials (RAM) (See Appendix G). The package will be then taken to the Radiation Chemistry Laboratory in ODHL Building 22.

5.1.2.3. The RSO or designee will inspect and document all packages of radioactive materials received by this laboratory. Such inspections are performed in accordance with OAC 3701:1-38-18 using the following procedures:

5.1.2.3.1. Monitor external surfaces of a labeled package for radioactive contamination unless package contains quantities of radioactive material less than or equal to the type A shipping quantity, or unless otherwise specified as defined in rule OAC 3701:1-38-01 of the Administrative Code:

http://codes.ohio.gov/pdf/oh/admin/2012/3701$1-50-25_ph_ff_a_app1_20110819_0818.pdf

5.1.2.3.2. Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if there is evidence of degradation of package integrity. This commonly includes all Radioactive Material-Exempted Limited Quantity, N.O.S.; Radioactive White I; Radioactive Yellow II; or Radioactive Yellow III labeled packages.

5.1.2.3.3. Monitoring shall be comprised of the performance of surveys and wipe tests as follows:

5.1.2.3.3.1. Moisten filter paper discs with de-ionized water, and wipe 300 cm^2 area of the exterior and interior package.

5.1.2.3.3.2. Survey filter paper disks using a calibrated Geiger-Mueller survey meter instrument and record readings in mR/hr.

5.1.2.3.3.3. If removable contamination in excess of 22 dpm/cm^2 or 6,600 dpm for 300 cm^2); or radiation levels in excess of 200 mR/hr at the surface or 10 mR/hr at 1 meter are detected, the RSO will immediately notify the carrier and ODH BRP.

5.1.2.3.3.4. All radioactive packages shall be inspected and wipe tested as soon as possible, but no later than three (3) hours from the time of arrival at the laboratory.

5.2. Inventory of Radioactive Materials

5.2.1. The RSO is responsible for ensuring that the possession limits for each specific isotope are not exceeded.

5.2.2. The RSO maintains an inventory of all radioisotopes received in the laboratory and associated activity. See "Inventory of Radioactive Materials" Form in Appendix H.

5.2.3. All inventory records and documentation are maintained in the RSO's office in Building 4. Copies of these records are maintained in the Radiation Chemistry Laboratory's files for access as needed.

5.3. Use of Radioactive Materials

5.3.1. All radioactive materials must be handled in approved areas only.

5.3.2. Radioactive materials should at all times be treated as hazardous substances and handled with caution.

5.3.3. All use of radioactive materials must be supervised by an authorized user.

5.3.4. No eating, drinking, smoking, chewing gum, applying cosmetics, or any other procedure that could lead to the inadvertent exposure of radioactive materials is permitted.

5.3.5. Lab coats and disposable gloves should be worn when handling radioactive materials.

5.3.6. Care must be taken not to contaminate other surfaces when working gloved. Traces of radioactive material are often inadvertently transferred to refrigerator handles, phones, faucets and lab equipment when handling with a "hot" glove.

5.3.7. Glassware, tongs, pipettors, and other similar lab equipment used for working with radioisotopes should be marked as such and must be decontaminated before being used in a non-radioactive area. "Hot" glassware should be washed with detergent and rinsed thoroughly to remove contamination or stored with other radioactive waste for removal by a hazardous waste contractor

5.3.8. Work should be confined to as small an area as possible to facilitate confinement and shielding, and also serves as an aid in limiting the affected area in the event of contamination.

5.3.9. All work involving the likelihood of aerosols, dusts, or gaseous products, must be conducted in hoods or similar protective devices.

5.3.9.1. All releases from these systems shall be ALARA, and may never exceed maximum permissible concentration in air outlined in OAC 3701:1-38.

5.3.10. Work surfaces should be covered with an absorbent paper with waterproof backing. Procedures involving high activity liquids should be confined to a tray impervious to absorbing contamination.

5.3.10.1. Change paper and wash trays frequently to prevent the spread of radioactive contamination.

5.3.11. Secure all licensed material when it is not under constant surveillance and immediate control of Authorized Users.

5.4. Accountability of Radioactive Materials
  5.4.1. Handling of unsealed radioactive materials must be documented to account for receipt, transfer, disposal, use and decay.
    5.4.1.1. Records of receipt, transfer and disposal are kept in paper form and filed.
    5.4.1.2. Records of use are kept via log book.
    5.4.1.3. Records of decay are kept in Excel spreadsheets.
  5.4.2. All records include the date and initials of staff.
5.5. Storage of Radioactive Materials
  5.5.1. All radioactive materials must be stored in an approved area of controlled access to prevent unauthorized removal.
  5.5.2. Each area must be locked when personnel authorized to handle the material are not present.
  5.5.3. Only approved laboratory areas may be used for storage.
  5.5.4. The authorized user is responsible for assuring that all items containing radioactive materials are marked with the approved label bearing the isotope symbol and the words "Caution Radioactive Material".
  5.5.5. Place high activity gamma, x-ray and high energy beta emitting radioisotopes in a suitably shielded box in a remote spot of the laboratory (e.g. back corner of a hood or refrigerator). Use long handled forceps or tongs when possible to reduce potential of hand exposure.
5.6. Disposal of Radioactive Waste
  5.6.1. All radioactive waste must be placed in appropriate containers in accordance with ODH BRP licensing requirements. A Radioactive Waste Log (Appendix I) is required to be affixed to or near the waste disposal area and used at all times. This log is also maintained in an Excel spreadsheet on the network drive.
  5.6.2. Allowable amounts of liquid radioactive waste may be put to sewer in accordance with guidelines set forth in OAC 3701:1-38-12, Appendix C, Table III. All such discharges are to be immediately recorded on the Sink Disposal of Radioactive Waste – Liquids (Appendix J). This form is near the sink used and labeled for radioactive liquid waste. This log is also maintained in an Excel spreadsheet on the network drive.
    5.6.2.1 Radioactive material discharged into laboratory drains must be readily soluble or dispersible in water. All releases of radioactive material must be followed by flushing the sink with copious amount of water.
    5.6.2.2. A designated sink must be used for disposal of radioactive waste, and only that sink should be used for this purpose.
    5.6.2.3. The amounts of radioactivity that can be discharged into the sewer system are limited both in terms of concentration as well as total activity.
    5.6.2.4. The quantity of radioactive material released into the sewer in one month divided by the average monthly volume of water released into the sewer must not exceed the concentrations listed in OAC 3701:1-38-12, Appendix C, Table III.
      5.6.2.4.1. The total quantity of radioactive material released into the sewer in a year must not exceed five curies of hydrogen-3, one curie of carbon-14, and one curie of all other radioactive materials combined.
      5.6.2.4.2. Disposal records will be reviewed prior to radioactive material release into the sewer to verify compliance with monthly and yearly limits.

5.6.3. Dry solids are collected and maintained in containers containing yellow radioactive bags. These containers must be labeled – CAUTION RADIOACTIVE MATERIAL - on the exterior. No liquids are to be placed in these containers.

5.6.4. All wastes that contain, or are contaminated with, any radioactive material (liquids, solids, infectious materials, etc.) are considered radioactive waste. It is prohibited to place non-radioactive waste in containers labeled as containing radioactive waste.

5.6.5. Radioactive waste is stored in the Radioactive Waste Storage Area in the Radiation Chemistry Laboratory in ODHL Building 22.

5.6.5.1. Short half-life (defined as radioisotopes having a half-live of less than 70 days) material will be stored in the lead safe in the Radiation Chemistry Laboratory for decay on site.

5.6.5.1.1. Decay on site is performed by properly storing the waste for at least ten (10) half-lives, and monitored to ensure no activity remains. The material is then disposed of in regular solid waste stream.

5.6.5.2. For long half-lived material, the waste is collected and removed by an approved radioactive waste transporter to a licensed radiation disposal facility.

5.6.5.3. Scintillation fluid that has been demonstrated as having at or below background radioactivity is poured off into approved waste containers for non-radioactive hazardous waste, and processed in accordance with regulations for hazardous waste.

5.7. Transfer of Radioactive Materials

5.7.1. No quantities of radioactive materials may be transported off-site except as specifically-permitted and processed by the Radiation Safety Officer. All transfers must comply with all applicable regulations found in OAC 3701:1-50 and 49 CFR Part 173.

