RADIOACTIVE MATERIALS PROGRAM

INSTALLED GAUGES AND GAS CHROMATOGRAPHY LICENSING GUIDE Revision 5

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APPENDICES

I. PURPOSE OF GUIDE

This guide describes the information needed by the Georgia Department of Natural Resources Radioactive Materials Program (Department) to assist applicants and licensees in preparing applications for new licenses, license amendments, and license renewals for the use of sealed sources in installed gauging devices, i.e. gauges mounted in "fixed" locations or gas chromatography (GC) devices. Installed gauges are designed for measurement or control of material density, flow, level, thickness, weight, etc. **If you will be using only GC's, you may follow Appendix H in preparing the license application.**

This regulatory guide is intended to provide you, the applicant or licensee, with information that will enable you to understand specific regulatory requirements and licensing policies as they apply to the specified services that you provide.

After you are issued a 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 Department of Natural Resources' regulations.

Rule 391-3-17-.01 "General Provisions, Amended."

Rule 391-3-17-.02 "Licensing of Radioactive Materials, Amended."

Rule 391-3-17-.03 "Standards for Protection Against Radiation, Amended."

Rule 391-3-17-.06 "Transportation of Radioactive Materials, Amended."

Rule 391-3-17-.07 "Notices, Instructions and Reports to Workers; Inspections, Amended."

Rule 391-3-17-.10 **"**Administration, Amended."

Unless otherwise stated, all regulations cited in this guide are in Chapter 391-3-17, "Rules and Regulations for Radioactive Materials". You may obtain copies of the above documents from the Secretary of State website:. http://rules.sos.ga.gov/gac/391-3-17

Before preparing your application for a license to use radioactive materials, you should be acquainted with the applicable regulations. It is your responsibility as an applicant and as a licensee to have copies of, to read, and to abide by each regulation.

AS LOW AS IS REASONABLY ACHIEVABLE (ALARA) PHILOSOPHY

Georgia Rule 391-3-17-.03(4)(b) states "The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)." As an applicant, you must have an ALARA plan that embraces this philosophy when developing plans for working with radioactive materials.

This radiation protection program must be reviewed at least annually for the effectiveness of implementation. Licensees are required to maintain records of their radiation protection program until the Department terminates the pertinent license. Licensees must maintain records of audits and other reviews of program content and implementation for 3 years after the record is made.

II. FILING AN APPLICATION

Complete the form "Application for a Radioactive Materials License", **refer to Appendix A**. Complete Items 1 through 4 on the form itself. For items 5 through 11 submit the information on supplementary pages. Each separate sheet or document submitted with the application needs to be identified and keyed to the item number on the application to which it refers. All typed pages, sketches, or drawings should be on 8 and1/2 x11 inch paper to facilitate handling and review. Complete all items in enough detail for the Department to determine that your equipment, facilities, training and experience, and radiation protection program are adequate to protect health and to minimize danger to life and property.

You should prepare your application in duplicate. Submit one to the Department and retain a copy for your records

PUBLIC AVAILABILITY OF RECORDS

Licensees should remember that all documents submitted to the State of Georgia may be made available to the public.

The Department recommends that the licensee not include in any submittal trade secrets or personal information about your employees, unless the information is directly related to radiation safety or specifically required by the Department. For example (1) information submitted on training and experience of employees should be limited to training related to radiation safety; (2) home addresses and telephone numbers should be submitted only if they are part of the emergency procedures; and (3) dates of birth, social security numbers, and radiation dose information should be submitted only if specifically required by the Department.

If you submit trade secrets, proprietary information, or personnel information that you want withheld from public disclosure, you must request withholding in accordance with procedures specified in the Georgia Open Records Law[1]. Failure to follow this procedure may result in disclosure of the information to the public and/or substantial delays in processing your submittals. Using labels such as "confidential" or "restricted" may not guarantee that your documents will be withheld.

III. CONTENTS OF AN APPLICATION

Item 1. License Information

Indicate whether this is an application for a new license, an amendment, or a renewal. If this is an amendment or a renewal, please identify the license number. An amendment request may be submitted in letter form without using the application. For an amendment, the licensee must identify the “GA” license number and give the business name.

Item 2.a. Name and Mailing Address of Applicant

Enter the applicant’s name, mailing address, county, telephone number, fax number and **Internet address** if applicable. The applicant should be the legal name of the corporation or other legal entity with direct control over the use of the radioactive material. If the applicant is an individual, the individual should be

[1] A copy of the Georgia Open Records Law is available from the Georgia Law Library, for a copy of the law the library may be contacted at (404) 656-3468.

acting in a private capacity and the use of the radioactive material should not be connected to the individual's employment in a corporation or other legal entity.

Item 2.b. Street Address(es) of Use

List each permanent facility used as a location of storage and use by the street address, city, and state or other descriptive address (such as on highway 10, two miles east of the intersection of highway 10 and state route 234, Any town, Georgia). The descriptive address should be sufficient to allow a Department inspector to find the location. A post office box is not acceptable for address of use. **The use address must be an in-state address.**

Please identify the geographical location of your facility(s).

Item 3. Person to Contact

Enter the name and telephone number of the individual(s) responsible for this application and license. This individual should be familiar with the proposed radioactive materials program and be able to answer questions about the application. This individual is usually the person responsible for the radiation protection program and will serve as the point of contact during the review of the application and after issuance of the license. Notify the Department if the individual assigned this function changes. Notification of a contact change is **not considered a license amendment** unless the individual is the Radiation Safety Officer.

The individual named in Item 3 may or may not be the individual who signs the application in Item 13. However, any commitments made by the applicant must be signed by the individual named in Item 13. The Department considers that individual to have the authority to make commitments on behalf of the applicant.

Item 4. Record Retention

Indicate where records are to be maintained. If multiple locations are being requested, records for each site's operation must be maintained at that site and at the main Georgia facility location as indicated in Item 2.a. or 2.b. If multiple locations are requested, the record location will be indicated in a condition in the radioactive materials license when it is issued.

Item 5. Radioactive Material

1. Identify each radionuclide, the chemical or physical form, the number of sources, and the maximum activity requested. Specify activity in terms of Curies. For example, the maximum activity per source is 300 millicuries of Cesium-137.

2. Identify the manufacturer's name and model number of each sealed source that will be used in each gauging device.

3. Identify the manufacturer's name and model number of each gauging device in which the sealed sources will be used.

NOTE: Consult with the proposed supplier for this information to be sure that the sources, devices, and source-device combination(s) conform to the sealed source and device designations registered with the NRC or an Agreement State. Improperly identified equipment may require additional correspondence and may slow the review process.

Item 6. Purposes For Which Licensed Material Will Be Used

Specify the purposes for which the gauging devices you want to possess will be used. For example, an installed gauge is normally used for measuring thickness, density, weight, flow, level, etc. of different 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.

Item 7. Individual Responsible For Radiation Protection Program And Their Training and Experience

State the name of the person designated by, and responsible to, the applicant's management as Radiation Safety Officer (RSO). This individual is responsible for the management and coordination of the Radiation Protection Program, who maintains the license and associated records, and who, in most instances, is the license contact with the Department.

The RSO may delegate certain day-to-day tasks of the radiation protection program to other responsible individuals, sometimes referred to as “alternate RSOs” or “site RSOs.” For example, a licensee with multiple permanent locations of use or use at temporary jobsites may appoint “site RSOs,” who assist the RSO and are responsible for the day-to-day activities at these locations. Licensees may also appoint “alternate RSOs” who may “step in” as an emergency contact when the RSO is unavailable. Such “alternate RSOs” or “site RSOs” do not need to meet all RSO qualifications; however, they should be qualified, experienced authorized users who have adequate knowledge of the activities to which they are assigned. These individuals should have the same management support and decision-making authority as the RSO that is necessary to accomplish the tasks to which they have been assigned. Please note that only the primary RSO is named on an NRC license.

The RSO should have the training required for the gauge users as described in your response to Item 8 below. If the RSO has completed gauge manufacturer's course, submit a copy of the training certificate that shows the title of the course, the completion date, the name of the company teaching the course, and an official signature.

If the RSO received training other than that provided by the gauge manufacturer, you should provide the information requested in 1 through 3 under Item 8.2 below and submit supporting evidence.

The RSO must have independent authority to: maintain an ALARA program, enforce radiation safety polices and procedures, suspend activities deemed unsafe, implement remedial action when necessary, make a decision relative to any and all licensed activities, and, if designated as the primary contact with the Department, be delegated the authority to act as a duly authorized person on behalf of the applicant.

You should provide management's commitment that the RSO has independent authority to stop unsafe operations and will be given sufficient time to do his or her radiation safety duties and responsibilities.

Provide a copy of an organizational chart which shows the RSO position as respects to his or her

authority in communicating directly with responsible management officials. It should also show the position of the individual who signs the application in Item 13 of the Application Form.

