

# **Consolidated Guidance About Materials Licenses**

## **Program-Specific Guidance About Portable Gauge Licenses**

**Draft Report for Comment**

## AVAILABILITY OF REFERENCE MATERIALS IN NRC PUBLICATIONS

### NRC Reference Material

As of November 1999, you may electronically access NUREG-series publications and other NRC records at NRC's Public Electronic Reading Room at <http://www.nrc.gov/reading-rm.html>.

Publicly released records include, to name a few, NUREG-series publications; *Federal Register* notices; applicant, licensee, and vendor documents and correspondence; NRC correspondence and internal memoranda; bulletins and information notices; inspection and investigative reports; licensee event reports; and Commission papers and their attachments.

NRC publications in the NUREG series, NRC regulations, and *Title 10, Energy*, in the Code of *Federal Regulations* may also be purchased from one of these two sources.

1. The Superintendent of Documents  
U.S. Government Printing Office  
Mail Stop SSOP  
Washington, DC 20402-0001  
Internet: [bookstore.gpo.gov](http://bookstore.gpo.gov)  
Telephone: 202-512-1800  
Fax: 202-512-2250
2. The National Technical Information Service  
Springfield, VA 22161-0002  
[www.ntis.gov](http://www.ntis.gov)  
1-800-553-6847 or, locally, 703-605-6000

A single copy of each NRC draft report for comment is available free, to the extent of supply, upon written request as follows:

Address: U.S. Nuclear Regulatory Commission  
Office of Administration  
Publications Branch  
Washington, DC 20555-0001

E-mail: [DISTRIBUTION.SERVICES@NRC.GOV](mailto:DISTRIBUTION.SERVICES@NRC.GOV)

Facsimile: 301-415-2289

Some publications in the NUREG series that are posted at NRC's Web site address <http://www.nrc.gov/reading-rm/doc-collections/nuregs> are updated periodically and may differ from the last printed version. Although references to material found on a Web site bear the date the material was accessed, the material available on the date cited may subsequently be removed from the site.

### Non-NRC Reference Material

Documents available from public and special technical libraries include all open literature items, such as books, journal articles, and transactions, *Federal Register* notices, Federal and State legislation, and congressional reports. Such documents as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings may be purchased from their sponsoring organization.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at—

The NRC Technical Library  
Two White Flint North  
11545 Rockville Pike  
Rockville, MD 20852-2738

These standards are available in the library for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from—

American National Standards Institute  
11 West 42<sup>nd</sup> Street  
New York, NY 10036-8002  
[www.ansi.org](http://www.ansi.org)  
212-642-4900

Legally binding regulatory requirements are stated only in laws; NRC regulations; licenses, including technical specifications; or orders, not in NUREG-series publications. The views expressed in contractor-prepared publications in this series are not necessarily those of the NRC.

The NUREG series comprises (1) technical and administrative reports and books prepared by the staff (NUREG-XXXX) or agency contractors (NUREG/CR-XXXX), (2) proceedings of conferences (NUREG/CP-XXXX), (3) reports resulting from international agreements (NUREG/IA-XXXX), (4) brochures (NUREG/BR-XXXX), and (5) compilations of legal decisions and orders of the Commission and Atomic and Safety Licensing Boards and of Directors' decisions under Section 2.206 of NRC's regulations (NUREG-0750).

# **Consolidated Guidance About Materials Licenses**

## **Program-Specific Guidance About Portable Gauge Licenses**

### **Draft Report for Comment**

Manuscript Completed: April 2012  
Date Published: May 2012

Prepared by:  
J. Cook  
T. Herrera  
B. Juran  
S. Lodhi  
K. McDaniel  
J. R. Mullauer  
M. Reichard

Office of Federal and State Materials and  
Environmental Management Programs

## COMMENTS ON DRAFT REPORT

Any interested party may submit comments on this report for consideration by the NRC staff. Comments may be accompanied by additional relevant information or supporting data. Please specify the report number, NUREG-1556, Volume 1, Revision 2, draft, in your comments, and send them by the end comment period specified in the *Federal Register* notice announcing the availability of this draft to the following address:

