TEXAS
Health and Human Services

Texas Department of State Health Services

Radiation Control Program Application Guide 2.8

Application Guide for Use of Radioactive Material in Portable Gauges

March 2021

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1. Agency Contacts

For questions on the application and any related correspondence, please contact us at:

Phone: (512) 834-6661

Email: RAMlicensing@dshs.texas.gov

We welcome suggestions for improvements of this guide. You can send letters with comments and suggestions to:

Texas Department of State Health Services
Attn.: Manager-Radioactive Materials Licensing-MC 2835
P.O. Box 149347
Austin, Texas 78714-9347

The rules and forms referenced in this guide, as well as this and other guides are available at www.dshs.texas.gov/radiation.

Texas is divided into health service regions and inspectors are assigned to specific regions. Once the agency issues a license, an agency inspector will periodically visit the licensee to conduct a risk-informed, performance-based inspection. The inspection will cover requirements in rule as well as implementation of procedures identified in the content of your application. For more information on inspections, visit the agency website.

2. Abbreviations

25 TAC	Title 25 Texas Administrative Code
ALARA	as low as is reasonably achievable
ALI	annual limit on intake
Am-241/Be	Americium-241/Beryllium
ANSI	American National Standards Institute
Bq	becquerel
CFR	*Code of Federal Regulations*
Ci	curie
Cs-137	Cesium-137
DOT	U.S. Department of Transportation
dpm	disintegrations per minute
L/C	License Condition
mCi	millicurie
mR	milliroentgen
mrem	millirem
mSv	millisievert
NCRP	National Council on Radiation Protection and Measurements
NIST	National Institute of Standards and Technology
NRC	U.S. Nuclear Regulatory Commission
NSTS	National Source Tracking System
NVLAP	National Voluntary Laboratory Accreditation Program
OSL	Optically Stimulated Luminescence
R	roentgen

RAM	radioactive material
RG	Regulatory Guide
RSO	Radiation Safety Officer
SoS	Texas Secretary of State
SRSO	Site Radiation Safety Officer
SSD	sealed source and device
TEDE	total effective dose equivalent
TI	Transport Index
TLD	thermoluminescent dosimeters
µCi	microcurie

3. Overview

Scope and Purpose

The Department of State Health Services ("the agency") applies the rules found in Title 25 Texas Administrative Code (25 TAC) Chapter 289 and the Texas Health and Safety Code Chapter 401 to regulate the use of radioactive material. This document will help you apply for a specific license to use radioactive material in a portable gauge (a "gauge" or "device"). It also gives the agency information for evaluating the applications.

This guide is not a substitute for the regulations in 25 TAC Chapter 289 and you do not have to follow it. The agency will consider compliance methods acceptable if they a) support public health and safety and b) show compliance with rules. The agency will issue a license to receive, have, use, transfer or get radioactive material once they receive satisfactory information from you.

The agency also regulates the use of machines that produce radiation. You will need to file a separate application for the use of such machines. Information about applying for that use is beyond the scope of this document.

For more information, visit https://www.dshs.texas.gov/radiation/

Types of Licenses

There are two types of radioactive material licenses: general and specific.

25 TAC §289.251 provides a general license. It is effective without filing an application or issuing a license document. The general license is subject to other applicable portions of the rules and any limitations of the general license.

For a specific license you need to submit an application to the agency and the get a licensing document issued.

Applicable Rules

It is your responsibility to get and have available up-to-date copies of applicable rules, to read and understand the requirements of each of these rules, and to follow each applicable rule.

The following Sections of 25 TAC, Chapter 289 apply to a portable gauge license:

§289.201 "General Provisions for Radioactive Material"

§289.202 "Standards for Protection Against Radiation from Radioactive Materials"

§289.203 "Notices, Instructions, and Reports to Workers; Inspections"

§289.204 "Fees for Certificates of Registration, Radioactive Material Licenses, Emergency Planning and Implementation, and Other Regulatory Services"

§289.205 "Hearing and Enforcement Procedures"

§289.251 "Exemptions, General Licenses, and General License Acknowledgments"

§289.252 "Licensing of Radioactive Material"

§289.257 "Packaging and Transportation of Radioactive Material"

Format of this Guide

The format for each item in this guide is as follows:

Rules – references the rules applicable to the item;

Criteria – outlines the criteria used to evaluate the applicant's response;

Discussion – gives additional information on the topic; and

Response from Applicant – gives suggested response(s) or indicates you do not need to send a response on that topic during the initial licensing process.

Notes and references are self-explanatory.

Some sections of this guide include references to other documents or resources that may be useful. If those documents include information conflicting with current rules, the rules in 25 TAC §289 apply. Some may include alternate limits for occupational and public dosage; but you should note the limits in 25 TAC §289.202 are applicable.

Purpose of Appendices and Note on Procedures

You can submit the appendices that serve as model procedures as your procedures.

You should carefully consider each procedure you provide to the agency in the licensing process.

After we issue the license, you must run your program by following the procedures in you listed both in your application and correspondence with us.

The "As-Low-As Reasonably-Achievable" (ALARA) Concept

25 TAC §289.202(e), "Radiation protection programs," states "each licensee shall develop, document, and implement a radiation protection program sufficient to ensure compliance…" with 25 TAC §289.202 and "the licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and public doses that are ALARA."

You are required by rule in 25 TAC §289.202(e)(3) to review the content of the radiation protection program and its implementation at least once a year. The RSO handles the day-to-day operation of the radiation protection program.

References and Resources: You should consider the ALARA philosophy in the following reports when making plans to work with licensed radioactive material. These documents and resources have information, methods, and references that are useful for establishing a radiation protection program to maintain radiation exposures at ALARA levels:

- NRC Regulatory Guide (RG) 8.10, "Operating Philosophy for Maintaining Occupational and Public Radiation Exposures ALARA," August 2016.
- NRC RG 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure," February 1996.
- NRC NUREG–1736, "Consolidated Guidance: 10 CFR Part 20 – Standards for Protection Against Radiation."
- NCRP Report No. 127, "Operational Radiation Safety Program," 1998.

4. How to File an Application

Application Preparation

You should do the following when applying for a radioactive materials license:

- Use the most recent guidance in preparing an application.
- Complete RC Form 252-2 "Application for Radioactive Material License," items 1 – 4, and 12 on the form itself.
- Complete RC Form 252-2 "Application for Radioactive Material License," items 5 – 10, using the "Application Review Checklist" provided in this guide.
- Complete RC Form 252-1 "Business Information Form".
- Give enough details for the agency to determine equipment, facilities, training, experience, and the radiation protection program are adequate to protect health and safety and minimize danger to life and property.
- For each supplementary page sent with the application, show, and cross-reference the information to the item number on the application or the topic to which it refers. Use standard 8.5 x 11-inch paper. Print should be clear and sharp on the paper.
- Submit the required fee. The agency will not review your license application until you pay the fee. For the fee amount contact (512)231-5627 or RadiationFeesandRecords@dshs.texas.gov.
- Submit facility diagrams. If a professional engineer or engineering firm prepares these diagrams, those drawings shall be in a final version, signed, sealed, and dated per Title 22 of the Texas Administrative Code, Chapter 131.
- Avoid sending proprietary or personally identifiable information unless the agency requests it. (Personally identifiable information (PII) includes social security numbers, home phone number, birth dates and radiation dose information.) If you must send this information, separate it from the rest of the application paperwork and mark it to meet the appropriate exemption from public disclosure rule as described by 25 TAC §289.201(m).

Application Review Checklist

For your convenience and for streamlined handling of your application, use this application review checklist and include it with your application, RC Form 252-2.

You can find detailed information about each item and other available options within this guide.

- Complete items 1 – 4 and 12 on RC Form 252-2. Use this application review checklist to complete items 5 – 10.
- Check the proper box below and send a detailed description of the requested information. You may use a separate sheet identifying and cross-referencing the item number on the application or the topic to which it refers.

Item 5: Radioactive Material Requested

RADIONUCLIDE	MANUFACTURER AND MODEL NO. OF EACH SEALED SOURCE	MAXIMUM ACTIVITY REQUESTED	PROPOSED USE
Ex: Cesium-137 (Cs-137)	*Ex: Sealed source (QSA Model CDCW556; EZ Model HEG-137)*	*Ex: 10 sources not to exceed 9 millicuries each*	*Ex: Measurement of physical properties using Troxler Electronics Laboratories Model 3400 series moisture/density gauge.*
Cs-137			
Cs-137			
Americium 241/Beryllium (Am-241/Be)			
Am-241/Be			
Am-241/Be			
Other:			

If you are not using the device per the manufacturer's instructions, submit a safety analysis supporting safe use.

ITEM NUMBER AND TITLE	INCLUDE THE APPLICABLE DOCUMENTATION AND/OR SUGGESTED RESPONSE IN THE PROCEDURE
Item 6: Individual(s) Responsible for the Radiation Safety Program and their Training and Experience Name of Proposed Radiation Safety Officer (RSO):	❑ An organizational chart. Or describe the individual(s) in charge of the radiation protection program. (Include the report path through upper management); ❑ Documentation showing the proposed RSO is qualified by education, training, and experience; ❑ If you appoint a Site RSO, provide the individual's name and documentation. Show qualification by education, training, and experience.
Item 7: Training for Individual(s) Working in or Frequenting Restricted Areas 7.1 Radiation Worker 7.2 Individual(s) Working in or Frequenting Restricted Areas	The statements: ❑ "Before using radioactive material, we will make sure that personnel pass a portable gauge manufacturer's course or an equal course. The course must meet the criteria in 25 TAC §289.252(jj)(1); and they need to have experience in the handling of a portable gauge"; ❑ "People who prepare packages containing radioactive material for shipment will complete hazardous materials training within 90 days after hiring or if their job function changes. Also, every 3 years thereafter, per Title 49, CFR, Part 172: Subpart H." ❑ Describe the radiation safety training program. Include: topics covered, workers included, training assessment, instructor qualifications, and the method and frequency of training.
Item 8: Facilities and Equipment	❑ A facility floor plan or diagram showing each room where you will use or store radioactive material and the principal use of each adjacent room; ❑ Describe the two independent physical controls used to secure a portable gauge from unauthorized removal while in storage; ❑ Identify the owner of each proposed storage facility. If another company owns the facility, provide a letter from the owner or the owner's agent. It must document they are aware you are using or storing devices containing radioactive material on the property.
8.1 Radiation Monitoring Instruments	❑ The manufacturer and model of each survey meter to be possessed; **AND** ❑ The statement: "We will have the survey meter calibrated annually by a person licensed by the agency, NRC or any Agreement State to perform such service"; **OR** ❑ Describe an alternative procedure for determining the source integrity after an incident involving the gauge.
Item 9: Radiation Protection Program	❑ The statement: "We will perform an audit of the radiation protection program content and implementation at an interval not to exceed 12 months";

ITEM NUMBER AND TITLE	INCLUDE THE APPLICABLE DOCUMENTATION AND/OR SUGGESTED RESPONSE IN THE PROCEDURE
9.1 Audit Program	❑ Describe the program for ensuring personnel are complying with agency rules, conditions of the license, the operating, safety, and emergency procedures; and ❑ The document(s) used to perform audits and other reviews of the program.
9.2 Material Receipt and Accountability	❑ A description of how you will secure radioactive material from unauthorized removal or access. The statements: ❑ "We will document and retain records for receipt, transfer and disposal of all sealed sources. We will maintain records until the agency authorizes disposal." ❑ "We will perform a physical inventory of all sealed sources at intervals not to exceed six months. We will maintain records for three years. The record will include the following for each source: ▸ Model number ▸ Serial number ▸ Radionuclide ▸ Activity ▸ Location ▸ Date of inventory ▸ Identification of the individual who performed the inventory." ❑ "We will record the utilization of a portable gauge when it is removed from and returned to a licensed site. Records will be maintained for 3 years after the record is made".
9.3 Occupational Dose	❑ Documentation showing that unmonitored individuals are not likely to receive a dose more than 10% of the limits in 25 TAC §289.202(f)(1); **OR** ❑ The statement: "We will provide and require the use of individual monitoring devices (dosimetry). An NVLAP-approved processor will evaluate and process personnel dosimeters that need processing to determine the radiation dose".
9.4 Public Dose	❑ A procedure for showing any member of the public will not exceed a radiation dose of 100 mrem [1 mSv] in a year and the dose in any unrestricted area will not exceed 2 mrem [0.02 mSv] in any one hour.
9.5 Operating, Safety and Emergency Procedures	❑ Operating, safety and emergency procedures; ❑ The statement: "We will provide copies of these procedures to all portable gauge users and they will be available at each jobsite".
9.6 Leak Test	❑ The statement: "We will perform leak tests at intervals specified in rule or in the Sealed Source and Device registration certificate. An organization licensed by the agency, the NRC or another Agreement State will analyze the leak tests".

ITEM NUMBER AND TITLE	INCLUDE THE APPLICABLE DOCUMENTATION AND/OR SUGGESTED RESPONSE IN THE PROCEDURE
	OR ❑ Give us the manufacturer and model of the instrument used to analyze the leak test samples if you perform that analysis in-house; **AND** ❑ A copy of your procedures for performing leak test sample analysis.
9.7 Maintenance	**ROUTINE MAINTENANCE ONLY** ❑ The statement: "We will implement and maintain procedures for routine maintenance of gauges according to each manufacturer's written recommendations and instructions"; **OR** ❑ Alternative procedures for agency review; **AND** ❑ The statement: "The gauge manufacturer, or other person licensed by the agency, NRC, or another Agreement State will perform non-routine maintenance or repair operations that require detaching the source or source rod from the gauge." For nonroutine maintenance, refer to Guide 6.9.
9.8 Transportation	❑ Procedure for shipment or transport of a portable gauge.
9.9 Recordkeeping	No response is necessary.
9.10 Reporting	No response is necessary.
Item 10 Waste Management	❑ The statement: "We will transfer radioactive material only to an authorized recipient".

Where to File

Send your application in paper format to the address noted in the table below, as applicable, or by email to RAMLicensing@dshs.texas.gov.

Individual files should not exceed 5 megabytes. Please include your license number in the subject line, if applicable.

NEW License Application and Fee	Radiation Control Program MC 2003 Texas Department of State Health Services P.O. Box 149347 Austin, TX 78714-9347
Regular correspondence, license renewal or amendment request	Radiation Control Program MC 2835 Texas Department of State Health Services P.O. Box 149347 Austin, TX 78714-9347
Special service deliveries such as FedEx, UPS, or hand delivery	Radiation Control Program MC 2835 Texas Department of State Health Services 8407 Wall Street Austin, TX 78754

5. Management Responsibility

Commitments and Responsibilities

We define "management" as the chief executive officer or other person given the authority to manage, direct, or administer the licensee's activities. A representative of management should sign a license application as stated in 25 TAC §289.252(d)(2).

The signature on an application acknowledges your commitments and responsibility for the following:

- To ensure radiation safety, security, and control of radioactive materials and compliance with regulations;
- To confirm the licensee's knowledge about the contents of the license and application;
- To follow current agency and U.S. Department of Transportation (DOT) regulations, the licensee's operating, emergency, and security procedures, and agency license commitments;
- To provide adequate resources (including space, equipment, personnel, time, and, if needed, contractors);
- To protect the public and workers from radiation hazards;
- To report reportable events per regulations;
- To select and assign a qualified individual to serve as the RSO for licensed activities;
- To ensure the RSO has independent authority to stop unsafe operations; and enough time to fulfill their radiation safety duties and responsibilities;
- To ensure radiation workers have adequate training;
- To obtain the agency's prior written consent before transferring control of the license [25 TAC §289.252(x)(2)], as discussed further in Section 7, subsection titled, "Timely Notification of Transfer of Control," of this guide;
- To notify the agency in writing, at once following the filing of petition for voluntary or involuntary bankruptcy [25 TAC §289.252(x)(6)], as discussed further in Section 7, subsection titled, "Notification of Bankruptcy Proceedings," of this guide.

Safety Culture

The agency expects those performing regulated activities to establish and maintain a positive safety culture. It should be comparable with the security level of their activities and the nature and complexity of their functions. This applies to all licensees and applicants subject to agency authority.

The U.S. Nuclear Regulatory Commission (NRC) Safety Culture Policy Statement (76 FR 34773; June 14, 2011) defines "nuclear safety culture" as "the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment."

The individuals performing regulated activities bear the primary responsibility for safely handling and securing these materials. Experience has shown that certain personal and organizational traits are present in a positive safety culture. A trait, in this case, is a pattern of thinking, feeling, and behaving that emphasizes safety. Refer to the table below for the traits of a positive safety culture from the NRC's Safety Culture Policy Statement.

Organizations should ensure workers in the safety and security areas appreciate the importance of each. They should emphasize the need for integration and balance to achieve both safety and security in their activities. Safety and security activities are intertwined. Many safety and security activities complement each other, but there may be instances in which safety and security interests compete against each other. You should integrate these activities so neither one is diminished. You should establish mechanisms to identify and resolve these differences. A safety culture that accomplishes this would include all nuclear safety and security issues associated with agency-regulated activities.