The RSO's duties and responsibilities should include those areas listed in **Appendix B**. In lieu of submitting the requested description, you may state, "The RSO's duties and responsibilities will be those listed in Appendix B of Installed Gauges and Gas Chromatography Licensing Guide Revision 5".

Item 8. Training Provided To Other Users

8.1 Initial Training Received in a Gauge Manufacturer's Course

If gauge users receive training through a gauge manufacturer's course, you should provide the following:

1. A commitment that, before an individual is permitted to use a gauge, the individual: (a) will have successfully completed a gauge manufacturer's course that meets the criteria in Part I of **Appendix C** of this guide and the course instructor's qualifications meet the criteria in Part II of **Appendix C** of this guide; (b) will have received copies of, and been trained in the applicant's operating and emergency procedures; and (c) will have been designated as an authorized user by the RSO.

   For each individual trained after you have made the above commitment in an application to the Department, you should maintain records demonstrating what is stated in (1) above. These records should be maintained until three years after the individual terminates employment.

2. A commitment that refresher training will be provided by the RSO or an instructor whose qualifications are those described in Part II of **Appendix C** of this guide. Indicate the frequency of the refresher training. The refresher training should include participating in "dry runs" of your emergency procedures and reviewing (1) operating and emergency procedures, including lock-out/tag-out procedures as appropriate, (2) changes in applicable regulations or license conditions, and (3) deficiencies identified during the performance of annual audits of the radiation protection program. Refresher training may also include review of applicable Department's Information Notices and Bulletins. Typically, refresher training lasts 2-4 hours; refresher training of shorter duration is acceptable provided it encompasses participation in "dry runs" and review of the items listed above.

   You should maintain records of refresher training, including the date of the training, identity of the instructor, list of attendees, and topics covered. These records should be kept for at least 3 years.

8.2 Initial Training Received in an Alternative Course (i.e., Other than a Gauge Manufacturer's Course)

If gauge users receive initial training in an alternative course, you should provide the following.

1. A description of the alternative course, including its duration, the topics covered, the amount of time devoted to each topic;

2. The name and qualifications of each instructor;

3. A description of how the trainees' competency is ensured, including a description of tests to be administered and copies of sample tests with correct answers shown and a notation of the minimum

"passing" grade.

4. A commitment that, before an individual is permitted to use a gauge, the individual (a) will have successfully completed the alternative course described in response to 1 through 3 above, (b) will have received copies of and been trained in the applicant's operating and emergency procedures, and (c) will have been designated as an authorized user by the RSO.

   For each individual trained by an alternative course, you should maintain records until three years after the individual terminates employment.

5. A commitment that refresher training will be provided, by the RSO or an instructor whose qualifications are those described in Part II of **Appendix C** of this guide. Indicate the frequency of the refresher training. The refresher training should include participating in "dry runs" of your emergency procedures and reviewing (1) operating and emergency procedures, including lock-out/tag-out procedures as appropriate, (2) changes in applicable regulations or license conditions, and (3) deficiencies identified during the performance of annual audits of the radiation protection program. Refresher training may also include review of applicable Department's Information Notices and Bulletins. Typically, refresher training lasts 2-4 hours; refresher training of shorter duration is acceptable provided it encompasses participation in "dry runs" and review of the items listed above.

You should maintain records of the refresher training, including the date of the training, identity of the instructor, list of attendees, and topics covered. These records should be kept for at least three years.

NOTE: An alternative training program should meet the criteria in Part I of **Appendix C** of this guide. The Department does not consider a training program adequate if the only qualification of the instructor is completion of the device manufacturer's training program. In general, an instructor should have the training and experience outlined in Part II of Appendix D. The course instructor's qualifications are important in order to avoid "pyramid training" (i.e., persons with minimal training train new individuals who, in turn, train others). Individual qualifications will vary, and authorization of trainers may be made on a case-by-case basis.

In a case-by-case review, the Department may consider the extent to which the following factors offset the need for some of the formal training outlined in Part II of **Appendix C**: possession of a Bachelors (or more advanced) degree in a physical science or engineering; possession of a license as a professional engineer; an extensive amount of field experience; use of instruction materials (e.g., instructor's notes, slides, handouts, videotapes, test questions) prepared by more highly qualified individuals (e.g., certified health physicist); grading of students' tests by more highly qualified individuals.

6. Licensee personnel who work in the vicinity of a fixed gauge but do not use gauges (ancillary staff) are not required to have radiation safety training as long as they are not likely to receive a dose of 1 mSv [100 mrem] in a year. However, to minimize potential radiation exposure when ancillary staff are working in the vicinity of a fixed gauge, it is prudent for them to work under the supervision and in the physical presence of an AU or to be provided some basic radiation safety training. Such ancillary staff should be informed of the nature and location of the gauge and the meaning of the radiation symbol and should be instructed not to touch the gauge and to keep away from it as much as their work permits.

   Some ancillary staff, although not likely to receive doses over 1 mSv [100 mrem], should receive

training to ensure adequate security and control of licensed material. To ensure the control and security of licensed material, licensees may provide these individuals with training commensurate with their assignments in the vicinity of the gauge.

Item 9. Facilities and Equipment

Georgia Rule 391-3-17-.01(2)(qqqq) defines a " restricted area" as any area to which access is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to sources of radiation and radioactive material. A restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area."

1. Provide diagrams of the facility that include the building, the proposed restricted area(s) and adjacent areas, including above and below the restricted areas and explain how radiation levels in unrestricted areas will be controlled and monitored to comply with 391-3-17-.03(5)(i). The diagram should indicate the location of each gauge.

3. If the gauges will be stored at any time, submit a diagram showing where the gauge(s) may be stored when not installed.

4. Describe the security measures that will be taken during use and storage of gauges at the addresses listed in Item 2b of the application form.

Item 10. Radiation Protection Program

As the licensee, you are responsible for the conduct of your radiation protection program at all facilities and for the actions of all your employees. If you list more than one facility as an authorized location of use, you should design your radiation protection program to be applicable to all listed facilities and all your employees. In addition, you are required by Rule .03(4) to verify at least annually that your licensed activities are being conducted in compliance with the Department's regulations and the terms and conditions of your license.

It is very important that you document all activities conducted under your license to demonstrate regulatory compliance. Records showing activities conducted under your license are evidence of your efforts to be in compliance. For example, during inspections, inspectors may request records of the receipt, transfer, and disposal of licensed material, and training for authorized users.

10.1 Personnel Monitoring Program

Personnel monitoring equipment is to be used by individuals entering restricted areas that are likely to receive a dose in excess of 10% of the dose specified in 391-3-17-.03(5)(a). The specified annual dose to the whole body of adults is 5 rems (0.05 sievert). The whole body includes the head, trunk (including male gonads), arms above the elbow, and legs above the knee. The specified annual dose limit to the skin or any extremity (shallow dose equivalent) is 50 rems (0.50 sievert). The specified annual dose limit for minors is 10% of the annual dose limits specified for adult workers, and the specified occupational dose limit for the embryo/fetus of a declared pregnant woman is 0.5 rem (5 millisieverts).

You will need to monitor all authorized users and individuals working in the proximity of the gauges with a film badge, optically stimulated luminescent devices (OSL) or thermoluminescent dosimeter (TLD). Unless you can demonstrate, in accordance with 391-3-17-.03(8)(b), that individuals working in proximity of the gauges are not likely to receive a radiation dose in excess of 10% of the allowable limits (e.g., the source in the installed gauge does not emit gamma or high-energy beta radiation); or the gauges are

installed in locations which are normally inaccessible and your company does not service the gauges. If authorized for extended maintenance users shall wear appropriate dosimetry.

Accordingly, you should provide the following information on your monitoring program, as appropriate:

1. Calculations documenting your evaluation that unmonitored gauge users are not likely to receive radiation doses in excess of 10% of the allowable limits,

OR

2. A commitment to monitor all gauge users with a film badge, OSL or TLD when they use gauges. Including the following:

    a. The name of the supplier of the monitoring equipment you will use which must be accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

    b. Identify the type of personnel monitoring equipment that will be used (i.e., film badge, OSL or TLD).

    c. Specify the frequency with which film badges, OSL's or TLD's will be exchanged. Acceptable exchange frequencies are every 3 months for OSL's or TLD's and every month for film badges. Other exchange frequencies can be considered based on the frequency of using installed gauges. The personnel monitoring device vendor may recommend an exchange frequency based upon the type of monitoring equipment you will be using. If you want to be authorized to perform servicing of gauges it may be necessary, depending on the level of maintenance you chose to perform, to use extremity monitors.