Cindy Bladey, Chief  
Rules, Announcements, and Directives Branch  
Division of Administrative Services  
Office of Administration  
Mail Stop: TWB-05-B01M  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

For any questions about the material in this report, please contact:

Tomas Herrera  
Mail Stop: T-8E24  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001  
Phone: (301) 415-7138  
E-mail: [tomas.herrera@nrc.gov](mailto:tomas.herrera@nrc.gov)

Please be aware that any comments that you submit to the NRC will be considered a public record and entered into the Agencywide Documents Access and Management System (ADAMS). Do not provide information you would not want to be publically available.

## **ABSTRACT**

This technical report contains information intended to provide program-specific guidance and assist applicants and licensees in preparing applications for materials licenses for portable gauges. In particular, it describes the types of information needed to complete U.S. Nuclear Regulatory Commission (NRC) Form 313, "Application for Materials License." This document describes both the methods acceptable to the NRC license reviewers in implementing the regulations and the techniques used by the reviewers in evaluating the application to determine if the proposed activities are acceptable for licensing purposes.

### **Paperwork Reduction Act Statement**

This NUREG contains and references information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget, approval numbers 3150-0044; 3150-0014; 3150-0017; 3150-0008; and 3150-0120.

### **Public Protection Notification**

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.



# CONTENTS

<b>ABSTRACT</b> .....	iii
<b>FIGURES</b> .....	vii
<b>TABLES</b> .....	vii
<b>FOREWORD</b> .....	ix
<b>ACKNOWLEDGMENTS</b> .....	xi
<b>ABBREVIATIONS</b> .....	xiii
<b>1 PURPOSE OF REPORT</b> .....	1
<b>2 AGREEMENT STATES</b> .....	3
<b>3 MANAGEMENT RESPONSIBILITY</b> .....	7
3.1 Commitments and Responsibilities .....	7
3.2 Safety Culture .....	8
<b>4 APPLICABLE REGULATIONS</b> .....	11
<b>5 HOW TO FILE</b> .....	13
5.1 Paper Application .....	13
5.2 Where to File .....	13
5.3 Transfer to Electronic Format .....	14
<b>6 IDENTIFYING AND PROTECTING SENSITIVE INFORMATION</b> .....	15
<b>7 APPLICATION AND LICENSE FEES</b> .....	17
<b>8 CONTENTS OF AN APPLICATION</b> .....	19
8.1 Item 1: License Action Type .....	20
8.2 Item 2: Applicant's Name and Mailing Address .....	20
8.2.1 Notification of Bankruptcy Proceedings .....	21
8.3 Item 3: Address(es) Where Licensed Material Will Be Used or Possessed .....	21
8.4 Item 4: Person To Be Contacted about This Application .....	22
8.5 Item 5: Radioactive Material .....	23
8.5.1 Sealed Sources and Devices .....	23
8.5.2 Financial Assurance and Recordkeeping for Decommissioning .....	24
8.6 Item 6: Purpose(s) for Which Licensed Material Will Be Used .....	25
8.7 Item 7: Individual(s) Responsible for Radiation Safety Program and Their Training and Experience .....	25
8.8 Item 8: Training for Individuals Working in or Frequenting Restricted Areas (Instructions to Occupationally Exposed Workers and Ancillary Personnel) .....	26
8.9 Item 9: Facilities and Equipment .....	27
8.10 Item 10: Radiation Safety Program .....	28
8.10.1 Audit Program .....	28
8.10.2 Instruments .....	29
8.10.3 Material Receipt and Accountability .....	29
8.10.4 Occupational Dosimetry .....	30
8.10.5 Public Dose .....	32
8.10.6 Operating, Emergency, and Security Procedures .....	34