The agency reviews the performance of individuals and organizations to determine compliance with requirements and commitments through its existing inspection and assessment processes. The agency does not incorporate into the rules the Safety Culture Policy Statement and traits. Many of the safety culture traits may be inherent to an organization's existing radiation safety practices and programs. For instance, if you handle unsealed material you must perform surveys to find any skin contamination. Then you take prompt action to reduce the dose to the individual and reduce the spread of the contamination. The need to perform the personnel surveys may correspond with the safety culture trait specified in the table below as "Work Processes". You should be aware this is an example and consider reviewing

your radiation safety program to develop and put in place a safety culture comparable to the nature of your organization.

Traits of a Positive Safety Culture

Leadership Safety Values and Actions	Problem Identification and Resolution	Personal Accountability
Leaders demonstrate a commitment to safety in their decisions and actions.	Safety issues are promptly identified, fully evaluated, and promptly addressed and corrected consistent with their significance.	All individuals take personal responsibility for safety.
Work Processes	**Continuous Learning**	**Environment for Raising Concerns**
The process of planning and controlling work activities is implemented so safety is maintained.	Opportunities to learn about ways to ensure safety are sought out and implemented.	A safety-conscious work environment is maintained where personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination.
Effective Safety Communications	**Respectful Work Environment**	**Questioning Attitude**
Communications maintain a focus on safety.	Trust and respect permeate the organization.	Personnel avoids complacency. They challenge existing conditions and activities to identify problems that might result in error or incorrect action.

Refer to Appendix A for the NRC's Safety Culture Policy Statement. You can find more information on activities relating to safety culture on the NRC Safety Culture web site.

6. Contents of an Application

Introduction

This section explains, item by item, the information you must send for each step in RC Form 252-2. Our review of your application may be delayed if your information is incomplete or incorrect.

Complete all items in the application. Use enough detail for the agency to tell whether the proposed equipment, facilities, training, experience and the radiation safety program meet regulatory standards. The agency will check this information to ensure it is enough to protect public health and safety and reduce danger to life and property. You should consider the concepts of keeping exposure as low as is reasonably achievable (ALARA) by reducing contamination and keeping control of radioactive materials when developing your procedures.

Item 1: License Action Type

Rules: 25 TAC §289.252(d)(1), 25 TAC §289.252(z)(1)

Criteria: You must file a new license application in a manner prescribed by the agency according to 25 TAC §289.252(d)(1) and for renewal applications according to 25 TAC §289.252(z)(1).

Discussion: For new license applications, the agency may conduct a site visit prior to issuing the license.

Response from Applicant: Select the checkbox for a new license or renewal of an existing license. Provide the license number(s)/names if you hold a current or prior license issued by the agency, the NRC, or another Agreement State.

Item 2: Legal Business Name and Mailing Address of Applicant/Licensee

Rules: 25 TAC §289.252(d)(1), 25 TAC §289.252(x)(5)(A) and (B)

Criteria: The name provided must be the legal business name of the company that directly controls the proposed uses of radioactive material.

Discussion: Do not use a division or department name within the business as the primary legal business name.

The mailing address must be in Texas. A PO box is an acceptable mailing address. Be prepared to receive correspondence at the proposed mailing address as the agency may begin corresponding immediately.

Response from Applicant: Give the legal business name and assumed name or dba, if applicable, and the mailing address to receive agency correspondence.

Note: Once licensed, you must let us know within 15 calendar days about a change in the business name or change in mailing address as described in 25 TAC §289.252(x)(5)(B).

Item 3a: Address(es) Of Radioactive Material Use or Storage

Rules: 25 TAC §289.252(e)(8)

Criteria: Your permanent facility must be in Texas as required by 25 TAC §289.252(e)(8). Any proposed permanent facility must be within Texas boundaries and *not* under exclusive federal jurisdiction.

Discussion: If you intend on having more than one location listed on the license, give the physical address for each facility. A PO box address is not acceptable.

"Temporary job site" means a location, other than the specific location(s) authorized on the license, where you use radioactive material (a portable gauge) for limited periods of time.

The license allows storage of radioactive material at a temporary job site for no more than 90 days in any 12-month period.

You must amend your license before receiving, using, or storing a portable gauge at an address or location not already listed on the license.

Response from Applicant: Provide each address where you will use or store radioactive material including the street address, suite number (if applicable), city, state, and zip code. If applicable, check the box if you intend on using radioactive material at temporary job sites in Texas.

Item 3b: Address Where Records Will Be Maintained

Rules: 25 TAC §289.202(ll)(5)

Criteria: Choose a main records site and maintain all records at that site. Do the same at each authorized use site, per 25 TAC §289.202(ll)(5) and as specified in the license conditions.

Discussion: You must keep records pertinent to operations at each authorized use site and copies of all records at the main site. The agency will designate the main records address on the license.

Response from Applicant: Provide the street address, suite number (if applicable), city, state, and zip code of the main records site.

Item 4: Radiation Safety Officer

Rules: 25 TAC §289.252(f)(1)

Criteria: You must appoint an RSO per 25 TAC §289.252(f)(1).

Discussion: The RSO serves as the primary contact with the agency and is responsible for establishing and overseeing the radiation protection program. The agency will name the RSO on the license.

Response from Applicant: Provide the proposed radiation safety officer's name and contact information, including email address. Failure to provide proper contact information may delay processing the application.

Item 5: Radioactive Material Requested

Rules: 25 TAC §289.252(d)(9), 25 TAC §289.252(e)(5), 25 TAC §289.252(v)

Criteria: Provide the radionuclide, the physical form, and activity for each requested sealed source.

You must provide the manufacturer's name and model number for each sealed source and portable gauge per 25 TAC §289.252(d)(9) and 25 TAC §289.252(e)(5) as listed in the NRC registry. You can verify the manufacturer and model numbers at the NRC web page "Obtaining Reports from the National Registry" at https://www.nrc.gov/materials/miau/ssd/obtain-reports.html. You must show the maximum numbers of each model gauge that you will possess and provide a description of how you will use the gauge.

You may possess and use only those sealed sources and devices approved and registered by the agency, the NRC, or another Agreement State. Use them for the purposes for which the manufacturer or distributor designed them for. (As specified in an approved Sealed Source and Device (SSD) registration certificate per 25 TAC §289.252(v)).

Discussion: The agency, the NRC, or another Agreement State performs safety evaluations of portable gauges before distributing the devices to specific licensees. They document the safety evaluation in a SSD registration certificate issued to the manufacturer.

SSD registration certificates have information specific to the sealed source and device. These include conditions of normal use, leak test intervals, device labeling, and external radiation levels. The user manual supplied with the device also has this information. Except when specifically approved by the agency, always use a gauge corresponding to its user manual and SSD certificate. You may get a copy of the SSD certificate from the manufacturer or distributor. If the manufacturer or distributor is no longer in business, request a copy from the agency or the issuing Agreement State. The agency will review requests to use a gauge for purposes not listed in the SSD registration certificate on a case-by-case basis. We may need a custom registration certificate review. This will increase the time needed to process a license application.

Response from Applicant: Provide the following:

- Identify each radionuclide, physical form, and activity for each sealed source in each gauge.
- Identify the manufacturer and model number of each type of sealed source and gauge.
- State the number of each type of model requested.
- Specify the purpose of use for each gauge.

Note: You may use the "Application Review Checklist" to describe information requested in Item 5 or you may submit the information as a separate attachment.

Item 6: Individual(s) Responsible for the Radiation Protection Program and Their Training and Experience

Rules: 25 TAC §289.252(e)(6), 25 TAC §289.252(f)(2), 25 TAC §289.252(x)(5), 25 TAC §289.252(jj)(1)

Criteria: The RSO's training and experience should be consistent with the type and quantities of radioactive material listed on the license. You must also establish, in writing, the authority, duties, and responsibilities of the RSO as required by 25 TAC §289.252(f)(2). The RSO must meet the minimum qualifications specified 25 TAC §289.252(f).

Discussion: The person responsible for the radiation protection program is the RSO. The RSO must have adequate training to understand the hazards associated with radioactive material and be familiar with all applicable regulatory requirements. The RSO is key to overseeing and ensuring safe operation of the radiation protection program.

The RSO should have, at a minimum:

1. Possession of a high school diploma or a certificate of high school equivalency based on the GED test;
2. Successful completion of a portable gauge user course; and
3. Training and experience corresponding to the scope of proposed activities.

Training should include, at a minimum, the subjects in 25 TAC §289.252(jj)(1):

- Radiation protection principles
- Characteristics of ionizing radiation
- Units of radiation dose and quantities
- Radiation detection and measurement instrumentation
- Biological hazards of exposure to radiation (appropriate to types and forms used)
- Hands-on use of radioactive materials
- Pertinent federal and state regulations
- Licensee's written operating, safety, and emergency procedures
- Licensee's record-keeping procedures

Experience should include the following areas:

- Use of a portable gauge
- Security and control of a portable gauge
- Planning and conducting surveys
- Monitoring inventory of portable gauges possessed under the license
- Maintaining records of receipts, transfers, and disposal of portable gauges
- Planning, conducting, and documenting audits and other evaluations of the radiation safety program

- Evaluation and documentation of radiation exposures
- Maintaining required records of the radiation safety program and providing required reports
- Other applicable duties and responsibilities, as described in Appendix B

The agency lists the RSO's name on the license to ensure management always has a responsible, qualified person identified.

Per 25 TAC §289.252(f)(3), you must establish in writing the authority, duties, and responsibilities of the RSO. You must ensure the RSO has enough authority, organizational freedom, time, and resources to perform their duties and responsibilities. Ensure personnel use radioactive material safely. Ensure personnel are implementing approved radiation safety procedures. You must maintain the required records of licensed activities. You may use Appendix F which serves as a model delegation of authority, to further emphasize the agreement on duties and responsibilities of the RSO by management and the designated RSO.

The RSO may delegate certain day-to-day tasks of the radiation protection program to other responsible individuals. For example, a licensee with more than one authorized site of use may request the designation of a "Site RSO" (SRSO), who helps the RSO with the day-to-day activities at the location. A SRSO must meet all RSO qualifications. They should be an experienced authorized user with good knowledge of their assigned duties. SRSOs are on the license but the RSO has ultimate responsibility for the radiation protection program.

The RSO must have independent authority to stop operations they consider unsafe. Appendix B lists the specific duties of the RSO listed in 25 TAC §289.252(f)(3)(A) through (O).

The agency may allow individuals such as a consultant to fill the role of RSO or to support the facility RSO. You should note the RSO must be onsite periodically to conduct meaningful, person-to-person interactions with licensee staff. This is to ensure the duties and responsibilities corresponding to the scope of licensed activities meet the requirements of 25 TAC §289.252(f)(5).

You must provide additional information to demonstrate that you can satisfy the requirements in 25 TAC §289.252(f)(5) and (6) if the RSO is not based at the main site and if there are multiple sites authorized on the license.

Response from Applicant: Provide the following:

- An organizational chart or listing of the people responsible for the radiation protection program. This includes the reporting structure through upper management;
- Documents showing the proposed RSO is qualified by education, training, and experience as described above;
- If you appoint a SRSO, give the person's name and documents showing qualification by education, training, and experience.

Note:

- The agency will review alternative responses against the criteria listed above.
- Notify the agency, in writing, within 15 calendar days, if an RSO permanently ends their duties under the license, as required by 25 TAC §289.252(x)(5).

Item 7: Training for a Radiation Worker and Individual(s) Working in or Frequenting Restricted Areas

7.1 Radiation Worker

Rules: 25 TAC §289.252(e)(1), 25 TAC §289.252(jj)(1), 25 TAC 289.257(e)(1)(7)

Criteria: A portable gauge user must have suitable training and experience to handle radioactive material, per 25 TAC §289.252(e)(1). The agency considers successful completion of the following to be evidence of suitable training and experience:

- Portable gauge manufacturer's course or equivalent course meeting the criteria in 25 TAC §289.252(jj)(1);
- Documentation of experience in the use and handling of a portable gauge in the field. A resume, training log, or a record of on-the-job training performed under the supervision of an experienced gauge user or RSO is acceptable.

Discussion: A gauge user is responsible for ensuring the surveillance, proper use, security, and routine maintenance of a portable gauge. The gauge user should also show competence in the use and handling of the gauge.

Response from Applicant: Provide the following:

- The statements:
  - "Before using radioactive material, we will ensure personnel successfully complete a portable gauge manufacturer's course or equivalent course meeting the criteria in 25 TAC §289.252(jj)(1); and they have experience in the use and handling of a portable gauge";
  - "Individuals who prepare packages containing radioactive material for shipment or transport will complete hazardous materials training within 90 days after employment or a change in job function and every 3 years thereafter, per Title 49, CFR, Part 172: Subpart H."

Note:

- You should keep training records for each authorized user for at least 3 years.
- In addition to online training, authorized users should receive hands-on training.
- The agency will evaluate alternative responses against the criteria listed above.

7.2 Individual(s) Working in or Frequenting Restricted Areas

Rules: 25 TAC §289.203(c)

Criteria: Anyone whose duties involve

- radiation exposure or contact with radioactive materials, and
- who are likely to receive an occupational dose of radiation greater than 100 millirem (mrem) [1 millisievert (mSv)] in a year,

must get instructions complementary to their duties and responsibilities, as required by 25 TAC §289.203(c), "Instructions to Workers."

Discussion: Before beginning work with or near radioactive material, anyone likely to receive an occupational dose more than 100 millirem (mrem) [1 mSv] in a year must receive radiation safety training. This training corresponds with their assigned duties and is specific to the licensee's radiation safety program.

Training may be in the form of

- lecture
- demonstrations

- pre-recorded videos
- self-study

It should emphasize practical subjects important to the safe use of a portable gauge. The person conducting the training should be a qualified individual (that is, a person who meets the qualifications for RSO or radiation worker and is familiar with the licensee's program).

Other workers (clerical, housekeeping, security) who work near radioactive material (whether escorted or not) but do not handle a gauge, are not required to have radiation safety training as long as they are not likely to receive a dose of 100 millirem [1 mSv] in a year. To reduce potential radiation exposure when they are working near a gauge, they should work under the supervision and in the physical presence of a gauge user. (Or provide them with some basic radiation safety training.) You should inform these workers of the nature and location of the gauge(s) and the meaning of the radiation symbol. Instruct them not to touch the gauge and to keep away from it as much as their work permits.

Do not assume prior employment has covered safety instruction. Provide site-specific training to all individuals.

Response from Applicant: Provide the following:

A description of the radiation safety training program. This includes:

- topics covered
- workers trained
- assessment of training
- instructor qualifications
- method and frequency of training.

Item 8: Facilities and Equipment

Rules: 25 TAC §289.202(e)(2), 25 TAC §289.202(f), 25 TAC §289.202(n), 25 TAC §289.202(y), 25 TAC §289.202(aa), 25 TAC §289.203(b), 25 TAC §289.252(d)(7), 25 TAC §289.252(e)(2) and (e)(9)

Criteria: You must demonstrate the facility you will use to store or use a portable gauge is adequate to protect health and minimize danger to life or property, per 25 TAC §289.252(e)(2). You must use, to the extent practical, procedures and

engineering controls to achieve occupational doses and public doses are ALARA [25 TAC §289.202(e)(2)].

Per 25 TAC §289.202(y), you must secure a portable gauge from unauthorized access or removal. You must also use a minimum of two independent physical controls that form tangible barriers to secure gauges not under constant control and surveillance.

You must post caution signs and notices to workers as required by 25 TAC §289.202(aa) and 25 TAC §289.203(b), respectively.

Discussion: Describe the proposed facilities and equipment. Identify the restricted area. 25 TAC §289.201(b)(108) defines a restricted area as "any area where you limit access to protect individuals from undue risk against sources of radiation."

Show that your facility and equipment:

- provides enough engineering controls and barriers to protect the health and safety of the public and your employees,
- keeps exposures to radiation and radioactive materials ALARA, and
- reduces danger to life and property from the use of radioactive material.

The facility diagram should include the room(s) where you will use or store a portable gauge at a level of detail enough to show:

- The facilities and equipment are adequate to protect health and minimize danger to life or property;
- Controlled access by using a minimum of two independent physical controls that form tangible barriers to secure gauges not under constant control and surveillance, per 25 TAC §289.202(y);
- The use of a portable gauge will not exceed the occupational or public dose limits in 25 TAC §289.202(f) and 25 TAC §289.202(n), respectively.

Refer to Appendix E for acceptable methods of securing portable gauges.

You must provide a written statement from the property owner, or the owner's agent, recognizing they are aware you are storing or using devices containing radioactive material on the property if you do not own the property.

Response from Applicant: Provide the following:

- A facility floor plan or diagram showing each room where you will use or store radioactive material and the principal use of each adjacent room;
- A description of the two independent physical controls used to secure a portable gauge from unauthorized removal while in storage;
- Identify the owner of each proposed storage facility. If another company owns the facility, provide a letter from the owner or the owner's agent, acknowledging they are aware you are using or storing devices containing radioactive material on the property.