6.0. Audit Program

6.1. Inspections/Surveys

6.1.1. The RSO conducts inspections of all laboratories where radioisotopes are used or stored to evaluate compliance with license requirements. These inspections include monthly monitoring with survey meters and quarterly monitoring with wipe tests, and are recorded on a "RSO Monthly Survey - Radioanalytical Chemistry" (Appendix K) for each testing area (Main Lab or Counting Room).

6.1.2. If activities involving radioisotopes cease, the RSO will remove any active radioisotopes remaining as waste, and perform a final inspection.

6.1.3. Contamination found in unrestricted areas will be immediately decontaminated to acceptable s contamination level amounts that do not exceed the levels listed below in Table 8.6 on page 55 of ODH NMS-LIC-18 (see Reference listing):

Table 8.6 Acceptable Surface Contamination Levels for Equipment

Nuclide (a)	Average (b)(c)	Maximum (d)	Removable (e)
Natural uranium, U-235, U-238 and associated decay products	83.3 Bq/100 cm^2 (5000 dpm/100 cm^2)	250 Bq/100 cm^2 (15000 dpm/100 cm^2)	16.7 Bq/100 cm^2 (1000 dpm/100 cm^2)
Transuranics, Ra-226, Ra-228, Th-230, Pa-231, Ac-227, I-125, I-129	1.7 Bq/100 cm^2 (100 dpm/100 cm^2)	5.0 Bq/100 cm^2 (300 dpm/100 cm^2)	0.3 Bq/100 cm^2
Th-nat, Th-232, Ra-223, Ra-224, U-232, I-126, I-131, I-133, Sr-90	16.7 Bq/100 cm2 (1000 dpm/100cm^2)	50.00 Bq/100 cm^2 (3000 dpm/100 cm^2)	3.3 Bq/100 cm^2 (200 dpm/100 cm^2)
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	83.3 Bq/100 cm^2 (5000 dpm/100 cm^2)	250 Bq/100 cm^2 (15000 dpm/100 cm^2)	16.7 Bq/100 cm^2 (1000 dpm/100 cm^2)

* 1 Bq = 1 Disintegration per second

a) Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

(b) As used in this table, dpm (disintegration per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

(c) Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

(d) The maximum contamination level applies to an area of not more than 100 cm^2.

(e) The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with filter or soft absorbent paper, applying moderate pressure and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

6.1.4. If equipment or facilities that are potentially contaminated are to be released for unrestricted use, Table 8.6 above also provides the maximum acceptable residual levels for that equipment. To the extent practicable, it is appropriate to decontaminate to below these levels. Surface contamination surveys should be conducted for both removable and fixed contamination before equipment and facilities are released from restricted to unrestricted use to ensure they meet these limits.

6.1.5. Sealed Source Leak Tests

6.1.5.1. Per NRC regulations (52 FR 8234, Mar. 17, 1987, as amended at 65 FR 20344, Apr. 17, 2000) and cited below, this laboratory does not at present possess sealed sources with activity that requires periodic leak testing:

http://www.nrc.gov/reading-rm/doc-collections/cfr/part039/part039-0035.html

The procedure below is provided for regulatory purposes in the event this laboratory acquires such materials.

6.1.5.2. All sealed sources must be wiped checked for leakage every six months by the RSO. Samples shall be taken from the surface of the sealed source, or from surfaces of the container(s) in which the sealed source is mounted where contamination is likely to accumulate. If contained inside instrumentation or devices, the unit must be de-energized prior to performing the test.

6.1.5.3. This laboratory implements the model leak test program published in Appendix L to NMS-LIC-18 "Guidance About Service Provider Licenses" as follows:

6.1.5.3.1. For each source tested, list identifying information such as manufacturer, model number, serial number, radionuclide, and activity. See "Sealed Source Leak Test Report" (Appendix L.)

6.1.5.3.2. Prepare a separate wipe sample (e.g., cotton swab or filter paper) for each source.

6.1.5.3.3. Number each wipe to correlate with identifying information.

6.1.5.3.4. Wipe the most accessible area (but not directly from the surface of a source) where contamination would accumulate if the sealed source were leaking.

6.1.5.3.5. Use an instrument that is sensitive enough to detect 185 Becquerels (0.005 microcurie) of removable contamination for the radionuclide (liquid scintillation counter) and ensure that its calibration is current.

6.1.5.3.6. Count and record background count rate.

6.1.5.3.7. Calculate efficiency of the detector using the formula below:

$$\text{Efficiency in cpm/Bq} = \frac{[(\text{cpm from std}) - (\text{cpm from bkg})]}{\text{activity of std in Bq}}$$

cpm = counts per minute
std = standard
bkg = background
Bq = Becquerel

6.1.5.3.8. Count each wipe sample; determine net count rate.

6.1.5.3.9. For each sample, calculate and record estimated activity in becquerels (or microcuries).

$$\text{Bq on wipe sample} = \frac{[(\text{cpm from wipe samples}) - (\text{cpm from bkg})]}{\text{efficiency in cpm/Bq}}$$

6.1.5.3.10. Sign and date the list of sources, data and calculations. Retain records for 3 years (OAC 3701:1-38-20(C)).

6.1.5.3.11. If the wipe test activity is 185 Bq (0.005 mCi) or greater, notify the RSO so that the source can be withdrawn from use and disposed of properly.

7.0. Monitoring Program

7.1. Goals

7.1.1. The goal of the monitoring program are to assure the safe working conditions for all personnel in restricted and unrestricted areas.

7.1.1.1. Frequent monitoring of laboratories and personnel serves as an aid in assuring that individuals will not exceed their maximum permissible exposure limits, and that radiation levels remain as low as reasonably achievable (ALARA).

7.1.1.2. The RSO maintains all required records of personnel occupational exposure histories and laboratory working conditions.

7.1.1.3. All documentation pertaining to the health status of all workers will be held in confidence.

7.2. Personnel Film Badge Dosimetry

7.2.1. Any individuals handling x-ray, gamma ray, or high energy beta emitting isotopes (e.g. ^{32}P, ^{60}Co, ^{125}I) must wear a dosimetry badge. Individuals working with low energy beta emitters (e.g. ^{3}H, ^{14}C) in this laboratory are also required to wear a dosimetry badge.

7.2.2. ODH contracts with an accredited firm for a quarterly radiation dosimetry badge program. The standard badge issued is a whole body badge. Doses are reported quarterly to the Radiation Safety Officer. Any individual receiving a dose above 10 mRem/quarter will be immediately notified.

7.2.2. The Radiation Safety Office also has a limited number of spare badges which may be issued to new authorized users.

7.2.3. A limited number of direct-read pencil dosimeters are also available for use in emergency situations (i.e. when individuals not normally issued a badge, such as maintenance personnel who must enter a controlled area to perform maintenance work). Exposure information must be calculated and recorded for each individual. These dosimeters are only to be used for unplanned short term exposure to areas with low-level activity. See "Direct-Read Dosimeter Log and Charging Instructions" in Appendix N.

7.3. Pregnant Workers

7.3.1. Specific guidelines are set forth by the ODH (OAC 3701:1-38- 01, 3701:1-38-12 and 3701:1-38-14) to ensure protection of pregnant individuals who work with radioisotopes, and their developing fetus.

7.3.2. All female employees who work with radioisotopes will be informed during radiation safety training that should they become pregnant, they may voluntarily notify the ODHL in writing of their pregnancy. See draft "Declaration of Pregnancy Form for Occupational Exposure to Radioactive Materials" form in Appendix M.

7.3.2.1. The RSO will be responsible to obtain and submit for testing any specialized dosimetry required.

7.4. The maximum permissible exposures for ODHL personnel are:

Maximum Permissible Dose (Annual) - Regulatory Reference OAC 3701:1-38-11(E):

Dose Type	REM	Sieverts
Total Effective Dose	5.0	0.05
Deep Dose + Equivalent Committed Dose to Organs (noneye)	50	0.5
Dose Equivalent to Eye	15	0.15
Shallow Dose Equivalent to skin or extremities	50	0.5
Declared Pregnant Women	0.5	0.005

7.4.1. Should an exposure report indicate an individual has received an exposure in excess of 20 mRem, the RSO will notify the individual as soon as possible and consult with Ohio BRP as to action required. The RSO will make every effort to identify the cause of the exposure and take corrective action to eliminate the source.

