

A GUIDE FOR PREPARATION OF RADIOACTIVE MATERIAL  
APPLICATIONS FOR THE USE OF SEALED SOURCES  
IN PORTABLE GAUGING DEVICES

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## I. INTRODUCTION

### A. Purpose of Guide

This guide describes the information needed to evaluate an application for a specific license for receipt, possession, use and transfer of radioactive material in the form of sealed sources as contained in portable gauging devices. This guide also provides assistance to applicants and licensees in preparing applications for license amendments, license renewals and license terminations.

There is no single portion of the Kentucky Radioactive Material Regulations which specifically addresses portable gauging devices. Therefore, this guide is intended to provide you with information that will clarify more general regulatory requirements and licensing policies as they apply to portable gauging devices. Licensing guides are issued to describe the methods acceptable to the Radiation Control Branch for implementing the Cabinet's regulations, to outline techniques used by the staff in evaluating specific problems, and to provide guidance to applicants. The information in this guide is not a substitute for training in radiation safety or for developing and implementing an effective radiation safety program. However, you should be aware that if your application references procedures in this guide, those procedures become a part of your licensing conditions and regulatory requirements.

After you are issued a license, you must conduct your program in accordance with (1) the statements, representations, and procedures contained in your application and other correspondence with the Radiation Control Branch, (2) the terms and conditions of the license, and (3) applicable regulations as discussed below. Therefore, all information you provide in your application must be clear, specific and accurate.

### B. Applicable Regulations

In addition to the contents of this guide, applicants should refer to the requirements in the Cabinet's regulations listed below. The applicant should carefully read the regulations. This guide does not substitute for an understanding of the regulations. It is your responsibility as an applicant and licensee to have copies, read and abide by each regulation.

1. 902 KAR 100:012, "Fees."
2. 902 KAR 100:019, "Standards for Protection Against Radiation."
3. 902 KAR 100:040, "General Provisions for Specific Licensees."
4. 902 KAR 100:060, "Leak Testing."
5. 902 KAR 100:070, "Transportation of Radioactive Material."

6. 902 KAR 100:165, "Notices, Reports and Instructions to Employees."

C. As Low As Reasonably Achievable (ALARA) Philosophy

Section 2 of 902 KAR 100:019 states that each licensee shall develop, document and implement a radiation protection program commensurate with the scope and extent of their activities and sufficient to ensure compliance with the provisions of 902 KAR 100:019. This must include the use, to the extent practicable, of procedures and engineering controls based on sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA. This radiation protection program must be reviewed at least annually for the effectiveness of its implementation. Section 30 of 902 KAR 100:019 requires licensees to maintain records of the provisions of their radiation protection program until the license is terminated by the Cabinet. Records of audits and other reviews of program content and implementation must be retained for three (3) years after the record is made.

II. FEES

A fee is required for a radioactive material license, renewals and amendments. The applicant should refer to 902 KAR 100:012, "Fees", to determine the amount of fee that must accompany the application. No action will be taken on applications submitted without the proper fee. Checks should be made payable to the Kentucky State Treasurer.

III. FILING AN APPLICATION

An application for a license should be filed on Form RPS-7, "Application for Radioactive Material License." Since the space provided on the form is limited, additional sheets should be attached as necessary to provide complete information. Each separate sheet submitted with the application should be identified and keyed to the item number on the application to which it refers. The information submitted must be of sufficient detail to enable the Cabinet to determine that the proposed equipment, facilities, procedures and controls are adequate to protect health and minimize danger to life and property. Submittal of insufficient information will result in delays in issuance of the license.

The original application should be mailed to:

Radiation Control Branch  
Department for Health Services  
275 East Main Street  
Frankfort, Kentucky 40621

One copy of the application with all information submitted should be retained by the applicant, since licensees are required to possess and use licensed material in accordance with the statements and representations in the application, license conditions and Cabinet rules and regulations.

#### IV. CONTENTS OF AN APPLICATION

Item 1 - Applicant and Mailing Address: The applicant corporation or other legal entity should be specified by name and mailing address in Item 1. Individuals should be designated as the applicant only if they are acting in a private capacity and the use of radioactive material is not connected with their employment with a corporation or other legal entity.

The Cabinet shall issue a license only to an applicant who maintains an office in Kentucky at which copies of records are kept and from which licensed activities are directed. However, the applicant may maintain an out-of-state office for corporate radiation safety direction.

