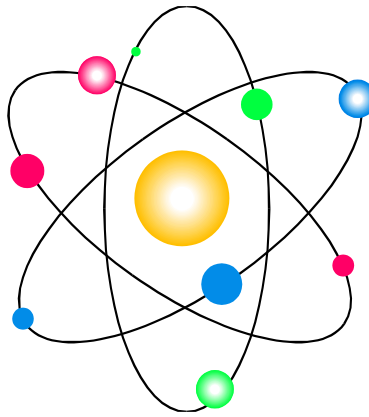




RADIOACTIVE MATERIALS REGULATORY GUIDE



PORTABLE GAUGE LICENSES



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Photo courtesy of American Portable Nuclear Gauge Association (APNGA)

REGULATORY GUIDE FOR USE OF PORTABLE GAUGES

INTRODUCTION

This guide is designed to describe the type and extent of information needed by the Minnesota Department of Health (MDH) to evaluate an application for a license to use and possess sealed sources in portable gauging devices. An example of a portable gauging device is a moisture-density gauge that contains a gamma emitting sealed source, Cesium-137, and a sealed neutron source, Americium-241: Beryllium.

The information in this guide is not a substitute for radiation safety training or for developing and implementing an effective radiation safety program. You should carefully study this guide and all the regulations identified in this guide and then complete the application. MDH may request additional information when necessary to provide reasonable assurance that you have established an adequate radiation protection program.

AS LOW AS REASONABLY ACHIEVABLE (ALARA) PHILOSOPHY

Every reasonable effort should be made to maintain radiation exposures and releases of radioactive material in effluents to unrestricted areas as low as is reasonably achievable (ALARA). As an applicant, you should consider the ALARA philosophy in the development of work plans involving radioactive materials.

The success of an ALARA program depends on the cooperation of each person who works at your facility. Management should make a formal policy commitment to the ALARA philosophy and implement that commitment with adequate resources.

The Radiation Safety Officer (RSO) and management are required to audit the radiological program to ensure the continued safe use of radioactive material. The RSO is also responsible for the day-to-day operations of the radiation safety program.

A model ALARA management program is contained in Appendix A to this guide. Applicants are required to consider the ALARA philosophy in the development of plans for radioactive materials.

FILING AN APPLICATION

You should apply for a license by completing the "Application for a Minnesota Radioactive Materials License." Complete Items 1 through 4 on the form itself. For Items 5 through 11, submit the information on supplementary pages. Identify and key each sheet or document with the item number on the application. All typed pages, sketches, and, if possible, drawings should be on 8 1/2 X 11 inch paper to facilitate handling and review. If larger drawings are necessary, they should be folded to 8 1/2 X 11 inches. You should complete all items in the application in sufficient detail for MDH to determine that your equipment, facilities, training and experience, and radiation safety program is adequate to protect the health and safety of the public as well as your employees.

Please note that license applications are available for review by the general public in the MDH offices. Do not submit proprietary information unless necessary. If submittal of such information is necessary, please clearly specify the proprietary information. Failure to do so may result in disclosure of information to the public or substantial delays in processing your application.

Do not submit personal information about your individual employees unless it is necessary. For example, the training and experience of individuals should be submitted to demonstrate their ability to manage

radiation safety programs or to work safely with radioactive materials. Home addresses and home telephone numbers should be submitted only if they are part of an emergency response plan. Dates of birth, social security numbers, and radiation dose information should be submitted only if specifically requested by MDH.

Submit one copy of your application to:

Radioactive Materials Unit
Minnesota Department of Health
PO Box 64975
St. Paul, MN 55164-0975

Retain one copy for yourself, as the license will be issued based on the statements and representations in your application, its supplements, and the requirements in the regulations. The statements and representations you make as if they were regulations will bind you.

The following comments apply to the indicated items on the Application for a Minnesota Radioactive Materials License.

Item 1: License Action Type

Check box A for a new license request.

Check box B for an amendment to an existing license and provide the license number. See "Amendments and Renewals to a License," section of this document.

Check box C for a renewal of an existing license and provide the license number.

Item 2: Name and Mailing Address of Applicant

List the legal name of the applicant's corporation or other legal entity with direct control over use of the radioactive material; a division or department within a legal entity may not be a licensee. An individual may be designated as the applicant only if the individual is acting in a private capacity and the use of the radioactive material is not connected with employment in a corporation or other legal entity. Provide the mailing address where correspondence should be sent.

Timely Notification of Transfer of Control

Licensees must provide full information and obtain MDH's prior written consent before transferring control of the license, directly or indirectly, or, as some licensees call it, "transferring the license." Transfers of control may be the results of mergers, contractual agreements, buyouts, or majority stock transfers. Although it is not MDH's intent to interfere with the business decisions of licensees, it is necessary for licensees to obtain prior MDH written consent. This is to ensure the following:

- Radioactive materials are possessed, used, or controlled only by persons who have valid MDH licenses.
- Materials are properly handled and secured.
- Persons using these materials are competent and committed to implementing appropriate radiological controls.
- A clear chain of custody is established to identify who is responsible for final disposal of radiography devices.
- Public health and safety are not compromised by the use of such materials.

Item 3: Address(es) Where Licensed Material Will Be Used or Possessed

Applicants must provide a specific address for each location where radioactive material will be used, stored, or dispatched. Specify the street address, city, and state or other descriptive address (such as on Highway 10, 5 miles east of the intersection of Highway 10 and State Route 234, Anytown, State) for each permanent storage or use facility and field station. A field station is a location where licensed material may be stored or used and from which the applicant will dispatch equipment to jobsites. A Post Office Box address is insufficient because MDH needs a specific address to allow an MDH inspector to find the use and/or storage location. If devices will not be stored at a dispatch site or field station, indicate this. In addition, the applicant should state whether a location will be used to perform radiographic operations or only for storage of sources and devices.

If a device will be used in a permanent installation, give the specific address of each location.

If operations will be conducted at temporary jobsites (i.e., locations where work is conducted for limited periods of time), specify "temporary jobsites anywhere in the Minnesota where MDH maintains jurisdiction."

Item 4: Person to Be Contacted About This Application

Identify the individual who can answer questions about the application and include his or her telephone number. This is typically the proposed radiation safety officer (RSO) or knowledgeable management official. The MDH will contact this individual if there are questions about the application.

Notify MDH if the contact person or telephone number changes. This notice is for information only and does not require a license amendment or a fee.

Items 5 through 11 should be submitted on separate sheets of paper.

Item 5: Radioactive Material

Applicants must provide the manufacturers or distributor's name and model number for each requested sealed source and device. Licensees will be authorized to possess and use only those sealed sources and devices specifically approved or registered by NRC or an Agreement State. NRC or an Agreement State performs a safety evaluation of portable gauges before authorizing a manufacturer or distributor to distribute the gauges to specific licensees. The safety evaluation is documented in a Sealed Source and Device (SSD) Registration Certificate. Before the SSD registration process was formalized, older gauges may not have been evaluated in a separate document; but were specifically approved on a license. Licensees can continue to use the gauges that are specifically listed on their licenses.

Consult with the proposed manufacturer or distributor to ensure that requested sources and devices are compatible and conform to the sealed source and device designations registered with NRC or an Agreement State. Licensees may not make any changes to the sealed source, device, or source/device combination that would alter the description or specifications from those indicated in the respective registration certificates, without obtaining MDH's prior permission in a license amendment. Such changes may necessitate a custom registration review, increasing the time needed to process a licensing action.

SSD Registration Certificates contain sections on "Conditions of Normal Use" and "Limitation and Other Considerations of Use." These sections may include limitations derived from conditions imposed by the manufacturer or distributor, by particular conditions of use that would reduce radiation safety of the device, or by circumstances unique to the sealed source or device. For example, working life of the device or appropriate temperature and other environmental conditions may be specified. Except as

specifically approved by MDH, licensees are required to use gauges according to their respective SSD Registration Certificates. Accordingly, applicants may want to obtain a copy of the certificate and review it with the manufacturer or distributor or with NRC or the issuing Agreement State to ensure that it correctly reflects the radiation safety properties of the source or device.

Identify each radionuclide that will be used in each source in the gauging device(s).

Identify the manufacturer or distributor and model number of each type of sealed source and device requested.

Confirm that each sealed source, device, and source/device combination is registered as an approved sealed source or device by NRC or an Agreement State and will be possessed and used in accordance with the conditions specified in the registration certificate.

Confirm that the activity per source and maximum activity per device will not exceed the maximum activity listed on the approved certificate of registration issued by NRC or by an Agreement State¹.

