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**INSTRUCTIONS FOR THE PREPARATION OF AN APPLICATION  
FOR A RADIOACTIVE MATERIAL LICENSE  
FOR THE POSSESSION AND USE OF PORTABLE NUCLEAR GAUGES**

An applicant for a new Colorado Radioactive Material License or for the renewal of an existing License must submit 1) a Form OR-RH-12.3P completed in its entirety, 2) a training certificate for the Radiation Safety Officer, 3) a facility diagram, and 4) survey data and/or calculations to show compliance with dose limits for members of the public. Supplemental sheets may be attached when necessary to provide complete information.

A licensee who desires to amend their existing Radioactive Material License need not submit Form OR-RH-12.3P. Amendment requests are made by submitting a letter to the Radiation Management Unit detailing the requested changes to the license and providing supporting information. There are no fees required to process an amendment for an existing license.

An application fee as specified in Part 12 of the State of Colorado *Rules and Regulations Pertaining to Radiation Control* (Regulations) must accompany each new license application. No application fee is charged for the timely renewal of a license.

No application for a new license, or for the reinstatement of an expired license will be accepted for filing or processing prior to payment of the full amount specified in Part 12 of the Regulations.

Each licensee will be subject to an annual license fee until the lawful termination of the license by the Department. Higher fees are charged to licensees with multiple permanent locations. The licensee may also be subject to fees for non-routine inspections. If you have any questions concerning fees please call the Department at (303) 692-3300 prior to submitting your application.

The submission of an incomplete application may delay the issuance of the license because of the correspondence necessary to obtain information requested on the application. Pursuant to Section 12.2.1 of the Regulations, the Department will consider any application abandoned if the Department does not receive a reply within forty-five (45) days to its most recent request for additional information.

The original of the completed Form OR-RH-12.3P and any attachments must be emailed to CDPHE\_hmradmat@state.co.us. Mail the fee payment (and, if electronic copies cannot be submitted, the form and attachments) to the Colorado Department of Public Health and Environment, Radiation Management Unit, HMWMD - B2, 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530. A copy of these documents must be retained by the applicant.

- Item 1.** Mark the appropriate licensing action. A check made out to the Colorado Department of Public Health and Environment must accompany the application for a new license.
- Item 2.** The "Applicant" is the organization or person legally responsible for possession and use of the radioactive material specified in the application. This will usually be the Company name. If the applicant does business under a different name (DBA), include this name on the application.
- Item 3.** If the application is for the renewal of an existing radioactive materials license indicate the current license number and expiration date.
- Item 4.** Indicate the applicant's mailing address. A post office box number is acceptable.
- Item 5.** Designate the individual to be the Radiation Safety Officer. If the application is for license renewal and changes the Radiation Safety Officer, then an official of the Company must sign the application. Attach a copy of the training certificate and any other relevant documentation of the training and experience for the proposed Radiation Safety Officer. At a minimum, this documentation must show the successful completion of an accepted training course in the safe use and handling of portable gauges.
- Item 6.** Specify the member of management to be contacted if there are questions about the organization.
- Item 7.** Specify the individual to be contacted if there are questions about billing, if different than the management contact.
- Item 8.** Indicate the physical address at which the gauges containing radioactive materials will be routinely stored and used. If this is the same as the applicant's mailing address, indicate "SAME." However, a post office box number is **NOT** acceptable.

If the applicant desires authorization for multiple storage locations, then attach separate sheets listing the physical address for each storage location. Temporary job sites need not be identified.

- Item 9.** Attach a diagram for each facility identified in Item 8. The diagram must be 8½" x 11", or folded to that size. The diagram can be hand drawn and need not be drawn to scale. The diagram must be sufficiently detailed to give a clear picture of your facility in relation to radioactive material storage or use. The diagram must identify the following items:
- A. the areas adjacent to the storage and use locations. This includes areas inside and outside the applicant's facility in which a member of the public could have access;
  - B. the locations of "Radioactive Materials" warning signs;
  - C. work areas within the applicant's facility;

- D. distances from the storage area to unrestricted areas and work areas;
- E. security for the radioactive materials, including locked doors and/or fences.