Item 2 - Street Address(es) Where Radioactive Material Will be Used: Specify each location of storage or use by the street address and city or other descriptive address (such as 5 miles east on Highway 10, Town, State) to allow easy locating of the facility. These sites may be different from the mailing address specified in Item 1. A post office box address is not acceptable. If you will conduct operations at temporary job sites, you may specify "temporary job sites throughout the Commonwealth of Kentucky."

Item 3 - Telephone Number: Indicate the telephone number of the applicant.

Item 4 - Person to be Contacted: This individual should know your proposed program and be able to answer questions regarding the application. A change in the contact person requires notification to the Cabinet but is not considered an application for amendment; therefore no fee is required.

Item 5 - Individual(s) and Title(s) Who Will Use Radioactive Material: Each person who will use radioactive material should be named in Item 5 and his qualifications provided in Item 13. An authorized user, as specified in the license, must be physically present when the gauges are in use.

Item 6 - Radiation Safety Officer (RSO): This individual is responsible for your radiation safety program, and as a minimum,

should have completed the device manufacturer's training program or have received equivalent training. The RSO is expected to coordinate the safe use of the gauging devices and ensure compliance with the Kentucky Administrative Regulations 902 KAR 100 and applicable U.S. Department of Transportation regulations.

The RSO needs independent authority to stop operations that he or she considers unsafe. The RSO also needs sufficient time and commitment from management to fulfill certain duties and responsibilities to ensure that radioactive materials are used by authorized individuals and in a safe manner.

Provide management's commitment that the RSO has independent authority to stop unsafe operations and will be given sufficient time to fulfill his/her radiation safety duties and responsibilities. Provide a description of the methods and checks management will use to assure that the RSO has current copies of the regulations, reviews all new and revised regulations, and makes changes, as needed, in licensee procedures to comply with the regulations. Describe the duties and responsibilities of the RSO. Provide a copy of an organizational chart that shows the RSO position to demonstrate that the RSO has sufficient independence and direct communication with responsible management officials. Typical duties should include those areas listed in Appendix A.

Item 7 - Licensed Material and Use of Radioactive Material:

- (a) Identify each radioisotope that will be used in the gauge (for example, cesium-137, americium-241, etc).
- (b) Identify the manufacturer and model number of each sealed source.
- (c) Specify the activity of radioactive material that will be in each sealed source.
- (d) Identify the manufacturer and model number of the gauge in which the sealed sources will be used.
- (e) Provide a commitment to limit the number of source/device combinations such that you do not exceed the quantities of radioactive material that would require financial assurance for decommissioning. These limits are defined in 902 KAR 100:040, Section 15. With this commitment, you do not need to specify, in advance, a particular number of identical source/device combinations that you may wish to possess. Alternatively, specify the maximum number of identical sealed source/device combinations you will possess at one time. Refer to Appendix H for further discussion on

financial assurance and for recordkeeping requirements important for decommissioning.

- (f) Specify the purpose(s) for which the gauging device(s) you want to possess will be used. For example, a moisture/density gauge is normally used for measuring moisture and density of construction materials. In order for gauging devices to be used safely, the device should be used only for the purposes for which the device was designed and in accordance with the manufacturer's recommendations for use.
- (g) Also specify whether the sealed source will be lowered into the ground more than the 1-3 feet common for most surface measurements. If you plan to make measurements at depths exceeding 3 feet, you will need appropriate provisions in your operating and emergency procedures to reduce the probability of the source becoming lodged in the hole and to recover a "stuck" source, respectively. Your license will require that you notify the Cabinet in accordance with 902 KAR 100:019 and 040, if a sealed source becomes lodged in a hole and it becomes apparent that recovery efforts will be unsuccessful.

Item 8 & 9 - Radiation Detection Instruments and Calibrations: If you plan to perform gauge servicing that requires removal of the source from its shielded position or removal of the source rod from the gauging device, you will need to address the items listed in Appendix B, which includes the possession and use of radiation detection instrumentation.

Item 10 - Personnel Monitoring Devices: Normally, personnel using portable moisture/density gauges are required to wear personnel monitoring devices such as film badges or thermoluminescence dosimeters (TLD). Personnel monitoring devices are also required to be worn during maintenance on the gauge. Specify the type of device, that is, film badges or thermoluminescence dosimeters (TLD), the frequency of exchange and the name and address of the supplier of the film badge or TLD service. In general, a monthly exchange is required for film badges. TLDs may be exchanged every three (3) months.