Financial Assurance and Recordkeeping for Decommissioning

The requirements for financial assurance are specific to the types and quantities of radioactive material authorized on a license. Most portable gauge applicants and licensees do not need to take any action to comply with the financial assurance requirements because their total inventory of licensed material does not exceed the possession thresholds. A licensee would need to possess many gauges before the financial assurance requirements would apply.

The standard gauge license does not specify the maximum number of gauges that a licensee may possess (allowing flexibility in obtaining additional gauges specifically authorized by the license as needed without amending its license). It contains a condition requiring the licensee to limit its possession of gauges to quantities not requiring financial assurance. Applicants and licensees desiring to possess gauges exceeding the threshold amounts must submit evidence of financial assurance.

Even if no financial assurance is required, licensees are required to maintain, in an identified location, decommissioning records related to structures and equipment where gauges are used or stored and to leaking sources. Licensees must transfer records important to decommissioning either to the new licensee prior to conducting licensed activities or to MDH before the license is terminated. For portable gauge licensees whose sources have never leaked, acceptable records important to decommissioning are sketches or written descriptions of the specific locations where each gauge was used or stored.

Item 6: Purpose(s) For Which Licensed Material Will Be Used

Gauges should be used only for the purposes for which they were designed, according to the manufacturers or distributor's recommendations and instructions, as specified in an approved SSD Registration Certificate, and as authorized on an NRC or Agreement State license. Uses other than those listed in the SSD Registration Certificate require review and approval by the NRC or an Agreement State. Requests to use portable gauges for purposes not listed in the SSD Registration Certificate will be reviewed on a case-by-case basis. Applicants need to submit sufficient information to demonstrate that the proposed use will not compromise the integrity of the source or source shielding, or other radiation safety-critical components of the device. MDH will evaluate the radiation safety program for each type and use of gauge requested.

If the portable gauge(s) will be used for the purposes listed on the SSD Registration Certificate², do the following:

¹ For information on SSD registration certificates, contact the Registration Assistant by calling NRC's toll free number (800) 368-5642 and then asking for extension 415-7217.

- You should state, "The portable gauge(s) will be used for the purposes described on the SSD Registration Certificate(s)"
- Provide a specific description of use for each type of gauge requested, e.g., "for use in measuring moisture and density of soil, compaction of asphalt, etc."

If the portable gauge will be used for purposes other than those listed on the SSD Registration Certificate, specify these other purposes and submit safety analyses (and procedures, if needed) to support safe use.

Item 7: Individual(s) Responsible for Radiation Safety Program

Radiation Safety Officer (RSO)

The person responsible for the radiation protection program is called the Radiation Safety Officer (RSO). The RSO needs independent authority to stop operations that he or she considers unsafe. He or she must have sufficient time and commitment from management to fulfill certain duties and responsibilities to ensure that radioactive materials are used in a safe manner. MDH requires the name of the RSO on the license to ensure that licensee management has always identified a responsible, qualified person and that the named individual knows of his or her designation as RSO³.

Radiation Safety Officers (RSOs) must have adequate training and experience. Successful completion of training of one of the following is evidence of adequate training and experience:

- Portable gauge manufacturer's or distributor's course for users or for Radiation Safety Officer's
- An equivalent course that meets Appendix B criteria

The licensee should provide the name of the proposed RSO and information demonstrating that the proposed RSO is qualified by training and experience.

As an alternative, the licensee should state that:

- Before obtaining licensed materials, the proposed RSO will have successfully completed the training described in Appendix B of this guide; or
- The new RSO will receive training described in Appendix B of this guide within a specified time after being appointed.

A copy of the completed Delegation of Authority that is Appendix B should accompany any license application or amendment requesting a change in Radiation Safety Officer.

Authorized Users

An authorized user (AU) is a person whose training and experience meet MDH criteria, who is named explicitly or implicitly on the license, and who uses or directly supervises the use of licensed material. Authorized users must ensure the proper use, security, and routine maintenance of portable gauges containing licensed material. Therefore, prior to the use of gauges, they must attend the training and instruction provided by a manufacturer or they must receive equivalent training and instruction.

An AU is considered to be supervising the use of licensed material when he or she directs personnel in operations involving the material. Although the AU may delegate specific tasks to supervised users (e.g., maintaining records), he or she is still responsible for safe use of licensed material.

² Allowed uses of portable gauges normally include process control methods such as measuring the thickness of paper, the density of coal, the level of material in vessels and tanks, etc. Unusual uses will be evaluated on a case-by-case basis and the authorized use condition will reflect approved uses.

³ It is important to notify MDH, as soon as possible, of changes in the designation of the RSO.

Authorized users must have adequate training and experience. Successful completion of a portable gauge manufacturer's or distributor's course for users will satisfy the training requirements.

Item 8: Training for Individuals Working In or Frequenting Restricted Areas

Individuals who in the course of employment are likely to receive occupational doses of radiation in excess of 100 mrem (1 mSv) in a year must receive training. The extent of this training must be commensurate with potential radiological health protection problems present in the work place.

Licensees need to perform a prospective evaluation to determine radiation doses likely to be received by different individuals or groups. Authorized users would be most likely to receive doses in excess of 100 mrem (1 mSv) in a year.

Licensee personnel who work in the vicinity of a portable 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 100 mrem (1 mSv) in a year. However, to minimize potential radiation exposure when ancillary staff are working in the vicinity of a portable 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 100 mrem, should receive training to ensure adequate security and control of licensed material. Licensees may provide these individuals with training commensurate with their assignments near the gauge to ensure the control and security of licensed material.

Submit the training program for individuals who in the course of employment are likely to receive occupational doses of radiation in excess of 100 mrem (1 Sv) in a year (occupationally exposed workers) and ancillary personnel.

Item 9: Facilities and Equipment

An application will be approved if, among other things, the applicant's proposed equipment and facilities are adequate to protect health and minimize danger to life or property. Therefore, you should provide the following information concerning your equipment and facilities:

- A diagram that shows where the gauge will be stored when not at field locations.
- The security measures to be taken during storage when not at field locations.
- The security measures taken when stored in the field.
- If the proposed permanent facility is under construction, or is planned for construction, include the estimated completion date.

You should state that the device will be stored in a locked enclosure such as the transport vehicle, store room, closet, shed, etc., in a way that will prevent access by unauthorized persons. You should keep in mind that the device needs to be in storage or physically watched by an authorized user at all times. It is not acceptable for a device to be chained to a post or left lying unattended at the place of use during lunch or breaks because the device would then be accessible to unauthorized persons.

Provide diagrams of the facility that include the building and the proposed restricted area(s). Indicate the use of the adjacent areas (e.g., storage, hallway, etc.). Include the spaces above and below the restricted areas.

Indicate the types of posting and their locations.

Submit the results of radiation level calculation or actual radiation measurements adjacent to, above, and below the storage installation. For determination of installation adequacy, provide information showing that the radiation level in all directions around the installation will not exceed 2.0 mrem (0.02 mSv) in any one hour. Identify the exposure devices, isotope(s), and amount(s) for the calculations or measurements. Take into account the highest quantity of radioactive material that will be stored.

If any proposed permanent facility is a private residence, confirm that the use of the gauge does not conflict with local codes or zoning laws. Provide commitments that restricted areas do not include residential quarters and explain how radiation levels in unrestricted areas will be controlled and monitored to comply with Chapter 4731.

Any change in permanent storage locations, unless approved by an amendment to the license, is prohibited.

Item 10: Radiation Safety Program

You, as the licensee, are responsible for the conduct of your radiation safety program and for all actions of your employees. The elements of a radiation safety program are contained in the Appendices to this guide. Review each appendix carefully. (Some of these appendices have been addressed in the proceeding text and need not be re-addressed.) Commit to the specific appendix, submit your own procedures using the appendix as a guide, or indicate "not applicable."

Security

Minnesota Department of Health *Radioactive Materials Rules*, Chapter 4731.3075 Subpart 8 states:

A portable gauge licensee must use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal, whenever portable gauges are not under the control and constant surveillance of the licensee.

It is essential that the licensee specifically identify the methods used to secure the gauges while being transported as well as while being stored. See Appendix C for additional information.

Leak Testing of Sealed Sources

Each sealed source must be tested for leakage at intervals not to exceed 6 months. The instrumentation should be sufficiently sensitive to detect 0.005 microcuries of radioactivity.

The following options are available for leak testing:

- Engage the services of a consultant or commercial facility to take samples, evaluate the samples, and report the results to you.
- Use a commercial leak test kit. You take the smear and send the smear to the kit supplier, who will report the results to you.
- Perform the entire leak test sequence yourself, including the smears and measurements.

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

For Option 2, specify the name, address, and license number of the kit supplier. In your application, you should state that the individuals specified in Item 8 who are responsible for your radiation safety program will take the test samples.