**Item 10.** Attach survey data and/or calculations to demonstrate compliance with dose limits for members of the public. Section 4.14 of the Regulations specifies two dose limits which must be met. Members of the public must not receive a dose greater than 2 millirem in any one hour in an unrestricted area and 100 millirem in a year. Attachment A to the application form provides a brief calculation sheet for determining compliance with dose limits for members of the public. Complete this form for all areas surrounding the storage area (including above and below) and submit them with the application. Include any additional information such as a description of the shielding around the storage area if needed. You should contact the Department prior to submitting your application if you have questions or need assistance with the calculations.

**Item 11.** List the Manufacturer and model number of the gauges requested. Specify the maximum number of each type of gauge. For example:

<b>Manufacturer:</b>	<b>Model Number:</b>	<b>Quantity:</b>
CPN _____	MC Series _____	3 _____
Troxler _____	3400 Series _____	3 _____

If the applicant desires authorization for more gauges than can be listed on the application, attach separate sheets listing the manufacturer, model number, and quantity of gauges.

**Explanation of Commitments:**

- C.1. The State of Colorado *Rules and Regulations Pertaining to Radiation Control* govern the licensed use of radioactive materials within the State of Colorado. Part 4 of the Regulations establishes standards for the protection of workers and the public against the hazard from radiation. Part 10 of the Regulations specifies the information and training that must be provided to the worker using radioactive materials. Part 17 of the Regulations specifies requirements for the safe transport of radioactive material.
- C.2. A radioactive materials license provides authorization and specifies limitations for the possession and use of radioactive materials. The storage location, the name of the company, name of the Radiation Safety Officer, the maximum quantity of gauges, and type of gauges are all specifically listed on the license. An amendment request must be submitted to the Department, and approval granted, prior to changes in the storage location and/or configuration, the name of the Radiation Safety Officer, or acquiring gauges which are not authorized on the existing license.

- C.3. Section 4.14 and Section 4.15 in Part 4 of the Regulations, specify dose limits for members of the public. The limits are 2 millirem in any one hour and 100 millirem in a year. Occupancy by members of the public in adjacent unrestricted areas needs to be considered. For example: if an office suite adjacent to the gauge storage area is occupied for 2000 hours each year, then a dose rate of 0.050 millirem/hr in that location would result in a dose of 100 millirem in a year to a person working in that area. Attached is a guidance document to assist you in determining the dose to a member of the public from your use of radioactive materials. You must demonstrate compliance with the public dose limits assuming that all radioactive materials authorized on the license are present at your facility. Documentation of the calculations and/or measurements must be maintained on file for inspection by the Department.

If the licensee uses survey instruments for quantitative radiation measurements then the instruments must be calibrated at intervals not to exceed 12 months. These calibrations must be performed by persons licensed by the U.S. NRC or an Agreement State.

- C.4. Each individual who uses radioactive materials must complete a training course in the safe use and handling of portable nuclear gauges that has been accepted by the U.S. Nuclear Regulatory Commission or an Agreement State. This person must also be instructed in the applicable requirements of the Regulations, the operating procedures established at your facility, and requirements specified in the license. It is the duty of the Radiation Safety Officer to assure that each individual has the required training prior to that person's first use of radioactive materials. The Radiation Safety Officer must also document the training and maintain this documentation for review by the Department.
- C.5. The radiation dose received by each user of radioactive material must be monitored if the dose to the individual is likely to exceed 10% of any applicable limit specified in Part 4 of the Regulations. This is typically done using either a film badge or TLD.

When dose monitoring is required by the Regulations:

- 1) the total dose received must be recorded at the end of each year and a permanent record established;
- 2) each monitored individual must have his/her own dosimeter. Sharing of personal dosimeters is prohibited;
- 3) the dosimeter must be capable of detecting the types of radiation emitted from the gauges. Portable moisture/density gauges emit both gamma and neutron radiation;
- 4) the supplier of film badges or TLDs must be approved by the National Laboratory Accreditation Program (NVLAP). The Department has a listing of NVLAP approved companies that will be provided upon request;

- 5) dosimeter exchange frequencies must be appropriate for the type of dosimeter used. The maximum authorized use period is one month for film badges and three months for TLD's;

Personnel monitoring devices need not be used if the licensee has submitted to the Department and received approval of an acceptable application documenting six months use of continuous individual monitoring devices and demonstrating that each individual is not likely to receive, in one year from sources external to the body, a dose in excess of 10% of the limits in 4.6.1. In addition, the licensee shall include an assessment of individual dose monitoring needs as part of the annual program review required under Section 4.5.