7.4.2. All whole body exposures indicated in excess of 200 mRem for a three-month reporting period will result in the RSO immediately halting further use of radioisotopes until the cause of the reported exposure is determined.

7.4.2.1. Corrective action may include, but is not limited to revising specific standard operating procedures, the use of additional shielding, and reducing the amount of time a worker handles a radioisotope.

7.4.2.2. Copies of exposure reports are provided to Authorized Users individually to review their values.

7.4.3.3. Upon receipt of a signed release, an individual may request a transfer of their exposure history to another facility by filling an appropriate release form.

7.5. Bioassays

7.5.1. Specific radioisotopes, under certain circumstances, may require that a bioassay program be implemented. This program is designed to prevent the inhalation, absorption, or ingestion of these specific radioisotopes.

7.5.2. Bioassays are required to be performed if an individual working with a specific quantity and type of radioisotope exceeds 10% of the Annual Limits of Intake (ALI).

7.5.3. Given the current normal usage of radioisotopes in this laboratory, bioassay is not required.

7.5.4. Under circumstances where bioassay is recommended by medical authorities following an accidental exposure to radioactive materials, the RSO will consult with Laboratory Administration and the Ohio BRP to arrange testing and evaluation.

8.0. Emergency Procedures

8.1. Emergency Contacts

8.1.1. All emergencies involving radioactive materials should be reported immediately to the RSO and Laboratory Administrative Office (See ODH Laboratory Safety and Security Manual).

8.2. The name and telephone number of RSO or alternate person(s) should be posted conspicuously in areas of use, so that it is readily available to workers in case of emergencies.

8.3. Spill Control

8.3.1. The decision to implement a spill procedure depends on many incident specific variables, such as the number of individuals affected; other hazards present; the likelihood of spread of contamination and types of surfaces contaminated as well as the radiotoxicity of the spilled material.

8.3.2. Spills involving licensed radioactive materials in this laboratory should be of very small volume and low activity. Environmental samples routinely tested may be of larger volume but will still have only low-level activity with contact readings < 1.0 mR/hr. As such, these would be classified as low-level spills defined as follows:

8.3.2.1. A low-level spill is confined to a limited area and does not result in an increase in radiation levels in that area greater than 2 mR/hr, and meets both of the following criteria:

8.3.2.1.1. No contact was made with any part of the body; and

8.3.2.1.2. Radiation levels measured at 1 meter from the center of the spill are not in excess of 2 mR/hr.

8.3.3. The following emergency equipment should be readily available for handling spills:

8.3.3.1. Disposable gloves;

8.3.3.2. Chemical spill kit and cleanup tools;

8.3.3.3. Disposable lab coats and shoe covers;

8.3.3.4. Safety glasses or face shield;

8.3.3.5. Roll of absorbent paper with plastic backing;

8.3.3.6. Masking tape;

8.3.3.7. "Radioactive Material" labeling tape;

8.3.3.8. Pre-strung "Radioactive Material" labeling tags;

8.3.3.9. Plastic trash bags for radioactive waste with twist ties;

8.3.3.10. Marking pen;

8.3.3.11. Box of paper towels or disposable wipes; and

8.3.3.12. Appropriate survey instruments, including batteries (for survey meters).

8.3.4. Decontamination - Spills of Low-Level Liquids and Solids

8.3.4.1. Immediately notify all persons to vacate the immediate area, but to not leave the premises.

8.3.4.2. Attempt to prevent the spread of contaminants by covering the spill with absorbent paper.

8.3.4.3. Dampen dry material thoroughly, taking care not to spread contamination. Water should be used unless an adverse chemical reaction would generate an air contaminant. Refer to reagent MSDS for reactivity information if needed.

8.3.4.4. Place a call for help if necessary. Notify the Radiation Safety Officer immediately upon discovery of a large volume low-level radioactive spill.

8.3.4.5. Using emergency equipment, carefully collect contaminated materials and transfer into a plastic bag for transfer to a radioactive waste container. Also, put contaminated gloves and any other contaminated disposable material into the bag.

8.3.4.6. Survey all personnel who could possibly have been contaminated.

8.3.4.6.1. External Bodily Contamination

8.3.4.6.1.1. Radioactive materials coming into contact with body surfaces should be promptly removed using mild soap and gentle scrubbing, and rinsing with lukewarm water. Do not use caustic soaps or use an abrasive scrub brush that may abrade the skin resulting in the potential transfer of radioactive material internally.

8.3.4.6.2. Internal Bodily Contamination

8.3.4.6.2.1. Ingestion or injection of radioactive materials should be immediately reported to the RSO or designee.

8.3.4.6.3. The RSO will facilitate the transport of the individual to Mount Carmel East Medical Center Emergency Room if needed to evaluate exposure and will oversee completion and submission of ODH Form 4303: Accident and Illness Report (available from the RSO or the website below):

http://das.ohio.gov/LinkClick.aspx?fileticket=wyosnH9Wtj8%3d&tabid=216

8.3.4.7. Perform a survey using a low range radiation survey meter to determine the extent of the spill. Also survey hands, shoes, and clothing for contamination.

8.3.4.7.1. The contaminated area should be labeled and isolated to prevent an inadvertent entry into the area.

8.3.4.7.2. Only authorized personnel may enter the area until the decontamination procedures are completed.

8.3.4.8. The RSO and authorized user are responsible for assuring that the area is as free of contamination as reasonably achievable when decontamination procedures are completed.

8.3.4.9. The RSO will complete a Radioactive Spill Report (see Appendix N) and investigate the exposure to determine the cause and implement action to prevent recurrence as necessary.

8.3.4.10. The RSO will report the incident to the ODH BRP (OAC 3701:1-38-21) if necessary.

8.4. Fire or Explosion Emergencies

8.4.1. Evacuate the building.

8.4.2. Notify the fire department.

8.4.3. Upon arrival of firefighters, RSO or representative will inform them:

8.4.3.1. Where radioactive materials are stored or where radioisotopes were being used; and

8.4.3.2. 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.

8.4.4. Once the fire is extinguished, RSO or representative will advise the firefighters not to enter potentially contaminated areas or areas where radioactive sources may be present until a thorough evaluation and survey are performed to determine the extent of the damage to the licensed material use and storage areas.

8.4.4.1. The RSO will verify that firefighters have completed thorough contamination surveys of their personnel and equipment before they leave the controlled area and assist with decontamination if necessary.

8.4.5. The RSO will consult with Ohio BRP to arrange bioassays if licensed material is suspected to have been ingested, inhaled, or absorbed through or injected under the skin.

8.4.6. The RSO and will document the incident notify the ODH BRP as needed.

8.4.7. No one is permitted to return to work in the area unless approved by Fire Department, RSO, and Lab Administration.

9.0. Record Retention

9.1. Self-audit program

9.1.1. Licensees must review the content and implementation of their radiation protection programs at least annually to ensure the following per OAC Rules: 3701:1-38-11(D)(3); 3701:1-38-20(B); 3701:1-38-23(G):

9.1.1.1. Compliance with the department rules and DOT regulations (as applicable), and the terms and conditions of the license.

9.1.2. Occupational doses and doses to members of the public are ALARA (OAC 3701:1-38-11(D).

9.1.3. Records of audits and other reviews of program content are maintained for three years from the date of record.

9.1.4. Records of these audits should include the following information: date of audit, name of person(s) who conducted audit, persons contacted by the auditor(s), areas audited, audit findings, corrective actions, and follow-up. These records must be maintained for inspections by the BRP.

9.2. Licensed material

9.2.1. Licensees must maintain records of receipt, use, transfer, and disposal (as waste) of all licensed material.

9.2.2. Table 8.3 below from ODH NMS-LIC-18: Guidance About Service Provider Licenses (Rev. 0) lists each type of record and how long the record must be maintained.