For Option 3, indicate how the test sample will be taken. Specify the instrumentation that will be used for measurement. An instrument capable of making quantitative measurements should be used. Hand-held survey meters will not normally be considered adequate for measurements. Include a sample calculation for conversion of the measurement data to microcuries. You should also specify the individual who will make the measurement and his or her qualifications. The individual should have prior experience in making quantitative measurements, and this experience should be documented in your application.

Routine Maintenance

You should state that any maintenance you will perform (such as cleaning) will always be done with the radioactive source in the safe shielded position. You may not do any maintenance unless the source is safely shielded.

To take the radioactive source out of the device, you must have special training and procedures, use a radiation survey meter, and take appropriate radiation safety precautions. If you plan to remove the source from the device for exchange or maintenance, your license must specifically authorize those procedures.

Radiation Detection Equipment

It is important in incidents involving gauges to determine, by use of a radiation survey meter, as soon as possible whether the shielding and source are intact. Applicants should preplan how they will obtain an instrument (e.g., use an instrument located on site or obtain one from the applicant’s home office or a local emergency response organization). Provide either of the following:

- A statement that: “We will either possess and use, or have access to and use, a radiation safety survey meter that meets the criteria in the Minnesota Department of Health Regulatory Guide for Use of Portable Gauges, in the event of an incident.”

OR

- A description of an alternative procedure for determining source integrity after an incident involving the gauge.

If you plan to perform gauge servicing that requires removal of the source from its shielded position or removal of the source rod from the gauging device, you must have a survey meter that is calibrated annually. Provide the manufacturer name, model number, and range of the survey instruments being used. For example:

MANUFACTURER	MODEL NUMBER	RANGE
Geotronics Industries	OMG-12	0.01 - 50 mR/hr
Flick Manufacturing Co.	BBSM-42	1 - 1000 mR/hr

If you plan to send your survey instruments to a private contractor for calibration, provide the name, address, and license number of the provider. If you plan to perform your own calibration, request the regulatory guide on survey instrument calibration from the MDH.

Instruments must be calibrated annually and after servicing or repair. Electronic calibrations alone are not acceptable. Battery charges are not considered “servicing.”

State that before using the survey meter, you will check the response of the instrument with a check source and, if the meter does not respond properly, you will not use the meter until it is repaired and operable.

Personnel Monitoring Equipment

Applicants must do either of the following:

- Maintain, for inspection by MDH, documents demonstrating that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10 percent of the allowable limits as specified in 4731.2020.

OR

- Individuals who receive or are likely to receive occupational exposure in one year from sources external to the body, in excess of 10 percent of the dose specified in 4731.2020 must use personnel monitoring equipment. Individuals under 18 years of age or declared pregnant women are required to use personnel monitoring equipment if they receive or are likely to receive a dose in excess of 10 percent of that specified in paragraph 4731.2070 and 2080, respectively.

If you propose to service the gauges yourself (e.g., install the gauges and perform the initial radiation survey, relocate gauges, ship devices), you should provide personnel monitoring devices for your personnel who will perform the operations. Film badges, thermoluminescent dosimeters (TLDs), or optically stimulated dosimeters (OSD) are acceptable. You should:

- Make a commitment in your application that personnel monitoring devices will be worn.
- Specify the type of personnel monitoring devices that will be used and the frequency of their exchange. The changes should be made at intervals not to exceed one month for film badges and three months for TLDs and OSDs.
- Provide the name and address of the company that will provide your personnel monitoring devices.

Inventories

State that you will conduct inventories at intervals not to exceed six (6) months to account for all sealed sources and gauges received and possessed under your license. You should maintain records of the inventories for at least five (5) years from the date of the inventory. The records should include the radionuclide and amount of material in each source, the manufacturer's name, model number and serial number of each gauge, the location of each, and the date of the inventory.

Annual Audits

Licensees must review the content and implementation of their radiation protection programs at intervals not to exceed 12 months to ensure compliance with MDH rules and the terms and conditions of the license. Records of audits and other reviews of program content are maintained for three years.

As part of their audit programs, applicants should consider performing unannounced audits of their authorized users. The purpose is to determine that proper radiation safety and operating procedures are followed.

Once problems are identified, it is essential that they be corrected promptly and comprehensively. MDH will review a licensee's audit program and determine if corrective actions are thorough, timely, and sufficient to prevent recurrence. MDH will normally exercise discretion and not to cite violations previously identified and corrected by the licensee. The licensees are encouraged to regulate their own compliance.

An audit program for a portable gauge should include a review of:

- ✓ leak test records and procedures

- ✓ inventory records
- ✓ training
- ✓ the operating and emergency procedures
- ✓ survey instrument calibration records and procedures (if applicable)

See Appendix D for questions to consider in an annual audit. You, as the licensee, are responsible for the content and implementation of your radiation safety program and for all actions of your employees.

Transportation to Field Locations

It is your obligation to obtain a copy of the DOT regulations on transportation of radioactive materials. The requirements for package labeling are in subpart E of 49 CFR Part 172 of the DOT regulations. General requirements for shipping and packaging radioactive material are in Subpart I of 49 CFR Part 173 of the DOT regulations. The address to write for a copy of these regulations is:

US Government Bookstore
120 Bannister Road
Kansas City, MO 64137
816-765-2256

You should state in your application that packaging and transport of the device will be carried out in accordance with the applicable DOT regulations.

Item 11: Waste Management

The only option for disposal of the licensed material contained in portable gauges is to transfer the material to an authorized recipient. You should state that disposal will be by transfer of the radioactive material to a licensee specifically authorized to possess it. Authorized recipients are the original suppliers of the device, a commercial firm licensed by an Agreement State or the NRC to accept radioactive waste from other persons, or another specific licensee authorized to possess the licensed material. No one else is authorized to dispose of your licensed material.

Item 12: License Fee

If this is an application for a new license, the full fee must be included with this application. An application received without a fee or with an inadequate fee may be returned to you or delayed in processing. Fees for processed applications are not refundable. Make check or money order payable to the Minnesota Department of Health.

For license renewals, the fee is due on the date your license expires.

Item 13: Certification

Individuals acting in a private capacity are required to sign and date the *Application for Radioactive Materials License*. Otherwise, representatives of the corporation or legal entity filing the application should sign and date the form. Representatives signing an application must be authorized to make binding commitments and to sign official documents on behalf of the applicant. Signing the application acknowledges management's commitment and responsibilities for the radiation protection program. MDH will return all unsigned applications for proper signature. When the application references commitments, those items become part of the licensing conditions and regulatory requirements.

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, (2) the terms and conditions of the license, and (3) the MDH rules.

It is your obligation to keep your license current. You should anticipate the need for a license amendment as far in advance as possible. If any of the information provided in your application is to be modified or changed, submit a signed application for a license amendment and include the appropriate amendment fee.

The licensee may not place into effect any amendment until receiving written verification from MDH that the amendment has been approved.

An application for a license amendment may be prepared either on the *Application for Radioactive Materials License* or in letter format. The application should identify your license by number and should clearly describe the exact nature of the changes, additions, or deletions. References to previously submitted information and documents should be clear and specific and should identify the pertinent information by date, page, and paragraph. For example, if you wish to change the responsible individual, your application for a license should specify the new individual's name, training, and experience.

RENEWAL OF A LICENSE

An application for the renewal of a license should be filed at least 30 days before the expiration date. This will ensure that the license does not expire before the final action on the application has been taken by MDH. The application for the renewal should not reference material that was previously submitted.

If you do not wish to renew your license and cannot dispose of all the licensed radioactive material in your possession before the expiration date, you must request a license renewal for storage only of the radioactive material. The renewal is necessary to avoid violating MDH rules that do not allow you to possess licensable material without a valid license.

IMPLEMENTATION

The information in this regulatory guide is *guidance*, not requirement. The Minnesota Department of Health reviews each application to ensure that users of radioactive material are capable of complying with MDH rules. This guide provides one set of methods approved by MDH for meeting the regulations and represents the minimum acceptable standards.

INSPECTIONS

MDH conducts initial inspections of new radiological programs between six and 12 months after licensed material is received and operations have begun. Subsequent routine inspections of licenses are scheduled after the initial inspection. The routine inspections are scheduled at intervals corresponding to frequency indicated in NRC Inspection Manual Chapter 2800.