Item 11 - Facilities and Equipment: The applicant should provide a description of the means of storage of gauges or devices at his address, location of use, etc., when gauges are not in actual use by the individuals listed in the application. Kentucky Administrative Regulation 902 KAR 100:019, Sections 21 and 22 require that licensed material stored in an unrestricted area be secured from unauthorized removal from the place of storage and that licensed material in an unrestricted area and not in storage be tended under constant surveillance and

immediate control of the licensee. A simple sketch of the storage area(s) showing relationship to actively occupied areas should be submitted. You should state that the device will be stored in a locked enclosure such as store room, closet, etc., in a way that will prevent access by unauthorized persons. Indicate who will have access to the storage areas. Confirm that the storage location does not include residential quarters. If the gauge will be kept at a temporary jobsite overnight, a description should be submitted of the means of storage to prevent unauthorized access.

When not in storage, the device must be physically watched by an authorized user at all times. It is not acceptable for a device to be chained to a post or left lying unattended at the place of use during lunch or breaks, because the device would then be accessible to unauthorized persons or damage by heavy equipment.

902 KAR 100:165, Section 2 requires the posting of certain documents, notices and forms, in order to be readily observable by employees. These postings are to include the regulations referenced in Section 2, the license and operating procedures. Refer to the regulation for other posting requirements. The posting requirements do not apply to temporary overnight storage locations.

Item 12 - Radiation Protection Program: Procedures should be established to ensure compliance with the provisions of 902 KAR 100:019, "Standards for Protection Against Radiation," and 902 KAR 100:165, "Notices, Reports and Instructions for Employees." The applicant should submit a copy of his written radiation safety and emergency procedures in the form of written instructions to users, covering the following items:

#### 12.1 Duties and Responsibilities of Radiation Protection Officer

The applicant should review Item 6 and Appendix A of this guide.

#### 12.2 Transportation of Devices to Field Locations

Transportation activities must be carried out in accordance with the requirements of 902 KAR 100:070 and U.S. Department of Transportation (DOT) regulations. (Refer to Appendix C.)

It is your responsibility to become familiar with all applicable DOT regulations to help ensure safe transportation of radioactive materials. The applicable DOT regulations are outlined in 902 KAR 100:070, "Transportation of licensed material." The major areas in the DOT regulations that are most relevant for transportation of typical portable gauges that are shipped as

Type A quantities are:

1. Table of Hazardous Materials and Special Provisions 49 CFR 172.101
  - a. 49 CFR 172.101 - Hazardous Materials Table [proper shipping name, hazard class, identification number]
  - b. Table 2, Appendix 2, 49 CFR 172.101 - List of Hazardous Substances and Reportable Quantities [for radionuclides]
2. Shipping Papers 49 CFR 172.200
  - a. 49 CFR 172.201 - General entries [on shipping papers]
  - b. 49 CFR 172.202 - Description of hazardous material on shipping papers
  - c. 49 CFR 172.203 - Additional description requirements
  - d. 49 CFR 172.204 - Shipper's certification [if applicable]
3. Package Markings 49 CFR 172.300
  - a. 49 CFR 172.301 - General marking requirements for non-bulk packagings
  - b. 49 CFR 172.304 - Marking requirements
  - c. 49 CFR 172.310 - Radioactive material [Type A or Type B]
  - d. 49 CFR 172.324 - Hazardous substances in non-bulk packaging [designation of "reportable quantities" with the letters "RQ"]
4. Package Labeling 49 CFR 172.400
  - a. 49 CFR 172.400(a) - General labeling requirements
  - b. 49 CFR 172.403 - Radioactive materials [types and contents of labels]
  - c. 49 CFR 172.406 - Placement of labels
5. Placarding of Vehicles 49 CFR 172.500
  - a. 49 CFR 172.504 - General placarding requirements
  - b. 49 CFR 172.516 - Visibility and display of placards
  - c. 49 CFR 172.556 - RADIOACTIVE placard
6. Emergency Response Information - Subpart G
  - a. 49 CFR 172.600 - Applicability and general requirements
  - b. 49 CFR 172.602 - Emergency response information
  - c. 49 CFR 172.604 - Emergency response telephone number

7. Training - Subpart H
  - a. 49 CFR 172.702 - Applicability and responsibility for training and testing
  - b. 49 CFR 172.704 - Training requirements (includes types of training, when it must be conducted, need for refresher training every 2 years, recordkeeping)
  
8. Carriage by Public Highway 49 CFR 177
  - a. 49 CFR 177.817 - Shipping paper [location of shipping papers during transport]
  - b. 49 CFR 177.842 - Class 7 (radioactive) material [includes requirement for blocking and bracing during transport]

Appendix C provides additional background information on transportation and includes NRC's Information Notice 90-35, "Transportation of Type A Quantities of Non-Fissile Radioactive Materials," dated May 24, 1990, and a sample shipping paper for a typical portable gauge.