Table 8.3 Record Maintenance Type of Record	**How Long Record Must be Maintained**
Receipt	For as long as the material is possessed until 3 years after transfer or disposal
Transfer	For 3 years after transfer
Disposal	Until the BRP terminates the license
Important to decommissioning	Until the site is released for unrestricted use

9.2.3. Receipt, transfer, and disposal records should contain the following information:

9.2.3.1. Radionuclide and activity (in units of becquerels or curies), and date of measurement of byproduct material;

9.2.3.2. For each sealed source, manufacturer, model number, location, and, if needed for identification, serial number and as appropriate, manufacturer and model number of device containing the sealed source;

9.2.3.3. Date of the transfer and name and license number of the recipient, and description of the affected radioactive material (e.g., radionuclide, activity, manufacturer's name and model number, serial number); link to radioactive material inventory records.; and

9.2.3.4. For licensed materials disposed of as waste, include the radionuclide, activity, date of disposal, and method of disposal (decay, sewer, etc.).

9.3. Occupational dose records

9.3.1. The use of individual monitoring devices for external dose is required (per OAC 3701:1-38-14; 3701:1-38-12; 3701:1-38-16(C)(D); 3701:1-38-20(H)(I); 3701:1-38-12 Appendix C.

9.3.2. The laboratory will retain these records until the Department of Health terminates the license or registration pertinent to the record.

10. References

10.1. Guidance About Service Provider Licenses. State of Ohio, Department of Health. NMS-LIC-18, Rev. 0. Effective date: December 27, 2007.

10.2. NUREG-1556, Vol. 18. Consolidated Guidance about Materials Licenses – Program Specific Guidance About Service Provider Licenses. Final Report. Prepared by Jack E. Whitten, Hector Bermudez, and Eric Reber. Published Nov. 2000. Division of Industrial and Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

10.3. Cleveland State University Radiation Safety Program. Developed by Robert Howerton, Radiation Safety Officer, Cleveland State University, Department of Environmental Health and Safety. Revised 2/1/2012.

10.4. Radiation Safety Manual. Ohio Department of Transportation. Michael Andrews, State Radiation Safety Officer.

10.5. Radiation Safety Manual for Bowling Green State University. Radiation Safety Office, Environmental Health and Safety, 1851 N. Research Drive, Bowling Green, Ohio 43403, June, 2012.

Signature Approvals

Katherine Crawford / 12/24/14
Radiation Safety Officer — Date

Steven York / 12/30/14
Assistant Radiation Safety Officer — Date

Rosemarie Kent / 12/30/2014
Bureau Chief — Date

APPENDIX A – Ohio Department of Health License for Radioactive Materials

Amendment No. 9

OHIO DEPARTMENT OF HEALTH

LICENSE FOR RADIOACTIVE MATERIAL

Pursuant to Chapter 3748 of the Ohio Revised Code, and in reliance on statements and representations made by the licensee, a license is hereby issued authorizing the licensee named herein to receive, acquire, possess, and transfer radioactive material as designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the applications of Chapter 3748 of the Ohio Revised Code and all applicable rules promulgated thereunder. This license is subject to all applicable rules, regulations and orders of the Ohio Department of Health now or hereinafter in effect and to any conditions specified below.

LICENSEE	LICENSE NUMBER
1. Ohio Department of Health Laboratories	3. 03225250039
	EXPIRATION DATE
2 8995 East Main Street Bldg. 22 Reynoldsburg, Ohio 43068	4. July 1, 2013
	FILE NUMBER – ID NUMBER
	5 500947-4193

6 RADIOACTIVE MATERIAL	7. CHEMICAL AND/OR PHYSICAL FORM	8. MAXIMUM QUANTITY THAT LICENSEE MAY POSSESS AT ANY ONE TIME UNDER THIS LICENSE
A. Any radioactive material with atomic numbers 1 through 96	A. Environmental samples	A. For normal operations: 10 times the quantity for each radio nuclide listed in OAC 3701:1-40-17, Appendix A. In cases of State emergency, environmental samples of any activity will be accepted for analysis; after assay, if the sample activity is above the limits of normal operations, the sample will be returned to the sender for proper disposition or to a waste broker specifically authorized by the Director, NRC, or Agreement State to perform such services.
B. Any radioactive material with atomic numbers 1 through 96	B. Calibration standards (EPA/NBS or other commercially available certified sources)	B. Not to exceed 185 kBq (5 μCi) per standard
C. Hydrogen-3	C. Tritium-labeled thymidine	C. 925 MBq (25 mCi)

9 Authorized Use

A. For receipt and possession incident to laboratory analysis of environmental samples.

B. To be used for instrument calibration and laboratory QC.

C. To be used for microbiological testing as described in letter to NRC dated May 1, 1997.

CONDITIONS

10 Licensed material may only be used at the licensee's facilities located at:

A. 8995 East Main Street, Bldg. 22, Columbus, Ohio 43068

11 The Radiation Safety Officer for this license is:

A. *Steve York*

B. *Katherine Grandfield, (Assistant Radiation Safety Officer)*

Ohio Department of Health	Page 2 of 2
LICENSE FOR RADIOACTIVE MATERIALS	License Number: [illegible]
	File Number - ID Number: 500947 - 4193
SUPPLEMENTARY SHEET	Amendment No. 9

12. *Licensed material shall be used by, or under the supervision of, individuals who have received the training described in application dated June 16, 2008 or have completed the manufacturer's training program and have been approved in writing by the Radiation Safety Officer.*

13. The licensee shall conduct a physical inventory every 6 months, to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for at least 5 years from the date of each inventory, and shall include the quantities and kinds of licensed material, manufacturer's name and model numbers, location of the sources and/or devices, and the date of the inventory.

14. The licensee is authorized to hold radioactive material with a physical half-life of less than 120 days for decay-in-storage before disposal in ordinary trash in accordance with OAC 3701:1-38-19(E).

15. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of sealed source licensed material to quantities below the minimum limit specified in OAC 3701:1-40-17(B) for establishing decommissioning financial assurance.

16. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Ohio Department of Health's statutes, rules, and orders shall govern unless statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

    A. Renewal application dated June 16, 2008. This amendment renews license number [illegible] in its entirety (Amendment 6).

    B. Letter correspondence dated September 22, 2009 (Amendment 7).

    C. Letter correspondence dated March 23, 2010 (Amendment 8).

    D. *Letter correspondence dated October 14, 2010 (Amendment 9).*

For the Ohio Department of Health

DATE: 11/23/10 BY: ______________________

Robert E. Owen, Chief
Bureau of Radiation Protection
on behalf of the Director of Health

Appendix B – Education, Training, and Experience Using Radioactive Materials (RAM)

Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

Education, Training, and Experience Using Radioactive Materials (RAM)

Applicant Information

Name_____

Department_____

Division_____

Position_____

Phone Extension_____

Highest degree:_____B.S. _____M.S. _____Ph.D. _____ M.D. ____Other

If previously authorized for RAM uses on an NRC or State license, provide name and location of the institution:_____

Specific Education, Training and Experience with RAM

Coursework	Location	Date(s)/Hours	Course Title

Experience:

Radionuclide	Activity	InVivo/Vitro	Locations

Total Hours of training/experience _____

Signature/Date _____

Appendix C – Application for Authorized User of Radioactive Material

OHIO DEPARTMENT OF HEALTH
NOTICE TO EMPLOYEES

As radiation protection rules adopted under Chapter 3748 of the Ohio Revised Code, the Ohio Department of Health has established standards for your protection from radiation sources which are required to be license/registered with the Ohio Department of Health.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to:

1) Inform you of the occurrence of radiation or radiation sources and the presence of a restricted area;
2) Instruct you in the safety problems associated with exposure to radiation and in precautions or procedures to minimize exposure to radiation; instruct you in the applicable laws for the protection of personnel from exposure to radiation;
3) Post or otherwise make available to you a copy of the operating provisions applicable to work under the license/registration;
4) Apply the radiation protection rules to all work involving license/registered sources of radiation; and
5) Post notices of violation involving radiological working conditions.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the radiation protection rules and operating procedures that apply to the work you are engaged in. You should observe these provisions for your own protection, the protection of your co-workers and others. If you should observe violations of the law, or have a safety concern, you should report them to your supervisor. You may also report them to ODH.