APPENDIX A

TYPICAL DUTIES AND RESPONSIBILITIES OF THE RADIATION SAFETY OFFICER

The RSOs duties and responsibilities include ensuring radiological safety and compliance with both MDH rules and the conditions of the license. Typically, the RSOs duties and responsibilities include ensuring the following:

- Activities involving licensed material that the RSO considers unsafe are stopped.
- Radiation exposures are ALARA.
- Development, maintenance, distribution, and implementation of up-to-date operating and emergency procedures.
- Individuals that use portable gauges are properly trained.
- Possession, installation, relocation, use, storage, routine maintenance and non-routine operations of portable gauges are consistent with the limitations in the license, the SSD Registration Certificate(s), manufacturer's or distributors recommendations and instructions.
- Safety consequences of non-routine operations are analyzed before conducting any such activities that have not been previously analyzed.
- Non-routine operations are performed by the manufacturer, distributor or person specifically authorized by the NRC or an Agreement State.
- Prospective evaluations are performed demonstrating that individuals likely to receive, in one year, a radiation dose in excess of 10 percent of the allowable limits are provided personnel monitoring devices.
- Personnel monitoring devices, if required, are used and exchanged at the proper intervals, and records of the results of such monitoring are maintained.
- Documentation is maintained to demonstrate, by measurement or calculation, that the TEDE to the individual member of the public likely to receive the highest dose from the licensed operation does not exceed the annual limit as specified in 4731.2090.
- Portable gauges are properly secured.
- Notification of proper authorities of incidents such as damage to or malfunction of portable gauges, fire, loss, or theft.
- Investigation of unusual occurrences involving the portable gauge (e.g., malfunctions or damage), identification of cause(s), implement of appropriate and timely corrective action(s).
- Radiation safety program audits are performed at intervals not to exceed 12 months.
- When the licensee identifies violations of regulations or license conditions or program weaknesses, corrective actions are developed, implemented, and documented.
- Licensed material is transported according to all applicable DOT requirements.
- Licensed material is disposed of properly.
- Appropriate records are maintained.
- An up-to-date license is maintained and amendment and renewal requests are submitted in a timely manner.
- Posting of documents or posting a notice indicating where these documents can be examined.

APPENDIX B

CRITERIA FOR ACCEPTABLE TRAINING FOR RADIATION SAFETY OFFICERS AND AUTHORIZED USERS

Classroom training may be in the form of lecture, videotape, or self-study emphasizing practical subjects important to safe use of the gauge:

Radiation Safety:

- Radiation vs. contamination
- Internal vs. external exposure
- Biological effects of radiation
- Types and relative hazards of radioactive material possessed
- ALARA concept
- Use of time, distance, and shielding to minimize exposure
- Location of sealed source within the gauge

Regulatory Requirements:

- Applicable regulations
- License conditions, amendments, renewals
- Locations of use and storage of radioactive materials
- Material control and accountability
- Annual audit of radiation safety program
- Transfer and disposal
- Recordkeeping
- Prior events involving portable gauges
- Handling incidents
- Recognizing and ensuring that radiation warning signs are visible and legible
- Licensing and inspection by regulatory agency
- Need for complete and accurate information
- Employee protection
- Deliberate misconduct
- Practical Explanation of the Theory and Operation for Each Gauge Possessed by the Licensee
- Operating and emergency procedures
- Routine vs. non-Routine maintenance
- Lock-out procedures

On-the-job training must be done under the supervision of an authorized user or RSO. Supervised hands-on experience should include performing the following:

- Operating procedures
- Test runs of emergency procedures
- Routine maintenance
- Lock-out procedures

Training Assessment

Management will ensure that proposed authorized users are qualified to work independently with each type of gauge with which they may work. Management will ensure that proposed RSOs are qualified to work independently with and are knowledgeable of the radiation safety aspects of all types of gauges to be possessed by the applicant. This may be demonstrated by written or oral examination or by observation.

Course Instructor Qualifications

Instructor should have:

- Bachelor's degree in a physical or life science or engineering
- Successful completion of a portable gauge manufacturer's or distributor's course for users (or equivalent)
- Successful completion of an 8 hour radiation safety course; and
- 8 hours hands-on experience with portable gauges

OR

- Successful completion of a portable gauge manufacturer's or distributor's course for users (or equivalent)
- Successful completion of 40-hour radiation safety course and 30 hours of hands-on experience with portable gauges.

OR

- The applicant may submit a description of alternative training and experience for the course instructor.

Additional training is required for those applicants intending to perform non-routine operations such as 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, alignment, or removal of a gauge from service.

Delegation of Authority

Memo To: Radiation Safety Officer

From: President or CEO

Subject: Delegation of Authority

You, _____, have been appointed Radiation Safety Officer and are responsible for ensuring the safe use of radioactive materials. 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 radioactive material by employees who do not meet the necessary requirements and termination operations where justified by radiation safety. You are required to notify management if staff do not cooperate and do not address radiation safety issues. In addition, you are free to raise issues with the Minnesota Department of Health at any time.

It is estimated that you will spend _____ hours per week conducting radiation protection activities.

Your signature below indicates acceptance of the above responsibilities.

Signature of Radiation Safety Officer

Signature of Management Representative

Date

Date

APPENDIX C

SECURITY PROCEDURES

The objective of the security guidance is to reduce the opportunity for unauthorized removal and/or theft by providing a delay and deterrent mechanism. By following this guidance, it will become more difficult and time-consuming to defeat security measures.

The following security requirements apply to portable gauge licensees regardless of the location, situation, and activities involving the portable gauge. The security requirements apply to:

- storage on vehicles;
- storage at temporary facilities (e.g., residence, hotel, job site trailer); and
- storage at permanent facilities.

At all times, licensees are required to either maintain control and constant surveillance of the portable gauge when in use and, at a minimum, use two independent physical controls to secure the portable gauge from unauthorized removal while in storage. The physical controls used must be designed and constructed of materials suitable for securing the portable gauge from unauthorized removal. Both physical controls must be defeated in order for the transportation case to be opened or to be removed. The construction and design of the physical controls used must be such that they will deter theft by requiring a more determined effort to remove the transportation case and access the portable gauge.

The security procedures used must ensure that the two physical barriers chosen clearly increase the deterrence value over that of a single barrier and the two physical barriers would make unauthorized removal of the transportation case and portable gauge more difficult.

MDH rules require a portable gauge licensee to use a minimum of two independent physical controls that form tangible barriers to secure transportation case containing a portable gauge from unauthorized removal whenever the portable gauge is not under the control and constant surveillance by the licensee. Being immediately present or remaining in close proximity to the portable gauge (or the transportation case containing the portable gauge) so as to be able to prevent unauthorized removal is what satisfies the requirement to "control and maintain constant surveillance."

If possible, the licensee should consider storing transportation cases containing the portable gauges inside a locked facility or other non-portable structure overnight, instead of storage in a vehicle.

While transporting a portable gauge, a licensee should not modify the transportation case if it is being used as the Type A container for transporting the device. This includes, but is not limited to, drilling holes to mount the case to the vehicle or to mount brackets or other devices used for securing the case to the vehicle.

Physical controls used may include, but are not limited to:

- metal chains with locks,
- steel cables with locks,
- a secured enclosure,
- a locked tool box,
- a locked camper,
- a locked trailer,
- a locked trunk of a car,
- inside a locked vehicle,
- a locked shelter,
- a locked garage,

- a locked non-portable cabinet,
- a locked room, or
- a secured building.

To assist licensees, some common scenarios are illustrated and examples of two independent physical controls are provided below.

Securing a Portable Gauge at a Licensed Facility

Long term storage of a portable gauge is usually at a permanent facility listed in the license or license application. Routine storage of a portable gauge in a vehicle or at temporary or permanent residential quarters is usually reviewed and may be authorized by MDH or the applicable Agreement State during the licensing process. In accordance with MDH rules, when a portable gauge is stored at a licensed facility, the licensee would be specifically required to use a minimum of two independent physical controls to secure the gauge.

Examples of two independent physical controls used by to secure a portable gauge when stored at a licensed facility are:

- The transportation case containing the portable gauge is chained to a structural component inside a locked storage shed;
- The transportation case containing the portable gauge is stored in a room with a locked door within a secured building for which the licensee controls access by lock and key;
- The transportation case containing the portable gauge is stored inside a locked, non-portable cabinet inside a room with a locked door, if the building is not secured;
- The transportation case containing the portable gauge is physically secured to the inside structure of a secured mini-warehouse or storage facility.

Securing a Portable Gauge in a Vehicle

Licensees who transport licensed material, or who may offer such material to a carrier for transport, must comply with the applicable requirements of the United States Department of Transportation (DOT) that are found in 49 CFR Parts 170 through 189.