Safety measures to be used in transporting the devices in the applicants' vehicle must be described. The gauge must be fully secured in the vehicle and away from the passenger area. The gauge must be transported in packaging that has been certified by the U.S. Department of Transportation. Shipping papers are required to be carried with the gauge during transportation over public highways. The shipping papers must be carried in the passenger area of the transport vehicle. Carrying shipping papers in any other manner, such as in the gauge transport case, will result in a cited violation during inspection.

In response to Item 12.2 submit procedures for complying with applicable DOT regulations.

### 12.3 Storage and Securing of the Device

Means of preventing unauthorized access, use or removal of the gauges during use at temporary job sites must be described. Instructions should state that individual users are never to leave gauges unattended. Also a description of means of preventing unauthorized use or removal of the gauge from the designated place(s) of storage at permanent and temporary job sites must be included.

#### 12.4 Use of Personnel Monitoring

All personnel who are listed on the application as users must wear personnel monitoring devices when using the gauge. Instructions should cover location on body where devices are to be worn, frequency at which they should be exchanged and where they are to be stored when not in use.

Some authorized users as listed on the license may never use the gauge. An option to providing personnel monitoring to these individuals would be to maintain a utilization log. This log would provide documentation of who actually used the gauge and should include the name of the user, film badge number, date gauge removed from storage, serial number of gauge, use location and date returned to storage. Records of utilization logs must be maintained for five (5) years. A copy of the utilization log form must be submitted with the application for review. This option does not eliminate the need for badging any individual using the gauge. It does serve as documentation that certain users named on the license did not use the gauge and thus did not require badging. If this option is not selected then all users listed on the license must be badged whether they have actually used the gauge or not.

#### 12.5 Maintenance

Instructions should state that any maintenance (such as cleaning) will always be performed with the radioactive source in the safe shielded position. Maintenance may not be performed unless the source is safely shielded. To take the radioactive source out of the device, you must have special training and procedures, use a radiation survey meter, and take appropriate radiation safety precautions. Your license must specifically authorize any maintenance, repair, etc., that would involve removing the source from the device or taking the source out of the safe shielded position. (See Appendix B.)

#### 12.6 Leak-Testing

As a licensee you must test to determine whether or not there is any leakage from the radioactive source in the gauge. Leak tests are normally performed at 6-month intervals. There are some sources that have a 1-year leak-test interval. Information on intervals may be obtained from the manufacturer. Unless a specific request for the 1-year interval is included in the application, a 6-month interval will be specified in the license.

The options for leak-testing are:

1. Engage the services of a consultant or commercial facility to take samples, evaluate the samples, and report the results to you.
2. Use a commercial leak-test kit. You take the smear and send it to the kit supplier, who reports the results to you.
3. You perform the entire leak-test sequence yourself, including taking the smears and making the measurements.

For Option 1, specify the name, address, and license number of the consultant or commercial organization.

For Option 2, specify the kit model number and the name, address, and license number of the kit supplier. In your application, you should state the test samples will be taken by the individual designated as radiation safety officer in Item 6 and that a copy of the leak tests instructions are available.

For Option 3, specify how and by whom the test sample will be taken, the instrumentation that will be used for measurement, and the individual who will make the measurement and his or her qualifications. An instrument capable of making quantitative measurements should be used. Hand-held survey meters will not normally be considered adequate for measurements. Include a sample calculation for conversion of the measurement data to microcuries.

## 12.7 Inventories

902 KAR 100:015, Section 8 provides that the Cabinet may incorporate, in any license, such additional requirements and conditions with respect to the licensee's receipt, possession, use and transfer of radioactive material as it deems appropriate or necessary in order to, among other things, protect health or to minimize danger to life or property. The Cabinet requires that, periodically, licensees must account for all sealed sources and devices received and possessed under their licenses.