- C.6. Adequate security must be provided for gauges containing radioactive materials to prevent unauthorized use. The facility and/or the storage area for gauges shall be locked when the gauges are unattended. Public access to the gauge storage area and use locations must be controlled at all times. Only authorized personnel may have access to the gauges.
- C.7. A use log must be maintained in the vicinity of the gauge storage area. The authorized user taking a gauge to a temporary job site should indicate his/her name, the date of use, gauge identification, and the location of use, each time a gauge is removed from the storage area. Upon return the user should sign or initial the log.
- C.8. Each authorized user of radioactive materials must be instructed to operate gauges in accordance with procedures and instructions provided by the manufacturer. Use of gauges for other than their designed purposes is prohibited. Routine maintenance of the gauges is limited to cleaning and general servicing which does not involve the removal of the sealed sources. The licensee is prohibited from opening or removing sealed sources from their respective source holders.

You may request authorization to perform additional maintenance on the gauges. This requires submittal of written procedures regarding source removal and documentation of specific training and experience of the individual to perform such maintenance.

- C.9. The State of Colorado has jurisdiction for regulating the use of radioactive material within the boundaries of Colorado with the exception of federal facilities and Native American Tribal Lands. The radioactive materials license will authorize the use of radioactive materials only at temporary job sites throughout Colorado where Colorado maintains jurisdiction. Use of gauges outside the jurisdiction of Colorado will require that the licensee notify the appropriate licensing authority and request reciprocity.

- C.10. The authorized user is responsible for maintaining control of radioactive materials at temporary job sites. While in use, gauges must be under constant surveillance by the authorized user. Adequate security must be provided for all gauges whenever unattended. This may include locking the gauge within the transport vehicle.
- C.11. Each licensee must establish written procedures for the use of radioactive materials. These procedures must be sufficiently detailed to assure compliance with applicable requirements in the Regulations and the Radioactive Materials License. For example: procedures for use, storage, and transport of gauges; use of TLDs or film badges; leak testing gauges; and emergency procedures. Each authorized user must be instructed to abide by established written procedures. A copy of these procedures, including emergency procedures, must be provided to each user and accompany the user to temporary job sites. Department inspectors will review the adequacy of established procedures during the inspection of your facility and work sites.
- C.12. The requirements for shipment and transport of radioactive materials are specified in the U.S. Department of Transportation Regulations (49 CFR) and Part 17 of the State of Colorado *Rules and Regulations Pertaining to Radiation Control*. Completed shipping papers must be kept in the cab of the vehicle while the gauge is being transported. The gauge shall be transported in an approved container bearing appropriate DOT labels. Emergency telephone numbers for the licensee and the Department should be placed in or affixed to the shipping container. Gauges transported in an open vehicle must be locked within the transport case and securely fastened and locked to the vehicle to prevent loss or theft. Department inspectors review shipping papers, packaging and labeling, security, and the availability of procedures and the license during the inspection of your facility and work sites.
- C.13. Each licensee must establish written procedures for handling emergencies involving gauges. These procedures must include instructions for the authorized user to limit access to a damaged gauge until the integrity of the sealed source can be determined. In general, keeping all persons at least 15 feet from the damaged gauge will provide adequate protection. The procedures must require that the user notify the Radiation Safety Officer as soon as possible. The user or the Radiation Safety Officer will notify the Radioactive Materials Unit of Colorado Department of Public Health and Environment at 303-877-9757.
- C.14. The Radiation Safety Officer is the designated point of contact with the Department. The Radiation Safety Officer has the responsibility for assuring activities involving gauges are in accordance with license conditions and Regulations. This includes conducting leak tests at the required frequency, overseeing the personnel monitoring program, designating authorized users and maintaining their training, record keeping, and reviewing the radiation protection program. This person must understand the requirements of the license, Regulations, and company procedures. Prior to changing the Radiation Safety Officer, the licensee must request an amendment to the license.