8.1 Radiation Monitoring Instruments

Rules: 25 TAC §289.202(p), 25 TAC §289.202(nn), 25 TAC §289.252(e)(2), 25 TAC §289.202(ggg)(5)

Criteria: You must possess or have access to a calibrated survey meter or instrument that detects and measures radiation. Before using the survey meter, you should check it for functionality using a portable gauge or a check source. The radiation survey meter should be capable of detecting gamma and neutron radiation. You should also use the survey meter to ensure compliance with surveys required by 25 TAC §289.202(o) and 25 TAC §289.202(p).

Any instrument used to make quantitative radiation measurements shall be operable and calibrated at intervals not to exceed 12 months. These calibrations must be performed by entities licensed by the agency, the NRC, or an Agreement State, as required by 25 TAC §289.202(p)(3).

You must keep records of the calibration of instruments and equipment used for quantitative radiation measurements for 3 years per 25 TAC §289.202(nn) and (ggg)(5).

Discussion: You should have, or have access to a radiation monitoring instrument, especially for incidents involving a portable gauge. It is important to determine as soon as possible after an incident, using a radiation survey meter, whether the shielding and source are intact.

You should consider the availability of a survey meter during non-business hours and preplan how you will get and use a radiation survey instrument. (e.g., use a radiation survey instrument found on site or get one from your home office, another licensee, a consultant, or a local emergency response organization).

You must have and use a radiation survey meter if you plan to perform non-routine maintenance that needs the source or source rod removed from the gauge.

Each maintenance area should have at least one survey meter capable of detecting gamma and neutron radiation, as applicable, for monitoring during and following the non-routine maintenance procedure.

Response from Applicant: Provide either of the following:

- The manufacturer and model of each survey meter to be possessed;

AND

- The statement: "We will have the survey meter calibrated annually by a person licensed by the agency, NRC or any Agreement State to perform such service."

OR

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

Item 9: Radiation Protection Program

Rules: 25 TAC §289.202(e), 25 TAC §289.252 (e), 25 TAC §289.252(w)(2)

Criteria: Per 25 TAC §289.202(e), you must develop, document, and implement a radiation safety program to ensure compliance with rules. Submit it to the agency with your application per 25 TAC §289.252(e). You may incorporate the program in your operating, safety, and emergency procedures.

You are responsible for the conduct of all licensed activities and the acts and omissions of individuals handling a portable gauge.

Per 25 TAC §289.252(w)(2), the agency may incorporate in the license, at the time of issuance or thereafter, additional requirements and conditions it deems appropriate or necessary to:

- Minimize danger to occupational and public health and safety and the environment;
- Require reports and recordkeeping; and
- Prevent loss or theft of radioactive material.

Discussion: You must abide by all applicable rules. You must develop, implement, and maintain procedures when required. You must provide requested information

about the proposed radiation safety program during the licensing process. You may find the "Application Review Checklist" helpful when deciding what information you should provide when requesting a license.

Response from Applicant: Provide a response as requested in Items 9.1 – 9.8, below.

References:

NCRP Report No. 127, "Operational Radiation Safety Program," 1998

International Commission on Radiological Protection (ICRP) Report No. 75, "General Principles for the Radiation Protection of Workers," 1997

9.1 Audit Program

Rules: 25 TAC §289.202(e), 25 TAC §289.202(mm), 25 TAC §289.252(f)(3)(M)

Criteria: Review the content and implementation of your radiation protection program at intervals not to exceed 12 months, per 25 TAC §289.202(e), to ensure:

- The radiation protection program is current and conforms with agency and U.S. Department of Transportation (DOT) rules and the terms and conditions of the license;
- Occupational doses and doses to members of the public are ALARA;
- Reevaluate and document the assessment made to determine personnel monitoring is not required for your current operating conditions in accordance with 25 TAC §289.202(q)(1) and (3); and
- You keep proper records for the time required by the regulations.

Per 25 TAC §289.252(f)(3)(M), the RSO must ensure personnel follow agency rules and the conditions of the license as well as the licensee's operating, safety, and emergency procedures.

Discussion: Appendix C has a suggested yearly audit program specific to the use of a portable gauge that is acceptable to the agency. There are areas in Appendix C that may not apply to you. There may also be items that you do not need to address during each audit; so, you may wish to develop an audit checklist specific to your program. You must review or audit, once a year, the content and implementation of your radiation protection program.

A performance-based review is one way to ensure personnel are following radiation safety procedures. This involves observing work in progress, interviewing staff, and spot-checking required records. As part of your review or audit program, you should consider including unannounced audits of authorized users. Once you find a problem, you need to take comprehensive corrective actions.

The agency has found audit records having the following information to be acceptable:

- Date of audit
- Name of person(s) who conducted audit
- Persons contacted by the auditor(s)
- Areas audited
- Audit findings
- Corrective actions

- Follow-up

25 TAC §289.202(mm) requires you to keep records of audits and other program content and implementation reviews for 3 years.

Response from Applicant: Provide the following:

- The statement: "We will perform an audit of the radiation protection program content and implementation at an interval not to exceed 12 months";
- A description of the program for ensuring personnel are complying with agency rules, conditions of the license, the operating, safety, and emergency procedures; and
- The document(s) used to perform audits and other reviews of the program.

References:

NCRP Report No. 162, "Self-Assessment of Radiation-Safety Programs," 2009

Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," May 1, 1996

9.2 Material Receipt and Accountability

Rules: 25 TAC §289.201(d), 25 TAC §289.202(y), 25 TAC §289.202 (ww), 25 TAC §289.202 (ggg)(5), 25 TAC §289.252(f)(3)(L), 25 TAC §289.252(cc)

Criteria: To keep accountability of portable gauges containing radioactive material, you must do the following:

- Secure the portable gauge. [25 TAC §289.202(y)]
- Maintain records of receipt, transfer, and disposal. [25 TAC §289.201(d)]
- Conduct physical inventories twice a year to account for all portable gauges containing radioactive material. [25 TAC §289.252(f)(3)(L)]
- Keep utilization records or log books for portable gauges transported to and from temporary job sites. These records, per 25 TAC §289.202(y), must include the following:
    - The manufacturer
    - Model and serial number of the portable gauge
    - The name of the individual(s) transporting and using the gauge
    - The location(s) where each gauge is used
    - The date the gauge is removed from storage
    - The date the gauge is returned to storage

Discussion: You must track radioactive material "from cradle to grave." This means from receipt (from another licensee) to its eventual transfer or disposal. This ensures accountability. Missing radioactive material is identifiable and documents show the last confirmed owner of the material when it is lost, stolen [25 TAC §289.202(ww)], or misplaced. It further ensures you do not exceed the possession limits listed on your license.

You are required per 25 TAC §289.202(y) to secure radioactive materials from unauthorized removal or access while in storage. You must control and keep constant surveillance over a portable gauge that is not in storage.

You must keep receipt, transfer, and disposal records until the agency authorizes disposal, as required by 25 TAC §289.201(d)(1)(B). These records have the following types of information:

- A unique identifier of each device containing radioactive material including manufacturer name, isotope, activity, and serial number
- Location of each sealed source and device
- For inventories: the date of the inventory, and the name and signature of the individual conducting the inventory
- For portable gauges transferred or disposed of: the date of the transfer or disposal, and the name and license number of the recipient and a description of the radioactive material (e.g., manufacturer name, isotope, activity, model number and serial number)

Response from Applicant: Provide the following:

- A description of how you will secure radioactive material from unauthorized removal or access.
- The statements:
  - "We will document and retain records of receipt, transfer and disposal for all sealed sources. We will maintain records until the agency authorizes disposal."
  - "We will perform a physical inventory of all sealed sources at intervals not to exceed six months. We will maintain records for three years. The record will include the following for each sealed source:
    - ◊ Model number
    - ◊ Serial number
    - ◊ Radionuclide
    - ◊ Activity
    - ◊ Location

        - ◊ Date of inventory and identification of the individual who performed the inventory."
    - "We will record the utilization of a portable gauge when it is removed from and returned to a licensed site. Records will be maintained for 3 years after the record is made".

9.3 Occupational Dose

Rules: 25 TAC §289.202(f), 25 TAC §289.202(l), 25 TAC §289.202(m), 25 TAC §289.202(p), 25 TAC §289.202(q), 25 TAC §289.202(rr), 25 TAC §289.202(aaa)

Criteria: You must evaluate the potential exposure of all workers and monitor occupational exposure. Per 25 TAC §289.202(q), you must use individual monitoring devices for external dose for:

- Adults who are likely to receive an annual dose in excess of any of the following (each evaluated separately):
    - 0.5 rem [5 mSv] total effective dose equivalent
    - 1.5 rem [15 mSv] lens of the eye equivalent
    - 5 rems [50 mSv] shallow-dose equivalent to the skin
    - 5 rems [50 mSv] shallow-dose equivalent to any extremity
- Minors who are likely to receive an annual dose in excess of any of the following (each evaluated separately):
    - 0.1 rem [1.0 mSv] total effective dose equivalent
    - 0.15 rem [1.5 mSv] lens of the eye dose equivalent
    - 0.5 rem [5 mSv] shallow-dose equivalent to the skin
    - 0.5 rem [5 mSv] shallow-dose equivalent to any extremity
- Declared pregnant women who are likely to receive a dose from radiation sources external to the body during the entire pregnancy exceeding a deep-dose equivalent of 0.1 rem [1.0 mSv].
- Individuals entering a high or very high radiation area

25 TAC §289.202(c)(7), defines a declared pregnant woman as "a woman who has voluntarily informed the licensee, in writing, of her pregnancy and estimated date of conception. The declaration remains in effect until the declared pregnant woman voluntarily withdraws the declaration in writing or is no longer pregnant."

Discussion: You must monitor for occupational exposure if an adult radiation worker is likely to receive in one year a dose greater than 10 percent of any applicable limit.

You must also monitor minors and declared pregnant women. You should perform an evaluation of the dose the individual is likely to receive prior to allowing the individual to receive the dose. You do not need to do this evaluation for every individual. Evaluations used for minors and pregnant women can be used for employees with similar job functions or work areas.

You must use a National Voluntary Laboratory Accreditation Program (NVLAP) approved processor for personnel dosimeters that require processing to determine the radiation dose complies with 25 TAC §289.202(q)(1).

The exchange frequency for dosimeters is typically monthly or quarterly. You should consult with an NVLAP approved processor for its recommendations on exchange frequency and proper use of the dosimeter. The National Institute of Standards and Technology (NIST) maintains a directory of laboratories that are NVLAP-approved.

Response from Applicant: Provide one of the following:

- Documents showing that unmonitored individuals are not likely to receive a dose more than 10% of the limits in 25 TAC §289.202(f)(1).

OR

- The statement: "We will provide and require the use of individual monitoring devices (dosimetry). An NVLAP-approved processor will evaluate and process personnel dosimeters that need processing to determine the radiation dose."

9.4 Public Dose

Rules: 25 TAC §289.202(n), 25 TAC §289.202(o), 25 TAC §289.202(y), 25 TAC §289.202(ss)

Criteria: You must ensure that a portable gauge will be used, transported, stored, and disposed of in such a way that a member of the public will not receive more than 100 mrem [1 mSv] in 1 year. Also, the dose in any unrestricted area will not exceed 2 mrem [0.02 mSv] in any 1 hour, from licensed operations.

You must control and keep constant surveillance over a gauge not in storage and secure a stored gauge to prevent unauthorized access, removal, or use.

Discussion: 25 TAC §289.201(b) defines public dose as "the dose received by a member of the public from exposure to sources of radiation released by a licensee, or to any other source of radiation under the control of a licensee."

A "public dose" excludes occupational doses received from background radiation and any medical procedures. Whether the dose to an individual is an occupational dose or a public dose depends on the individual's assigned duties. It does not depend on the area where the individual is when they receive the dose.

"Members of the public" include persons who live, work, or may be near locations where a licensee is using or storing a gauge. They also include employees whose assigned duties do not include the use of a gauge and who work in the vicinity where a licensee is using or storing a gauge.

Operating, safety and emergency procedures for security and surveillance specified under Section 9.5 should be enough to limit the exposure to the public during use or storage and after accidents.

Public dose is controlled, in part, by ensuring that a gauge securely stored in a locked area to prevent unauthorized access or use when it is not being used by an authorized user. If a gauge is not in storage, then authorized users must keep constant surveillance and control. This ensures members of the public (who could be coworkers) do not get near the gauge or use it and thus get unnecessary radiation exposure.

The choice of storage location and conditions also affect public dose. There is always a radiation field around the gauge. Store the gauge so the radiation level in an unrestricted area (e.g., an office, the exterior surface of an outside wall, or occupied areas of a personal house) does not result in a dose that exceeds 100 mrem [1 mSv] in a year or 2 mrem [0.02 mSv] in any one hour. Consider time, distance, and shielding when choosing a permanent or temporary storage location. Decreasing the time spent near a gauge or increasing the distance from the gauge and using shielding (i.e., brick, concrete, lead, or other solid walls) will reduce radiation exposure. Store a gauge as far away as possible from areas that other employees and members of the public occupy.

Determine the radiation levels (including areas above or below the storage location) by either calculations or a combination of direct measurements and calculations using some or all the following:

- Typical known radiation levels provided by the manufacturer

- The "inverse square" law to evaluate the effect of distance on radiation levels
- The occupancy factors to account for the actual presence of the member of the public and of the gauge
- The types of radiation, such as gamma or neutron

You will have to perform a new evaluation if you make a change that affects the storage area to ensure public dose limits are not exceeded. Below are examples of changes that can affect the storage area:

- Changing the location of a gauge within the storage area
- Removing any shielding
- Adding a gauge
- Changing the occupancy of adjacent areas
- Moving the storage area to a new location

As part of your evaluation you must also ensure that you properly secure the gauge.

Response from Applicant:

- Provide a procedure for showing any member of the public will not exceed a radiation dose of 100 mrem [1 mSv] in a year and the dose in any unrestricted area will not exceed 2 mrem [0.02 mSv] in any one hour.

9.5 Operating, Safety and Emergency Procedures

Rules: 25 TAC §289.202(e), 25 TAC §289.202(y)(1), 25 TAC §289.202(y)(2), 25 TAC §289.202(ww), 25 TAC §289.202(xx), 25 TAC §289.202(yy), 25 TAC §289.202(y)(3)

Criteria: You must do the following:

- Keep radiation doses to workers and members of the public ALARA.
- Ensure proper security of the portable gauge.
- Make the required notifications of events to the agency.

Discussion: You are responsible for the security and safe use of a gauge from the its arrival at the facility until is it transferred or disposed.

You must develop, put in place, and keep written procedures that ensures only trained personnel will handle and use a gauge, and do so without undue hazard to workers or members of the public.

Appendix D includes model procedures you may adopt, or you may develop your own operating, safety, and emergency procedures. Portable gauge users should review the operating, safety, and emergency procedures and have them available at each jobsite.

The written procedures should include the following elements:

- Instructions for using the gauge and performing routine maintenance according to the manufacturer's recommendations and instructions
- Instructions for keeping gauges secure during storage and transportation
- Instructions to keep the gauge under control and constant surveillance during field operations
- Steps to take to keep radiation exposures ALARA
- Steps to keep accountability during use
- Emergency procedures to be followed in case of accidents involving damage or loss of the gauges. This includes names and telephone numbers of the individual(s) in the applicant's organization who should be notified. They will, in turn, notify the local police and proper state personnel
- Steps to control access to a damaged gauge

Per 25 TAC §289.202(y)(2), you must maintain constant surveillance and control of a portable gauge in an unrestricted area and not in storage. The rule requires that you must use a minimum of two independent physical controls that form tangible barriers to secure a portable gauge. Appendix E provides methods for securing a portable gauge using two independent controls.

You must notify the agency when a gauge is lost, stolen, or damaged. Refer to 25 TAC §289.202(xx) for a description of when and where such notifications are required. You must notify the agency's Radiological Emergency Assistance number (512)458-7460.

Response from Applicant: Provide the following:

- Operating, safety and emergency procedures; and
- The statement: "We will provide copies of these procedures to all portable gauge users and they will be available at each jobsite."

9.6 Leak Tests

Rules: 25 TAC §289.201(g), 25 TAC §289.202(oo), 25 TAC §289.202(bbb)

Criteria: The regulations require testing to determine if there is any radioactive leakage from sealed sources. Persons authorized by the agency, the NRC or another

Agreement State must perform the analysis of tests for leakage or contamination. Rule 25 TAC §289.202(oo) requires that you keep leak test records for five years.

Discussion: Per §289.201(g), you must perform a leak test at 6-month intervals or at other intervals approved by the agency, the NRC or an Agreement State and specified in the SSD registration certificate and before first use, unless accompanied by a certificate indicating the test was performed within the past 6 months.

You should collect a leak test sample at the most accessible area where contamination would accumulate if the sealed source was leaking. If the test reveals the presence of 0.005 microcuries [185 Bq] or more of removable contamination, you must immediately withdraw the source from use and take action to prevent the spread of contamination. You must notify the agency per 25 TAC §289.202(bbb).