State that you will conduct inventories, at intervals not to exceed 6 months, to account for all sealed sources and devices received and possessed under the license. You should maintain records of the inventories for at least 2 years from the date of the inventory. Your inventory records should include: the radionuclide and amount (in units of curies) of radioactive material in each sealed source; the manufacturer's name, model number, and serial number (if appropriate) of each device containing radioactive material; the location of each sealed source and device; and the date of the inventory.

## 12.8 Operating and Emergency Procedures

It is necessary to submit operating and emergency procedures to the Cabinet for review. You will need to:

- a. Commit to having and implementing operating and emergency procedures, as described in correspondence with the Cabinet;
- b. Commit to providing a copy of your operating and emergency procedures to all users of gauging devices before they begin using the gauges;
- c. Commit to having a copy of your operating and emergency procedures at each jobsite;
- d. Submit a copy of your operating and emergency procedures. Your procedures should include the requirements and prohibitions outlined in Appendix C, but will be more detailed than those in Appendix D to accommodate your particular situation.

In addition, if the sealed source is to be lowered into the ground more than 3 feet, then you also need to have (1) special procedures to minimize the possibility of the source being stuck or lost "down hole" due to collapse of dirt or concrete around the source, including procedures requiring the use of piping, tubing, or other casing material to line the hole from the lowest depth to 12 inches above the surface, and (2) emergency procedures to recover a "stuck" source, including notifying the Cabinet, when it becomes apparent that recovery efforts will be unsuccessful.

Emergency procedures should include steps for workers to take in case of accidents involving damage or loss of the gauges. These procedures should include names and telephone numbers of the individual(s) within the applicant's organization who should be notified and who would, in turn notify the local police and the Kentucky Radiation Control Office. Telephone numbers should also be included for the manufacturer and the Kentucky Radiation Control Office: (502) 564-3700 normal working hours; (502) 564-7815 other hours. A statement should be made that emergency procedures will be carried with the driver when the gauge is transported.

## 12.9 Annual Audit of Radiation Protection Program

Section 2 of 902 KAR 100:019 requires licensees: (1) to develop, document, and implement a radiation program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the regulations; (2) to use procedures

and engineering controls to achieve occupational doses and doses to members of the public that are ALARA; and (3) to review, at least annually, the content and implementation of their radiation programs. Section 30 of 902 KAR 100:019 requires licensees to maintain records of their radiation protection program. Licensees must maintain records of the provisions of their radiation protection program until the Cabinet terminates the license. Licensees must also maintain records of audits and other reviews of program content and implementation for 3 years after the record is made.

The RSO needs to ensure that annual audits are conducted, but does not necessarily need to do it himself/herself. In fact, if the RSO is one of the authorized gauge users, it may be beneficial for a qualified individual (e.g., radiation safety consultant or the corporate radiation safety officer) who is not associated with day-to-day operations to conduct the audit.

The audit should be sufficiently detailed to ensure that (a) the licensee is abiding by Cabinet and DOT regulations and the terms and conditions of the license (e.g., periodic leak tests, inventories; only trained, approved individuals use gauges independently), (b) the licensee's radiation protection program content and implementation achieve occupational doses and doses to members of the public that are ALARA; and (c) the licensee maintains all appropriate records with all appropriate information (e.g., records of personnel exposure, leak tests, inventory, training of gauge users) sufficient to comply with Cabinet requirements. Appendix E describes an audit program that is acceptable to the Cabinet.

Submit (1) the name and radiation safety qualifications of the individual who will conduct audits; (2) a description of the scope and extent of the audits; (3) a commitment to conduct audits at intervals not to exceed 12 months and to maintain records of the audits for a least 3 years after the record is made; (4) management's commitment to review the documented results of the audit promptly after the audit's completion; and (5) a commitment to take prompt action to correct deficiencies identified during audits, to inform all personnel (including those at other locations and those working under other licenses) of the deficiencies and the actions management expects its personnel to take to avoid similar deficiencies.

In lieu of describing the scope and extent of the audits, you may state, "We will conduct audits as described in Appendix E of "Guide for Preparation of Radioactive Material Applications for the use of Sealed Sources in Portable Gauging Devices",

Revised 1/95.

#### 12.10 Maintaining of Records

Records required to be maintained in accordance with 902 KAR 100 or license conditions are to be maintained at one (1) central location. Usually this is the address specified in item 1 of the application. If records will be maintained at a different location, the location must be specified. If more than one use/storage location is authorized by the license, records or copies of records from these other locations must be forwarded, at least quarterly, to the central location for review by the Cabinet.