WHAT IS COVERED BY THESE RULES

1) Limits on exposure to radiation and radioactive materials in restricted and unrestricted areas;
2) Measures to be taken after accidental exposures;
3) Personal monitoring: surveys and equipment;
4) Caution signs, labels, and safety interlock equipment;
5) Exposure records and reports; and
6) Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

Your employer is required to advise you of your dose annually if you are exposed to radiation for which monitoring was required by ODH or upon request. In addition, you may request a written report of your exposure when you leave your job.

INSPECTIONS

All activities covered by the ORC 3748 and other radiation protection laws are subject to inspection by representatives of the Ohio Department of Health.

ODH inspectors want to speak or talk with you if you are worried about radiation safety or have other safety concerns about licensed/registered activities. Your employer may not prevent you from talking with an inspector. The ODH will make all reasonable efforts to protect your identity where appropriate and possible.

If you believe that your employer has not corrected violations involving radiological working conditions, you may request an inspection. Your request should be addressed to the Ohio Department of Health, Bureau of Radiation Protection, and must describe the alleged violation in detail. It must be signed by you, or your representative.

DISCRIMINATION

Your employer is prohibited from firing or otherwise discriminating against you for bringing safety concerns to the attention of your employer or the ODH. You may not be fired or discriminated against because you:

- ask the ODH to enforce the law against your employer;
- refuse to engage in activities that violate the law;
- provide information, or are about to provide information to the ODH or your employer about violations of laws or safety concerns;
- are about to ask for, or testify, help, or take part in an ODH or other state proceeding.

The ODH will investigate each allegation of harassment, intimidation, or discrimination.

CONTACT INFORMATION

Bureau of Radiation Protection
Ohio Department of Health
246 North High Street
Columbus, Ohio 43215
BRadiation@odh.ohio.gov

Radioactive Materials
Phone 614-644-2727
Fax 614-466-0381

Radiologic Technology Section (X-ray)
Phone 614-644-2727
Fax 614-466-0381

POSTING REQUIREMENTS

Copies of this notice must be posted in a sufficient number of places in every facility where employees are engaged in activities subject to the radiation protection rules of the Ohio Administrative Code to permit employees working in or frequenting any portion of a restricted area to observe a copy on their way to or from their place of employment. OSHA requires 29 CFR 24 Appendix A "Energy Reorganization Act" Poster be displayed when applicable.

ODH 4726.32 (Rev. 8-06)

Appendix E – Radiation Safety Training for Authorized Users

Documentation of Initial Training

Ohio Department of Health Laboratory *Initial Training Form*

Assay/Method	Radiation Safety Training	Trainee	[illegible]
		Trainer(s)	[illegible]

	Checklist	Trainee Initials/Date	Trainer(s) Initials/Date	Supervisor Initials/Date	Lab Director Initials/Date
1	Principles of the procedure				
2	Precautions/safety practices				
3	Specimen collection, labeling, handling, &storage requirements/rejection criteria				
4	LIMS specimen data entry				
5	Components of kit/reagents & storage/expiration requirements				
6	Maintenance/equipment requirements				
7	Calibration/calibration verification				
8	Quality control requirements				
9	Test procedure(s)				
10	Interpretation of test results				
11	Method limitations/troubleshooting				
12	Reporting of test results (including panic values)				
13	Specimen/record retention				
14	Assessment of competency (i.e., testing of challenge specimens); attach documentation				

Initial Training Documentation – Radiation Safety Training 12-4-12

Radiation Safety Training for Authorized Users - Documentation of Refresher Training

OHIO DEPARMENT OF HEALTH LABORATORY
SIX MONTH and ANNUAL COMPETENCY FORM

LAB SECTION Radiation Chemistry EMPLOYEE: SIX MONTH or ANNUAL: Page ____ of ____ Available Tools Used for Assessment*; Attach available document(s) to support finding of compliance	Receives and Processes Specimens Properly (Met, Not Met, or N/A)	Performs Assay per Test Protocol (Met, Not Met or N/A)	Completes QC Records (Met, Not Met, or N/A)	Records and Reports Results Accurately (Met, Not Met or N/A)	Accurately Performs Instrument Maintenance (Met, Not Met or N/A)	Assessment of Test Performance (Met, Not Met or N/A)	Adheres to Safety Requirements (Met, Not Met or N/A)	Assessment of Problem Solving
	DO	DO; SOP Review	QC, PT, MN Records	DO; Test Report	DO; MN Records	IBT, PT Records	DO; Audit Records	Quiz; VA Reports
Method/Instrument: Radiation Safety Refresher Training using DVD by Nevada Technologies, Inc. **Date: Evaluator:**								
List observed deficiencies &/or action plan for additional training:								
Method/Instrument: **Date: Evaluator:**								
List observed deficiencies &/or action plan for additional training:								
Method/Instrument: **Date: Evaluator:**								
List observed deficiencies &/or action plan for additional training:								

* DO = direct observation; QC = quality control; PT = proficiency testing; MN = equipment maintenance; IBT = internal blind testing; VA = variance

Employee: Date: Evaluator: Date:

Appendix F: – Radiation Survey Equipment List

Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

Radiation Survey Equipment List

Listing of equipment available for use in performing radiation safety surveys as part of the ODH Laboratory Radiation Safety Program is provided below.

All survey meters are calibrated on an annual basis by a company licensed and certified to calibrate these meters. Calibration of all survey meters is scheduled by the Radiation Safety Officer (RSO) or Assistant Radiation Safety Officer (ARSO).

Calibration records are maintained for three years.

Manufacturer	Model	Serial #	Probe	Radiation Detected
Ludlum	Model 3	196355	Pancake Geiger-Mueller detector (Ludlum Model 44-9, Serial # PR 202276) with Exposure filter cap	Alpha, beta, gamma
Ludlum	Model 3	195865	Pancake Geiger-Mueller detector (Ludlum Model 44-9, Serial # PR 202260) with Exposure filter cap	Alpha, beta, gamma
Ludlum	Model 3	294190	Pancake Geiger-Mueller detector (Ludlum Model 44-9, Serial # PR 317690) with Exposure filter cap	Alpha, beta, gamma
Ludlum	Model 3	294144	Pancake Geiger-Mueller detector (Ludlum Model 44-9, Serial # PR 317712) with Exposure filter cap	Alpha, beta, gamma

Appendix G – Shipment Receipt Form for Radioactive Materials

Ohio Department of Health Laboratory
Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

Shipment Receipt Form for Radioactive Materials (RAM)
(Use one form per item)

Vendor _____ Item _____
Catalog # _____ Purchase Order # _____
Isotope/Activity (attach vendor documentation):

_____

_____
Date Received _____ Time Received _____
Ordered by: _____
Received by: _____

Survey Information

1. Surveyor: _____ Survey Date _____ Time_____
2. Condition of Package:
   O.K. _____ Punctured _____ Stain _____ Wet _____
   Crushed _____ Other _____
3. Radiation Label:
   _____White-I _____Yellow-II _____Yellow-III
4. Transportation Index:_____ (0.25mR/hr at 3 feet)
5. Measure Radiation Levels:
   a. Package Surface: _____ mR/hr
   200 mR/hr? _____Yes _____ No (Yes RSO requires notification)
   b. 3 feet from surface_____ mR/hr
   10 mR/hr? _____ Yes _____ No (Yes RSO requires notification)
6. Do Packing Slip and Vial Contents Agree?
   a. Radionuclide: _____Yes _____ No _____ Difference
   b. Amount: _____Yes _____ No _____ Difference
   c. Chemical Form _____Yes _____ No _____ Difference
7. Survey Results
   a. Outer: _____cpm= _____dpm
   Eff=_____
   b. Final Source Container:_____cpm = _____dpm
   Eff=_____
8. Survey Results of Packing Material and Cartons:
   a. _____mR/hr
   b. Bkg._____mR/hr
9. If ODH BRP/Carrier Notification Required:
   Time:_____ Date:_____ Persons Notified_____
10. Disposition of Package after Inspection:

    _____

    _____

Appendix H: – Inventory of Radioactive Materials

Inventory of Radioactive Materials

(Available as an Excel file on Laboratory Network Drive)

Location Legend
SH = Shield
UH = Under hood
DR = Drawer in Counting room

Serial Number	Date Rec'd	Isotope	Ao (Bq)	Ao (mCi)	RefDate	HalfLife (y)/(d)	For Decay Today	T (d)	Fraction	A (Bq)	A (mCi)	Loc	Inventory Date	Notes

Appendix I – Radioactive Waste Log

Radiological Waste Log

(Available as an Excel file on Laboratory Network Drive)

Source Type	Manufacturer	Serial Number	Ref Date	Isotope	Location

Location Legend
UH = Under Hood
MPC = On or Under Protean Counter
DE = Desiccator
LSB = LS Bench
SH = Shield
DR = Drawer in Counting Room
BE = Bench in Main Lab

Appendix J – Sink Disposal of Radioactive Waste - Liquids

Ohio Department of Health Laboratory
Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

Sink Disposal of Radioactive Waste – Liquids

(Dispose in Radiation Chemistry Hot Sink Only)
Maximum: 30 microcuries/day

Date	Radionuclide	Volume	Estimate of Activity (microCuries)	Initials of Authorized User

Appendix K: – RSO Monthly Survey Forms – Radioanaytical Chemistry

Radiation Laboratory Survey Form – Main Lab

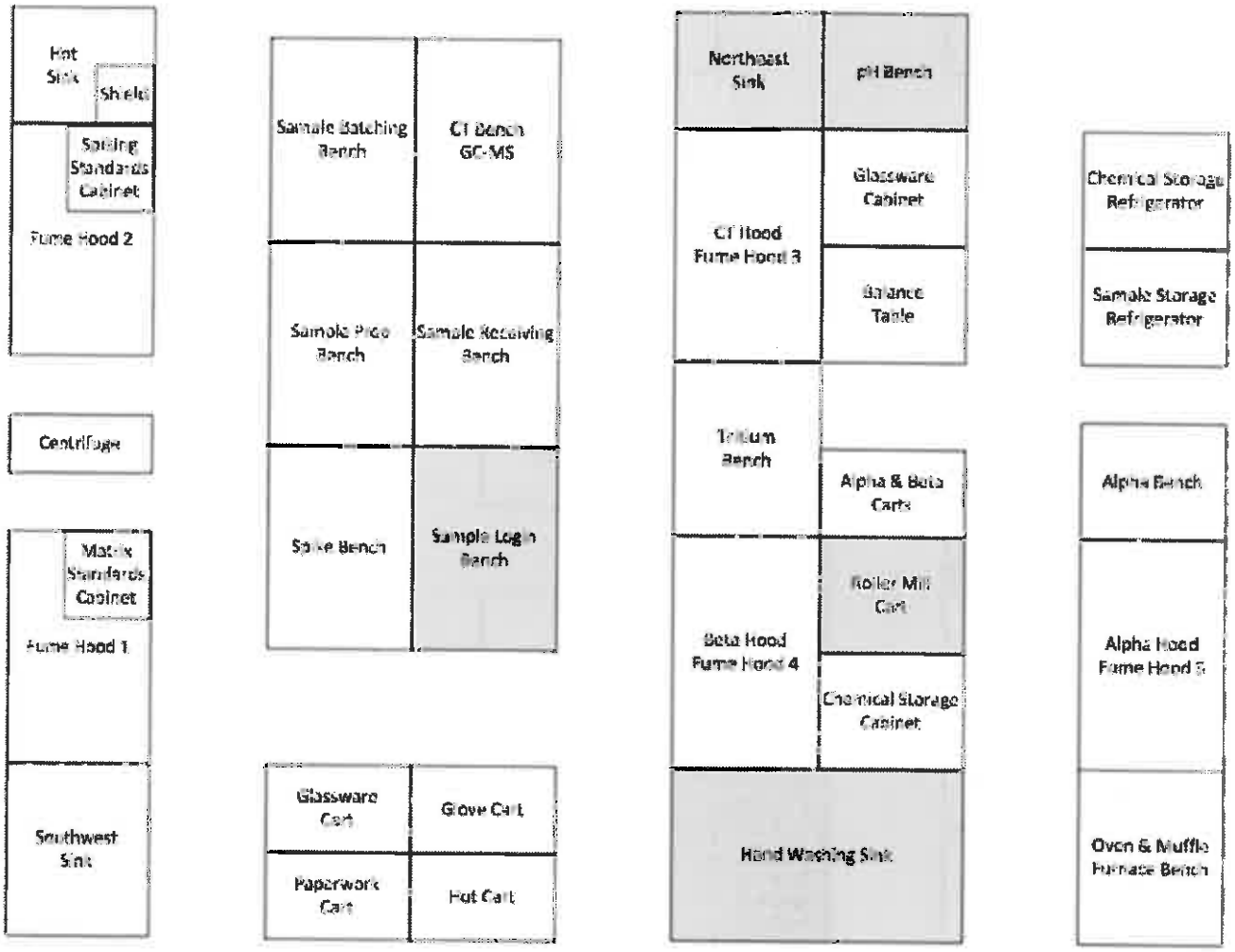
RSO Monthly Survey - Radioanalytical Chemistry – Main Lab												
Surveyors: Katherine Grandfield, ARSO (KG)	1 Q			2 Q			3 Q			4 Q		
Steve York, ARSO (SY)	Smear Survey ○ Date:			Smear Survey ○ Date:			Smear Survey ○ Date:			Smear Survey ○ Date:		
Main Lab	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surveyor												
Date												
Survey and Smear												
#1 Hot Sink (bench)												
#2 Shield (outside)												
#3 Spiking Standards Cabinet (handles)												
#4 Fume Hood 2 (sash)												
#5 Matrix Standards Cabinet (handles)												
#6 Fume Hood 1 (sash)												
#7 Spike Bench												
#8 Sample Prep Bench (balance area)												
#9 Sample Receiving Bench												
#10 Beta Hood, Fume Hood 4 (sash)												
#11 Balance Table												
#12 Oven & Muffle Furnace Bench												
#13 Alpha Hood, Fume Hood 5 (sash)												
#14 Alpha Bench												
#15 Sample Storage Refrigerator (handle)												
Survey Only												
#1 Sample Login Bench												
#2 Hand Washing Sink												
#3 Northeast Sink												
#4 pH Bench												
#5 Roller Mill Cart (mill)												
Check source reading (mR/hr)												
Survey Meter model & serial number												
Survey Meter calibration date												
#1 Ludlum Survey Meter model 3/serial 195865				#2 Ludlum Survey Meter model 3/serial 298664								
#3 Ludlum Survey Meter model 3/serial 294144				#4 Ludlum Survey Meter model 3/serial 196355								