- C.15. Each sealed source containing radioactive material will be tested for leakage and/or contamination in accordance with the requirements of Section 4.16 of the Regulations. Leak tests are to be performed at six-month intervals or 12-month intervals as specified on the license. Leak test kits can be obtained from the manufacturer or from other approved sources. Procedures supplied with the kit or from the manufacturer must be followed. Gauges in long-term storage need not be leak tested until removed from storage. However, records of the date placed in storage and the last leak test must be maintained. A leak test must be performed on each gauge to be disposed or transferred within the 6 months prior to the disposal or transfer. Copies of the most recent leak test, the recipient's license, and records of the transfers must be maintained.
- C.16. A physical inventory of each sealed source or device containing radioactive material authorized by the license shall be conducted at intervals not to exceed 6 months or an alternate frequency specifically approved by the Department. The licensee shall retain each inventory record for 5 years. The inventory records shall contain the date of the inventory, the model number of each sealed source or device, the serial number if one has been assigned, the identity of each source radionuclide and its estimated activity, the location of each sealed source or device, and the name of the individual who performed the inventory.
- C.17. A licensee may dispose or transfer gauges containing radioactive materials by transfer of gauges to persons licensed to receive these materials. The licensee must verify that the recipient's license authorizes the receipt of the type, form, and quantity of radioactive material to be transferred. Records of the transfers and a copy of the recipient's license must be maintained for review by the Department. Each sealed source containing radioactive material must also be tested for leakage and/or contamination within 6 months prior to transfer.
- C.18. Part 4 of the Regulations establishes radiation dose limits for radiation workers and members of the public. Part 4 also requires that a licensee develop, document, and implement a radiation protection program. The goal of the licensee's radiation protection program is to assure that the radiation doses to individual workers and members of the public do not exceed specified limits and that these doses are as low as reasonably achievable. Implementation of the "As Low As Reasonably Achievable" or ALARA philosophy is a requirement of the Regulations.

To achieve radiation doses that are ALARA, the licensee must use procedures and engineering controls based upon sound radiation protection principles. The determination of how low is "reasonably achievable" takes into consideration the state of technology, costs of improvements, benefits to health and safety, and other societal considerations.

In addition to procedures and engineering controls, the licensee must review the radiation protection program content and implementation at intervals not to exceed 12 months.

- C.19. Section 10.2 of the Regulations requires that specific documents relating to the radioactive materials program be made available to employees who work with radioactive materials or who frequent the areas where radioactive materials are used or stored. Section 4.28 of the Regulations requires that radiation areas and storage locations be posted with appropriate caution signs. In addition to the posting requirements, a copy of the current license must accompany the gauge to temporary job locations.
- C.20. Sections 4.40 through 4.50 of the Regulations specify requirements for record keeping. Provisions of your radioactive materials program which require documentation include written operating procedures, personnel exposure reports, use logs, leak tests, results of annual program reviews, documentation of training, RSO approval of users, and public dose surveys or calculations. These documents must be maintained in good order for inspection by the Department.
- C.21. Expiration of a radioactive materials license does not imply or equate to termination of the license. Expiration of a license does not relieve the licensee from any requirements of the license or the Regulations. All requirements of the license will remain in effect until the Department issues a license termination.

### **Annual License Fees:**

The licensee shall be subject to an annual license fee until the license is terminated by the Department. The amount of the annual fee takes into consideration the number of permanent storage locations authorized on the license. "Permanent location" is defined in Section 12.4.4.1.4 as one where radioactive materials are used and/or stored for more than 180 days in any calendar year. The licensee may also be subject to separate fees for non-routine inspections.

Termination of a radioactive materials license requires that:

- A. all radioactive materials are disposed of lawfully;
- B. the facilities are free of contamination as demonstrated by current leak tests;
- C. personnel dosimetry records are permanently maintained; and
- D. a written request is submitted to the Department.

### **Requesting Alternative Authorization**

The applicant may request authorization to conduct activities not specifically provided for in the application, or request authorization to conduct activities by an alternate method. To do so the licensee must submit written procedures and supporting documentation and receive written approval from the Department.

## CERTIFICATE

The individuals signing the application must have the authority to make commitments on behalf of the applicant. A signature by both a member of management and the radiation safety officer is required. A signature indicates that the application and attachments contain true and correct information and that the applicant will abide by the commitments identified in the application and the State of Colorado *Rules and Regulations Pertaining to Radiation Control*.

If you have specific questions, Ms. Cheri Hall, Licensing Lead, may be reached by phone at 303-692-3444, by fax at 303-691-7841, or by email at [cheri.hall@state.co.us](mailto:cheri.hall@state.co.us).

The Department's licensing staff are also available to answer questions and can meet with you prior to the submission of a license application to discuss any specific issues you may have regarding the licensing process, regulatory requirements, and the information to be provided with the application.