Item 13 - Training and Experience of Users: User qualifications should include, as a minimum, the completion of a training course or program approved by an Agreement State or the NRC. A certificate verifying training must be included with the application.

If an applicant desires to provide in-house training for his own personnel, a description of the training must be provided, including topics covered in the training, time spent on each topic, and the name and qualifications of the instructor. The instructor should have training in radiation safety equivalent to completion of an 80-hour course in radiation safety principles and practices and should have experience in the use of the device. (See Appendix F.)

Item 14 - Waste Disposal: The applicant must specify the means of disposal in the event the sealed sources will no longer be used. Sealed sources containing radioactive material may be returned to the manufacturer, transferred to another licensee authorized to possess the material or transferred to a licensed waste disposal firm.

Before transferring radioactive material, you must verify that the recipient is properly authorized to receive it using one of the methods described in 902 KAR 100:040, Section 12. In addition you must package and ship the material in accordance with the Cabinet and DOT regulations and you must maintain records of the transfer as required by 902 KAR 100:040, Section 14.

Item 15 - Certification: If you are an individual applicant acting in a private capacity, you are required to sign the form. Otherwise, your application should be dated and signed by a representative of the corporation or legal entity who is

authorized to sign official documents and to certify that the application contains information that is true and correct to the best of your knowledge and belief. Unsigned applications will be returned for proper signature.

You should also submit the names of additional individuals authorized to sign on behalf of the licensee. This permits these individuals to sign correspondence sent to this office requesting license amendments or for responses submitted in regards to Inspection Letters. These individuals should be officers of the company or others with administrative authority in regards to matters of radiation safety.

#### V. AMENDMENTS TO A LICENSE

After you are issued license, you must conduct your program in accordance with (1) the statements, representations, and procedures contained in your application; (2) the terms and conditions of the license; and (3) the Cabinet's regulations as specified in 902 KAR 100.

It is your obligation to keep your license current. You should anticipate the need for a license amendment insofar as possible. If any of the information provided in your application is to be modified or changed, including a change in RSO or authorized users, submit an application for a license amendment. In the meantime, you must comply with the terms and conditions of your license until it is actually amended. Cabinet regulations do not allow you to implement changes on the basis of a submission requesting an amendment to your license.

An application for a license amendment may be prepared either on the application form or in letter form and should be submitted to the address specified in Section III of this guide. Your application should identify your license by number and should clearly describe the exact nature of the changes, additions, or deletions. References to previously submitted information and documents should be clear and specific and should identify the pertinent information by date, page, and paragraph. For example, if you wish to change the radiation safety officer specified in Item 6, your application for a license amendment should specify the new RSO's name, training, and experience. The qualifications of the new RSO individual should be equivalent to those specified in Item 6 of this guide.

You must send the appropriate fee for license amendment with your application. The Cabinet will not accept an application for filing or processing before the proper fee is paid in accordance with 902 KAR 100:012.

## VI. RENEWAL OF LICENSE

An application for renewal of a license should be filed at least 30 days prior to the expiration date.

Renewal applications may be filed by completing the form sent by the Cabinet or in letter form. The renewal application should be signed and dated by a representative of the licensee's administrative management and should include the Kentucky Radioactive Material License Number.

## VII. TERMINATION OF A LICENSE

If you do not wish to renew your license, you must dispose of all licensed radioactive material you possess in a manner authorized by 902 KAR 100:021. Submit Form RPS-10 "Disposition of Radioactive Material," (See Attachment 1) or a letter indicating the manner in which you disposed of the radioactive material and send to the Kentucky Radiation Control office before the expiration date of your license with a request that your license be terminated. Include your Kentucky Radioactive Material License Number in the request. There is no fee assessed for terminating a license.

If you cannot dispose of all the licensed radioactive material in your possession before the expiration date, you must submit a request for license renewal, along with the renewal fee, for storage only of the radioactive material. The renewal is necessary to avoid violating Kentucky Administrative Radiation Regulations that do not allow you to possess radioactive material without a valid license.

APPENDIX A  
DUTIES AND RESPONSIBILITIES OF THE RADIATION SAFETY OFFICER

The Radiation Safety Officer (RSO) is responsible for implementing the radiation safety program and ensuring that radiation safety activities are performed in accordance with approved procedures and regulatory requirements.