10.2 Radiation Detection Instruments

It is **not necessary** to have a radiation survey meter to make surveys during routine use of the device. However, if you plan to install, perform initial radiation surveys, relocate, removal from service, dismantling, alignment, replacement, disposal of the sealed source, and repair of components related to the radiological safety of the gauge, a survey meter will be required. **(Refer Appendix E)**

If survey meters are required, please submit one of the following:

- the statement: "Surveys according to .03(8)(a) will be performed by a person specifically authorized by the NRC or an Agreement State to perform these surveys."

OR

- "Each radiation survey meter will be calibrated by the manufacturer or other person authorized by the NRC or an Agreement State to perform radiation survey meter calibrations."

10.3 Leak Testing

A leak test (i.e., a check for removable radioactive contamination) is required to be performed at 6-month intervals or as specified int the Sealed Source and Device Registration certificate. The measurement of the leak test sample needs to be quantitative, and the instrumentation used to analyze the sample needs to be sufficiently sensitive to detect 185 Becquerel (0.005 microcurie) of radioactivity.

The options for leak testing are:

- the statement: "Leak tests will be performed at intervals approved by the NRC or an Agreement State and specified in the Sealed Source and Device registration certificate. Leak tests will be performed by an organization licensed by the NRC or an Agreement State to provide leak testing services to other licensees; or by using a leak test sample collection kit supplied by an organization licensed by the NRC or an Agreement State to provide leak test kits and/or sample analysis services to other licensees and according to the kit supplier's instructions. Records of leak test results will be maintained."

OR

- the statement: "We will implement the model leak test program in **Appendix J** of this Guide. Records of leak tests will be maintained."

OR

- a description of alternative equipment and/or procedures for determining whether there is any radioactive leakage from sources contained in gauges and the statement: "Records of leak tests will be maintained."

10.4 Inventories

The Department requires that licensees must periodically account for all sealed sources and devices received and possessed under their license. One your license is approved, there will be a condition stipulating that you, the licensee, must conduct inventories at six-month intervals. You should maintain records of the inventories for the next Departmental inspection. Your inventory records should include the following:

- radionuclide and amount (in units of Becquerel or Curies) of radioactive material in each sealed source;
- the manufacturer's name
- model number
- serial number (if appropriate) of each device containing radioactive material
- the location of each sealed source and device
- the date of the inventory
- the name of the individual conducting the inventory

Note: for materials transferred or disposed of, the date of the transfer or disposal, the name and license number of the recipient, and a description of the affected radioactive material (e.g., radionuclide, activity, manufacturer's or distributor's name and model number, serial number), and return confirmation from recipient

10.5 Maintenance

Licensees should routinely clean and maintain gauges according to the manufacturer's or distributor's written recommendations and instructions. Individuals performing routine maintenance must have adequate training and experience. Radiation safety procedures for routine cleaning and maintenance (e.g., removal of exterior residues from the gauge housing, shutter operation checks, external lubrication of shutter mechanism, calibration, and electronic repairs) must consider ALARA principles and ensure that the gauge functions as designed and source integrity is not compromised. The source must be safely shielded within the gauge.

Specific authorization by the Program is required to perform nonroutine maintenance and repair of installed gauges. Nonroutine consists of maintenance or repair of components, including electronics, related to the radiological safety of the gauge (e.g., the source, source holder, source drive mechanism, shutter, shutter control, or shielding) and any other activities during which personnel could receive radiation doses exceeding the regulatory dose limits.

For routine maintenance: Submit either of the following:

- the statement: "We will implement and maintain procedures for routine maintenance of our gauges according to each manufacturer's or distributor's written recommendations and instructions."

OR

- alternative procedures for Department review

For nonroutine operations: Submit either of the following:

- the statement: "The gauge manufacturer, distributor, or other person licensed by the NRC or an Agreement State will perform nonroutine operations such as installation, initial radiation survey, repair and maintenance of radiological safety components, relocation, replacement, alignment, removal from service, and disposal of sealed sources."

OR

- provide the information listed in **Appendix E** of this guide

10.6. Transportation of Devices

It is your responsibility as a licensee to become familiar with all applicable Department of Transportation (DOT) regulations to help ensure safe transportation of radioactive materials. The applicable DOT regulations are outlined in 10 CFR 71.5, "Transportation of Licensed Material." Fixed gauges are rarely transported. Transportation for fixed gauges usually occurs when a gauge is shipped back to the manufacturer for repair or disposal, or to a sister company licensed to receive the gauge. It is best to contact the manufacturer of the gauge to determine the current shipping procedures to ensure your company is in compliance with State and Federal DOT regulations. **This will be reviewed during the inspection.**

10.7 Operating and Emergency Procedures

The Department requires that all installed gauge licensees submit operating and emergency procedures to the Department for review. **Refer to Appendix D**. You should:

1. Commit to having and implementing operating and emergency procedures, as described in correspondence with the Department;

2. Commit to providing a copy of your operating and emergency procedures to all users of gauging devices before they begin using the gauges;

3. Submit a copy of your operating and emergency procedures. Your procedures should include the requirements and prohibitions outlined in this guide in Appendix D, "Standard Operating and Emergency Procedures," but yours may be more detailed than those in **Appendix D** to accommodate your particular situation.

In addition, lock-out/tag-out procedures will be required if it is possible that a major portion of an employee's body could receive exposure from the radiation beam from certain devices. You should have lock-out/tag-out procedures so that personnel will not be subjected to unnecessary exposure. The procedure should specify the means for preventing employees from entering the radiation beam during maintenance, repairs, or other work in, on, or around the bin, tank, or hopper on which the device is mounted. You need to submit the procedures and post them at the facility so that personnel can see them.

10.8 Annual Audit of Radiation Protection Program

Georgia's Rule 391-3-17-.03(4) requires each licensee to: (1) develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the regulations, (2) use procedures and engineering controls to achieve occupational doses and doses to members of the public that are ALARA, and (3) review, at least annually, the content and implementation of their radiation program. Licensees are required by 391-3-17-.03(14)(b) to maintain records of their radiation protection program. Licensees must maintain records of the provisions of their radiation protection program until the Department terminates the pertinent license. Licensees must also maintain records of audits and other reviews of program content and implementation for 3 years after the record is made.

As noted in **Appendix B**, the RSO needs to ensure that annual audits are conducted but does not necessarily need to conduct the audits themselves. 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, the corporate RSO) who is not associated with day-to-day operations to conduct the audit.

In lieu of describing the scope and extent of the audits, you may state, "We will conduct audits as described in **Appendix F** of this guide."

If your procedure does not follow the guidance in the model, you may develop your own procedures for review. The audit should be sufficiently detailed to ensure that (1) the licensee is abiding by the Department's and DOT's regulations and the terms and conditions of the license (e.g., periodic leak tests and inventories, only trained and approved individuals use gauges independently), (2) the content and implementation of the licensee's radiation protection program achieve occupational doses and doses to members of the public that are ALARA, and (3) the licensee maintains all appropriate records (e.g., records of personnel exposure, leak tests, inventory, training of gauge users) sufficient to comply with the Department's requirements.

These audits may be conducted as "mini-inspections" similar to those conducted by the Department and may include observation of some or all of the licensee's authorized users during actual or simulated use of installed gauges. Department inspections have identified some common violations among installed gauge licensees: failure to perform leak tests or conduct inventories at the required frequency, unauthorized personnel performing maintenance on gauges, possession and use of sealed source or device combinations other than those specified on the license, and an unauthorized individual as RSO.

You should 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 next Departmental inspection 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 and to inform the licensee's 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.

Item 11. Waste Management

Because of the nature of the licensed material contained in devices, your only option for disposal is to transfer the material to an authorized recipient. Authorized recipients are the original supplier of the device, a commercial firm licensed by the Department, NRC or an Agreement State to accept radioactive material from other persons, or another specific licensee authorized to possess the licensed material (i.e., whose license specifically authorizes the source and gauge by manufacturer's name and model numbers or similar designation). No one else is authorized to receive licensed material.

Before transferring radioactive material, you must verify that the recipient is properly authorized to receive it by using one of the methods described in 391-3-17-.02(19)(d). In addition, you must package and ship the material in accordance with the Department's and DOT regulations, and you must maintain records of the transfer as required by 391-3-17-.06(19). In response to Item 11, it is acceptable to state: **"disposal will be by transfer of the radioactive material to a person who is specifically licensed to receive and possess it."**

Item 12 Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material

10 CFR Part 37 Rule 391-3-17-.13 incorporates the regulations in 10 CFR Part 37 by reference. 10 CFR Part 37 applies to licensees that possess an aggregated "Category 1 quantity of radioactive material" or "Category 2 quantity of radioactive material." These terms are defined in 10 CFR 37.5. The list of these radionuclides and the threshold quantities can be found in Appendix A to 10 CFR Part 37.
5.2 Applicable.