Response from Applicant: Provide one of the following:

- The statement: "We will perform leak tests at intervals specified in rule or in the Sealed Source and Device registration certificate. An organization licensed by the agency, the NRC or another Agreement State Leak tests will analyze the leak tests".

OR

- If you will perform leak test analysis in-house, provide the manufacturer and model of the instrument used to analyze leak test samples;

AND

- A copy of your procedures for performing leak test sample analysis.

Note: The agency will authorize requests to perform leak test sample analysis by license condition.

9.7 Maintenance

Rules: 25 TAC §289.202(e), 25 TAC §289.252(w)(2)

Criteria: You should clean and maintain a portable gauge according to the manufacturer's written instructions. You should also ensure the gauge functions as designed and that you have not weakened the source integrity during routine maintenance.

The radiation safety procedures for routine cleaning and lubrication of the source rod and shutter mechanism should consider the possibility of personnel receiving exposures to the whole body, as well on the hands, from handling the source rod.

The gauge manufacturer or a person authorized by the agency, the NRC, or another agreement state must perform any non-routine maintenance or repairs. Non-routine maintenance involves detaching the source or source rod from the gauge (and any other activities where personnel could receive radiation doses exceeding regulatory limits). If the maintenance or repairs are not performed properly, the gauge may not operate as designed. Then personnel performing these tasks could receive an excessive radiation dose. In a period of 5–10 minutes, a typical moisture density gauge with its sources unshielded can deliver 5 rems [50 mSv] to a worker's hands or fingers, assuming they are 1 centimeter from the sources. The threshold for extremity monitoring is 5 rems [50 mSv] per year.

Discussion: You may perform routine maintenance, provided you follow the gauge manufacturer's instructions. Although manufacturers may use different terms, "routine maintenance" includes cleaning, lubrication, changing batteries or fuses, and repairing or replacing a handle.

Routine maintenance does not include any activities that involve removing the sealed source or source rod from the gauge.

Do not perform non-routine maintenance or repair operations that involve detaching the source or source rod from the gauge. Return the gauge to the manufacturer. If you wish to perform non-routine operations, submit procedures for review.

Response from Applicant:

Routine Maintenance ONLY

- The statement: "We will implement and maintain procedures for routine maintenance of gauges according to each manufacturer's written recommendations and instructions";

OR

- Alternative procedures for agency review;

AND

- The statement: "The gauge manufacturer, or other persons licensed by the agency, NRC, or another Agreement State will perform non-routine maintenance or repair operations that require detaching the source or source rod from the gauge."

Routine and Nonroutine Maintenance

- The statement: "We will implement and maintain procedures for routine maintenance of gauges according to each manufacturer's written recommendations and instructions;

AND

- Procedures to support the request to perform nonroutine maintenance.

Note: The agency will authorize requests to perform nonroutine maintenance by license condition.

9.8 Transportation

Rules: 25 TAC §289.257(e), 49 CFR 107, 171–180, and 390–397

Criteria: You must develop, implement, and maintain a safety program for transportation of radioactive material if you will prepare for shipment, ship, or transport radioactive material to ensure compliance with agency and U.S. Department of Transportation (DOT) regulations.

Discussion: The agency incorporates by reference DOT requirements in Title 49 Code of Federal Regulations (CFR) in 25 TAC §289.257(e). Licensees who deliver radioactive material to a carrier for transport, transports the material outside the authorized sites listed on the license, or transport material on public highways are subject to packaging and transport requirements.

Under 49 CFR 172.704, "Training requirements," each person (shipper or carrier) involved in the transportation of radioactive materials must receive proper training for the jobs the employee performs related to transportation, every 3 years. These jobs include activities such as packaging radioactive materials, loading and securing the package on a vehicle, or preparation of paperwork for shipping the material. Appendix H lists applicable DOT regulations.

Instructions to personnel should not reference DOT requirements. You should rephrase information and place it into the instructions, so personnel know exactly what you expect from them. The instructions should include the following elements:

- A portable gauge must be in its approved Type A package during shipment or transport.
- Each package must be marked on the outside with "USA DOT 7A TYPE A", "RADIOACTIVE MATERIAL", the proper shipping name and United Nations identification number (UN ID) and "RQ" for "Reportable Quantities". If a common carrier transports it, it must also be marked with the name and address of the shipper and consignee.
- Each package must be labeled with a RADIOACTIVE YELLOW-II hazard label to include the contents, activity, and transport index (TI). A label must be affixed to opposite sides of the package.
- Each package must have a security feature, such as a seal, to demonstrate the package has not been opened during shipment or transport.
- Packages must be visually inspected prior to each shipment for sound physical condition and all closure devices are present and secured.
- Packages cannot be carried in passenger compartments, must be maintained a minimum distance away from vehicle occupants, and must be blocked and braced against movement within the transport vehicle.
- Shipping papers must be prepared in accordance with all requirements and must be readily accessible. Licensees who use a "permanent shipping paper" or the same shipping paper for multiple shipments of the same gauge must also retain a separate record of each shipment including: the proper shipping name, the UN number, total activity of the sources in the shipment, and the date of shipment.

- Vehicle accidents involving fire, breakage, spillage, or suspected contamination must be reported to the agency and to DOT as soon as possible.

Response from Applicant: Provide procedures for shipment or transport of a portable gauge.

9.9 Recordkeeping

Rules: 25 TAC §289.201(d), 25 TAC §289.202(ll) – (vv), 25 TAC §289.202(ggg)(5), 25 TAC §289.252(gg)(7), 25 TAC §289.252(mm)

Criteria: The general provision for records is identified in 25 TAC §289.202(ll).

You must maintain records as provided in 25 TAC §289.201(d); 25 TAC §289.202(ggg)(5); and 25 TAC §289.202(ll) – (vv).

Each licensee must make, maintain, and retain records at each authorized use site per 25 TAC §289.202(mm) and 25 TAC §289.252(mm).

Discussion: You must maintain certain records to comply with agency rules, the conditions of the license, and commitments made in the license application and correspondence with the agency.

If a licensee has a leaking source, records must be maintained in accordance with 25 TAC §289.252(gg)(7).

Operating procedures should identify which individuals in the organization are responsible for maintaining which records.

Response from Applicant: No response is necessary.

9.10 Reporting

Rules: 25 TAC §289.202(ww) – (bbb), 25 TAC §289.202(hhh)(1)

Criteria: You must report to the agency via telephone, written report, or both, in the event the safety or security of a portable gauge containing radioactive material is compromised. 25 TAC §289.202(ww) – (bbb) and 25 TAC §289.202(hhh)(1) explain the specific events that require reporting and specify the timing and type of reporting requirements.

Discussion: The agency requires licensees to report incidents that might compromise the health and safety of the public. Therefore, 25 TAC §289.202 includes provisions describing reporting requirements. Refer to Appendix G for a table of reporting requirements.

Response from Applicant: No response is necessary.

Item 10: Waste Management

Rules: 25 TAC §289.202(d)(1); 25 TAC §289.202(ff), 25 TAC §289.252(x)(11), 25 TAC §289.252(cc)

Criteria: You must dispose of radioactive material per agency requirements by transfer to an authorized recipient and maintain those records.

Discussion: The radiation protection program you develop, document, and implement per 25 TAC §289.202(e) must include provisions for disposal of devices containing radioactive material.

Problems can arise from improper gauge transfer or failure to dispose of a gauge in a proper and timely manner. These include the possession of radioactive materials by unauthorized individuals, which could result in exposures to members of the public.

You must transfer or dispose sources or devices that have not been used for longer than 24 months per 25 TAC §289.252(x)(11) or provide a plan for future use. When disposing of a gauge, you must transfer it to an authorized recipient. "Authorized recipients" are:

- the original manufacturer of the device
- a commercial firm licensed by the NRC or an Agreement State to accept radioactive waste from other persons
- or another specific licensee authorized to have the licensed material.

Before transferring radioactive material, you must verify the recipient may receive the gauges by either getting a copy of the recipient's radioactive material license or getting license verification from the agency, the NRC, or Agreement State, as applicable.

All packages containing radioactive sources must be prepared and shipped per agency and DOT regulations. You must maintain transfer and disposal records until you end the license.

Response from Applicant: Provide the following:

- The statement: "We will transfer radioactive material only to an authorized recipient."

Item 11: Financial Qualification and Financial Assurance

Rules: 25 TAC §289.252(d)(5), 25 TAC §289.252(d)(6), 25 TAC §289.252(e)(11), 25 TAC §289.252(gg), 25 TAC §289.252(jj)(2), 25 TAC §289.252(jj)(8)

Criteria: Per 25 TAC §289.252(d)(5), you must submit a completed RC Form 252-1, "Business Information Form". You must have a current registration with the Office of the Texas Secretary of State to conduct business in the state unless exempt, as described in 25 TAC §289.252(e)(11). If you use an assumed name or "doing business as" (dba) name, you must register it with the Office of the Texas Secretary of State or county clerk's office, per 25 TAC §289.252(e)(11).

Per 25 TAC §289.252(d)(6), you must prove to the agency you are financially qualified to conduct the activity requested for a license. This includes any required decontamination and disposal of radioactive material. 25 TAC §289.252(jj)(8) specifies methods for demonstrating financial qualification. You can show financial qualification by checking the proper box on page 1 of RC Form 252-1, "Business Information Form".

Licensees who are licensed to possess more radioactive materials than the limits specified in 25 TAC §289.252(gg), "Financial assurance and recordkeeping for decommissioning," must have evidence of financial assurance for decommissioning. 25 TAC §289.252(jj)(2) lists amounts of specific radionuclide activities that dictate certain levels of financial assurance.

All licensees must keep records of information important to the decommissioning of the facility in an known location until the site is released for unrestricted use..

Discussion: The agency seeks to ensure that decommissioning is done with the least impact on both public and occupational health and safety and the environment. There are two parts to the rule: (i) financial assurance, which applies to some licensees, and (ii) recordkeeping, which applies to all licensees.

The need to provide financial qualification is separate from the need specified in subsection 25 TAC §289.252(gg) for certain applicants or licensees to provide financial assurance.

Once licensed, you must immediately notify the agency in writing after any kind of bankruptcy filing as identified in 25 TAC §289.252(x)(6) – (8).

The financial assurance requirements are specific to the types and amounts of radioactive material authorized on a license. Most portable gauge applicants and licensees do not need to follow the financial assurance requirements because the thresholds for sealed sources are very high. A licensee would need to have hundreds of gauges before the financial assurance requirements would apply. Applicants and licensees wishing to have gauges exceeding the threshold amounts must submit evidence of financial assurance.

25 TAC §289.252(gg) describes the requirements for financial assurance and record keeping for decommissioning.

Response from Applicant: Provide the following:

- A completed Business Information Form, RC 252-1
- For Corporations, Limited Liability Companies (LLC), Limited Partnerships (LP), or Professional Associations (PA): Attach a copy of your "certificate of status" issued by the Office of the Texas Secretary of State. If using a dba, also submit your "certificate of filing."
- For Government entities, Sole Proprietorships or General Partnerships: Attach a copy of your Employer Identification Number (EIN) certificate or other documentation confirming your EIN. If using a dba, also submit your "certificate of filing" issued by the Office of the Texas Secretary of State.

Item 12: Certification

The chief executive officer or individual delegated the authority to manage the licensee's activities must sign RC Form 252-2, as required by 25 TAC §289.252(d)(2). The person signing the application must be authorized to sign official documents on behalf of the applicant/licensee. As discussed in "Management Responsibility," signing the application certifies management's commitment and responsibility for the radiation protection program. The agency will return all unsigned applications for proper signature.

The RSO, if not a member of company management, may sign an initial application if the applicant also provides a signed "Delegation of Authority". Refer to Appendix F. It includes a model document you may use for this purpose.

Note: When the application references commitments, those items become binding and are part of the license conditions and regulatory requirements.

7. License Amendments

Timely Submittal of Amendments

Rules: 25 TAC §289.252(w)(2), 25 TAC §289.252(aa)

Criteria: It is the licensee's obligation to keep the license current. If you change any of the information provided in the original application, you must submit a request for a license amendment before the change takes place.

Per 25 TAC §289.252(aa), a license amendment request must specify how the license should be amended, why the amendment is needed and be signed by management or the RSO.

The change is not in effect until the agency issues the amendment.

Discussion: Under 25 TAC §289.252(aa), you must apply for and receive a license amendment before several activities can occur, including:

- Changing the RSO
- Receiving or using radioactive material not authorized on your current license
- Receiving radioactive material more than the amount or in a different form
- Receiving a different radionuclide than authorized on the license
- Adding or changing the areas in which you use or store radioactive material
- Changing the address(es) of where you use or store radioactive material
- Changing operating, safety, and emergency procedures

Response from licensee: No response is needed from an applicant for a new license.

Requests for a license amendment must:

- Be signed by management or the RSO;
- Include the license number;
- Specify the respects in which the license should be amended and the grounds for the amendment.

Timely Notification of Transfer of Control

Rule: 25 TAC §289.252(x)(2)

Criteria: Per 25 TAC §289.252(x)(2), transferring licenses to other persons is prohibited unless the agency, after securing full information, finds the transfer is in accordance with agency rules and gives its consent *in writing*. You must contact the agency at least 30 days prior to relinquishing control of a site.

Discussion: Transferring control may be the result of a sale, merger, reorganization or transfer of certain operations or assets of a corporation, partnership, or sole proprietorship.

The agency identifies a licensed legal entity based on the unique file or charter number generated by the Office of the Texas Secretary of State. If transfer of control does not affect the file or charter number, such as a change in company name or organizational changes in officers or registered agent, then an amendment may be required. If transfer of control results in the issuance of a new file or charter number, the new entity must apply for a new radioactive material license and terminate the existing license.

Response from Applicant: No response is required from an applicant for a new license.

Current licensees should refer to Regulatory Guide 8.1, "Guide for Submitting Applications or Amendment Requests due to Changes in Licensed Legal Entity" for more information.

Notification of Bankruptcy Proceedings

Rule: 25 TAC §289.252(x)(6) – (8)

Criteria: Immediately following filing a voluntary or involuntary petition for bankruptcy for or against a licensee, the licensee must notify the agency, *in writing*, identifying the bankruptcy court in which the petition was filed and the date of the filing.

- **Discussion:** Even if a licensee files for bankruptcy, they remain subject to all applicable agency regulatory requirements. The licensee must notify the agency when they are in bankruptcy proceedings to determine whether they have accounted for all radioactive material, adequately controlled it, and whether there are any public health and safety concerns (e.g., contaminated facility).

Response from Applicant: No response is required from an applicant for a new license.

Licensees must immediately notify the agency, in writing, following filing a voluntary or involuntary petition for bankruptcy by or against the licensee.

Other

You must notify the agency of changes as noted below:

- Decommissioning activities per 25 TAC §289.252(y)(4), including permanently ceasing principal activities at a site or under the license;
- Change in mailing address per 25 TAC §289.252(x)(5)(B);
- Name change that does not constitute a transfer of control per 25 TAC §289.252(x)(5)(A);
- The intent to vacate premises, prior to vacating and relinquishing possession or control per 25 TAC §289.202(ccc);
- Waste, sources, or devices not authorized for disposal by decay in storage and not in use for longer than 24 months per 25 TAC §289.252(x)(11).

8. License Renewals

Rules: 25 TAC §289.252(d), 25 TAC §289.252(e), 25 TAC §289.252(z)

Criteria: 25 TAC §289.252(z) requires that the renewal of specific licenses be filed in accordance 25 TAC §289.252(d) and 25 TAC §289.252(e), which describe filing an application for a specific license and the requirements for the issuance of specific licenses, respectively.

Discussion: Licensees are responsible for filing renewal documentation, which consists of all the information required for initial licensure. Submit a renewal application at least 30 days before the license expiration date. Applications received more than 90 days after the license expiration may be reinstated.

Licensees do not need to resubmit training documentation for individuals already authorized on the license when renewing a license.

Response from licensee: Submit a complete and up-to-date application, including all required program elements outlined in the "Application Review Checklist" of this guide. This must be submitted more than 30 days before the license expiration date.

Appendix A. Safety Culture Policy Statement

The purpose of this Statement of Policy is to set forth the agency's expectation that individuals and organizations establish and maintain a positive safety culture commensurate with the safety and security significance of their activities and the nature and complexity of their organizations and functions. This applies to all licensees and applicants for a license, subject to agency authority.

Nuclear Safety Culture is defined as the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment. Individuals and organizations performing regulated activities bear the primary responsibility for safety and security. The performance of individuals and organizations can be monitored and trended and, therefore, may be used to determine compliance with requirements and commitments and may serve as an indicator of possible problem areas in an organization's safety culture. The agency will not monitor or trend values. These will be the organization's responsibility as part of its safety culture program.