The RSO's duties and responsibilities include ensuring:

1. Radioactive materials possessed under the license conform to the materials listed on the license.
2. Use of the devices, particularly in the field, is only by individuals authorized by the license.
3. All users wear personnel monitoring equipment, such as film badges or thermoluminescence dosimeters (TLD), when required and reports of personnel exposure are reviewed in a timely manner.
4. Gauges are properly secured against unauthorized removal at all times when they are not in use.
5. Proper authorities are notified promptly in case of accident or damage to gauges, fire or theft.
6. Audits are performed at least annually to ensure that (a) the licensee is abiding by Cabinet and DOT regulations and the terms and conditions of the license (e.g., periodic leak tests, inventories, use limited to trained, approved users); (b) the licensee's radiation protection program content and implementation achieve occupational doses and doses to members of the public that are ALARA (see 902 KAR 100:019, Section 2); and (c) the licensee maintains required records with all required information (e.g., records of personnel exposure, receipt, transfer, and disposal of radioactive material; gauge user training) sufficient to comply with Cabinet requirements.
7. Results of audits, identification of deficiencies, and recommendations for change are documented (and maintained for at least 3 years), provided to management for review, and prompt action is taken to correct deficiencies.
8. Audit results and corrective actions are communicated to all personnel who use radioactive material (regardless of their location or the license under which they normally work).

9. All incidents, accidents, and personnel exposure to radiation in excess of ALARA or 902 KAR 100:019 limits are investigated and reported to the Cabinet and other authorities, as appropriate, within required time limits.
10. Radioactive material is transported in accordance with all applicable DOT requirements.
11. Radioactive material is disposed of properly.
12. He/she has up-to-date copies of regulations 902 KAR 100, reviews new or amended regulations, and revises license procedures, as needed to comply with Cabinet regulations.
13. The license is amended whenever there are changes in: licensed activities, responsible individuals, or information or commitments provided to the Cabinet in the licensing process.

## APPENDIX B

### EXTENDED MAINTENANCE

If you are considering performing maintenance or cleaning of gauges that requires the removal of the radioactive source from the shielded position or removal of the source rod from the device (i.e., extended maintenance), you should keep in mind the radiation levels you may encounter. A typical moisture-density gauge contains 10 millicuries of cesium-137 and 40 millicuries of americium-241. In about 9 minutes, an unshielded cesium-137 source of this activity can deliver 5 rems to a worker's hands or fingers (i.e., extremities), assuming the extremities are 1 centimeter from the source. The threshold for extremity monitoring is 5 rems per year.

Thus, to perform extended maintenance, you must have special training, follow special procedures, use a radiation survey meter, use special shields, use special personnel monitoring devices, and take appropriate radiation safety precautions. Accordingly, provide the following information:

#### 1. Type of Work to be Performed

Describe the types of work, maintenance, cleaning, etc., that you wish to perform that necessitates removal of the radioactive source from the shielded position or the removal of the source rod from the device and correlate with the specific manufacturer's name and model number of the gauges on which you will perform extended maintenance.

#### 2. Training and Experience

List the individuals who will perform extended maintenance and describe their training and experience in performing extended maintenance. Individuals are considered on a case-by-case basis.

For each individual proposed to perform extended maintenance, list all radiation safety courses the individual has had, the amount of hands-on experience the individual has had involving extended maintenance, including a correlation of manufacturer's name and model number gauge with the type and frequency of extended maintenance performed, and why you consider the individual competent to perform extended maintenance safely.

#### 3. Handling Procedures

Submit your procedures for safe handling of the radioactive

source while the source is outside the gauge. Your procedures should require that: the source rod will only be handled at the end opposite to the source end; the source end will be immediately place in a shielded container (e.g., lead shield); unauthorized individuals will not be allowed into the areas where extended maintenance is performed and where the source rod is located; containers shielding the source will be labeled "Caution Radioactive Material"; the source will be under constant surveillance of an authorized user when not in storage and will be secured against unauthorized removal or access when in storage; and the manufacturer's instructions and recommendations for performing extended maintenance will be followed.

#### 4. Personnel Monitoring

Describe how you will ensure that radiation exposure to individuals performing extended maintenance will not exceed 902 KAR 100:019 limits. An acceptable response is: "Individuals performing extended maintenance on gauges will always wear both whole body and extremity monitoring devices; extremity devices, like the whole body devices, will be TLDs and exchanged at least quarterly."