Radiation Laboratory Survey Form – Counting Room

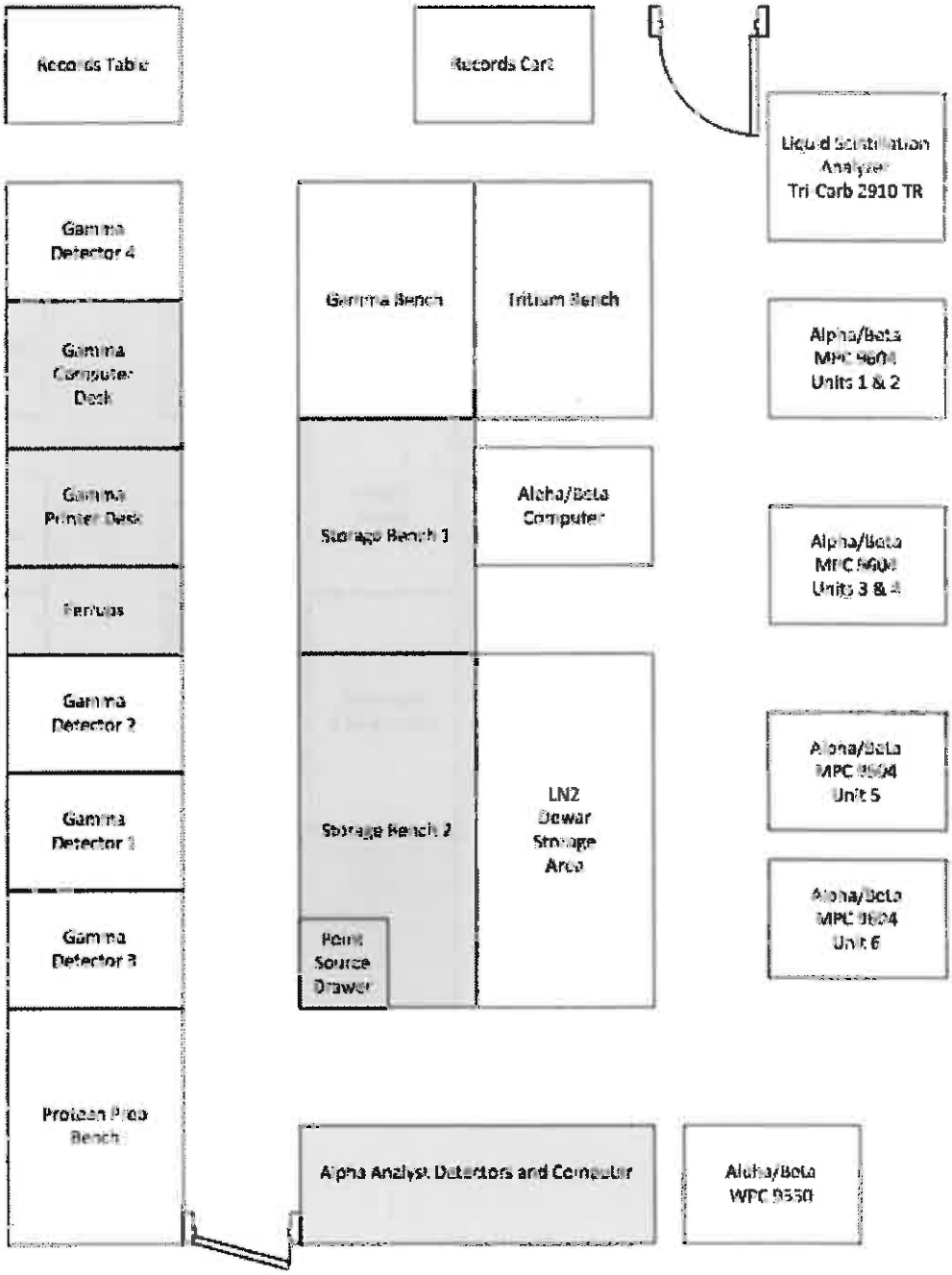
RSO Monthly Survey - Radioanalytical Chemistry – Counting Room

Surveyors: Katherine Grandfield, RSO (KG)	1 Q			2 Q			3 Q			4 Q		
Steve York, ARSO (SY)	Smear Survey ○ Date:			Smear Survey ○ Date:			Smear Survey ○ Date:			Smear Survey ○ Date:		
Room 121 (Counting Room)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surveyor												
Date												
Survey and Smear												
#16 Protean Prep Bench												
#17 Detector 3 (handles & top)												
#18 Detector 1 (handles & top)												
#19 Detector 2 (handles & top)												
#20 Detector 4 (handles & top)												
#21 Gamma Bench												
#22 Alpha/Beta WPC 9550												
#23 Alpha/Beta MPC 9604 Unit 6 (drawers)												
#24 Alpha/Beta MPC 9604 Unit 5 (drawers)												
#25 Alpha/Beta MPC 9604 Unit 4 (drawers)												
#26 Alpha/Beta MPC 9604 Unit 3 (drawers)												
#27 Alpha/Beta MPC 9604 Unit 2 (drawers)												
#28 Alpha/Beta MPC 9604 Unit 1 (drawers)												
#29 Alpha/Beta Computer												
Survey Only												
#6 Ferrups (top)												
#7 Gamma Printer Desk												
#8 Gamma Computer Desk												
#9 Storage Bench 1												
#10 Storage Bench 2												
#11 Point Source Drawer												
#12 Alpha Analyst Detectors and Computer Check source reading (mS/hr)												
Survey Meter model & serial number												
Survey Meter calibration date												
#1 Ludlum Survey Meter model 3/serial 195865				#2 Ludlum Survey Meter model 3/serial 298664								
#3 Ludlum Survey Meter model 3/serial 294144				#4 Ludlum Survey Meter model 3/serial 196355								

Radiation Laboratory Survey Diagram – Main Lab



Radiation Laboratory Survey Diagram – Counting Room


Records Table
Records Cart
Liquid Scintillation Analyzer Tri Carb 2910 TR
Gamma Detector 4
Gamma Computer Desk
Gamma Printer Desk
Fenulas
Gamma Detector 2
Gamma Detector 1
Gamma Detector 3
Protein Prep Bench
Gamma Bench
Tritium Bench
Storage Bench 1
Alpha/Beta Computer
Storage Bench 2
LN2 Dewar Storage Area
Point Source Drawer
Alpha/Beta MPC 9604 Units 1 & 2
Alpha/Beta MPC 9604 Units 3 & 4
Alpha/Beta MPC 9604 Unit 5
Alpha/Beta MPC 9604 Unit 6
Alpha Analyst Detectors and Computer
Alpha/Beta MPC 9550

Appendix L: – Sealed Source Leak Test Report

Ohio Department of Health Laboratory
Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

Sealed Source Leak Test Report

Authorized User: _____

Source description: _____ Device/Inventory #: _____

Date Received by ODH Laborator: _____

Manufacturer: _____ Serial No.: _____

Nuclide: _____ Activity: _____ µCi mCi Ci (Circle one)

Nuclide: _____ Activity: _____ µCi mCi Ci (Circle one)

Nuclide: _____ Activity: _____ µCi mCi Ci (Circle one)

Direct wipe of accessible surface of housing:

Counting instrument: _____

Model: _____ Ser. No.: _____ Cal. date: _____

Reference source identification: _____

Nuclide: _____ Activity, Ar = _____ µCi (preferably <0.005 µCi or 10,000 dpm)

Background obtained from tap water or from instrument only

RESULT: Background (b), Reference (r), Sample (s)

Total counts recorded: Countb = _____ Cr = _____ Cs = _____

Total count time (minutes): Tb = _____ Tr = _____ Ts = _____

Count rate (counts/minute): Rb = _____ Rr = _____ Rs = _____

Efficiency, E = (Rr-Rb)/Ar = _____ net cpm/µCi, or _____ cpm/dpm

Activity on wipe, As = (Rs-Rb)/E = _____ µCi, or

If the test result is < 0.005 µCi on wipe, the source is acceptable for use. If the result exceeds this level (≥ 0.005 uCi) the source is assumed to be leaking and must be disposed of as radioactive waste.

Tested by: _____ Date: _____

Sealed Source and Plated Foil Leak Test Procedure

1. The ODH BRP per OAC 3701:1-38-14 requires testing to determine whether there is any radioactive leakage from sealed sources. Sealed sources are wiped checked every 6 months.
2. Sealed source means radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal of the radioactive material under the most severe conditions which are likely to be encountered in normal use and handling.
3. This laboratory implements the model leak test program published in Appendix O to NMS-LIC-07, "Consolidated Guidance about Materials Licenses: 'Program-Specific Guidance About LIC-07, "Consolidated Guidance about Materials Licenses: 'Program-Specific Guidance About Academic, Research & Development, and Other Licensees of Limited Scope" below:
   - 3.1. For each source tested, list identifying information such as manufacturer, model number, serial number, radionuclide, and activity.
   - 3.2. Prepare a separate wipe sample (e.g., cotton swab or filter paper) for each source.
   - 3.3. Number each wipe to correlate with identifying information for each source.
   - 3.4. Wipe the most accessible area (but not directly from the surface of a source) where contamination would accumulate if the sealed source were leaking.
   - 3.5. Use a calibrated liquid scintillation counter sensitive enough to detect 185 becquerels (0.005 microcurie) of removable contamination for the radionuclide.
   - 3.6. Count and record background count rate.
   - 3.7. Calculate efficiency of the detector using the formula below:

$$\text{Efficiency in cpm/Bq} = \frac{[(\text{cpm from std}) - (\text{cpm from bkg})]}{\text{Activity of std in Bq}}$$

cpm = counts per minute
std = standard
bkg = background
Bq = Becquerel

   - 3.8. Count each wipe sample; determine net count rate.
   - 3.9. For each sample, calculate and record estimated activity in becquerels (or microcuries).