Organizations should ensure personnel in the safety and security sectors have an appreciation for the importance of each, emphasizing the need for integration and balance to achieve both safety and security in their activities. Safety and security activities are closely intertwined. While many safety and security activities complement each other, there may be instances in which safety and security interests create competing goals. It is important that consideration of these activities be integrated so as not to diminish or adversely affect either; thus, mechanisms should be established to identify and resolve these differences. A safety culture that accomplishes this would include all nuclear safety and security issues associated with agency-regulated activities.

Experience has shown that certain personal and organizational traits are present in a positive safety culture. A trait, in this case, is a pattern of thinking, feeling, and behaving that emphasizes safety, particularly in goal conflict situations, e.g., production, schedule, and the cost of the effort versus safety. It should be noted that although the term "security" is not expressly included in the following traits, safety and security are the primary pillars of the agency's regulatory mission. Consequently, consideration of both safety and security issues, commensurate with their significance, is an underlying principle of this Statement of Policy.

The following are traits of a positive safety culture:

1. *Leadership Safety Values and Actions* — Leaders demonstrate a commitment to safety in their decisions and behaviors;
2. *Problem Identification and Resolution* — Issues potentially impacting safety are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance;
3. *Personal Accountability* — All individuals take personal responsibility for safety;
4. *Work Processes* — The process of planning and controlling work activities is implemented so safety is maintained;
5. *Continuous Learning* — Opportunities to learn about ways to ensure safety are sought out and implemented;
6. *Environment for Raising Concerns* — A safety-conscious work environment is maintained where personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination;
7. *Effective Safety Communication* — Communication maintains a focus on safety;
8. *Respectful Work Environment* — Trust and respect permeate the organization; and
9. *Questioning Attitude* — Individuals avoid complacency and continuously challenge existing conditions and activities to identify discrepancies that might result in error or inappropriate action.

There may be traits not included in this Statement of Policy that are also important in a positive safety culture. You should note these traits were not developed to be used for inspection purposes.

It is the agency's expectation that all individuals and organizations, performing or overseeing regulated activities involving nuclear materials, should take the necessary steps to promote a positive safety culture by fostering these traits as they apply to their organizational environments. The agency recognizes the diversity of these organizations and acknowledges some organizations have already spent considerable time and resources in the development of a positive safety culture. The agency will take this into consideration as the regulated community addresses the Statement of Policy.

Appendix B. RSO Responsibilities

Every licensee, per 25 TAC §289.252(f)(3), must establish in writing the authority, duties, and responsibilities of the Radiation Safety Officer. You must also ensure the RSO is given enough authority, organizational freedom, time, resources, and management prerogative to perform the following duties:

1. establish and oversee operating, safety, emergency, and as low as reasonably achievable (ALARA) procedures, and to review them at least annually to ensure the procedures are current and conform with 25 TAC 289;
2. oversee and approve all phases of the training program for operations and personnel so appropriate and effective radiation protection practices are taught;
3. ensure required radiation surveys and leak tests are performed and documented, including any corrective measures when levels of radiation exceed established limits;
4. ensure individual monitoring devices are used properly by occupationally-exposed personnel, records are kept of the monitoring results, and timely notifications are made;
5. investigate and cause a report to be submitted to the agency for each known or suspected case of radiation exposure to an individual or radiation level detected in excess of limits established and each theft or loss of source(s) of radiation, to determine the cause(s), and to take steps to prevent a recurrence;
6. investigate and cause a report to be submitted to the agency for each known or suspected case of release of radioactive material to the environment in excess of limits established;
7. have a thorough knowledge of management policies and administrative procedures of the licensee;
8. assume control and have the authority to institute corrective actions including shutdown of operations when necessary in emergency situations or unsafe conditions;
9. ensure records are maintained;
10. ensure the proper storing, labeling, transport, use, and disposal of sources of radiation, storage, and transport containers;

11. ensure inventories are performed per the activities for which the license application is submitted;

12. perform a physical inventory of the radioactive sealed sources authorized for use on the license every 6 months and make, maintain, and retain records of the inventory of the radioactive sealed sources authorized for use on the license every 6 months, to include, but not be limited to the following: (i) isotope(s); (ii) quantity(ies); (iii) activity(ies); (iv) date inventory is performed; (v) location; (vi) unique identifying number or serial number; and (vii) signature of the person performing the inventory;

13. ensure personnel comply with 25 TAC 289, the conditions of the license, and the operating, safety, and emergency procedures of the licensee;

14. serve as the primary contact with the agency;

15. have knowledge of and ensure compliance with federal and state security measures for radioactive material.

Appendix C. Portable Gauge Audit Checklist

Note*:* All areas shown in the audit checklist may not apply to every license and you may not need to address it during each audit. For example, you do not need to address areas that do not apply to you or review activities that have not occurred since the last audit.

The auditor should consider performing a performance-based review consisting of field observations and tours.

Licensee's name		License No.	
Date of this audit		Date of Last Audit	
Audit Date Range			
Auditor Printed Name		Date	
Auditor Signature			
Management Printed Name		Date	
Management Signature			

AUDIT HISTORY

- ❑ Were previous audits conducted periodically (at least annually)? [25 TAC §289.202(e)(3)]
- ❑ Were records of previous audits maintained? [25 TAC §289.202(mm)]
- ❑ Were any deficiencies identified during the last two audits or 2 years, whichever is longer?
- ❑ Were corrective actions taken? (Look for repeated deficiencies)

ORGANIZATION AND SCOPE OF PROGRAM

- ❑ Was the license amended if the mailing address or places of use or storage changed? [License Condition (L/C)]
- ❑ Was the license amended if the RSO changed? [25 TAC §289.252(x)(5)(C)]

- ❑ Does the license authorize all the radionuclides contained in the gauges possessed? (L/C)
- ❑ Are the gauges as described in the Sealed Source and Device (SSD) registration sheets? [25 TAC §289.252(e)(5)]
- ❑ Are manufacturer's manuals for operation and maintenance available?
- ❑ Are the actual uses of gauges consistent with the authorized uses listed on the license (L/C)
- ❑ Is the current inventory of material below the possession limits listed on the license? (L/C)

TRAINING AND INSTRUCTIONS TO WORKERS

- ❑ Were all workers who are likely to exceed 100 mrem (1 mSv) in a year instructed per 25 TAC §289.203(c)? Was refresher training provided, as needed? Were records maintained?
- ❑ Is each gauge user trained per license requirements? (L/C)
- ❑ Are training records maintained for each gauge user?
- ❑ Did interviews with gauge users reveal they know the operating, emergency, and security procedures?
- ❑ Did this audit include observation of a gauge user using the gauge in a field situation per regulations? Operating the gauge? Performing routine cleaning and lubrication? Transporting the gauge? Storing the gauge?
- ❑ Did the gauge user show safe handling and security during transportation, use, and storage?
- ❑ Was U.S. Department of Transportation (DOT) hazardous material (HAZMAT) training (required at least once every 3 years) provided as required? [25 TAC §289.257(e)(1)(F) and 49 CFR Part 172; Subpart H]

RADIATION SURVEY INSTRUMENTS

- ❑ If the licensee possesses their own survey meter, does the survey meter meet agency requirements? [25 TAC §289.202(p)(3)]
- ❑ Are calibration records maintained, if applicable? [25 TAC §289.202(nn)]
- ❑ If the licensee does not possess a survey meter, are specific plans made to have one available in case of an emergency?

PORTABLE GAUGE INVENTORY

- ❑ Is a record kept showing the receipt of each gauge? [25 TAC §289.201(d)]
- ❑ Is a physical inventory performed every 6 months? [25 TAC §289.252(f)(3)(L)]
- ❑ Are records of inventory with appropriate information maintained? (L/C)

PERSONNEL RADIATION PROTECTION

- ❑ Are considerations for keeping doses as low as is reasonably achievable (ALARA) incorporated into the radiation protection program? [25 TAC §289.202(e)(2)]
- ❑ Were prospective evaluations performed showing unmonitored individuals receive less than the limits in 25 TAC §289.202(q)(1)?

  Did these evaluations consider doses to minors [25 TAC §289.202(q)(1)(B)] and declared pregnant women? [25 TAC §289.202(q)(1)(C)]
- ❑ Did unmonitored individuals' activities change during the year in a way that could put them over the limits in 25 TAC §289.202(q)(1)?

  If yes, was a new evaluation performed?
- ❑ If external dosimetry is required such as when individuals are likely to receive greater than the limits in 25 TAC §289.202(q)(1), was it provided to these individuals? If yes, address the following:
  - Is the dosimetry supplier approved by the National Voluntary Laboratory Accreditation Program? [25 TAC §289.202(p)(4)(A)]
  - Are the dosimeters exchanged at the proper frequency?
  - Are dosimetry reports reviewed and signed by the RSO when they are received?
  - Are the records based on agency forms or the equivalent? [25 TAC §289.202(j), 25 TAC §289.202(rr)(3)]
- ❑ Is RC Form 202-2, "Cumulative Occupational Exposure History," completed?

- ❑ Is RC Form 202-3, "Occupational Dose Record for a Monitoring Period," completed?
- ❑ Are there any declared pregnant workers?

  If a worker declared her pregnancy, did the licensee comply with 25 TAC §289.202(m), "Dose equivalent to an embryo/fetus?"

  Were records kept of embryo/fetus dose per 25 TAC §289.202(rr)(4)?
- ❑ Are records of exposures, survey monitoring, and evaluations maintained? [25 TAC §289.202(mm), 25 TAC §289.202(nn), 25 TAC §289.202(rr)]

PUBLIC DOSE

- ❑ Are gauges stored in a manner to keep doses to members of the public below 100 mrem (1 mSv) in a year? [25 TAC §289.202(n)(1)]
- ❑ Has a survey or evaluation been performed per 25 TAC §289.202(p)(1)? Have there been any additions or changes to the storage, security, or use of the surrounding areas that would need a new survey or evaluation?
- ❑ Do unrestricted area radiation levels exceed 2 mrem (0.02 mSv) in any one hour? [25 TAC §289.202(n)(1)(B)]
- ❑ Are gauges stored in a manner that would prevent unauthorized use or removal? [25 TAC §289.202(y)]
- ❑ Are records of surveys maintained? [25 TAC §289.202(nn)]

OPERATING, EMERGENCY, AND SECURITY PROCEDURES

- ❑ Have operating, emergency, and security procedures been developed and updated to incorporate any new elements, practices, or requirements?
- ❑ Does each gauge user have current copies of the operating, emergency, and security procedures, including current emergency telephone numbers?
- ❑ Did any emergencies occur?

  If so, were they handled properly?

Were appropriate corrective actions taken?

- ❑ Were gauges properly controlled or secured during use or storage? [25 TAC §289.202(y)(1) and (2)]
- ❑ Are the gauges in storage secured with two independent physical controls? [25 TAC §289.202(y)(3)]

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

LEAK TESTS

- ❑ Were sealed source leak tests performed every 6 months or at other authorized intervals? [25 TAC §289.201(g)]
- ❑ Were leak tests performed per requirements?

  [25 TAC §289.201(g)(1)(E)]
- ❑ Are records of leak test results retained with the required information included? [25 TAC §289.201(g)(4)]
- ❑ Were any sources found to be leaking?

  If yes, was the agency notified? [25 TAC §289.202(bbb)]

MAINTENANCE OF GAUGES

- ❑ Are manufacturer's procedures followed for routine cleaning and lubrication of the gauge?
- ❑ Does the source rod remain attached to the gauge during cleaning? (L/C)
- ❑ Is nonroutine maintenance performed where the source or source rod is detached from the gauge?

  If yes, was it performed according to license requirements (e.g., extent of work, individuals performing the work, procedures, dosimetry, survey instrument, compliance with limits under 25 TAC §289.202(n), "Dose limits for individual members of the public")?
- ❑ Are labels, signs, and postings identifying gauges containing radioactive material, radiation areas and warnings clean and legible?

TRANSPORTATION

- ❑ Were U.S. Department of Transportation (DOT)-7A or other authorized packages used? 49 CFR 173.415, 49 CFR 173.416(b)]
- ❑ Are Type A package, engineering drawings, and performance test records on file? [49 CFR 171.2 (a, b, e), 49 CFR 173.415(a)]
- ❑ For any special form source, is the International Atomic Energy Agency Certificate of Competent Authority or other safety analysis documentation maintained on file? [49 CFR 173.476(a)]
- ❑ Were packages properly labeled? [49 CFR 172.400, 49 CFR 172.403, 49 CFR 172.406, 49 CFR 172.407]
- ❑ Were packages properly marked? [49 CFR 172.301, 49 CFR 172.304, 49 CFR 172.310, 49 CFR 172.324]
- ❑ Were packages closed and sealed (e.g., locked) during transport? [49 CFR 173.475(f)]
- ❑ Were shipping papers prepared and used? [49 CFR 172.201)]
- ❑ Did the shipping papers have proper entries?
    - Proper shipping name
    - Hazard class
    - Identification number [United Nations (UN)] number
    - Reportable quantity (RQ), if applicable
    - Nuclide
    - Physical or chemical form
    - Activity (International System of Units required)
    - Total quantity
    - Package type
    - Category of label
    - Transportation Index (TI)
    - Shipper’s name
    - Certification and signature
    - Emergency response phone number

- Cargo aircraft only (if applicable)?

[49 CFR 172.200, 49 CFR 172.201, 49 CFR 172.202, 49 CFR 172.203, 49 CFR 172.204, 49 CFR 172.604]

❑ Were the shipping papers within the driver's reach and readily accessible during transport? [49 CFR 177. 817(e)]

❑ Were packages secured against movement? [49 CFR 177.834]

❑ Were placards on the vehicle, if needed? [49 CFR 172.504]

❑ Were any incidents reported to the DOT? [49 CFR 171.15, 49 CFR 171.16]

AUDITOR'S INDEPENDENT SURVEY MEASUREMENTS (IF MADE)

❑ Describe the type, location, and results of the measurements.

Does any radiation level exceed regulatory limits? [25 TAC §289.202(p)(1), 25 TAC §289.202(q)(1)]

NOTIFICATION AND REPORTS

❑ Did any reportable incidents occur? Were the appropriate notifications made to the agency's Radiological Emergency Assistance number (512-458-7460)? Examples of incidents with notification requirements are as follows:

- Lost or stolen radioactive material. [25 TAC §289.202(ww)]
- Overexposures or high radiation levels. [25 TAC §289.202(xx)]
- Gauge is disabled or does not function as designed.

  [25 TAC §289.202(xx)(7)(b)]

❑ Were the required written reports made as follow-ups to the events?

POSTING AND LABELING

❑ Is RC Form 203-1, "Notice to Employees," posted? [25 TAC §289.203(b)]

❑ Are agency rules and license documents posted, or is a notice posted stating where these documents are located? [25 TAC §289.203(b)]

❑ Are any other posting and labeling requirements met? [25 TAC §289.202(aa) and (cc)]

DECOMMISSIONING

- ❑ Were any locations of use or separate buildings decommissioned since the last audit?
- ❑ Were appropriate notifications made or license amendment requested? [25 TAC §289.252(y)]
- ❑ Are records kept of information important to decommissioning? [25 TAC §289.252(gg)(7)]
- ❑ Do records include all information outlined in 25 TAC §289.252(gg)(7)?

SPECIAL LICENSE CONDITIONS OR ISSUES

- ❑ Did the auditor review special license conditions or other issues (e.g., nonroutine maintenance)? (L/C)

EVALUATION OF OTHER FACTORS

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

DEFICIENCIES IDENTIFIED IN AUDIT AND CORRECTIVE ACTIONS

- ❑ Summarize problems or deficiencies identified during the audit.
- ❑ If problems or deficiencies were identified in this audit, describe the corrective actions planned or taken.
  Are corrective actions planned or taken at *all* licensed locations (not just the location audited)?
  Include date(s) when corrective actions are implemented.
- ❑ Provide any other recommendations for improvement.
- ❑ Describe communication with management about deficiencies.

DEFICIENCIES IDENTIFIED DURING AGENCY INSPECTION AND CORRECTIVE ACTIONS

- ❑ Were any agency inspections performed?
  If so, were any violations cited?
- ❑ If violations were cited during this inspection, describe the corrective actions implemented to prevent future violations.

Appendix D. Operating, Safety and Emergency Procedures

The purpose of operating, safety, and emergency procedures is to provide personnel with clear and specific guidance and instructions for the use of radioactive material in a portable gauge. A complete and current copy of the operating, safety and emergency procedures should always accompany the gauge.

The procedure should include, but not be limited to the following:

Operating and Safety Procedures

Handling Procedures

ALARA Philosophy: All personnel participating in licensed operations must follow the ALARA philosophy — keep radiation exposures As Low As Reasonably Achievable.

The goal is to reduce occupational and public exposures as far below regulatory limits as possible with good work practices.

Apply the following methods to minimize radiation exposures:

- Minimize the **TIME** spent near the radiation source (the shorter the time, the lower the dose);
- Maximize the **DISTANCE** from the radiation source (doubling the distance quarters radiation intensity); and
- Make use of available **SHIELDING** to block out radiation.