**Instructions for the completion of Attachment A**  
**Calculations of Public Doses for the Gauge Storage Area**

1. Consult your gauge manufacturer for the correct gauge Transport Index or enter 0.9.
2. Your storage facility must be able to meet the dose limits for the maximum number of gauges to be listed on the license, even if you will actually have fewer gauges.
3. The actual exposure rate may vary from this estimate due to the storage geometry.
4. **Note:** The nearest member of the public may be within your facility, outside, in an adjacent suite, or directly over or under the gauge storage area. ***Separate calculations should be made for each area in question to ensure that public dose limits are met for all areas.***
5. This is an adjustment based on the inverse square law.
6. Plywood and drywall provide little shielding. If your shielding differs from that listed in Item 6 of the attachment, please contact the Radiation Management Unit to discuss the correct value to enter.
7. If the estimated exposure rate exceeds 2 mR/hr in any area where the public has unrestricted access, you do not meet the requirements of Section 4.14.1.2 of the regulations. Your options to address this requirement include: a **reduction in the number of gauges** to be authorized on the license, relocating or reconfiguring the storage area **to increase the distance, adding shielding, or controlling access to the area** where the radiation levels are too high. ***A combination of increased distance and added shielding is very effective in reducing the exposure rate in a specific area.***
8. The exposure period may be significantly different for various areas in the vicinity of the gauge storage area. ***Separate calculations should be made for each area in question to ensure that public dose limits are met for all areas.***
9. If you have questions regarding the occupancy factor, please contact the Radiation Management Unit to discuss the correct value to enter.
10. If the estimated exposure rate exceeds 100 mR/year in any area where the public has access, you do not meet the requirements of Section 4.14.1.1 of the regulations. Your options to address this requirement include: a **reduction in the number of gauges** to be authorized on the license, relocating or reconfiguring the storage area **to increase the distance, adding shielding, or controlling access to the area** where the radiation levels are too high. ***A combination of increased distance and added shielding is very effective in reducing the exposure rate in a specific area.***

**OR-RH12.3P Attachment A**  
**Calculations of Public Doses for Gauge Storage Areas**

1. Transport Index (TI) from gauge shipping label. TI = \_\_\_\_\_ mR/hr
2. Maximum number of gauges to be authorized on license = \_\_\_\_\_ gauges.
3. Estimated exposure rate at 1 meter from storage area (line 1 x line 2) = \_\_\_\_\_ mR/hr
4. Distance to nearest member of the public = \_\_\_\_\_ meters.
5. Exposure rate adjustment due to distance from storage area (line 4 x line 4) = \_\_\_\_\_
6. Exposure rate adjustment due to shielding added to storage area \_\_\_\_\_
  - no shielding: **enter 1.0**
  - 8 inch solid or concrete filled cinder block: **enter 0.1**
  - 16 inch solid or concrete filled cinder block: **enter 0.01**
  - 2 inches of steel or 1 inch of lead: **enter 0.1**
7. Estimated exposure rate to nearest member of the public  
(line 3 ÷ line 5) x (line 6) = \_\_\_\_\_ mR/hr
8. Exposure period for members of the public: \_\_\_\_\_ hours/year
  - for residence, separate buildings, adjacent suites, or areas not controlled by licensee: **enter 8760**
  - for company employee working 40 hrs/wk: **enter 2000**
  - for part time employee or visitors: **enter best estimate**
9. Occupancy period adjustment for members of the public: \_\_\_\_\_
  - Enter 1 for: offices, work areas, living quarters, areas not controlled by licensee
  - Enter 0.2 for: hallways, employee lounges and bathrooms
  - Enter 0.125 for: hallway doors
  - Enter 0.05 for: storage rooms, public bathrooms, outdoor seating areas, unattended waiting and vending areas
  - Enter 0.025 for: unattended sidewalks, parking lots and drop off areas, attics, stairways
10. Estimated annual dose to nearest member of the public  
(line 7 x line 8 x line 9) = \_\_\_\_\_ mR per year

If Line 7 is greater than 2 mR/hr for unrestricted areas or Line 10 is greater than 100 mR per year then you do not meet public dose limits. You can reduce the number of gauges to be authorized, relocate or change the configuration of your storage area to increase distances, or add shielding to the storage area. Make appropriate changes and recalculate. It may be necessary to calculate the dose rate for more than one location in the vicinity of storage area.