#### 5. Survey Instrumentation

If you have already provided detailed information on survey instruments in response to Items 8 and 9, state, "See response to Items 8 and 9." Otherwise, list the type and ranges of survey instruments you will have available, state the frequency of calibration, and who will perform the calibration. Also include how you will ensure that the survey instrument is working properly.

For example, you can state that a survey instrument capable of measuring between 0.1 millirem per hour and 100 millirems per hour will be used to perform the surveys and that the survey instrument will be calibrated annually by the manufacturer. Alternatively, you can identify by name, address, and license number an organization that is specifically licensed by NRC or an Agreement State to calibrate survey instruments for other licensees. In addition, you can state that, before each use of the instrument, you will check the response of the instrument with a dedicated check source that was supplied with the instrument and commit that, if the instrument does not respond properly, then you will not perform extended maintenance on the gauges until the survey instrument is repaired and operable or until you obtain an operable instrument.

#### 6. Surveys

Describe how you will ensure that radiation levels in areas where extended maintenance will take place do not exceed 902 KAR 100:019 limits. For example, you can (1) commit to performing

surveys with a survey instrument (as described above); (2) specify where and when surveys will be conducted during extended maintenance; and (3) commit to maintaining, for 3 years from the date of the survey, records of the survey (e.g., who performed the survey, date of the survey, instrument used, measured radiation levels correlated to location of those measurements), as required by 902 KAR 100:019.

6. REMINDER TO LICENSEE MANAGEMENT:

- a. Arrange for a survey to be conducted as soon as possible by a knowledgeable person using appropriate radiation detection instrumentation. (This person could be a licensee employee using a survey meter located at the jobsite or a consultant.)
- b. Make necessary notifications to local authorities as well as to the Cabinet as required. Cabinet notification is required when gauges containing radioactive material are lost or stolen, or when gauges are damaged or involved in incidents that result in doses in excess of 902 KAR 100:019 limits.
- c. Timelines of reports to the Cabinet need to be considered.
- d. Reporting requirements are found in 902 KAR 100:019 Sections 38, 39 and 40 and 902 KAR 100:040, Section 18.

## APPENDIX F

### CRITERIA FOR TRAINING COURSES AND INSTRUCTOR QUALIFICATIONS

#### Part I: Criteria for Acceptable Training Courses for Portable Gauge Users

- o Courses must be at least 8 hours
- o Course must provide instruction in the following topics (the hours next to each topic are suggestions):
  1. Radiation Physics (0.5 hour)
    - Atomic and Subatomic Structure
    - Radioactivity and Types of Radiation
    - Sources of Radioactivity
    - Isotopes and Periodic Table
    - Units of Radiation Measurement and Half-Life
  2. Radiation Safety (1.0 hour)
    - Biological Effects of Radiation
    - Occupational Dose Limits
    - ALARA
    - Methods to Reduce Dose
    - Personnel Monitoring
  3. Regulatory Requirements (1.5 hour)  
(902 KAR 100)
    - Licensing
    - Storage of Licensed Material
    - Constant Control and Surveillance of Radioactive Material Not in Storage
    - Personnel Monitoring
    - Leak Testing
    - Inventory
    - Maintenance
    - Operating and Emergency Procedures
    - Audits
    - Recordkeeping
    - Reciprocity
    - Disposal
    - Incidents

<sup>1</sup> If training courses and/or instructor qualifications do not meet the criteria in this Appendix, an applicant may submit the information requested in Item 13, to the Cabinet, as part of a request for a licensing action and the applicant's proposal will be considered on a case-by-case basis.

4. Transportation (0.5 hour)

- Requirements in 902 KAR 100:070 and 49 CFR
- Transportation of Licensed Material in Vehicles
- Shipping by Common Carrier

5. Gauge Theory, Operation, and Field Training  
(3.5 hours)

6. Written Test and Test Review (0.5 hour)

- o Successful completion of the course requires obtaining a score of at least 80% on a closed-book test consisting of at least 50 questions that have not been provided to the students before the test
- o Course instructors must meet the qualifications outlined in Part II below

Part II: Criteria for Acceptable Qualification for Instructors  
of Portable Gauge Users

- o Each instructor who trains individuals as portable gauge users should meet the following:
  1. A high school graduate or has a general equivalency diploma (GED) AND
  2. Has successfully completed at least an 80-hour course in radiation safety principles and practices AND
  3. Has at least 32-hours of hands-on experience in the use of portable gauge devices