Licensees commonly use a chain and a padlock to secure a portable gauge in its transportation case to the open bed of a pickup truck while we are using the vehicle for storage. Because the transportation case is portable, a theft could occur if the chain is cut and the transportation case with the portable gauge in it is taken. If the licensee simply loops the chain through the handles of the transportation case, a thief could open the transportation case and take the portable gauge without removing the chain or the case. A lock on the transportation case or a lock on the portable gauge source rod handle is not sufficient because both the case and the gauge are portable. **The transportation case with the gauge inside must be protected by two independent physical controls.**

A vehicle may be used for storage; however, it is recommended by MDH and DOT that this practice is only used for short periods of time or when a portable gauge is in transit. A portable gauge should only be kept in a vehicle overnight if it is not practicable to provide temporary storage in a permanent structure.

When a portable gauge is being stored in a vehicle, the licensee is specifically required to use a minimum of two independent physical controls to secure the portable gauge. Examples independent two physical controls approved by MDH to secure portable gauges in this situation are:

- The locked transportation case containing the portable gauge is physically secured to a vehicle with:
 - a bracket that goes over the top of the transportation case and is padlocked; and

- a chain or steel cable (attached to the vehicle) is wrapped around the transportation case such that the case cannot be opened unless the chain or cable is removed. **The chain or cable looped only through the transportation case handle is not acceptable.**
- The portable gauge or transportation case containing the portable gauge is stored in a box physically attached to a vehicle, and the box is secured with:
 - a lock; and
 - a separate chain or steel cable attached independently to the vehicle in such a manner that the transportation case cannot be opened or removed without the removal of the chain or cable.
- The portable gauge or transportation case containing the portable gauge is stored in a locked trunk, camper shell, van, or other similar enclosure and is physically secured to the vehicle by a chain or steel cable in such a manner that one would not be able to open the case or remove the portable gauge without removal of the chain or cable.

Securing a Portable Gauge at a Temporary Jobsite or at Locations Other Than a Licensed Facility

When a job conducted requires storage of a portable gauge at a temporary jobsite or at a location other than a licensed facility, the licensee should use a permanent structure for storage, if practicable to do so. When storing a portable gauge in temporary or permanent residential quarters, the licensee should limit access by storing the gauge in a separate room away from residents and other members of the public. The licensee must also meet the radiation exposure limits specified in Chapter 4731. The licensee is always required to use a minimum of two independent physical controls to secure the portable gauge when it is not under constant surveillance.

Examples of two independent physical controls to secure portable gauges at these locations are:

- At a temporary job site, the portable gauge or transportation case containing the portable gauge is stored inside a locked building or in a locked non-portable structure (e.g., construction trailer, sea container, etc.) and is physically secured by a chain or steel cable to a non-portable structure in such a manner that an individual would not be able to open the transportation case or remove the portable gauge without removing the chain or cable. A lock on the transportation case or a lock on the portable gauge source rod handle would not be sufficient because the case and the gauge are portable;
- The portable gauge or transportation case containing the portable gauge is stored inside a locked room within temporary or permanent residential quarters, and is physically secured by a chain or steel cable to a permanent or non-portable structure (e.g., large metal drain pipe, support column, etc.) such that an individual would not be able to open the transportation case or remove the portable gauge without removing the chain or cable;
- The portable gauge or transportation case containing the portable gauge is stored in a locked garage, and is within a locked vehicle or is physically secured by a chain or steel cable to the vehicle in such a manner that an individual would not be able to open the transportation case or remove the portable gauge without removing the chain or cable; or
- The portable gauge or transportation case containing the portable gauge is stored in a locked garage, and is within a locked enclosure or is physically secured by a chain or steel cable to a permanent or non-portable structure in such a manner that an individual would not be able to open the transportation case or remove the portable gauge without removing the chain or cable.

APPENDIX D

SUGGESTED PORTABLE GAUGE AUDIT CHECKLIST

All areas indicated in audit notes may not be applicable to every license and may not need to be addressed during each audit. For example, licensees do not need to address areas that do not apply to their activities and activities that have not occurred since the last audit need not be reviewed at the next audit.

Audit History	4731	N/A	Yes	No
Were previous audits conducted annually?	2010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are records of previous audits maintained?	2500	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deficiencies identified?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the deficiencies corrected?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organization and Scope of Program	4731	N/A	Yes	No
Radiation Safety Officer		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If the RSO was changed, was license amended?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does new RSO meet MDH training requirements?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is RSO fulfilling all duties?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the written agreement in place for a new RSO?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are there multiple locations of use?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all locations listed on the license?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If multiple locations authorized, list locations audited.				
Were annual audits performed at each location? If no, explain.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Licensed Material	4731	N/A	Yes	No
Isotope, quantity, and use as authorized?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all gauge models and types listed on license?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are gauges and sealed sources described in the Sealed Source and Device Registration (SSDR) Certificate?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are copies of the SSDR Certificates possessed or accessible?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are manufacturer's manuals for operation of devices possessed?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If places of use changed, was the license amended?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If control of license was transferred, was MDH consent obtained prior to the transfer?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiation Safety Program	4731	N/A	Yes	No
Content and implementation reviewed annually by the licensee?	2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Records of reviews maintained?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Training, Retraining, and Instruction to Workers	4731	N/A	Yes	No
Have workers been provided with required instructions?	1020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the individual's understanding of current procedures and regulations adequate?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training program implemented?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Operating procedures?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency procedures?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Periodic training required and implemented?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were all workers who are likely to exceed 1 mSv (100 mrem) in a year instructed and was refresher training provided, as needed?	1020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are initial and periodic training records maintained for each individual?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workers cognizant of requirements for:				
Radiation Safety Program?	2010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annual dose limits?	2020 2090 2095	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10% monitoring threshold?	2210	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dose limits to embryo/fetus and declared pregnant worker?	2080	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workers observed using a gauge?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workers observed performing routine maintenance of a gauge?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities	4731	N/A	Yes	No
Facilities are as described in the license application?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Materials secured from unauthorized removal or access?	2290	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Licensee controls and maintains constant surveillance of licensed material not in storage?	2290	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiation Protection And Control Of Radioactive Material	4731	N/A	Yes	No
Proper dosimetry worn?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gauges secured with two independent barriers when not under direct surveillance?	3075	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiation Survey Instruments	4731	N/A	Yes	No
Survey instruments possessed?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calibrations completed before first use?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instrument calibrated annually (intervals not to exceed 12 months)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calibrations within 20 percent on each scale or decade of interest?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calibration records maintained?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Area Surveys	4731	N/A	Yes	No
Radiation surveys performed in accordance with the licensee's procedures and the regulatory requirements?	2200	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are area surveys being performed at required frequencies?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corrective action taken and documented if trigger level exceeded?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leak Tests	4731	N/A	Yes	No
Was each Sealed Source leak tested every six months or at prescribed intervals?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were leak tests performed according to the license?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Records maintained?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MDH notified of any leaking sources?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inventory	4731	N/A	Yes	No
Records of receipt for gauges maintained?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gauges physically inventoried at intervals not to exceed six months?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Records of inventories retained?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radioactive Waste	4731	N/A	Yes	No
Sources transferred to authorized individuals?	2400 2450 3105	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name of organization:				
Records of surveys and material accountability are maintained?	2510 2560	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Receipt And Transfer of Radioactive Material	4731	N/A	Yes	No
Describe how packages are received and by whom.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Written package opening procedures established and followed?	2350	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Records of receipt/transfer maintained?	2510 3115	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transportation (10 CFR 71.5(a) and 49 CFR 171-189)	4731	N/A	Yes	No
Shipments are:				
Delivered to common carriers;		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transported in own private vehicle;		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Both;		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No shipments since last audit.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Packages:				
Authorized packages used?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performance test records on file?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Two labels (White-I, Yellow-II, Yellow-III) with TI, Nuclide, Activity, and Hazard Class?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Properly marked (Shipping Name, UN Number, Package Type, RQ, Name and Address of consignee)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Closed and sealed during transport?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Papers:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prepared and used?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper Shipping Name, Hazard Class, UN Number, Quantity, Package Type, Nuclide, Radioactive Material, Physical and Chemical Form, Activity, Category of Label, TI, Shipper's Name, Certification and Signature, Emergency Response Phone Number?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Readily accessible during transport?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personnel Radiation Protection	4731	N/A	Yes	No
Exposure evaluation performed?	2200	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ALARA program implemented?	2010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Dosimetry:				