> **Note:** (**Aggregated means accessible by the breach of a single physical barrier that would allow access to radioactive material in any form, including any devices that contain the radioactive material, when the total activity equals or exceeds a category 2 quantity of radioactive material.)**

Applicants must determine if multiple sources of the same radionuclide or multiple radionuclides are aggregated at a location, the licensee must determine the sum of the ratios of the total activity (in TBq) of each of the radionuclides to verify whether the activity at the location is less than the Category 1 or Category 2 thresholds**.**

If the applicant exceeds the quantities for Category 1 or Category 2, please complete the form in **Appendix I** and return it to our office along with your application**.**

For additional guidance on implementing 10 CFR Part 37 requirements, see NUREG–2155, "Implementation Guidance for 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material." Additional information regarding best practices for protection of risk-significant radioactive material is available in NUREG–2166, "Physical Security Best Practices for the Protection of Risk-Significant Radioactive Material."

Item 12. License Fees

The applicant should contact the Department or go to https://epd.georgia.gov/documents/fee-table-radioactive-materials-licenses-revised-june-2019 or http://rules.sos.ga.gov/GAC/391-3-1710 to determine the applicable licensing fee. The Fee Category for Installed Gauge license C.10.a. At the website you will find the fees for New License Application and Annual Fees. If you are submitting an application for the first time, you are required to pay the New License Application Fee. Annual Fees for new licenses will be prorated after your license has been issued. Subsequently all existing licensees will be invoice in July/August for the Annual Fee for the coming year. No action will be taken on applications filed without the proper fee.

Checks for the fees should be made payable to the **Department of Natural Resources, Radioactive Materials Program**, and mailed to the following address:

Radioactive Materials Fees
P.O. Box 101161
Atlanta, Georgia 30392

Mail license applications, amendment, renewal requests, and terminations of license including a copy of the check for the appropriate fee to the following address:

Radioactive Materials Program
4244 International Parkway
Atlanta, Tradeport, Suite 120
Atlanta, GA. 30354

Note: Prior approval from the Department must be obtained before Small Entity classification can be used.

Item 13. Certification

If you are an individual applicant acting in a private capacity, you must sign the completed application form. Otherwise, the application should be dated and signed by a representative of the applicant's corporation or legal entity; the representative must be authorized to make binding commitments and to sign official documents on behalf of the applicant and must certify that the application contains information that is true and correct to the best of the signer's knowledge and belief. Unsigned applications will not be reviewed and will be returned for proper signature. Also, print the name and title of the individual signing the application.

IV. AMENDMENTS TO A LICENSE

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 Department, (2) the terms and conditions of the license, and (3) the Department's regulations.

It is your obligation to keep your license current. 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, submit an application or a letter for a license amendment. In the meantime, you must comply with the terms and conditions of your license until it is actually amended. Department 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, Appendix A-1, or in a letter and should be prepared in duplicate. Retain one copy because the license requires that you possess and use licensed material in accordance with the statements and representations in your amendment request and in any supplements to it. If you choose to write a letter, write the date, the name of the person requesting the changes, his or her signature, the exact requested changes, the licensee name and address, the license number, and attach to the letter any supporting documents.

Your application should state your license number and clearly describe the exact nature of the changes, additions, or deletions. References to previously submitted information and documents should be clear and specific and identify the pertinent information by date, page, and paragraph. For example, if you wish to change the RSO, your application for a license amendment should specify the proposed RSO's name and include documentation of the individual's training and experience.

V. RENEWAL OF A LICENSE

Licenses are issued for a period of up to 5 years. Send an application for renewal, to the address specified in Item 12 of this guide. Retain a copy of the renewal because the license requires that you possess and use licensed material in accordance with the statements and representations in your renewal request and in any supplements to it.

Submit an entirely new application for renewal as if it were an application for a new license. Submitting an entirely new application allows you to re-evaluate your program periodically and consolidate the description of your program into one or two up-to-date documents. A new application ensures that your program contains all needed information as requested in current licensing guidance.

In accordance with Rule .02(15), you should file your application for license renewal at least 30 days before the expiration date of your license, the Department will send you a Timely Filed Letter and your present license will automatically remain in effect until the Department takes final action on your renewal application. However, if you file your renewal application after your license has expired, you will not be able to receive a Timely Filed Letter and you'll be without a valid license. **You will need to apply for a new license and will be required to pay an application fee to process your application.**

If you do not wish to renew your license, see section VI. Termination of a License.

If you cannot dispose of all the licensed radioactive material in your possession before the expiration date, you must request a license renewal. The renewal is necessary to avoid violating the Department's regulations that do not allow possession of licensed material without a valid license.

VI. TERMINATION OF A LICENSE

You may request termination of your license at any time. This request should include a completed Department's form, "Request to Terminate Radioactive Materials License", **refer to Appendix G**, with appropriate documentation certifying that all sources have been disposed of in accordance with Rule .02(19). An application for license termination does not relieve the licensee from its obligations to comply with Department's regulations and the terms and conditions of the license.

Georgia Department of Natural Resources
Environmental Protection Division
Radioactive Materials Program

APPLICATION FOR RADIOACTIVE MATERIALS LICENSE

INSTRUCTIONS - Complete Items 1 through 13 if this is an initial application or renewal of a license. Use supplemental sheets where necessary. Refer to the Guide for your applicable modality for detailed explanations pertaining to your application. Item 13 on the application must be completed and signed. Retain one copy for your records. Submit original application to: Georgia Department of Natural Resources, Radioactive Materials Program, 4244 International Parkway, Suite 120, Atlanta, Georgia, 30354. Upon approval of this application, the applicant will receive a Georgia Radioactive Materials License. Once a New License is issued a Prorated Annual Fees invoice will be invoiced the following quarter. Georgia Radioactive Materials Licenses are issued in accordance with the general requirements contained in the Georgia Department of Natural Resources Rules and Regulations, Chapter 391-3-17.

1.This is an Application for: (Check appropriate item) A. New License ☐ B. Amendment to License ☐ C. Renewal of License ☐
If B or C , Please indicate current GA. License Number _____

2.a. Name and Mailing Address of Applicant

Name:
Address:
City, State, Zip Code:
County:
Telephone Number: ( ) -
E-mail address:

2.b. Address(es) where licensed material will be stored and/or used (Street Address)

A. Permanent (list main here, include additional on Supplemental Sheet)

B. Additional Temporary sites throughout Georgia? Yes ☐ No ☐
(Include addresses, if known, on Supplemental Sheet)

3.a Person to Contact Regarding this Application
Name:
Title:
Telephone Number: ( ) -
Email:

3.b Radiation Safety Officer:
Telephone Number ( ) -
Email:

3. c. Annual Fee contact and billing address (if different from Item 2.a.)
Name:
Address:
City, State, Zip Code:
Telephone Number: ( ) -
E-mail address:

4. Locations where records will be kept:
(note: records should be accessible at all locations of use)

SUBMIT ITEMS 5 THROUGH 11 ON SUPPLEMENTAL SHEET AND/OR ATTACH ADDITIONAL LETTER SIZE PAPER AS NEEDED.
SEE THE APROPRIATE LICENSE APPLICATION GUIDE FOR THE TYPE AND SCOPE OF INFORMATION TO BE SUUPLIED

5. RADIOACTIVE MATERIAL (see attached SUPPLEMENTAL SHEET)
a. Element and mass number; b. Chemical and/or physical form; and c. Maximum amount which will be possessed at any one time;

6.PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.
(list on SUPPLEMENTAL SHEET)

7. INDIVIDUAL(S) RESONSIBLE FOR RADIATION PROTECTION PROGRAM AND THEIR TRAINING & EXPERIENCE (if different or in addition to RSO listed in 3.b)

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS
(ATTACH TO APPLICATION)
No response required for medical license application

9. FACILITIES AND EQUIPMENT
Please include a brief business description of licensed locations.
(list on SUPPLEMENTAL SHEET)
Does the applicant possess any Radioactive Material Licenses from other states or the NRC? YES ☐ NO ☐
If so, please list on the SUPPLEMENTAL SHEET

10. RADIATION PROTECTION PROGRAM
(ATTACH TO APPLICATION)

11. WASTE MANAGEMENT and OFFSITE TRANSFER of RADIOACTIVE MATERIAL
(ATTACH TO APPLICATION)

12. LICENSEE FEES (SEE DEPARTMENT'S FEE SCHEDULE)
FEE CATEGORY: AMOUNT: $

MAKE CHECKS PAYABLE TO: DEPARTMENT OF NATURAL RESOURCES RADIOACTIVE MATERIALS PROGRAM

MAIL FEES TO: RADIOACTIVE MATERIALS PROGRAM
P.O. BOX 101161 ATLANTA, GEORGIA 30392

13. CERTIFICATION (Must be completed by the applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH GEORGIA DEPARTMENT OF NATURAL RESOURCES RULES AND REGULATIONS, DESIGNATED CHAPTER 391-3-17 AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

CERTIFYING OFFICER -- TYPED PRINTED NAME AND TITLE (Must be Senior Management Level for New Applications and Renewals)	SIGNATURE	DATE
		Form Revision June 2019

Georgia Department of Natural Resources
Environmental Protection Division
Radioactive Materials Program

APPLICATION SUPPLEMENTAL SHEET

2.b. Additional Addresses where licensed material will be stored and/or used (Street Address)

A. Permanent:

B. Temporary Site Addresses (if known):

5. RADIOACTIVE MATERIAL & 6. PURPOSE OF USE

a. Element and mass number	b. Chemical and/or physical form	c. Maximum amount which will be possessed at any one time;	6. Purpose for which element will be used

9. FACILITIES AND EQUIPMENT

Brief business description of licensed locations.