$$\text{Bq on wipe sample} = \frac{[(\text{cpm from wipe samples}) - (\text{cpm from bkg})]}{\text{Efficiency in cpm/Bq}}$$

   - 3.10. Sign and date the list of sources, data and calculations. Retain records for 3 years (OAC 3701:1-38-20(C)).
   - 3.11. Recording and reporting results:
     - 1.11.1 Leak test data is recorded on the printed "SEALED SOURCE LEAK TEST RECORD" or equivalent Excel spreadsheet with the date testing is completed.
       - 3.11.1.1. If the results of the leak test are negative, i.e. <0.005 μCi removable activity from the source or its housing, the leak test result should be recorded as "No contamination detected".
       - 3.11.1.2. If the results of the leak test are positive, i.e. ≥0.005 μCi removable activity from the source or its housing, the leak test result should be recorded as "Contamination detected" and corrective action taken. Remove from service immediately and contact RSO for disposal.

Appendix M: – Declaration of Pregnancy Form for Occupational Exposure to Radiation

Ohio Department of Health Laboratory
Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

Declaration of Pregnancy Form for Occupational Exposure to Radioactive Materials

In accordance with the NRC's regulations at 10 CFR 20.1208, "Dose to an Embryo/Fetus," I am declaring that I am pregnant. I believe I became pregnant _____ (only month and year need be provided).

I understand the radiation dose to my embryo/fetus during my entire pregnancy will not be allowed to exceed 0.5 rem (5 millisievert) (unless that dose has already been exceeded between the time of conception and submitting this letter). I also understand that meeting the lower dose limit may require a change in job or job responsibilities during my pregnancy.

I have been given the opportunity to read the following references:

A) Ohio Administrative Code 3701: 1-38-12, paragraph H.
B) United States Nuclear Regulatory Commission (USNRC) Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure*, Revision 3, dated June 1999.

_____ _____ _____
(Your Name Printed) **(Your Signature)** **(Date)**

_____ _____
(Work location where dosimetry will be kept) **(Phone number)**

_____ ____/____/____
EID **(Date of birth)**

Disclosure Statement

You must provide your name, Employee ID Number (EID), and date of birth for the Ohio Department of Health to process a dosimetry request. Federal and State law require the ODH Laboratory to maintain this information and provide your exposure history upon your authorization.

Radiation Safety Section use only
Fetal badge number assigned:_____ Date issued:_____

Appendix N: – Direct-Reading Dosimeter Log and Charging Instructions

Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

DIRECT-READING DOSIMETER LOG

Name	Date	Dosimeter Type	Dosimeter #	Initial Reading (IR)	Time IR	Final Reading (FR)	Time FR	Dose (FR – IR)

Notes:

- Time should be consistent (24-hour clock).
- Readings MUST include units (mR, R).

OPERATION OF THE CDV 750 MODEL 6 DOSIMETER CHARGER

BASIC OPERATION

The CDV 750 model 6 dosimeter charger (fig. 1) is used to zero all civil defense dosimeters. The charger is self powered, requiring no batteries. The voltage necessary to charge a dosimeter is generated by squeezing the generator lever. A discharge button allows the operator to set a dosimeter exactly on zero. The clamp trigger pulls back on the clamp to allow a dosimeter to be positioned on the charger or be removed from the charger.

The charger controls the movement of the hairline fiber inside the dosimeter. When the fiber is on zero, the dosimeter is said to be "zeroed".

POSITIONING THE DOSIMETER IN THE CHARGER

1. Hold the charger upright as shown in fig. 1. Lift the clamp and pull it back to its maximum length. Place the dosimeter in the clamp and fit the dosimeter recess (opposite end from the lens) over the charging contact. This allows for electrical contact between the dosimeter and the charger.

2. Squeeze the clamp trigger. Push the clamp forward until the end is against the eyepiece of the dosimeter.

3. Release the trigger. Check that the position of the dosimeter provides a good view through the lens Refer to fig. 2.

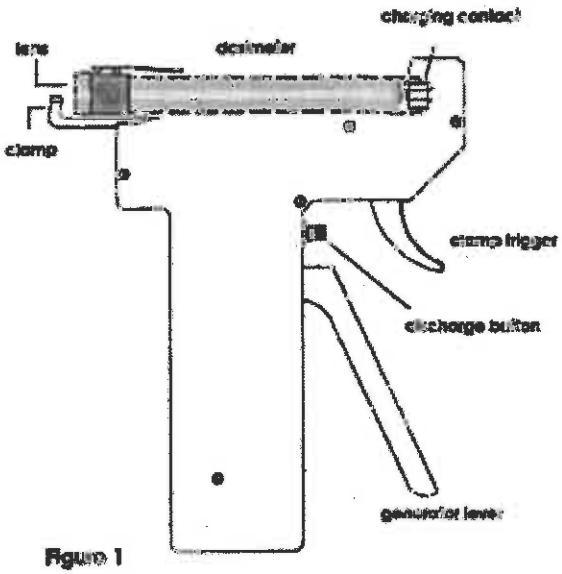


Figure 1

CHARGING THE DOSIMETER

4. With the dosimeter locked in place and lens facing you, point towards a suitable light source, such as a light fixture, window, candle, etc. as shown in fig. 2.

5. Look throught the lens and observe the scale (fig. 3). Squeeze the generator lever and release lightly a few times. NOTE: If the dosimeter is not responding, you may need to apply more pressure with the clamp by gently pushing forward on the clamp against the end of the dosimeter. DO NOT PUSH TOO HARD. You can damage the dosimeter.

Watch for movement of the fiber from the right of the scale towards 0. Squeeze the lever again if needed to zero the dosimeter. NOTE: If the fiber has travelled to the left of the zero but is still visible, push the discharge button and watch the fiber move to the right. If the fiber is not visible, repeat Step 5.

6. To remove the dosimeter, pull clamp trigger, lift dosimeter to just above the end of clamp and pull dosimeter straight back to disengage it from the charging contact. The length of the clamp will not change unless the clamp is manually adjusted.

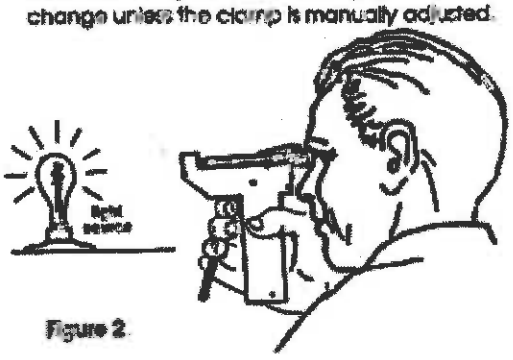


Figure 2

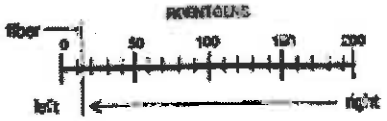


Figure 3

Appendix O: – Radioactivity Spill Report

Ohio Department of Health Laboratory
Building 22
8995 East Main Street
Reynoldsburg, Ohio 43068

RADIOACTIVE SPILL REPORT

Spill Occurred at ____:____ am/pm on / / In Building _____
Room _____

Instrument used to check for personnel contamination:

Meter Model _____ Meter S/N _____
Probe Model _____ Probe S/N _____

Personnel Present	Contamination Results
_____	_____
_____	_____
_____	_____

Indicate any personnel decontamination measures, additional monitoring, or care instituted:

_____
_____
_____

Survey the spill area to identify hot spots, then begin decontamination. When finished, conduct a post cleaning contamination wipe-test:

Radioisotopes present or suspected in the spill:

_____ uCi of _____ as _____
_____ uCi of _____ as _____
_____ uCi of _____ as _____

Give a brief description of the accident: _____
_____
_____

Describe any follow-up actions taken to prevent a recurrence:

_____
_____
_____

NAME _____

DATE _____