Monitors workers per 4731.2210?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supplier Frequency		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supplier is NVLAP-approved?	2200	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Review of Records and Reports				
Reviewed by Frequency		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Auditor reviewed personnel monitoring records for period to _____		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prior dose determined for individuals likely to receive doses?	2520	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were occupational limits met?	2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MDH Form 5 or equivalent provided to all monitored employees?	2520 2540	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If a worker declared her pregnancy during the audit period, then was the dose in compliance and were the records maintained?	2030 2540	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Records of exposures, monitoring, and evaluations maintained?	2500 2510 2540	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notification and Reports	4731	N/A	Yes	No
In compliance with 4731.2600, 4731.3110 (theft or loss)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In compliance with 4731.2610, 4731.3110 (incidents)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In compliance with 4731.2620, 4731.3110 (overexposures and high radiation levels)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aware of MDH phone number?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Posting and Labeling	4731	N/A	Yes	No
MDH Form, "Notice to Workers" is posted?	1010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other posting and labeling per 4731.2310, 4731.2330 and not exempted by 4731.2320, 4731.2340?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recordkeeping for Decommissioning	4731	N/A	Yes	No
Records of information important to the safe and effective decommissioning of the facility maintained in an independent and identifiable location until license termination?	3080	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Records include all information outlined in?	3080	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amendments Since Last Audit	4731	N/A	Yes	No
Any Amendments since last audit?				
Notifications Since Last Audit	4731	N/A	Yes	No
Any Notifications since last audit?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MDH notified within 30 days after Radiation Safety Officer (RSO) stops work or changes name?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MDH notified within 30 days after:				
licensee's mailing address changes;		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
licensee's name changes without a transfer of control of the license		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bulletins and Information Notices	4731	N/A	Yes	No
Bulletins, Information Notices, etc., received?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appropriate action in response to Bulletins, Information Notices, Generic Letters, etc.?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Special License Conditions or Issues

Special license conditions or issues to be reviewed:

Evaluation:

Audits and Findings

Summary of findings:

Corrective and preventive actions:

Audit conducted by: <hr/>	Date: <hr/>
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Organization and Scope of Program

- A. If the mailing address or places of use changed, was the license amended?
- B. If ownership changed or bankruptcy filed, was MDH prior consent obtained or was MDH notified?
- C. Radiation Safety Officer
 - 1. If the RSO was changed, was the license amended?
 - 2. Does the new RSO meet MDH training requirements?
 - 3. Is the RSO fulfilling his/her duties?
 - 4. To whom does the RSO report?
- D. If the designated contact person for MDH changed, was MDH notified?
- E. Sealed Sources and Devices
 - 1. Does the license authorize all of the MDH regulated radionuclides contained in gauges?
 - 2. Are the gauges as described in the Sealed Source and Device (SSD) Registration Certificate?
 - 3. Are copies available of the manufacturer's or distributor's manuals for operation and maintenance?
 - 4. Are the actual uses of gauges consistent with the authorized uses listed on the license?

Training and Instructions to Workers

- A. Were all workers who are likely to exceed 100 mrem (1.0 mSv) in a year instructed in accordance with 4731.1020?
 Has refresher training been provided, as needed?
 Are records maintained?
- B. Did each authorized user (AU) receive training and instruction given at the time of gauge installation or equivalent training and instruction before using gauges?
- C. Are training records maintained for each AU?
- D. Did individuals who perform non-routine operations receive training before performing these operations?

- E. Did interviews with authorized users reveal that they know the emergency procedures?
- F. Did this audit include observations of authorized users using the gauge?
- G. Did this audit include observations of workers performing routine cleaning and lubrication on the gauge?
- H. Is HAZMAT training provided, if required? [49 CFR 172.700, 172.701, 172.702, 172.703, 172.704]

Radiation Survey Instruments

- A. If the licensee is required to possess a survey meter, does it meet the MDH's criteria?

Gauge Inventory

- A. Is a record kept showing the receipt of each gauge?
- B. Are all gauges physically inventoried every six months?
- C. Are records of inventory results with appropriate information maintained?

Personnel Radiation Protection

- A. Are ALARA considerations incorporated into the radiation protection program?
- B. Were prospective evaluations performed showing that unmonitored individuals receive 10 percent of limit?
- C. Did unmonitored individuals' activities change during the year that could put them over 10 percent of limit?
- D. If yes to C. above, was a new evaluation performed?
- E. Is external dosimetry required for individuals likely to receive greater than 10 percent of limit?
- F. Relative to dosimetry provided to these individuals:
 - 1. Is the dosimetry supplier NVLAP approved?
 - 2. Are the dosimeters exchanged monthly for film badges and quarterly for TLDs or OSDs?
 - 3. Are dosimetry reports reviewed by the RSO when they are received?
 - 4. Are the records based on MDH Forms or equivalent?
 - a. Has MDH "Cumulative Occupational Exposure History" or equivalent been completed?
 - b. Has MDH "Occupational Exposure Record for a Monitoring Period" or equivalent been completed?

5. For declared pregnant workers/embryo/fetus:

- a. Was additional monitoring provided for a worker who declared her pregnancy?
- b. Were records kept of the embryo/fetus dose?

F. Are records of exposures, surveys, monitoring, and evaluations maintained?

Public Dose

A. Is public access to gauges controlled in a manner to keep doses below 100 mrem (1.0 mSv) in a year?

B. Has a survey or evaluation been performed?

Have there been any additions or changes to the storage, security, or use of surrounding areas that would necessitate a new survey or evaluation?

C. Do unrestricted area radiation levels exceed 2.0 mrem (0.02 mSv) in any one hour?

D. Is gauge access controlled in a manner that would prevent unauthorized use or removal?

E. Are records maintained?

Operating and Emergency Procedures

A. Have operating and emergency procedures been developed?

B. Do they contain the required elements?

C. Does each individual working with the gauges have a current copy of the operating and emergency procedures (including emergency telephone numbers)?

D. Did any emergencies occur?

- 1. If so, were they handled properly?
- 2. Were appropriate corrective actions taken?
- 3. Was MDH notification or reporting required?

Leak Tests

A. Was each sealed source leak tested every 6 months or at other prescribed intervals?

B. Was the leak test performed according to the license?

C. Are records of results retained with the appropriate information included?

- D. Were any sources found leaking and if yes, was MDH notified?
- E. If yes to D. above, was MDH notified?

Maintenance of Gauges

- A. Are manufacturer's or distributor's procedures followed for routine cleaning and lubrication of gauge?
- B. 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 MDH or an Agreement State and according to license requirements (e.g., extent of work, procedures, dosimetry, survey instrument)?
- C. Are labels, signs, and postings identifying gauges containing radioactive material, radiation areas, and lockout procedures/warnings clean and legible?

Transportation

(This section will not apply if you have not transported gauges during the period covered by this audit.)

- A. Were DOT-7A or other authorized packages used? [49 CFR 173.415, 173.416(b)]
- B. Are package performance test records on file?
- C. Is special form sources documentation available? [49 CFR 173.476(a)]
- D. Did the package have two labels (ex. Yellow-II) with TI, Nuclide, Activity, and Hazard Class? [49 CFR 172.403, 173.441]
- E. Was the package properly marked? [49 CFR 172.301, 172.304, 172.310, 172.324]
- F. Was the package closed and sealed during transport? [49 CFR 173.475(f)]
- G. Were shipping papers prepared and used? [49 CFR 172.200(a)]
- H. Did shipping papers contain proper entries? {Shipping name, Hazard Class, Identification Number (UN Number), Total Quantity, Package Type, Nuclide, RQ, Radioactive Material, Physical and Chemical Form, Activity (SI units required), category of label, TI, Shipper's Name, Certification and Signature, Emergency Response Phone Number, Cargo Aircraft Only (if applicable)} [49 CFR 172.200, 172.201, 172.202, 172.203, 172.204, 172.604]
- I. Were shipping papers within drivers reach and readily accessible during transport? [49 CFR 177.817(e)].
- J. Was the package secured against movement? [49 CFR 177.834]
- K. Were placards on vehicle, if needed? [49 CFR 172.504]
- L. Were there proper over packs, if used? [49 CFR 173.25]
- M. Were any incidents reported to DOT? [49 CFR 171.15, 171.16]

Auditor's Independent Survey Measurements (If Made)

- A. Describe the type, location, and results of measurements.
Do any radiation levels exceed regulatory limits?

Notification and Reports

- A. Was any radioactive material lost or stolen?
Were reports made?
- B. Did any reportable incidents occur?
Were reports made?
- C. Did any overexposures and high radiation levels occur?
Were reports made?
- D. If any events (as described in items a through c above) did occur, what was root cause?
Were corrective actions appropriate?
- E. Is the management/RSO/shift foreman licensee aware of telephone number for MDH?

Posting and Labeling

- A. Are MDH "Notice to Workers" posted?
- B. Are MDH regulations and license documents posted or is a notice posted?
- C. Is there other posting and labeling?

Record Keeping for Decommissioning

- A. Are records kept of information important to decommissioning?
- B. Do the records include all information?

Bulletins and Information Notices

- A. MDH Bulletins and MDH Information Notices received?
- B. Was appropriate training and action taken in response?

Special License Conditions or Issues

- A. Did auditor review special license conditions or other issues (e.g., non-routine operations)?