Radioactive Material Licenses from other states or the NRC:

a. Jurisdiction (State name or NRC)	b. License number	c. expiration date

a. Jurisdiction (State name or NRC)	b. License number	c. expiration date

APPENDIX B

DUTIES AND RESPONSIBILITIES OF THE RADIATION SAFETY OFFICER

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

The RSO's duties and responsibilities include the following:

1. Ensure that licensed material possessed by the licensee is limited to the kinds (e.g., cesium-137 as a sealed source) and quantities of radioactive material listed on the license.

2. Ensure that only individuals authorized by the license use the devices.

3. Ensure that individuals using gauges are properly trained; are designated by the RSO; receive refresher training including participation in a "dry run" of emergency procedures and a review of operating and emergency procedures including lock-out/tag-out procedures; and are informed of all changes in regulatory requirements and deficiencies identified during annual audits. Up-to-date operating, emergency, and security procedures have to be developed, implemented, maintained, and distributed.

4. Ensure that personnel monitoring devices, if required, are used as required and reports of personnel exposure are reviewed in a timely manner, alert the radiation worker in the event of a high or unusual exposure, and to investigate all such unusual exposures and take any necessary corrective action to prevent those incidents from occurring again.

5. Ensure that the gauges are properly secured against unauthorized removal at all times.

6. Ensure that proper authorities are notified in case of accident, damage to gauges, fire, or theft.

7. Ensure that audits are performed at least annually to ensure that (a) the licensee is abiding by the Department's 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, and (c) the licensee maintains required records with all required information (e.g., records of personnel exposure; receipt, transfer, and disposal of licensed material; gauge user training) sufficient to comply with Department requirements.

8. Ensure that all incidents, accidents, and personnel exposure to radiation in excess of 391-3-17-.03(15) are investigated and reported to the Department and other authorities, as appropriate, within the required time limits.

9 Ensure that licensed material is transported in accordance with all applicable DOT requirements.

10. Ensure that licensed material is transferred or disposed of properly.

11. Ensure the RSO has up-to-date copies of Department regulations; reviews new or amended Department regulations; and revises licensee procedures, as needed, to comply with Department regulations.

12. Ensure that the license is amended whenever there are changes in licensed activities, responsible individuals, or information or commitments provided to the Department in the license.

13. When necessary, personnel monitoring devices are used and exchanged at the proper intervals, and records of the results of such monitoring are maintained.

14. Licensed material is disposed of properly.

Model Delegation of Authority to Radiation Safety Officer

Memo

To: Radiation Safety Officer

From: Chief Executive Officer

Subject: Delegation of Authority

You,_____, have been appointed radiation safety officer and are responsible for ensuring the safe use of radiation. You are responsible for managing the Radiation Protection Program; identifying radiation protection problems; initiating, recommending, or providing corrective actions; verifying implementation of corrective actions; stopping unsafe activities; and ensuring compliance with regulations. You are hereby delegated the authority necessary to meet those responsibilities, including prohibiting the use of byproduct material by employees who do not meet the necessary requirements and shutting down operations, when justified, to maintain radiation safety. You are required to notify management if staff does not cooperate and does not address radiation safety issues. In addition, you are free to raise issues with the U.S. Nuclear Regulatory Commission at any time. It is estimated that you will spend_____hours per week conducting radiation protection activities.

_____ _____

Signature of Management Representative Date

I accept the above responsibilities,

_____ _____

Signature of Radiation Safety Officer Date

APPENDIX C

CRITERIA FOR TRAINING COURSES AND INSTRUCTOR QUALIFICATIONS

Part I: Criteria for Acceptable Training Courses for Installed Gauge Users

Courses are at least 8 hours

Course provides 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 hours) of 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 (Lock-out/tag-out procedures if applicable)
   - Audits
   - Record keeping
   - Disposal

4. Transportation (0.5 hour)
   - Requirements in 10 CFR 71.5 and 49 CFR
   - Shipping by Common Carrier

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

6. Written Test and Test Review (0.5) hour

Successful completion of the course requires obtaining a score of at least 70 percent on a closed-book test consisting of at least 50 questions that have not been provided to the students before the test.
An authorized user or radiation safety officer must ensure that trainees have supervised hands-on experience (on-the-job training) involving operating procedures, test runs of emergency procedures, routine maintenance and lock-out procedures.

Course instructors meet the qualifications outlined in Part II.

Part II: Criteria for Qualifications for Instructors of installed Gauge Users

Each instructor who trains individuals as installed gauge users:

Has successfully completed a course that meets the criteria in Part I above **AND**

Has successfully completed at least a 40-hour course in radiation safety principles and practices **AND**

Has at least 32-hours of hands-on experience in the use of installed gauge devices.

Note: Additional training is required for those applicants intending to perform nonroutine operations, such as gauge installation; initial radiation survey; repair and maintenance of components related to the radiological safety of the gauge; gauge relocation; replacement, and disposal of sealed sources; gauge alignment; or removal of a gauge from service.

If the training courses or qualifications of instructors do not meet the criteria in this Appendix, an applicant may submit to the Department, the information requested in Item 8.2 of this regulatory guide as part of a request for a licensing action, and the applicant's proposal will be considered on a case-by case basis.

ATTACHMENT 1

TRAINING TOPICS FOR INSTALLED GAUGE USERS

Radiological emergency response procedures for a damaged installed gauge and installed-gauge accident scenarios, to avoid incidents and accidents with installed gauges.

Loss prevention, security, surveillance, and storage.

Physical inventory, accountability.

Notification of the Department regarding damage devices and sources.

Proper disposal of gauges by transfer to the manufacturer (to avoid inadvertent transfer of a gauge to a scrap-metal broker and a possible foundry contamination incident).

Gauge labels and markings, necessary area signs (Caution: Radioactive Material).

Radiation safety instruction for gauge users.

Proper use of personnel-monitoring devices.

The terms and conditions of the license, and the occasions when it is appropriate to amend the license.

Review procedures for maintenance, installation or relocation of the gauge (if authorized to perform these functions). Use of a survey meter.

APPENDIX D

STANDARD OPERATING AND EMERGENCY PROCEDURES

The following Radiation Protection Program will be followed at all times. A copy of these procedures shall be maintained in the licensee's radioactive materials license file.

1. Only authorized users shall use, or supervise the use of, the gauge(s).

2. The licensee shall not remove a source holder or open a source containing radioactive material.

3. No one shall be permitted to touch or handle directly an unshielded source.

4. The user shall never unnecessarily expose himself to the unshielded source.

5. The gauge shall be locked in the safe, off, closed, or stored position when not in use.

6. Security of the nuclear gauge(s) shall be maintained at all times.

7. Only licensed operators shall have or carry keys to the shutters of the nuclear gauges or to their locked storage areas. The Radiation Safety Officer shall maintain key control.

8. If the operator detects any malfunction in the shutter or other part of the gauge, the Radiation Safety Officer shall be immediately notified.

9. Authorized users and individuals working in the proximity of the nuclear gauges who are likely to receive occupational doses greater than 10% of the limits specified in 391-3-17-.03(5), or if authorized for extended maintenance, shall wear appropriate personnel dosimeters, such as film badges, OSL's or TLD's. Each worker shall be assigned his own dosimeter. On no occasion shall a person wear a dosimeter assigned to another individual. Personnel dosimeters shall be kept in a cool, dry area, and in a low radiation background when not in use.

10. The personnel dosimeter shall be processed immediately if there is any indication of a high or unusual exposure, or if the dosimeter is damaged in any way. The Radiation Safety Officer shall investigate all high or unusual exposures, and take corrective action, if necessary, to prevent other such high exposures. Notification procedures shall be in accordance with Rule .07.

11. Exposure records shall be maintained on file for the Department's review.

12. If personnel monitoring is required, the company shall maintain on file indefinitely the exposure records of employees and past employees and supply such employees with exposure data annually and at termination of employment or hiring by another employer.