Before removing the portable gauge from its place of storage and transporting it, do the following:

- ❑ Make sure the source is in the fully shielded position. In a gauge with a movable rod having a sealed source, make sure you lock the source rod (e.g., keyed lock, padlock, mechanical control) in the shielded position. Place the gauge in the transport case and lock the case.

- ❑ Sign out the gauge in the daily use log that stays at the storage location. The log book should include:
    - The date(s) of use
    - Name(s) of the authorized users who will handle the gauge;

- The location(s) where the gauge will be used.

- ❑ Use the gauge according to the manufacturer's instructions and recommendations. Unless necessary, do not look under the gauge when you are lowering the source rod into the ground. If you must look under the gauge to align the source rod with the hole, follow the manufacturer's procedures to minimize radiation exposure.

- ❑ 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.

- ❑ Always keep constant surveillance and immediate control of the gauge when it is not in storage. At jobsites, do not walk away from the gauge when it is unattended. Take necessary action to protect the gauge and yourself from danger of moving heavy equipment.

- ❑ Place the gauge in a secured storage location when it is not in use at a temporary jobsite.

- ❑ Keep unauthorized persons away from the gauge.

- ❑ Immediately return the source to the shielded position after completing each measurement in which the source is unshielded.

- ❑ Use piping, tubing, or other casing material to line the hole from the lowest depth to 12 inches above the surface, if you use the gauge for measurements with the unshielded source extended more than 3 feet beneath 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 the hole is free of debris (and it is unlikely debris will reenter the cased hole) so the unshielded source can move freely (e.g., use a dummy probe to verify the hole is free of obstructions).

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

- ❑ Log the gauge into the daily use log when you return it to storage.
- ❑ Reevaluate compliance with public dose limits.

- ❑ Make sure the gauge is properly secured (two independent physical controls) if storage conditions change (i.e., changing the location of a gauge within the storage area, removing shielding, adding a gauge, changing the occupancy of adjacent areas, moving the storage area to a new location).

- ❑ Perform routine cleaning and maintenance according to the manufacturer's instructions and recommendations. The agency prohibits non-routine maintenance or repair needing removal of the radiation source or source rod. Only the manufacturer or other specifically authorized persons can perform such operations.

Transportation

- ❑ Make sure each gauge is in its approved Type A package during shipment or transport.

- ❑ Make sure each package is marked on the outside with:

    - "USA DOT 7A TYPE A";
    - "RADIOACTIVE MATERIAL";
    - The proper shipping name and United Nations identification number (UN ID); and
    - "RQ" (Reportable Quantity) if the package has 10 mCi or more of Americium-241.
    - If a common carrier is transporting the gauge, it must also be marked with the name and address of the shipper and consignee.

- ❑ Make sure each package is labeled with a RADIOACTIVE YELLOW-II hazard label to include the contents, activity, and transport index. A label must be affixed to opposite sides of the package.

- ❑ Make sure each package has a security feature, such as a seal, to show the package has not been opened during shipment or transport.

- ❑ Make sure that you visually inspect each package prior to each shipment for sound physical condition and all closure devices are present and secured.

- ❑ Make sure packages are not carried in passenger compartments and are kept away from vehicle occupants.

- ❑ Make sure packages are blocked and braced against movement within the transport vehicle.

- ❑ Make sure shipping papers are prepared per all DOT requirements and readily accessible. If you use a "permanent shipping paper" or the same shipping paper for multiple shipments of the same gauge, you must keep a separate record of each shipment including: the proper shipping name, the UN number, quantity transported (total activity of the sources in the shipment), and the date of shipment.

- ❑ Report, as soon as possible, vehicle accidents involving fire, breakage, spillage, or suspected contamination to the agency's Radiological Emergency Assistance number (512-458-7460) and to the DOT, 1-800-424-8802.

Personnel Dosimetry

If you use an individual monitoring device (dosimetry), do the following:

- ❑ Always wear the assigned dosimetry when handling, transporting, or using the gauge.

- ❑ Never wear another person's dosimetry.

- ❑ Wear your dosimeter at the chest or waist level. You should not wear your dosimeter during non-occupational radiation exposures (e.g., medical or dental x-rays, etc.).

- ❑ Never store dosimetry near the gauge.

- ❑ Immediately notify the RSO if you lose or damage your dosimeter.

Emergency Procedures

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

- ❑ Immediately secure the area and keep people at least 15 feet away from the gauge until you assess the situation 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.

- ❑ Detain the equipment and operator until it is determined there is no contamination present if any heavy equipment is involved.

- ❑ Make sure you and other potentially contaminated individuals do not leave the scene until emergency help arrives.

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

NAME[1]	WORK PHONE NUMBER	ALTERNATE PHONE NUMBER

[1]Fill in with (and update, as needed) the names and telephone numbers of appropriate personnel (e.g., the radiation safety officer or other knowledgeable licensee staff, licensee's consultant, portable gauge manufacturer) to be contacted in case of emergency.

Radiation Safety Officer and Licensee Management

- ❑ Arrange for a radiation survey to be conducted as soon as possible by a knowledgeable person using proper radiation detection instrumentation. This person could be a licensee employee using a survey meter found at the jobsite

or a consultant. To accurately assess the radiation danger, it is essential the person performing the survey be competent in the use of the survey meter.

- ❑ Ensure the contact person(s) above know the steps to follow to retrieve a stuck source or to convey those steps to the staff onsite, if a gauge is used for measurements with the unshielded source extended more than 3 feet below the surface.

- ❑ Make necessary notifications to local authorities, as well as to the agency as required.

Even if it is not required, any incident may be reported to the agency's Radiological Emergency Assistance number (512-458-7460), which is staffed 24 hours a day and accepts collect calls.

Agency notification is required when a gauge containing radioactive material is lost or stolen, damaged or involved in an incident that results in a dose in excess of 25 TAC §289.202(yy), "Reports of exposures, radiation levels, and concentrations of radioactive material exceeding the constraints or limits,". Notification is also required when it becomes clear that attempts to recover a source stuck below the surface will be unsuccessful.

You must report to the agency within the reporting timeframes specified by the rules. Reporting requirements are in 25 TAC §289.202(ww), 25 TAC §289.202(xx), 25 TAC §289.202(yy), 25 TAC §289.202(zz).

Security Procedures

At all times the gauge must either be:

- ❑ Under the control and constant surveillance of a portable gauge user.

OR

- ❑ Secured with a minimum of two independent physical controls that form tangible barriers to secure a portable gauge from unauthorized removal.

This requirement must always be met when in storage, including storage at permanent storage locations, temporary jobsites, and when stored in the vehicle (e.g., when in a convenience store, restaurant, or restroom while the gauge is in the vehicle).

Refer to Appendix E for acceptable methods that you can use to meet the security requirements.

Appendix E. Methods for Securing Gauges Using Two Independent Controls

Methods to Meet the Security Requirements

There have been various methods developed to meet the security requirement in 25 TAC §289.202(y)(3). The following information provides guidance to assist you in developing security procedures.

Agency rules require you to use a minimum of two independent physical controls that form tangible barriers to secure a gauge from unauthorized removal whenever the gauge is not under your control and constant surveillance.

"Control and maintain constant surveillance" of a gauge means being present or near the gauge to be able to prevent unauthorized removal of the gauge. The goal of the security requirement is to reduce the opportunity for unauthorized removal or theft by providing a delay and deterrent mechanism.

The security requirement applies to a gauge that is not under control and constant surveillance, including:

(1) storage in vehicles

(2) storage at temporary facilities (e.g. residence, jobsite trailer)

(3) storage at permanent facilities

At all times, you must maintain control and constant surveillance of the gauge when it is in use and, at a minimum, use two independent physical controls to secure the gauge from unauthorized removal while it is in storage.

You should use physical controls designed and constructed of materials suitable for securing the gauge from unauthorized removal where both physical controls must be defeated for the gauge to be removed. The construction and design of the physical controls should deter theft by requiring a more determined effort to remove the gauge. The security procedures should ensure the two physical controls chosen, increase the deterrence value over that of a single physical control, and make unauthorized removal of the gauge more difficult.

To provide adequate security, you are encouraged to use combinations of physical controls. For example, if two chains are used, each chain and lock combination should be physically robust enough to provide both a deterrent and a reasonable

delay mechanism. When you use two chains or cables, the second chain or cable should be more robust and more difficult to cut than the first chain or cable.

If possible, you should consider storing the gauge inside a locked facility or other non-portable structure overnight, instead of storing it in a vehicle.

As long as the you keep constant control and surveillance while transporting the gauge, you only need to comply with the DOT requirements for transportation (e.g., placarding, labeling, shipping papers, blocking, and bracing). However, you must use two independent controls to secure the gauge if you leave the vehicle and gauge unattended (e.g., while visiting a gas station, restaurant, store).

You should not modify the transportation case if it is being used as the Type A container for transporting the gauge. 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. In the event the package is modified, the modified package must be reevaluated by any of the methods described in 49 CFR 178.350, "Specification 7A; General Packaging, Type A," or 49 CFR 173.461(a). The reevaluation must be documented and maintained on file per DOT regulations.

Physical controls may include, but are not limited to the following:

- a metal chain with a lock
- a steel cable with a lock
- a secured enclosure
- a locked tool box
- a locked camper
- a locked trailer
- a locked car trunk
- a locked vehicle
- a locked garage
- a locked non-portable cabinet
- a locked shelter or room

Below are some common examples using two independent physical controls.

Securing a Portable Gauge at a Licensed Facility

Long-term storage of the portable gauge is usually at a permanent facility listed on the license. When you store the gauge at a licensed facility, you must use a minimum of two independent physical controls to secure the gauge.

The following are examples of how you can use two independent physical controls to secure the gauge when you store it at a licensed facility:

1. You store the gauge or transportation case containing the gauge inside a locked storage shed within a secured outdoor area, such as a fenced parking area with a locked gate.
2. You store the gauge or transportation case containing the gauge in a room with a locked door within a secured building. You or a security guard control access.
3. You store the gauge or transportation case containing the gauge inside a locked, non-portable cabinet inside a room with a locked door, if the building is not secured.
4. You store the gauge or transportation case containing the gauge in a separate secured area inside a secured mini-warehouse or storage facility.
5. You store the gauge or transportation case containing the gauge by securing it physically to the inside structure of a secured mini-warehouse or storage facility.

Securing a Portable Gauge in a Vehicle

The rules in 25 TAC §289.257(e), "Transportation of Licensed Material," require licensees who transport portable gauges containing licensed material, or who may offer such material to a carrier for transport, to comply with the applicable DOT requirements in 49 CFR.

Licensees commonly use a chain and a padlock to secure the gauge in its transportation case to the open bed of a pickup truck while using the vehicle for storage. The agency does not consider this to be adequate security because there is only one physical control. The transportation case is portable, and a theft could occur if the chain is cut and the transportation case with the gauge is taken.

Similarly, if you simply loop the chain through the handles of the transportation case, a thief could open the transportation case and take the gauge without removing the chain or the case. Because the transportation case is also portable,

you must protect it by using two independent physical controls if the gauge is inside. A lock on the transportation case, or a lock on the gauge source rod handle, is not enough because both the case and the gauge are portable.

You may use a vehicle for storage, however, the agency and DOT recommends this only for short periods of time or when the gauge is in transit. You should only keep the gauge in a vehicle overnight if it is not practical to provide temporary storage in a permanent structure.

When you store the gauge in a vehicle, you must use a minimum of two independent physical controls to secure the gauge. The following are examples of how you can use two independent physical controls to secure the portable gauge in a vehicle:

1. You physically secure the locked transportation case containing the gauge to a vehicle with brackets and use two chains (attached to the vehicle) to wrap around the transportation case such that the case cannot be opened unless the chains are removed.

2. You store the gauge or transportation case containing the gauge in a locked trunk, camper shell, van, or other similar enclosure. You physically secure it to the vehicle by a chain in such a manner that one would not be able to open the case or remove the gauge without removal of the chain or cable. After you properly secure the transportation case, you will have to block and brace it.

Note*:* These illustrations are only two examples of securing a gauge in a vehicle. There are other ways you may choose to secure the gauge.

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

When a job requires storage of the portable gauge at a temporary jobsite or at a location other than a licensed facility, you should use a permanent structure for storage, if practical to do so.

When storing the gauge at a temporary jobsite, you should limit access by storing the gauge away from residents or members of the public. You must also comply with the radiation exposure limits specified in 25 TAC §289.202, "Standards for Protection against Radiation."

When you store a portable gauge at a temporary jobsite or at a location other than an authorized facility, you must use a minimum of two independent physical controls to secure the gauge.

The following are examples of how you can use two independent physical controls to secure the gauge at these locations:

1. You store, at a temporary jobsite, the gauge or transportation case containing the gauge inside a locked building or in a locked non-portable structure (e.g., construction trailer, intermodal container). You physically secure it 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 gauge without removing the chain or cable. The lock on the transportation case or a lock on the gauge source rod handle would not be enough, because the case and the gauge are portable.
2. You store the gauge or transportation case containing the gauge in a locked garage that 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 gauge without removing the chain or cable.
3. You store the gauge or transportation case containing the gauge in a locked garage that 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 gauge without removing the chain or cable.

Appendix F. Model Delegation of Authority

Memo

To: Radiation Safety Officer

From: Chief Executive Officer

Subject: Delegation of authority

You, _____, have been appointed Radiation Safety Officer and are responsible for ensuring the safe use of radioactive material. You are responsible for the following:

- Managing the Radiation Protection Program
- Identifying radiation protection problems
- Initiating, recommending, or providing corrective actions
- Verifying implementation of corrective actions
- Stopping unsafe activities
- 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 shutting down operations where justified to maintain radiation safety.

You must notify management if staff does not cooperate and does not address radiation safety issues. In addition, you are free to raise issues with the Texas Department of State Health Services at any time.

We estimate you will spend _____ hours per week conducting radiation protection activities.

Signature of Management Representative Date

I accept the above responsibilities.

Signature of Radiation Safety Office Date

cc: Affected department heads

Appendix G. Reporting Requirements

The following table identifies all relevant notification and reporting requirements.

Event	Telephone Notification	Written Report	Regulatory Requirement
Removable surface contamination or external radiation levels from a RAM package exceeds the limits in §289.202(ee)(4)(A) and (B)	Immediate	**	§289.202(ee)(4)
Stolen, lost or missing radioactive material in an aggregate quantity ≥ 1,000 times the quantity in (ggg)(3)	Immediate	30 days after making the telephone report	§289.202(ww)(1)(A)
Stolen, lost, or missing radioactive material in an aggregate quantity > 10 times the quantity in (ggg)(3)	30 days	30 days after making the telephone report	§289.202(ww)(1)(B)
Event involving a source of radiation that may have caused or threatens to cause a TEDE dose ≥ 25 rem	Immediate	30 days	§289.202(xx)(1)(A)(i)
Event involving a source of radiation that may have caused or threatens to cause a lens dose ≥ 75 rem	Immediate	30 days	§289.202(xx)(1)(A)(ii)
Event involving a source of radiation that may have caused or threatens to cause a shallow dose equivalent to skin or extremities or a total organ dose equivalent ≥ 250 rads	Immediate	30 days	§289.202(xx)(1)(A)(iii)
Event involving loss of control of a source of radiation that may have caused or threatens to cause a TEDE > 5 rem in 24 hours	24 hours	30 days	§289.202(xx)(2)(A)(i)
Event involving loss of control of a source of radiation that may have caused or threatens to cause a lens dose equivalent > 15 rem in 24 hours	24 hours	30 days	§289.202(xx)(2)(A)(ii)

Event	Telephone Notification	Written Report	Regulatory Requirement
Event involving loss of control of a source of radiation that may have caused or threatens to cause a shallow dose equivalent to the skin or extremities or a total organ dose equivalent > 50 rem in 24 hours	24 hours	30 days	§289.202(xx)(2)(A)(iii)
The release of RAM, inside or outside a restricted area, so that had an individual been present for 24 hours, the individual could have received an intake > 1 occupational ALI	24 hours	30 days	§289.202(xx)(2)(B)
Occupational dose greater than 5 rems (50 mSv)	None	30 days	§289.202(yy)(1)(B)(i)
Dose to a minor greater than 500 mrem (5 mSv)	None	30 days	§289.202(yy)(1)(B)(ii)
Dose to an embryo/fetus of a declared pregnant woman greater than 0.5 rem (5 mSv)	None	30 days	§289.202(yy)(1)(B)(iii)

Appendix H. Summary of DOT Requirements for Transportation of a Portable Gauge

Note: The reference charts included at the end of this appendix are for reference only and are not a substitute for U.S. Department of Transportation (DOT) and agency transportation regulations.

You must transport radioactive material per DOT regulations. Listed below are the major areas in DOT regulations most relevant to the transportation of portable gauges shipped as Type A quantities.

You should note the list is incomplete in that not all potentially applicable requirements have been included. Also, transportation requirements change; therefore, you should consult the regulations for definitive information about current requirements.

You should review the most recent regulations in Title 49 of the *Code of Federal Regulations* (49 CFR) at http://www.dot.gov/.