Deficiencies Identified in Audit; Corrective Actions

- A. Summarize problems/deficiencies identified during audit.
- B. If problems/deficiencies identified in this audit, describe corrective actions planned or taken. Are corrective actions planned or taken at ALL licensed locations (not just location audited)?

Include date(s) when corrective actions are implemented.
- C. Provide any other recommendations for improvement.

Evaluation of Other Factors

- A. Is senior licensee management appropriately involved with the radiation protection program and/or RSO oversight?
- B. Does the RSO have sufficient time to perform his/her radiation safety duties?
- C. Does the licensee have sufficient staff to support the radiation protection program?

APPENDIX E

LEAK TESTING SEALED SOURCES

You may use the following model procedure to leak test sealed sources. If you follow the model procedure you may indicate on your application, "We will establish and implement the model procedure for leak testing sealed sources published in Appendix E to the MDH Regulatory Guide for Portable Gauges."

You may develop your own procedure for review. If you do so, you should consider for inclusion all the features in the model and carefully review the requirements of Minnesota Rules. State on your application, "We have developed a leak test procedure for your review that is appended as Appendix E," and submit your leak test procedure.

MODEL PROCEDURE FOR TAKING TEST SAMPLES

1. Make a list of all sources to be tested. This should include at least the isotope, the activity on a specified date, and the physical form.
2. If you will be testing sources stronger than a few millicuries, set out a survey meter, preferably with a speaker, so you can monitor your exposure rate.
3. Prepare a separate wipe sample for each source. A cotton swab, injection prep pad, filter paper, or tissue paper is suitable. Number each wipe so you will know for which source it is to be used. Samples should be taken as follows:
 - a. For small sealed sources, it may be easier to wipe the entire accessible surface area. Pay particular attention to seams and joints. However, do not wipe the port of beta applicators.
 - b. For larger sealed sources and devices (survey meter calibrator), take the wipe near the radiation port and on the activating mechanism.
 - c. If you are testing radium sources, they should also be checked for radon leakage. Submerging the source in a vial of fine-grained charcoal or cotton for a day can do this. Then remove the source and analyze the absorbent sample as described below. A survey should be done to be sure that sources are adequately shielded during the leak test period.

MODEL PROCEDURE FOR ANALYZING TEST SAMPLES

The samples will be analyzed as follows:

1. Select an instrument that is sufficiently sensitive to detect 0.005 microcuries. For beta sources, a proportional flow counter, liquid scintillation counter, or thin-end-window GM survey meter may be appropriate. For gamma sources, a GM instrument or a scintillation detector with either a ratemeter or scaler may be appropriate. Dose calibrators used in nuclear medicine are not sufficiently sensitive.
2. To estimate the detection efficiency of the analyzer used to assay the wipe samples, assay a check source that has the same isotope as the sealed source. The supplier should certify the source activity. If one is not available, it will be necessary to use a certified check source with a different isotope that has a similar spectrum. If calculations demonstrate that the instrument is not sufficiently sensitive to detect 0.005 microcuries, a different instrument must be used.

3. Assay the wipe sample. It must be in the same geometry relative to the detector as was the certified check source.
4. Record the wipe sample in counts per minute. Then calculate and record the estimated activity in microcuries on the wipe sample.
5. Continue the same analysis procedure for all wipe samples.
6. If the wipe sample activity is 0.005 microcuries or greater, notify the RSO. The source must be withdrawn from use to be repaired or disposed of in accordance with MDH rules.
7. Record model number and serial number (if assigned) of each source tested, radionuclide and estimated activity, measured activity of each test sample in microcuries, description of method used to test each sample, date of test, and signature of RSO. Maintain these records for three (3) years.

APPENDIX F

OPERATING PROCEDURES

Commit to providing the manufacturer's operating and emergency procedures; submit your procedures to the MDH for review; or commit to the following model operating procedure. If you follow the model procedure you may indicate on your application, "We will establish and implement the model operating procedure published in Appendix F of the MDH Regulatory Guide for Portable Gauges."

You may develop your own procedure for review. If you do so, you should consider for inclusion all the features in the model and carefully review the requirements of Minnesota rules. State on your application, "We have developed an operating procedure for your review that is appended as Appendix F," and submit your procedure.

You should state on your application that you will provide the operating procedures to personnel who using the device and that a copy of the operating procedures will be available at temporary job sites.

Model Operating Procedure

Before removing the portable gauge from its place of storage, ensure that, where applicable, each portable gauge sealed source is in the fully shielded position and that the source rod is locked (e.g., keyed lock, padlock, and mechanical control) in the shielded position in portable gauges with a movable rod containing a sealed source. Place the portable gauge in the transport case and lock the case.

Use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal whenever the portable gauges are not under the licensee's control and constant surveillance (i.e., in storage).

Sign out the portable gauge in a log book (that remains at the storage location) including the date(s) of use, name(s) of the authorized users who will be responsible for the portable gauge, and the temporary job site(s) where the portable gauge will be used.

Block and brace the portable gauge to prevent movement during transport and lock the portable gauge in or to the vehicle. Follow all applicable Department of Transportation (DOT) requirements when transporting the portable gauge. If chains or cables are used as a method of providing security, each chain and lock combination should be physically robust enough to provide deterrence and a reasonable delay mechanism.

Use the portable gauge according to the manufacturer's instructions and recommendations.

Do not touch the unshielded source rod with your fingers, hands, or any part of your body.

Do not place hands, fingers, feet, or other body parts in the radiation field from an unshielded source.

Unless absolutely necessary, do not look under the portable gauge when the source rod is being lowered into the ground. If you must look under the portable gauge to align the source rod with the hole, follow the manufacturer's procedures to minimize radiation exposure.

After completing each measurement in which the source is unshielded, immediately return the source to the shielded position.

Always maintain constant surveillance and immediate control of the portable gauge when it is not in storage. At job sites, do not walk away from the portable gauge when it is left on the ground. Take action necessary to protect the portable gauge and yourself from danger of moving heavy equipment.

When the portable gauge is not in use at a temporary job site, place the portable gauge in a secured storage location with two independent physical controls. Examples of two independent physical controls are:

- securing the portable gauge in a locked storage facility located in a separate secured area in a warehouse;
- securing the portable gauge inside a locked van and secured to the vehicle with a steel cable; or
- storing the portable gauge inside a locked, non-removable box and further securing the box with a steel cable or chain.

Always keep unauthorized persons away from the portable gauge.

Perform routine cleaning and maintenance according to the manufacturer's instructions and recommendations.

If personnel dosimetry is provided:

- Always wear your assigned National Voluntary Laboratory Accreditation Program (NVAP) approved thermoluminescent dosimeter (TLD), optical stimulated dosimeter (OSL), or film badge when using the portable gauge;
- Never wear another person's TLD, OSL, or film badge;
- Never store your TLD, OSL, or film badge near the portable gauge.

Before transporting the portable gauge, ensure that, where applicable, each portable gauge source is in the fully shielded position. Ensure that in portable gauges with a movable source rod, the source rod is locked in the shielded position (e.g., keyed lock, padlock, mechanical control). Place the portable gauge in the transport case and lock the case. Block and brace the case to prevent movement during transportation. Lock the case in or to the vehicle, preferably in a closed compartment.

Return the portable gauge to its proper locked storage location at the end of the work shift.

Log the portable gauge into the daily use log when it is returned to storage.

If portable gauges are used for measurements with the unshielded source extended more than 3 feet beneath the surface, use piping, tubing, or other casing material to line the hole from the lowest depth to 12 inches above the surface. If the piping, tubing, or other casing material cannot extend 12 inches above the surface, cap the hole liner or take other steps to ensure that the hole is free of debris (and it is unlikely that debris will re-enter the cased hole) so that the unshielded source can move freely (e.g., use a dummy probe to verify that the hole is free of obstructions).

After making changes affecting the portable gauge storage area (e.g., changing the location of portable gauges within the storage area, removing shielding, adding portable gauges, changing the occupancy of adjacent areas, moving the storage area to a new location), reevaluate compliance with public dose limits and ensure proper security of portable gauges.

APPENDIX G

EMERGENCY PROCEDURES

You may use the following model operating procedure. If you follow the model procedure you may indicate on your application, "We will establish and implement the model emergency procedure published in Appendix G of the MDH Regulatory Guide for Portable Gauges."

You may develop your own procedure for review. If you do so, you should consider for inclusion all the features in the model and carefully review the requirements of Minnesota rules. State on your application, "We have developed an emergency procedure for your review that is appended as Appendix G," and submit your procedure.

You should state on your application that you will provide the emergency procedures to personnel who use the device and that a copy of the emergency procedures will be available at temporary job sites.