13. Transportation of gauges shall be in accordance with the requirements of Rule .06.

14. The Licensee shall maintain current copies of the following publications along with the Radioactive Materials license, all amendments and supportive documents: Chapter 391-3-17" Rules and Regulations for Radioactive Materials," "Notice to Workers" and the "Emergency Radiological Assistance Telephone Directory." Licensee should know how to access a copy of the Rules and Regulations for Radioactive Materials, if a paper copy is not

available. Website where it can be obtained is: epd.georgia.gov.

15. For out-of-service gauges that are stored, as appropriate a “CAUTION RADIOACTIVE MATERIALS” sign shall be posted on the door of the storage area with a "Notice to Workers" in a conspicuous place wherever individuals work in or frequent any portion of a restricted area. The “Emergency Radiological Assistance Telephone Numbers” should be accessible to key personnel. Post a radiation warning sign at each entry to an area where it is possible to be exposed to radiation beams.

16. Leak testing of sealed sources is required at specific intervals and shall be performed in the manner designated in the application form. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Department. Conduct a physical inventory every 6 months to account for all devices.

17. Shutters in gauges may be opened and closed by any person who has the minimum basic training listed in 1, above, with the approval of the RSO.

18. Shutter closure and opening may be performed by untrained individuals only if the label affixed to the gauge allows this practice.

19. The initial installation of gauges shall be in accordance with the manufacturer’s instruction, instructions available in the Sealed Source and Device Registry for the device, and the commitments made in the license application.

20. Gauge relocation may be performed only by the manufacturer or its agent, or, if specifically authorized by the license, by an authorized user trained to do maintenance, unless the label affixed to the gauge specifically allows relocation.

21. All surveys must be performed by persons authorized by the license. The persons who may be authorized to do surveys are:

    - the manufacturer;
    - a representative of the manufacturer;
    - an authorized user trained by the manufacturer or his agent.

    Persons who conduct surveys must have had documented health physics training, unless otherwise approved by the Department. The training must include restricted and unrestricted areas, occupancy, use of instruments, types of instruments, and radiation dose hazards.

22. Provide instructions to prevent unauthorized access, removal, or use of the gauge.

23. Prevent employees from entering the radiation beam area during maintenance, repairs, or work in, on, or around the equipment on which the device is mounted by developing lock-out procedures. These procedures should specify who will be responsible for ensuring that the lock-out procedures are followed.

24. After making changes affecting the gauge (e.g., changing the location of gauges, removing shielding, adding gauges, changing the occupancy of adjacent areas), reevaluate compliance with public dose limits and ensure proper security of gauges.

Emergency Procedures

- If a gauge becomes damaged, a source becomes dislodged, a source is leaking, the device fails to function properly, or any other nonradiological emergency (e.g., fire or medical emergency) or unusual situation arises, do the following:

  - Stop use of the gauge.

  - Immediately secure the area, and keep people away from the gauge until the situation is assessed and radiation levels are known. Perform first aid for any injured individuals, and remove them from the area when it is medically safe to do so.

  - If any equipment is involved, isolate the equipment until it is determined there is no contamination present.

  - Gauge users and other potentially contaminated individuals should not leave the scene until emergency assistance arrives.

  - Notify the persons, in the order listed next, of the situation:

NAME[1]	WORK PHONE NUMBER[1]	HOME PHONE NUMBER[1]

- Follow the directions provided by the person contacted in the previous list.

Radiation Safety Officer and Licensee Management

- Arrange for a radiation 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, a local emergency responder, or a consultant. To accurately assess the radiation danger, it is essential that the person performing the survey be competent in the use of the survey meter.

- Make necessary notifications to the State and local authorities, if applicable, for incident notifications and reporting requirements. Even if not required to do so, you may report ANY incident to the Department 404-363-700, during business hours, or outside the Atlanta area, use 1-800-241-4113.

Department notification is required when gauges containing licensed material are lost or stolen, and when gauges are damaged or involved in incidents that result in doses in excess of the dose limits in accordance with Chapter 391-3-17-.03(15)(b).

Security Procedures

- Address guidelines to meet the security and control requirements of Rule .03(11)(a) and (b), and any other applicable security and control requirements.

- Provide instructions to prevent unauthorized access, removal, or use of fixed gauges, including at temporary jobsites if authorized on the license.

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[1] Fill in with (and update, as needed) the names and telephone numbers of appropriate personnel (e.g., the radiation safety officer (RSO), authorized users (AUs), or other knowledgeable licensee staff; licensee's consultant; gauge manufacturer, distributor, or representative; fire department or other emergency response organization, as appropriate, and the State) to be contacted in case of emergency.

APPENDIX E

EXTENDED MAINTENANCE

If you are considering performing installation, relocation, maintenance or cleaning of gauges that requires the removal of the radioactive source from the shielded position, i.e., extended maintenance, you should keep in mind the radiation levels you may encounter. A typical gauge contains approximately 300 millicuries of cesium-137. In about 18 seconds, an unshielded cesium-137 source of this activity can deliver 5 rems (0.05 sievert) to a worker's hands or fingers (extremities), assuming the extremities are 1 centimeter from the source.

Thus, to perform extended maintenance, you must have special training, follow special procedures, use a radiation survey meter, special shields and tools, 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, installation, relocation, maintenance, or cleaning that you wish to perform that necessitate removal of the source holder or radioactive source from the shielded position and indicate 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 taken; the amount of hands-on experience the individual has had involving extended maintenance, including the manufacturer’s name and model number of the gauge and the type and frequency of extended maintenance performed; and the reason for which you consider the individual competent to perform extended maintenance safely.

3. Handling Procedures

   Submit your procedures for the safe handling of the radioactive source while the source is outside the gauge. Your procedures should require a documented radiation profile survey to be performed all around the gauge initially and after installation and relocation. The distances for surveys should be at 5 cm, 30 cm, and 100 cm. Unauthorized individuals will not be allowed into the areas where extended maintenance is performed and where the gauge is located. Containers shielding the source will be labeled "Caution Radioactive Material". The source will be under the constant surveillance of an authorized user when not in storage and will be secured against unauthorized removal or access when in storage. 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 391-3-17-.03(5)(a) limits. An acceptable response is that individuals performing extended maintenance on gauges will always wear both whole body and extremity monitoring devices. Describe frequency of exchange for both types of devices.

5. Survey Instrumentation

If you have already provided detailed information on survey instruments in response to Item 10.2, state, "See response to Item 10.2." Otherwise, list the type and ranges of survey instruments you will have available, state the frequency of calibration, and state who will perform the calibration. Also include how you will ensure that the survey instrument is working properly. You should commit that, if the instrument does not respond properly, you will not perform extended maintenance on the gauges until the survey instrument is repaired and operable or until you obtain an operable instrument.

For example, you may state that a survey instrument capable of measuring between 1 microsievert per hour (0.1 millirem per hour) and 1 millisievert per hour (100 millirems per hour) will be used to perform the surveys and that the survey instrument will be calibrated annually by the manufacturer. In addition, you may 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.

6. Surveys

Describe how you will ensure that radiation levels in areas where extended maintenance will take place do not exceed limits. For example, you may: 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 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), for 3 years from the date of the survey.

Note: Initial radiation profile must be maintained for the life of the device.

APPENDIX F

SAMPLE AUDIT PROGRAM

An audit is conducted, in part, to fulfill the requirements of Chapter 391-3-17-.03(4)(c) for an annual review of the content and implementation of the licensee's radiation protection program. It should also identify program weaknesses and allow licensees to take early corrective actions (before a Department inspection). During an audit, the auditor needs to keep in mind not only the requirements of Department regulations, but also the licensee's commitments in its applications and other correspondence with the Department. The auditor should also evaluate whether the licensee is maintaining exposures to workers and the general public as low as is reasonably achievable (ALARA), and if not, make suggestions for improvement.

The outline in this appendix can be used to document the annual audit of the radiation protection program. Guidance is provided on completing each section; note any deficiencies that we identified, and the corrective actions taken (or to be taken).

1. Audit History.
   Enter the date of the last audit, whether any deficiencies were identified, and whether actions were taken to correct the deficiencies.

2. Organization and Scope of Program.
   Briefly describe the organizational structure, noting any changes in personnel. Describe the scope of licensed activities at the audited location. Check whether the Radiation Safety Officer (RSO) is the person identified in the license and fulfills the duties specified in the license.

3. Training, Retraining, and Instructions to Workers.
   Ensure that workers have received the training required by Chapter 391-3-17-.07(3). Be sure that, before being permitted to use a gauge, the user has received training (from the manufacturer or in an alternative course approved by the Department) and has a copy of, and training in, the licensee's operating and emergency procedures; records must be maintained. Note whether refresher training is conducted in accordance with licensee commitments. By interview and observation of selected workers, ensure that each has a copy of the licensee's operating and emergency procedures and can implement them properly.