- Table of Hazardous Materials and Special Provisions—Subpart B
    - 49 CFR 172.101—Purpose and Use of Hazardous Materials Table [proper shipping name, hazard class, identification number]
    - Table 2, Appendix A to 49 CFR 172.101—List of Hazardous Substances and Reportable Quantities [for radionuclides]
- Shipping Papers—Subpart C
    - 49 CFR 172.201—Preparation and retention of shipping papers
    - 49 CFR 172.202—Description of hazardous material on shipping papers
    - 49 CFR 172.203—Additional description requirements
    - 49 CFR 172.204—Shipper's certification [if applicable]
- Markings—Subpart D
    - 49 CFR 172.300—Applicability
    - 49 CFR 172.301—General marking requirements for non-bulk packagings
    - 49 CFR 172.304—Marking requirements
    - 49 CFR 172.310—Class 7 (radioactive) materials
    - 49 CFR 172.324—Hazardous substances in non-bulk packagings [designation of "reportable quantities" with the letters "RQ"]

- Labeling—Subpart E

    - 49 CFR 172.400—General labeling requirements
    - 49 CFR 172.400(a)—Exceptions from labeling
    - 49 CFR 172.403—Class 7 (radioactive) material
    - 49 CFR 172.406—Placement of labels
    - 49 CFR 172.436, 172.438, 172.440, 172.450—Labels [White-1, Yellow-2, Yellow-3, Empty]

- Placarding—Subpart F

    - 49 CFR 172.504—General placarding requirements
    - 49 CFR 172.516—Visibility and display of placards
    - 49 CFR 172.556—RADIOACTIVE placard

- Emergency Response Information—Subpart G

    - 49 CFR 172.600—Applicability and general requirements
    - 49 CFR 172.602—Emergency response information
    - 49 CFR 172.604—Emergency response telephone number

- Training—Subpart H

    - 49 CFR 172.702—Applicability and responsibility for training and testing
    - 49 CFR 172.704—Training requirements [types of training, frequency, recordkeeping]

- Safety and Security Plans—Subpart I

    - 49 CFR 172.800—Purpose and applicability
    - 49 CFR 172.802—Components of a security plan

- Shippers—General Requirements for Shipments and Packaging—49 CFR Part 173

  Class 7 (Radioactive Materials) – Subpart I

    - 49 CFR 173.25—Authorized packagings and overpacks
    - 49 CFR 173.403—Definitions
    - 49 CFR 173.410—General design requirements
    - 49 CFR 173.412—Additional design requirements for Type A packages

- 49 CFR 173.415—Authorized Type A packages
- 49 CFR 173.431—Activity limits for Type A and Type B packages
- 49 CFR 173.433—Requirements for determining basic radionuclide values, and for the listing of radionuclides on shipping papers and labels
- 49 CFR 173.435—Table of A_1 and A_2 values for radionuclides [for determination of package type]
- 49 CFR 173.441—Radiation level limitations and exclusive use provisions
- 49 CFR 173.476—Approval of special form Class 7 (radioactive) materials [includes requirement for documentation of special form status]

- Carriage by Public Highway—49 CFR Part 177

  - 49 CFR 177.816—Driver training
  - 49 CFR 177.817—Shipping papers [location of shipping papers during transport]
  - 49 CFR 177.834(a)—Genera requirements [secured against movement]
  - 49 CFR 177.842—Class 7 (Radioactive Material)

1. Minimum Required Packaging for Class 7 (Radioactive) Material[1] (49 CFR 173 and 10 CFR 71)[2]

These are basic reference charts; refer to current U.S. DOT & NRC regulations for complete requirements.

Minimum Packaging Required for Radioactive Materials other than Low Specific Activity (LSA) Material and Surface Contaminated Objects (SCO) based on Activity of Package Contents

Radioactive Material Quantity[3]		Excepted Quantities and Articles	Type A[4]	Type B
Activity Restrictions		≤ the limits specified in Table 4 of §173.425	≤ A_1 for special form ≤ A_2 for normal form	> A_1 for special form > A_2 for normal form
Contents of Package	Non-fissile and Fissile Excepted	Excepted Package	Type A Package	Type B(U) or Type B(M) package
	Fissile	N/A	Type AF package	Type B(U)F or Type B(M)F package

Minimum Packaging Required for LSA Material and SCO[5,6]

Type(s) of LSA and/or SCO	LSA-I	LSA-II	LSA-III	SCO-I	SCO-II
Category of Package for Domestic or International Transport[7,8]	Unpackaged[9] IP-1: solids, or liquids/exclusive use IP-2 : liquids/non-exclusive use Specification tank cars or cargo tank motor vehicles: liquids/exclusive use	- - IP-2: exclusive use IP-3: liquids or gases/non-exclusive use	- - IP-2: exclusive use IP-3: non-exclusive use	Unpackaged[9] IP-1 - -	- - IP-2 -
Alternative Provisions for Domestic only Transport[9]	Packaging shall meet the requirements of §§173.24, 24a, and 410 Transportation shall be an exclusive use shipment Activity per shipment must be less than an A_2 quantity				

[1] Additional provisions may apply for radioactive materials that are pyrophoric, oxidizing, fissile excepted, or uranium hexafluoride.
[2] Each NRC licensee shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 107, 171 through 180, and 390 through 397 (see §71.5).
[3] Materials that contain radionuclides, where both the activity concentration and the total activity in the consignment exceed either the values specified in the table in §173.436 or the values derived according to the instructions in §173.433, must be regulated in transport as Class 7 (radioactive) material.
[4] Except for LSA material and SCO, a Type A package may not contain a quantity of Class 7 (radioactive) materials greater than A_1 or A_2.
[5] The external dose rate from LSA material or SCO in a single package may not exceed 10 mSv/h (1 rem/h) at 3 m from the unshielded material or objects (see §173.427(a)(1)).
[6] LSA material and SCOs that are or contain fissile material in quantities that are not fissile excepted must be packaged in appropriate Type AF or Type BF packages. For alternate domestic transport provisions, see §173.427(b)(4). For comprehensive guidance on packaging and transportation of LSA material and SCO, see NUREG-1608.
[7] For LSA material and SCO, transport of combustible solids, all liquids and all gases classified as LSA-II and LSA-III material, and transport of all SCO-I and SCO-II is limited to a maximum activity of 100 A_2 in a conveyance (see §173.427(a)(2)).
[8] Unless excepted by §§173.427(c) or (d), the material or object(s) shall be appropriately packaged in a Type IP, DOT-7A Type A or Type B package.
[9] Certain LSA-I and SCO-I may be transported unpackaged under the conditions specified in §173.427(c).

2. Radiation Level, TI and CSI Limits for Transportation by Road, Rail and Air[1] (49 CFR 172 - 177, and 10 CFR 71)

Type of Transport	Non-exclusive use	Exclusive use		
Mode of Transport	Road, Rail, Vessel and Air	Road and Rail	Vessel	Air (cargo only)
Radiation Level Limits[2]				
Package Surface[1]	2 mSv/h (200 mrem/h)	2 mSv/h (200 mrem/h): other than closed vehicles 10 mSv/h (1000 mrem/h): closed vehicles	None specified	2 mSv/h (200 mrem/h)[3]
Conveyance[4]	N/A	2 mSv/h (200 mrem/h): outer surfaces (sides, top and underside) of vehicle[5]	N/A	N/A
		0.1 mSv/h (10 mrem/h): at any point two (2) m (6.6 ft) from sides of the vehicle[5]	N/A	N/A
Occupied position	N/A	0.02 mSv/h (2 mrem/h): at any normally occupied area[6]	Requirement of §176.708 applies	N/A
Transport Index (TI) Limits[2]				
Package[1,7]	3: passenger aircraft 10: road, rail, vessels and cargo aircraft	No limit		10
Conveyance[4]	50: road, rail and passenger aircraft 50 to No limit: vessels[8] 200: cargo aircraft	No limit		200
Overpack	N/A: for road, rail 50 to 200: vessels[8] 3: passenger aircraft; 10: cargo aircraft	N/A	No limit[8]	N/A
Criticality Safety Index (CSI) Limit for fissile material[2]				
Package[1,7]	50	100	100	100
Conveyance[4]	50: road, rail and air 50: for holds, compartments or defined deck areas of vessels[8] 200 to No limit: for a total vessel[8]	100	200 to No limit: for a total vessel[8]	100
Overpack	50: road, rail, vessels[8] and air	N/A		

[1] The limits in this table do not apply to excepted packages.
[2] In addition to any applicable radiation level, TI and CSI limits, separation distance requirements apply to packages, conveyances, freight containers and overpacks; to occupied positions; and to materials stored in transit. Separation distances are based on the sum of the TIs and, for fissile materials, also the sum of the CSIs.
[3] Higher package surface radiation levels may be allowed through an approved special arrangement.
[4] Conveyance is, for transport by public highway or rail, any transport vehicle or large freight container; and for transport by air, any aircraft.
[5] The outer surfaces (sides, top and underside) of vehicles are defined for road and rail vehicles in §173.441.
[6] For rail, normally occupied areas include the transport vehicle and adjacent rail cars. The 0.02 mSv/h (2 mrem/h) limit does not apply to carriers operating under a State or federally regulated radiation protection program where personnel wear radiation dosimetry devices.
[7] Additional TI and CSI limits apply for individual packages when non-fissile radioactive material packages are mixed with fissile material packages. Also, see CSI limits established by §71.59.
[8] For details on TI and CSI limits for transport by vessel, see §176.708.

3. Contamination Limits and Quality Control for Class 7 (Radioactive) Materials: (49 CFR 173.443 and 173.475, and 10 CFR 71)

These are basic reference charts; refer to current U.S. DOT & NRC regulations for complete requirements.

Maximum Permissible Limits for Non-fixed Radioactive Contamination on Packages When Offered for Transport

The level of non-fixed (removable) radioactive contamination on external surfaces of packages offered for transport must be kept as low as reasonable achievable, and shall not exceed the values shown in the following table:

Contaminant	Maximum permissible limits (§173.443(a), Table 9)		
	Bq/cm^2	µCi/cm^2	dpm/cm^2
Beta, gamma and low toxicity alpha emitters	4	10^{-4}	220
All other alpha emitting radionuclides	0.4	10^{-5}	22

The non-fixed contamination shall be determined by:

(a) wiping, with an absorbent material using moderate pressure, sufficient areas on the package to obtain a representative sampling of the non-fixed contamination;
(b) ensuring each wipe area is 300 cm^2 in size;
(c) measuring the activity on each single wiping material and dividing that value by the surface area wiped and the efficiency of the wipe procedure, where an actual wipe efficiency may be used, or it may be assumed to be 0.10.

Alternatively, the contamination level may be determined using alternative methods of equal or greater efficiency.

Provisions for Control of Contamination on Radioactive Material Packages Prior to Shipment

Prior to shipment, the non-fixed contamination on each package of radioactive material:

- must be kept as low as reasonable achievable; and
- may not exceed the limits set forth in §173.443(a), Table 9 (as shown **a**bove).

Provisions for Non-fixed (Removable) Contamination on Excepted and Empty Radioactive Material Packages

- The non-fixed radioactive surface contamination on the external surface of excepted and empty packages shall not exceed the limits specified in §173.443(a), Table 9 (as shown **a**bove).
- The internal contamination of an empty package must not exceed 100 times the limits in §173.443(a), Table 9 (as shown **a**bove).

Provisions for Non-fixed (Removable) Contamination on Packages and in Rail and Road Vehicles used for Exclusive Use Shipments of Radioactive Material

- The levels of non-fixed radioactive contamination on the packages (a) at the beginning of transport, may not exceed the levels prescribed in the above table, and (b) at any time during transport, may not exceed ten times the levels prescribed in §173.443(a), Table 9 (as shown **a**bove).
- Each transport vehicle used for transporting the radioactive material packages must be surveyed with appropriate radiation detection instruments after each use. If contamination values exceed acceptable levels, the transport vehicle may not be returned to service until the radiation dose rate at each accessible surface is demonstrated to be 0.005 mSv/h (0.5 mrem/h) or less, and that there is no significant non-fixed radioactive surface contamination specified in §173.443(a), Table 9 (as shown **a**bove).

Provisions for Non-fixed (Removable) Contamination in Closed Rail and Road Vehicles that are used Solely for the Transportation of Radioactive Material

- The contamination levels must not exceed 10 times the levels prescribed in §173.443(a), Table 9 (as shown **a**bove).
- Each vehicle shall be stenciled with the words "*For Radioactive Materials Use Only*" in letters at least 76 mm (3 in) high in a conspicuous place on both sides of the exterior of the vehicle.
- A survey of the interior surfaces of the empty closed vehicle must show that the radiation dose rate at any point does not exceed 0.1 mSv/h (10 mrem/h) at the surface or 0.02 mSv/h (2 mrem/h) at 1 m (3.3 feet) from the surfaces.
- Each vehicle shall be kept closed except for loading or unloading.

Provisions for Quality Control Prior to Each Shipment of Radioactive Material (§173.475)

- Before each shipment of any radioactive materials package, the offeror must ensure, by examination or appropriate tests, that:
  (a) the packaging is proper for the contents to be shipped;
  (b) the packaging is in unimpaired physical condition, except for superficial marks;
  (c) each closure device of the packaging, including any required gasket, is properly installed, secured, and free of defects;
  (d) for fissile material, each moderator and neutron absorber, if required, is present and in proper condition;
  (e) each special instruction for filling, closing, and preparation of the packaging for shipment has been followed;
  (f) each closure, valve, or other opening of the containment system is properly closed and sealed;
  (g) each packaging containing liquid in excess of an A_2 quantity and intended for air shipment has been tested to show that it will not leak under an ambient atmospheric pressure of not more than 25 kPa, absolute (3.6 psia), where the test must be conducted on the entire containment system, or on any receptacle or vessel within the containment system, to determine compliance with this requirement;
  (h) the internal pressure of the containment system will not exceed the design pressure during transportation; and
  (i) the external radiation and contamination levels are within the allowable limits specified in §173.441 and 443.

4. Hazard Communications for Class 7 (Radioactive) Materials: Shipping Papers (49 CFR 172, Subpart C)

These are basic reference charts; refer to current U.S. DOT & NRC regulations for complete requirements.
NOTE: IAEA, IATA/ICAO, and IMO may require additional hazard communication information.

Shipping Paper Entries

Always Required	Sometimes Required	Optional Entries
Basic description (in sequence): • **UN Identification number** • **Proper Shipping Name** • **Hazard Class (7)** • **Total activity contained in each package in SI units** (e.g. Bq, TBq, etc.), or in both SI and customary units (e.g. Ci, mCi, etc.) with customary units in parentheses following the SI units • **Number and type of packages** Additional description: • **Name of each radionuclide**[1] • **Description of physical and chemical form** (unless special form) • **Category of label** used • **Transport index (TI)** of each package bearing a Yellow-II or Yellow-III label Additional entry requirements: • 24 hour **emergency telephone number** • **Shipper's Certification** shall be provided by each person offering radioactive material for transportation[2] • Proper page numbering (e.g. Page 1 of 4)	Materials-based Requirements: • The criticality safety index (CSI) or "Fissile Excepted" for fissile material • The words "Highway route controlled quantity" or the term "HRCQ" entered in the basic description for highway route controlled quantities • The letters "RQ" entered on the shipping paper either before or after the basic description for each hazardous substance (see §171.8) • Enter applicable subsidiary hazard class(es) in parentheses immediately following the primary hazard class when a subsidiary hazard label is required • A hazardous waste manifest and the word "Waste" preceding the proper shipping name is required for radioactive material that is hazardous waste Package-based Requirements: • The applicable DOE or NRC package approval identification marking for certified Type AF and Type B packages • The International Atomic Energy Agency (IAEA) Certificate of Competent Authority identification marking for export shipment or shipment in a foreign made package Shipment- and Administrative-based Requirements: • Specify "exclusive use shipment" as required • Specify instructions for maintaining exclusive use controls for shipments of LSA material or SCO under exclusive use • Specify the notation "DOT–SP" followed by the special permit number[3] for a special permit shipment	• The weight in grams or kilograms of radionuclides may be inserted instead of activity units for fissile radionuclides, except for Pu-239 and Pu-241 • The weight in grams of Pu-239 and Pu-241 may be inserted in addition to the activity units • The words "RESIDUE: Last Contained * * *" may be included in association with the basic description of the hazardous material last contained in the packaging • Other information is permitted provided it does not confuse or detract from the proper shipping name or other required information

Special Considerations/Exceptions for Shipping Papers

- For shipments of multiple cargo types, any HAZMAT entries must appear as the first entries on the shipping papers, or be entered in a color that readily contrasts with any description on the shipping papers or highlighted on the shipping papers in a contrasting color, or be designated by an "X" (or "RQ" if appropriate).
- Emergency response information consistent with §§172.600-606 shall be readily available on the transport vehicle.
- Shipments of limited quantities of radioactive material in excepted packages, under UN2908, 2909, 2910 and 2911, are excepted from shipping paper requirements if (a) the package does not contain fissile material unless excepted by §173.453, and (b) the limited quantity of radioactive material is not a hazardous substance or hazardous waste.
- For road transport, the shipping papers shall be (a) readily available to authorities in the event of accident or inspection, (b) stored within the driver's immediate reach while he is restrained by the lap belt, (c) readily visible to a person entering the driver's compartment or in a holder which is mounted to the inside of the door on the driver's side of the vehicle, and (d) either in a holder mounted to the inside of the door on the driver's side of the vehicle or on the driver's seat.