Model Emergency Procedure

If the source fails to return to the shielded position (e.g., as a result of being damaged, source becomes stuck below the surface), or if any other emergency or unusual situation arises (e.g., the portable gauge is struck by a moving vehicle, is dropped, or is in a vehicle involved in an accident):

Immediately secure the area and keep people at least 15 feet away from the portable gauge until the situation is assessed and radiation levels are known. However, perform first aid for any injured individuals and remove them from the area only when medically safe to do so.

If any heavy equipment is involved, detain the equipment and operator until it is determined there is no contamination present.

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

Notify the following persons, in the order listed below, of the situation and follow the directions provided:

NAME	WORK PHONE NUMBER	HOME PHONE NUMBER

RSO and Licensee Management Responsibilities

Arrange for a radiation survey to be conducted as soon as possible by a knowledgeable person using appropriate radiation detection instrumentation. To accurately assess the radiation danger or potential contamination, it is essential that the person performing the survey be competent in the use of the survey meter.

If portable gauges are used for measurements with the unshielded source extended more than three feet below the surface, contact persons listed on the emergency procedures need to know the steps to be followed to retrieve a stuck source and to convey those steps to the staff on site.

Make necessary and timely notifications to local authorities as well as to MDH as required.

Reporting Requirements for Gauges Damages at Temporary Job Site

When portable gauges are damaged or involved in incidents that result in doses in excess of 4731.2620 limits, and when it becomes apparent that attempts to recover a sealed source stuck below the surface will be unsuccessful.

The reporting the occurrence of damaged gauges is necessary when any one of the following conditions is met:

- The protective housing (i.e., shielding) is damaged such that the source is not fully shielded, or cannot be moved into the shielded position, in accordance with 4731.3110, "Reporting requirements";
- The source is left exposed in an unrestricted area such that the radiation levels exceed 10 times the limit of 2 mrem in any one hour (i.e., 20 mrem in any one hour) in accordance with 4731.2620, "Reports of exposures, radiation levels, and concentrations of radioactive material exceeding the constraints or limits."
- The incident results in doses in excess of limits in Chapter 4731 or in the license, in accordance with 4731.2620.

Licensees are also required to file a written report within 30 days of the telephone report. For details that must be included in both the telephone and written reports, licensees should review 4731.3110.

Reporting Requirements for Lost or Stolen Gauges

MDH must be notified as soon as possible but no later than four hours after discovery that a portable gauges containing licensed material are lost or stolen. Licensees are also required to file a written report within 30 days of the telephone report. For details that must be included in both the telephone and written reports, licensees should review 4731.3110.

Reporting Requirements for Defective Gauges

Licensees must file a telephone report within 24 hours of any incident that involves disabled equipment, or equipment that fails to function as designed. Such occurrences include:

- When, in accordance with 4731.3110, the equipment is required by regulation or license condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident;
- When, in accordance with 4731.3110, the equipment is required to be available and operable when it is disabled or fails to function; and
- When, in accordance with 4731.3110, no redundant⁴ equipment is available and operable to perform the required safety function.

Licensees are also required to file a written report within 30 days of the telephone report. For details that must be included in both the telephone and written reports, licensees should review 4731.3110.

⁴ In this context, aredundant@ means similar equipment with safety features equivalent to the safety features of the disabled equipment.

APPENDIX H

US DEPARTMENT OF TRANSPORTATION TRAINING REQUIREMENTS

The following information summarizes The Department of Transportation training requirements and provides a reference to other DOT regulations.

The *Federal Hazardous Materials Transportation Law* requires the training of all hazardous material (HAZMAT) employees. "Hazardous material" means a substance or material capable of posing an unreasonable risk to health, safety, or property when transported in commerce. The training requirements are to increase a HAZMAT employee's safety awareness. As such, training is considered an essential element in reducing hazardous material incidents. As it pertains to a medical facility, a HAZMAT employee is any person who directly affects hazardous material transportation safety including a person who:

- loads, unloads, or handles hazardous material;
- marks packages for use in the transportation of hazardous material;
- prepares hazardous material for transportation;
- is responsible for safety of transporting hazardous material; or
- operates a vehicle used to transport hazardous material.

Each employer must train, test, certify, and retain records of current training for each HAZMAT employee to ensure knowledge of hazardous materials and the Hazardous Material Regulations as well as to ensure that the employee can perform assigned HAZMAT functions properly. (See 49 CFR 172.700 through 172.704.) HAZMAT training must include:

- general awareness/familiarization
- function-specific;
- safety;
- security awareness;
- In-depth security training, if a security plan is required; and
- driver training (for each HAZMAT employee who will operate a motor vehicle).

Initial training

A new employee, or an employee who changes job functions, may perform HAZMAT job functions before completing training, provided:

- the employee does so under the direct supervision of a properly trained and knowledgeable HAZMAT employee; and
- the HAZMAT training is completed within 90 days of employment of change in job function.

Recurrent Training

Training is required at least once every three years. The three-year period begins on the actual date of training. Relevant training received from a previous employer or source may be used to satisfy the requirements provided a current record of training is obtained from the previous employer or other sources.

Training records

Training records must include the following information:

- HAZMAT employee's name;
- completion date of most recent training;
- training materials (copy, description, or location);

- name and address of HAZMAT training; and
- certification that the HAZMAT employee has been trained and tested.

49 CFR References

Licensed material must be transported in accordance with DOT regulations. The major areas in the DOT regulations that are most relevant for transportation of Type A or Type B quantities of licensed material are:

- Table of Hazardous Materials and Special Provisions 49 CFR 172.101: Purpose and use of hazardous materials table;
- Shipping Papers 49 CFR 172.200-204: Applicability, general entries, description of hazardous material on shipping papers, additional description requirements, shipper's certification;
- Package Marking 49 CFR 172.300, 49 CFR 172.301, 49 CFR 172.303, 49 CFR 172.304, 49 CFR 172.310, 49 CFR 172.324: Applicability, general marking requirements for non-bulk packaging, prohibited marking, marking requirements, radioactive material, hazardous substances in non-bulk packaging;
- Package Labeling 49 CFR 172.400, 49 CFR 172.401, 49 CFR 172.403, 49 CFR 172.406, 49 CFR 172.407, 49 CFR 172.436, 49 CFR 172.438, 49 CFR 172.440: General labeling requirements, prohibited labeling, Class 7 (radioactive) material, placement of labels, label specifications, radioactive white-I label, radioactive yellow-II label, radioactive yellow-III label;
- Placarding of Vehicles 49 CFR 172.500, 49 CFR 172.502, 49 CFR 172.504, 49 CFR 172.506, 49 CFR 172.516, 49 CFR 172.519, 49 CFR 172.556: Applicability of placarding requirements, prohibited and permissive placarding, general placarding requirements, providing and affixing placards: highway, visibility and display of placards, general specifications for placards, RADIOACTIVE placard;
- Emergency Response Information 49 CFR 172.600, 49 CFR 172.602, 49 CFR 172.604: Applicability and general requirements, emergency response information, emergency response telephone number;
- Training 49 CFR 172.702, 49 CFR 172.704: Applicability and responsibility for training and testing, training requirements;
- Shippers – General Requirements for Shipments and Packaging 49 CFR 173.403, 49 CFR 173.410, 49 CFR 173.411, 49 CFR 173.412, 49 CFR 173.413, 49 CFR 173.415, 49 CFR 173.416, 49 CFR 173.433, 49 CFR 173.435, 49 CFR 173.441, 49 CFR 173.471, 49 CFR 173.475, 49 CFR 173.476: Definitions, general design requirements, industrial packages, additional design requirements for Type A packages, requirements for Type B packages, authorized Type A packages, authorized Type B packages, requirements for determining A1 and A2 values for radionuclides and for the listing of radionuclides on shipping papers and labels, table of A1 and A2 values for radionuclides, radiation level limitations, requirements for U.S.
- NRC-approved packages, quality control requirements prior to each shipment of Class 7 (radioactive) materials, approval of special form Class 7 (radioactive) materials; and
- Carriage by Public Highway 49 CFR 177.816, 49 CFR 177.817, 49 CFR 177.834(a), 49 CFR 177.842: Driver training, shipping papers, general requirements (packages secured in a vehicle), Class 7 (radioactive) material.

For additional transportation information, licensees may consult DOTs "A Review of the Department of Transportation Regulations for Transportation of Radioactive Materials" or contact the DOT at <<http://www.dot.gov>>.

SUMMARY OF REVISIONS

<u>REVISION</u>	<u>SECTION</u>	<u>DESCRIPTION</u>
01/12/10	Appendix B	Added Delegation of Authority for RSO
01/12/10	Appendices	Re-lettered all appendices after Appendix B