4. Internal Audits.
   Verify that audits fulfill the record keeping requirements as outlined in Chapter 391-3-17-.03(14), are conducted in accordance with licensee’s commitments, and are properly documented.

5. Facilities.
   Verify that the licensee's facilities are as described in its license documents.

6. Materials.
   Verify that the license authorizes the sealed source/ device combinations that the licensee possesses. Verify that the licensee uses the source/device combinations in accordance with license provisions. Ensure that gauges are maintained in accordance with licensee’s commitments.

7. Leak Tests.
   Verify that all sealed sources are tested for leakage at the prescribed frequency and in accordance

with licensee's commitments. Records of results must be maintained for inspection by the Department for three years.

8. Inventories.
Verify that inventories are conducted at least once every 6 months to account for all sealed sources; inventory records must be maintained for at least three years.

9. Radiation Surveys.
Verify that the licensee has at least one operable, calibrated survey instrument, if required, at each jobsite and that the instruments are calibrated in accordance with licensee's commitments; calibration records must be retained for three years.

10. Receipt and Transfer of Radioactive Material (Include Waste Disposal).
Verify that gauges received from others (e.g., new gauges) are received, opened, and surveyed in accordance with Chapter 391-3-17-.02(19) and .03(12). Ensure that gauge transfers are performed in accordance with 10 CFR 71.5 and 49 CFR. Records of surveys, receipt, and transfer must be maintained in accordance with Chapter 391-3-17-.03(14) and .06(18).

11. Transportation.
Determine compliance with Department of Transportation (DOT) requirements. Verify that radioactive packages are prepared, marked, and labeled in accordance with 49 CFR Parts 172 and 173 requirements. Be sure that the licensee has records of performance testing of its special form sources and DOT-7A packages. Verify that shipping papers are prepared, contain all needed information, and are readily accessible during transport (49 CFR 172.200-204 and 177.817). Check that packages are blocked and braced (49 CFR 177.842). Check for any needed placarding (49 CFR 172.504); if overpacks are used, verify that they are properly marked and labeled (49 CFR 173.25). For Department inspection the required information for shipments is listed in Rule.06(18).

12. Personnel Radiation Protection.
Evaluate the licensee's determination that unmonitored personnel are not likely to receive more than 10 percent of the allowable limits. Alternatively, if personnel dosimetry is provided and required, verify that it complies with Chapter 391-3-17-.03(8) and licensee commitments. Review personnel monitoring records; compare exposures of individuals doing similar work; determine reasons for significant differences in exposures. If any worker declared her pregnancy in writing, evaluate the licensee's compliance with Chapter 391-3-17-.03(5)(h). Check whether records are maintained as required by Chapter 391-3-17-.03(14)(g). See the Department's "Guide for Instruction Concerning Prenatal Radiation Exposure."

13. Auditor's Independent Measurements, If Made.
If the licensee performs extended maintenance, the auditor should make independent measurements and compare the results with those made or used by the licensee. If the licensee does not perform extended maintenance, the auditor may, if desired, make independent measurements.

14. Notification and Reports.
Check on the licensee's compliance with the notification and reporting requirements in Chapter 391-3-17-.03(15). Ensure that the licensee is aware of the emergency telephone numbers for the Department.

15. Posting and Labeling.
Check for compliance with the posting and labeling requirements of Chapter 391-3-17-.03(12)(b). Ensure all labels on gauges are legible.

16. Record keeping for Decommissioning.
Check to determine compliance with Chapter 391-3-17-.02(8)(g).

17. Bulletins and Information Notices.
Check to determine whether the licensee is receiving bulletins and information notices. Check whether the licensee took appropriate action in response to Department's mailings.

18. Special License Conditions or Issues.
Verify compliance with any special conditions on the licensee's license. If the licensee has any unusual aspect of its work with installed gauges, review and evaluate compliance with regulatory requirements. If the licensee conducts licensed activities at locations other than the one being audited, consider the deficiencies identified at the other locations and ensure that the corrective actions implemented in response to those deficiencies have in fact been implemented at the audited locations.

19. Continuation of Report Items.
This section is self-explanatory.

20. Problems or Deficiencies Noted, Recommendations.
This section is self-explanatory.

21. Evaluation of Other Factors.
Evaluate management's involvement with the radiation protection program, whether the RSO has sufficient time to perform their duties, and whether the licensee has sufficient staff to handle the workload and maintain compliance with regulatory requirements.

22. Operating, Emergency, and Security Procedures

Note: An ideal way to assess the adequacy and adherence to operating procedures is by observing work in progress.

A. Have operating, emergency, and security procedures been developed and updated to incorporate any new elements, practices, or requirements?

B. Does each individual working with the gauges have current copies of the operating, emergency, and security procedures (including lock-out procedures and emergency telephone numbers)?

C. Is a lock-out warning sign posted at each entryway to an area where it is possible to be exposed to the beam?

D. Did any emergencies occur?

1. If so, were they handled properly?

2. Were appropriate corrective actions taken?

E. Were gauges properly controlled or secured during use or storage? (10 CFR 20.1801, 10 CFR 20.1802)

23. Maintenance of Gauges

A. Are manufacturers' or distributors' procedures followed for routine cleaning and lubrication of gauges?

B. Was each on-off mechanism tested for proper operation every 6 months or at other approved intervals? (L/C)

C. Are repair and maintenance of components related to the radiological safety of the gauge performed by the manufacturer, distributor, or person specifically authorized by the NRC or an Agreement State and according to license's requirements (e.g., extent of work, procedures, dosimetry, survey instrument, compliance with 10 CFR 20.1301 limits)? (L/C)

D. Are labels, signs, and postings identifying gauges containing radioactive material, radiation areas, and lock-out procedures and warnings clean and legible?

APPENDIX G

GEORGIA DEPARTMENT OF NATURAL RESOURCES
RADIOACTIVE MATERIALS PROGRAM
REQUEST TO TERMINATE RADIOACTIVE MATERIAL LICENSE

1. Licensee Name _____ 2. License Number_____

3. Address _____
No. Street/ P. O. Box No. City, State Zip code

4. Contact Person_____ 5. Telephone Number _____

6. Request is hereby made that the Radioactive Material License described above be terminated for the following reason:
_____
_____

7. Radioactive Material possessed under this license has been disposed of as indicated below:

□ No materials have been possessed or procured by the licensee under this licensee.

□ All material was used for the licensed purposes; none remains.

All material was leased and has been returned to lessor.

Name of lessor: _____ License No. _____

□ Lessor acknowledgement of receipt attached.

□ Material has been transferred to the following licensee:

Licensee Name _____ License No. _____

Address _____
No. Street/ P. O. Box No. City, State Zip code

Date of transfer: _____

□ Transferee acknowledgement of receipt attached.

□ Material has been disposed of in the following manner:
_____
_____

□ A radiation survey was conducted to confirm the absence of radioactive material and to determine whether any contamination remains at the facility covered by the license.

□ Copy of survey results attached.

8. Management Official or Radiation Safety Officer

_____ _____
Signature of certifying officer Date

_____ _____
Print name Title

Keep one copy for your records and send original to:

GEORGIA DEPARTMENT OF NATURAL RESOURCES
RADIOACTIVE MATERIALS PROGRAM
4244 INTERNATIONAL PARKWAY, SUITE 120
ATLANTA, GEORGIA, 30354

APPENDIX H

GUIDANCE FOR GAS CHROMATOGRAPHS (GC) USE ONLY

This Appendix to the Licensing Guide for Installed Gauges and Gas Chromatography is provided to assist users of gas chromatography devices to prepare a license application. These devices are used to sample a variety of material. They are well-designed units that represent very little hazard to the public. As a result, the information required for authorization to use one of these devices is not extensive. This appendix describes the type of information that the Department needs to evaluate an application for a license for sealed sources in gas chromatography devices.

Contents of an Application

(Refer to Section III of the Licensing Guide)

Items 1-4. Please respond to as stated in Licensing Guide.

Item 5. Radioactive Material

1. Identify the radioisotope, the manufacturer's model number of the foil source, plated source or sealed source, and the maximum activity per source that will be used in the gas chromatography device.
2. Identify the manufacturer's name and model number of the detector cell that will be used in the gas chromatography device.
   For example: Ni-63, foil source, Amersham Model Number 123, 20 millicuries.

NOTE: Consult with the proposed supplier for this information to be sure that the sources, devices, and source-device combination(s) conform to the sealed source and device designations registered with the NRC or an Agreement State. Improperly identified equipment may require additional correspondence and may slow the review process.

Item 6. Purposes For Which Licensed Material Will Be Used

Specify the purposes for which the devices you want to possess will be used.