[1] For mixtures of radionuclides, the radionuclides to be shown must be determined in accordance with §173.433(g), which is commonly known as the 95% rule; abbreviations (symbols) are authorized.

[2] The shipper's certification shall satisfy the requirements of either §§172.204(a)(1) or 204(a)(2); or if transported by air of §172.204(c); but is not required if the shipper is a private carrier and the shipment is not reshipped or transferred from one carrier to another.

[3] Shipments made under an exemption or special permit issued prior to October 1, 2007 may bear the notation "DOT–E" followed by the number assigned.

5. Hazard Communication for Class 7 (Radioactive) Materials: Marking of Packagings: (49 CFR 172, Subpart D; and 49 CFR 178.3 and 178.350)

These are basic reference charts; refer to current U.S. DOT & NRC regulations for complete requirements.
NOTE: IAEA, IATA/ICAO, and IMO may require additional hazard communication information.

Markings on Packages

Markings Always Required Unless Excepted[1]	Additional Markings Sometimes Required	Optional Markings
Markings for Non-bulk Packagings: • Proper shipping name • Identification number (preceded by "UN" or "NA," as appropriate) • Name and address of consignor or consignee, unless the package is: ▪ highway only and no motor carrier transfers; or ▪ part of a rail carload or truckload lot or freight container load, and entire contents of railcar, truck, or freight container are shipped from one consignor to one consignee **Markings for Bulk Packages:** • Identification number on orange rectangular panel: ▪ on each side and each end, if the packaging has a capacity of 3,785 L (1,000 gallons) or more, or ▪ on two opposing sides, if the packaging has a capacity of less than 3,785 L (1,000 gallons), or ▪ on each side and end of motor vehicle carrying cylinders permanently installed on a tube trailer	**Package-based marking requirements:** • Gross mass, including the unit of measurement (which may be abbreviated) for each package with gross mass greater than 50 kg (110 lb) • Package type as appropriate, i.e., "TYPE IP–1," "TYPE IP–2," "TYPE IP–3," "TYPE A," "TYPE B(U)" or "TYPE B(M)"[1] • Marked with international vehicle registration code of country of origin for IP–1, IP–2, IP–3 or Type A package design [2] • Radiation (trefoil) symbol[3] on outside of outermost receptacle of each Type B(U) or Type B(M) packaging design • For NRC or DOE packaging, model number, serial number, gross weight, and package identification number for each certified package (Type AF, Type B(U), Type B(M), Type B(U)F, and Type B(M)F) • For Specification 7A packaging, mark on the outside with "USA DOT 7A Type A", and the name and address or symbol of the manufacturer satisfying §178.3 and §178.350. **Materials-based requirements:** • For non-bulk IP-1 package containing a liquid, use underlined double arrow symbol indicating upright orientation[4], where the symbol is placed on two opposite sides of the packaging • If a hazardous substance in non-bulk package, mark outside of each package with the letters "RQ" in association with the proper shipping name **Administrative-based requirements:** • For each Type B(U), Type B(M) or fissile material package destined for export shipment, mark "USA" in conjunction with specification marking, or certificate identification; and package identification indicated in U.S. Competent Authority Certificate • Mark "DOT–SP" followed by the special permit number assigned for each package authorized by special permit • Competent authority identification marking and revalidation for foreign made Type B(U), Type B(M), Type C, Type CF, Type H(U), Type H(M), or fissile material package for which a Competent Authority Certificate is required	• Both the name and address of consignor and consignee is recommended. • Other markings on packages such as advertising are permitted, but must be located away from required markings and labeling.

Special Considerations for Marking Requirements

- All markings are to be (a) on the outside of each packaging, (b) durable and legible, (c) in English, (d) printed on or affixed to the surface of a package or on a label, tag, or sign, (e) displayed on a background of sharply contrasting color, and (f) unobscured by labels or attachments.

[1] Some exceptions exist as specified in §§172.301(a) and 302(a); and in §§173.421(a), 422(a).

[2] The international vehicle registration code for packages designed by a U.S. company or agency is the symbol "USA."

[3] The radiation symbol shall be resistant to the effects of fire and water, plainly marked by embossing, stamping or other means resistant to the effects of fire and water that conform to the requirements of Appendix B to Part 172.

[4] The arrows must be either black or red on white or other suitable contrasting background and commensurate with the size of the package; depicting a rectangular border around the arrows is optional.

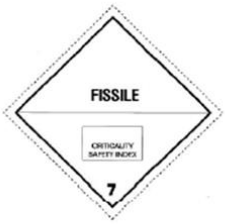
6. Hazard Communications for Class 7 (Radioactive) Materials:

Labeling of Packages (49 CFR 172.400-450)

These are basic reference charts; refer to current U.S. DOT & NRC regulations for complete requirements.
NOTE: IAEA, IATA/ICAO, and IMO may require additional hazard communication information.

Requirements for Labels [1]

- Label each package except for (a) excepted packages containing a limited quantity of radioactive material; and (b) Low Specific Activity (LSA) material and Surface Contaminated Objects (SCO), packaged or unpackaged, when transported domestically and when material or object contains less than an A_2 quantity.
- Labeling is required to be (a) printed or affixed to a surface other than the bottom of the package, (b) placed near the proper shipping name marking, (c) printed or affixed to a background of contrasting color or have a dotted or solid line outer border, (d) clearly visible, (e) un-obscured by markings or other attachments, and (f) representative of hazardous material content.
- Display duplicate labels on at least two opposite sides or two ends (other than the bottom) of all non-bulk packages of radioactive material except as noted above for excepted packages, and packaged or unpackaged LSA material and SCO.

Radioactive Category Labels [3]			Other Labels[2]	
				
White-I	**Yellow-II**	**Yellow-III**	**Fissile**	**Empty**
Radiation Surface Level (RSL):			Fissile labels required for each package containing fissile material, other than fissile-excepted material; and labels must be affixed adjacent to radioactive category labels.	Empty labels required for shipments of empty Class 7 (radioactive) packages satisfying §173.428; and any previously-used labels cannot be visible
mSv/h:	**RSL** ≤ 0.005	0.005 < **RSL** ≤ 0.5	0.5 < **RSL** ≤ 2[4]	
mrem/h:	**RSL** ≤ 0.5	0.5 < **RSL** ≤ 50	50 < **RSL** ≤ 200[4]	
Transport Index (TI):[4]				
TI = 0[4]	0[4] < **TI** ≤ 1	1 < **TI** ≤ 10[4, 5]		

Contents on Labels

- Each radioactive category label must contain: (a) Except for LSA-I material, the names of the radionuclides in the package where, for mixtures of radionuclides, the names listed must be in accordance with the 95% rule specified in §172.433(g); and, for LSA-I material, the term "LSA-I"; (b) activity in appropriate SI units (*e.g.* Bq, TBq), or appropriate customary units (e.g. Ci, mCi) in parentheses following SI units; and (c) for Yellow-II or Yellow-III labels the Transport Index (TI). Abbreviations and symbols may be used. Except for Pu-239 and Pu-241, the weight in g or kg of fissile radionuclides may be inserted instead of activity units; for Pu-239 and Pu-241, the weight in g of fissile radionuclides may be inserted in addition to the activity units.
- Each fissile label must contain the relevant Criticality Safety Index (CSI).

[1] Additional labeling may be required if the radioactive material also meets the definition of one or more other hazard classes. See §§172.402 and 403 for details on label requirements. See §§172.403, 421 and 427 for details when labels are not required, and see §172.407 for details on label design, size, color, form identification, exceptions, etc.

[2] An additional "Cargo Aircraft Only" label is required for each package containing a hazardous material which is authorized for cargo aircraft only.

[3] The category of the label must be the higher of the two values specified for RSL and TI; see §172.403(b).

[4] The TI is determined from radiation level 1 m from package surface; see definition for TI in §173.403 for details. If the measured TI is not greater than 0.05, the value may be considered to be zero.

[5] RSLs less than or equal to 10 mSv/h (1000 mrem/h), and TIs more than 10 are allowed for shipments under exclusive-us; see §§172.403(a) – 403(c). In addition; any package containing a Highway Route Controlled Quantity (HRCQ) must bear a YELLOW-III label.

8. Requirements/Guidance for Registration, Emergency Response and Action for Class 7 (Radioactive) Materials: (49 CFR 107, Subpart G, 49 CFR 171.15 and 49 CFR 172, Subparts G and H)

These are basic reference charts; refer to current U.S. DOT & NRC regulations for complete requirements.

Provisions for Persons Who Offer or Transport Class 7 (Radioactive) Materials (49 CFR 107, Subpart G)

- Any person, other than those excepted by §107.606, who offers for transportation, or transports, in foreign, interstate or intrastate commerce any of the following Class 7 (radioactive) materials must satisfy registration and fee requirements of Part 107, Subpart G:
  - a highway route-controlled quantity of radioactive material;
  - a shipment in a bulk packaging with a capacity ≥ 13,248 L (3,500 gallons) for liquids or gases, or > 13.24 cubic meters (468 cubic feet) for solids; or
  - any quantity of radioactive material that requires placarding, under provisions of Part 172, Subpart F.
- Any person required to register must submit a complete and accurate registration statement on DOT Form F 5800.2 by June 30th for each registration year, or in time to have on file a current Certificate of Registration in accordance with §107.620.
- Each registrant or designee must maintain for a period of 3 years from the date of issuance a copy of the registration statement and Certificate of Registration issued by PHMSA and must furnish its Certificate of Registration (or a copy thereof) and related records to an authorized representative or special agent of DOT upon request.
- Each motor carrier subject to registration requirements of this subpart must carry a copy of its current Certificate of Registration or another document bearing the registration number on board each truck and truck tractor, and the Certificate of Registration or document must be made available, upon request, to enforcement personnel.
- The amount of fees to be paid and procedures to be followed are found at §§107.612 and 616.

Provisions for Providing and Maintaining Emergency Response Information (49 CFR 172, Subpart G)

- When shipping papers for the transportation of radioactive materials are required (see Part 172, Subpart C), emergency response information shall
  - be provided and maintained during transportation and at facilities where materials are loaded for transportation, stored incidental to transportation, or otherwise handled during any phase of transportation;
  - be provided by persons who offer for transportation, accept for transportation, transfer or otherwise handle hazardous materials during transportation;
  - be immediately available for use at all times the hazardous material is present; and
  - include and make available the emergency response telephone number (see §172.604) to any person, representing a Federal, State or local government agency, who responds to an incident involving the material or is conducting an investigation which involves the material
- Emergency response information is information that can be used in mitigating an incident involving radioactive materials. It must contain at least the information specified in §§172.602 and 604; and includes an emergency response telephone number that is monitored at all times the material is in transportation by (a) knowledgeable person, or (b) a person who has immediate access to a knowledgeable person, or (c) an organization capable of accepting responsibility for providing the necessary detailed information concerning the material.
- Each carrier who transports or accepts for transportation radioactive material for which a shipping paper is required shall instruct, according to the requirements of §172.606, the operator of a conveyance to contact the carrier in the event of an incident involving the material.

Actions to be Taken in the Event of Spillage, Breakage, or Suspected Contamination by Radioactive Material

- Except for a road vehicle used solely for transporting Class 7 (radioactive) material, if radioactive material has been released in a road, rail, or air transport conveyance, the conveyance must be taken out of and remain out of service until the radiation dose rate at every accessible surface is less than 0.005 mSv/h (0.5 mrem/h) and the non-fixed radioactive surface contamination levels are below the values the limits in §173.443(a), Table 9 [see Chart 3].
- Each aircraft used routinely, and each motor vehicle used, for transporting radioactive materials under exclusive use, must be (a) periodically checked for radioactive contamination, (b) taken out of service if contamination levels are above acceptable limits, and (c) remain out of service until the radiation dose rates at accessible surfaces are less than 0.005 mSv/h (0.5 mrem/h) and non-fixed radioactive surface contamination levels are below the limits in §173.443(a), Table 9 [see Chart 3].
- Following any breakage, spillage, release or suspected radioactive contamination incident, any rail or air carrier shall notify, as soon as possible, the offeror (i.e. the consignor); special provisions apply for buildings, areas, and equipment that might become contaminated during rail transport. Alternative provisions may apply for motor vehicles transporting radioactive materials under exclusive use. [see §§174.750(a) and 750(e), and §177.843(b)]

Provisions for Immediate Notification for Reportable Incidents Involving Radioactive Materials (§§171.15 and 16)

- Each person in physical possession of radioactive material must provide notice in the event of a reportable incident (see §171.15(b)) as soon as practical, but no later than 12 hours after the occurrence of the reportable incident, to the National Response Center (NRC) by telephone at 800–424–8802 (toll free) or 202–267–2675 (toll call) or online at http://www.nrc.uscg.mil.
  - Each notice must include the information specified in §171.15(a)(1) – (a)(7).
- A detailed incident report must also submitted as required by §171.16.

Guidance on Responding to Emergencies (Emergency Response Guidebook)

- The DOT issues guidance to aid first responders in quickly identifying the specific or generic hazards of the dangerous goods involved in an accident or incident, and for protecting themselves and the general public during the initial response to the accident or incident. For each name or UN ID Number, the user is led to a specific guide that provides insight into potential hazards and steps to be taken for public safety and emergency response.
- The current Emergency Response Guidebook is available at the following URL: http://www.phmsa.dot.gov/hazmat/library/erg

9. Requirements for Training and Security for Class 7 (Radioactive) Materials: (49 CFR 172, Subparts H and I, and 49 CFR 173)

These are basic reference charts; refer to current U.S. DOT & NRC regulations for complete requirements.

Provisions for Training (49 CFR 172, Subpart H)

- For any person who is employed by an employer or is self-employed, and who directly affects radioactive materials transportation safety, a systematic program shall be established to ensure that the person:
  - has familiarity with the general provisions of Part 172, Subpart H;
  - is able to recognize and identify radioactive materials;
  - has knowledge of specific requirements of Part 172 that are applicable to functions performed by the employee;
  - has knowledge of emergency response information, self protection measures and accident prevention methods and procedures; and
  - does not perform any function related to the requirements of Part 172 unless instructed in the requirements that apply to that function.
- The person shall be trained pursuant to the requirements of §§172.704(a) and (b), may be trained by the employer or by other public or private sources, and shall be tested by appropriate means. The training must include the following:
  (a) general awareness training providing familiarity with applicable regulatory requirements;
  (b) function-specific training applicable to functions the employee performs;
  (c) safety training concerning emergency response information, measures to protect the employee from hazards, and methods and procedures for avoiding accidents;
  (d) security awareness training providing awareness of security risks and methods designed to enhance transportation security; and
  (e) in-depth security training if a security plan is required for the shipment(s) involved.
- Initial and recurrent training shall comply with the requirements of §172.704(c)
- Records of training shall be created and retained in compliance with the requirements of §172.704(d).

Provisions for Security (49 CFR 172, Subpart I and 49 CFR 173)

- A security plan for hazardous materials that conforms to the requirements of Part 172, Subpart I must be developed and adhered to by each person who offers for transportation in commerce or transports in commerce in a motor vehicle, rail car, or freight container any of the following radioactive materials:
  (a) IAEA Code of Conduct Category 1 and 2 materials (see §172.800(b)(15));
  (b) a highway route controlled quantity (HRCQ) of radioactive material as defined in §173.403 (see §172.800(b)(15));
  (c) known radionuclides in forms listed as radioactive material quantities of concern (RAM–QC) by the NRC (see §172.800(b)(15)); or
  (d) a quantity of uranium hexafluoride requiring placarding under §172.505(b) (see §172.800(b)(14)).
- The security plan must include an assessment of possible transportation security risks and appropriate measures to address the assessed risks.
- Specific measures put into place by the plan may vary commensurate with the level of threat at a particular time.
- At a minimum, a security plan must address personnel security, unauthorized access, and en route security.
- The security plan must be
  (a) in writing;
  (b) retained for as long as it remains in effect;
  (c) available as copies or portions thereof to the employees who are responsible for implementing it, consistent with personnel security clearance or background investigation restrictions and a demonstrated need to know;
  (d) revised and updated as necessary to reflect changing circumstances; and
  (e) maintained (all copies) as of the date of the most recent revision, when it is updated or revised.
- Security plans that conform to regulations, standards, protocols, or guidelines issued by other Federal agencies, international organizations, or industry organizations may be used to satisfy the requirements in Part 172, provided such security plans address the requirements specified in Part 172, Subpart I.
- Additional security planning requirements may apply for rail transport of a highway route controlled quantity of radioactive material (see §§172.820 and 173.403).