Item 7. Individual Responsible For Radiation Safety Program And Their Training and Experience

State the name of the person designated by, and responsible to, the applicant's management as Radiation Safety Officer (RSO). This individual who maintains the license and associated records is responsible for the management and coordination of the Radiation Protection Program. In most instances, this individual is the contact person for the applicant in answering any questions or concerns about the license.

The RSO shall have the training you will require of the users as described in your response to Item 8. below.

Provide a copy of an organizational chart that shows the organizational structure as it relates to the RSO position to demonstrate that the RSO has sufficient independence and direct communication with responsible management officials. The chart should also show the position of the individual who signs the application in Item 13. of the Application Form.

Item 8. Training Provided To Other Users

If you do not propose to perform any maintenance or repair on the gas chromatography device, no specific training and experience in the use and handling of radioactive material is necessary for individuals who will use it or supervise its use. No specific training or experience is needed to perform leak test using a leak-test kit or to clean detector cells used in the GC devices provided the source or foil is not removed from the detector cells. The only training required would be in the proper handling of the GC device.

If you propose to perform any operations that involve removal of the source from the devices or maintenance and repair of a device that involved the source, only a "responsible individual" may perform these operations. This "responsible individual" must have received instruction and training in the principles and practices of radiation safety, the use of radiation detection instruments and the performance of these operations.

Item 9. Facilities and Equipment

Please respond to as stated in Licensing Guide.

Item 10. Radiation Safety Program

For gas chromatography, the procedure for cleaning detector cells and/or removal and exchange of the foil or plated source should be provided. The applicant may specify that detector cells will be returned to the manufacturer for cleaning or servicing. If the applicant will perform in-house cleaning or servicing, the manufacturer's recommended procedures should be followed, and a copy of the procedures should be submitted with the application. If detector cells containing Hydrogen-3 will be used, the applicant should provide the procedure. for venting of the detector cells.

Item 10.1. Personnel Monitoring Program

Users of these devices exhibiting low radiation levels at the surface of the device are not usually required to wear personnel monitoring devices. However, if you intend to perform extended maintenance on the devices, personnel monitoring should be used.

Item 10.2. Radiation Detection Instruments

Radiation detection instruments such as survey meters are not normally required if the applicant plans only to use the devices for their intended use and does not plan to perform maintenance on the devices involving access to the sources and source holders. However, if the applicant does intend to perform maintenance, the survey instrument(s) that will be available to the site where maintenance will be performed should be specified.

Items 10.3-10.6. Please respond to as stated in Licensing Guide.

Items 10.7. Not applicable.

Item 10.8. Audit Program

Licensees must review the content and implementation of their radiation protection programs annually to ensure compliance with the State regulations and with the terms and conditions of the license. **Appendix F** of this guide contains a suggested audit program

10.9. Not applicable.

Item 11–14. Please respond to as stated in Licensing Guide, as applicable

10 CFR Part 37 Commitment Form

Licensee Information

License Number:	Certifying Official: Position/Title:
Licensee (Name): Licensee Address:	Signature:
Contact Email/Telephone No.:	Date:

Subpart B (Access Control Program)

37.23

Have you implemented an access control program meeting the requirements of 10 CFR 37 Subpart B? ☐ Yes ☐ No

If no, do you commit to developing and implementing an access control plan at all times? ☐ Yes ☐ No ☐ N/A

Date by which plan will be implemented: Click or tap here to enter text.

Subpart C (Security Program)

37.43

Have you implemented a written security plan meeting the requirements of 10 CFR 37 which: ☐ Yes ☐ No

(i) Describes the measures and strategies used to implement the requirements of this subpart; and
(ii) Identifies the security resources, equipment, and technology used to satisfy the requirements.

If no, do you commit to developing and implementing a written security plan that meets the requirements of Part 37 Subpart C? ☐ Yes ☐ No ☐ N/A

Date by which plan will be implemented: Click or tap here to enter text.

Subpart D (Transfer of Materials)

Have you implemented written shipping procedures for the transfer of Category 1 and/or Category 2 quantities of radioactive materials meeting the requirements of 10 CFR 37? ☐ Yes ☐ No

If no, do you commit to developing and implementing a written security plan that meets the requirements of Part 37 Subpart C? ☐ Yes ☐ No ☐ N/A

Date by which plan will be implemented: Click or tap here to enter text.

Appendix J
MODEL LEAK TEST PROGRAM

Training

Before allowing an individual to perform leak testing, the licensee must ensure that he or she has sufficient classroom and on-the-job training to show competency in performing leak testing and sample analysis independently.

Classroom training may be in the form of lecture, online, video, hands-on, or self-study and should cover the following subject areas:

- principles and practices of radiation protection
- radioactivity measurements, monitoring techniques, and instrument use
- mathematics and calculations used for measuring radioactivity
- biological effects of radiation

Appropriate on-the-job training consists of the following:

- observing authorized personnel collecting and analyzing leak test samples
- collecting and analyzing leak test samples under the supervision and in the physical presence of an individual authorized to perform leak testing and sample analysis

Facilities and Equipment

- To ensure achieving the required sensitivity of measurements, analyze leak tests in a low-background area.
- Use a calibrated and operable survey instrument to check leak test samples for gross contamination before they are analyzed.
- Analyze the leak test sample using an instrument that is appropriate for the type of radiation to be measured (e.g., NaI(TI) well-counter system for gamma emitters, liquid scintillation for beta emitters, and gas-flow proportional counter for alpha emitters).
- If the sensitivity of the counting system is unknown, determine the minimum detectable activity (MDA). The MDA may be determined using the following formula:

$$MDA = \frac{2.71 + 4.65\sqrt{bkg \times t}}{t \times E}$$

where: MDA = minimum detectable activity in disintegrations per minute (dpm)
bkg = background count rate in counts per minute (cpm)
t = background counting time in minutes
E = detector efficiency in counts per disintegration

For example:

where: bkg = 200 cpm
E = 0.1 counts per disintegration (10 percent efficient)
t = 2 minutes

$$MDA = \frac{2.71 + 4.65\sqrt{200 \text{ cpm} \times 2 \text{ minutes}}}{2 \text{ minutes} \times 0.1 \text{ cpm}} = \frac{2.71 + 4.65\sqrt{400}}{0.2}$$

$$= \frac{2.71 + 4.65\sqrt{20}}{0.2} = \frac{2.71 + 93}{0.2} = \frac{95.71}{0.2}$$

$$= \frac{478.55 \text{ disintegrations}}{\text{minute}}$$

$$becquerels\ (Bq) = \frac{1 \text{ disintegration}}{\text{second}}$$

$$MDA = \frac{478.55 \text{ disintegrations}}{\text{minute}} \times \frac{1 \text{ minute}}{60 \text{ seconds}} = 7.976 \text{ Bq}$$

Note: The MDA equation shown assumes that counting times for the background measurement and for the sample will be equal. MDA equations for non-equal counting times, as well as derivations of equations and discussions of limitations, can be found in "Decommissioning Health Physics—A Handbook for MARSSIM Users," Eric W. Abelquist, published by Taylor & Francis Group, 2001.

Frequency for Conducting Leak Tests of Sealed Sources

Leak tests will be conducted at the frequency specified in the respective Sealed Source and Device registration certificate. If a sealed source is not registered, leak tests should be conducted at 6 month intervals, unless a different interval is established during the licensing process. Leak testing of sealed sources may be required by license condition.

Procedure for Performing Leak Testing and Analysis

- For each source to be tested, list identifying information such as the sealed source serial number, manufacturer, model number, radionuclide, and activity.
- Use a radiation survey meter to monitor exposure.
- Prepare a separate wipe sample (e.g., cotton swab or filter paper) for each source.
- Number each wipe to correlate with identifying information for each source.

- Wipe the most accessible area where contamination would accumulate if the sealed source were leaking, but do not wipe the surface of a plated or foil source (see manufacturer's instructions).

- Select instrumentation that is sensitive enough to detect 185 becquerels (Bq) (0.005 microcurie) of the radionuclide contained in the gauge.

- Using the selected instrument, count and record background count rate.

  - Check the instrument's counting efficiency using a standard source of the same radionuclide as the source being tested or one with similar energy characteristics. The calibration source should be in the same configuration as the sample. Accuracy of standards should be within plus or minus 5 percent of the stated value and traceable to primary radiation standards such as those maintained by the National Institute of Standards and Technology.

- Calculate the counting efficiency of the detector.

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

Where:

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

Count each wipe sample; determine net count rate.

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

The activity of the sample in becquerels may be calculated using the following formula:

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

Sign and date the list of sources, data and calculations. Retain records for 3 years [under 10 CFR 20.2103(a) or Georgia equivalent].

If the wipe test activity is 185 becquerels (0.005 microcuries) or greater, notify the radiation safety officer so that the source can be withdrawn from use and disposed of properly. Also, notify the Georgia Radioactive Materials Program and U.S. Regulatory Commission (if applicable).