8.10.7 Leak Tests .....	36
8.10.8 Maintenance .....	37
8.10.9 Transportation.....	39
8.11 Item 11: Waste Management—Gauge Disposal and Transfer .....	39
8.12 Item 12: License Fees .....	40
8.13 Item 13: Certification.....	40
<b>9 AMENDMENTS AND RENEWALS TO A LICENSE .....</b>	<b>41</b>
9.1 Timely Notification of Transfer of Control .....	41
<b>10 APPLICATIONS FOR EXEMPTIONS .....</b>	<b>43</b>
<b>11 TERMINATION OF ACTIVITIES .....</b>	<b>45</b>
 <b>APPENDICES</b>	
APPENDIX A U.S. NUCLEAR REGULATORY COMMISSION FORM 313.....	A-1
APPENDIX B SUGGESTED FORMAT FOR PROVIDING INFORMATION REQUESTED IN ITEMS 5 THROUGH 11 OF U.S. NUCLEAR REGULATORY COMMISSION FORM 313.....	B-1
APPENDIX C CRITERIA FOR ACCEPTABLE TRAINING COURSES FOR PORTABLE GAUGE USERS .....	C-1
APPENDIX D TYPICAL DUTIES AND RESPONSIBILITIES OF THE RADIATION SAFETY OFFICER.....	D-1
APPENDIX E PORTABLE GAUGE AUDIT CHECKLIST .....	E-1
APPENDIX F INFORMATION NEEDED TO SUPPORT APPLICANT'S REQUEST TO PERFORM NONROUTINE MAINTENANCE .....	F-1
APPENDIX G OPERATING, EMERGENCY, AND SECURITY PROCEDURES....	G-1
APPENDIX H DOSIMETRY-RELATED GUIDANCE .....	H-1
APPENDIX I REQUESTS TO PERFORM LEAK TESTING AND SAMPLE ANALYSIS.....	I-1
APPENDIX J MAJOR U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS.....	J-1
APPENDIX K SAFETY CULTURE STATEMENT OF POLICY.....	K-1



## FIGURES

Figure 2.1	U.S. map: locations of NRC offices and Agreement States .....	3
Figure 8.1	Typical duties and responsibilities of RSOs.....	26
Figure 8.2	Annual dose limits for radiation workers.....	31
Figure 8.3	Storing gauges. Gauges should be stored away from occupied areas and must be secured against unauthorized removal. ....	33
Figure 8.4	Proper handling. Gauges are often damaged by heavy equipment at job sites; therefore, emergency procedures need to be followed to minimize radiation safety risk.....	35
Figure 8.5	Maintenance. All licensees need to perform routine cleaning and lubrication to ensure proper operating of the gauge. For nonroutine maintenance, most licensee rely on the gauge manufacturer or other service companies. ....	37

## TABLES

Table 2.1	Who Regulates the Activity? .....	4
Table 3.1	Traits of a Positive Nuclear Safety Culture.....	9



## FOREWORD

The NRC's NUREG-1556 technical report series provides a comprehensive source of reference information about various aspects of materials licensing and materials program implementation. These reports, where applicable, describe a risk-informed, performance-based approach to licensing consistent with the current regulations. The reports are intended for use by applicants, licensees, license reviewers, and other NRC personnel. The NUREG-1556 series currently includes the following volumes:

<b><i>Volume No.</i></b>	<b><i>Volume Title</i></b>
<b>1</b>	Program-Specific Guidance about Portable Gauge Licenses
<b>2</b>	Program-Specific Guidance about Industrial Radiography Licenses
<b>3</b>	Applications for Sealed Source and Device Evaluation and Registration
<b>4</b>	Program-Specific Guidance about Fixed Gauge Licenses
<b>5</b>	Program-Specific Guidance about Self-Shielded Irradiator Licenses
<b>6</b>	Program-Specific Guidance about 10 CFR Part 36 Irradiator Licenses
<b>7</b>	Program-Specific Guidance about Academic, Research and Development, and Other Licenses of Limited Scope Including Gas Chromatographs and X-Ray Fluorescence Analyzers
<b>8</b>	Program-Specific Guidance about Exempt Distribution Licenses
<b>9</b>	Program-Specific Guidance about Medical Use Licenses
<b>10</b>	Program-Specific Guidance about Master Materials Licenses
<b>11</b>	Program-Specific Guidance about Licenses of Broad Scope
<b>12</b>	Program-Specific Guidance about Possession Licenses for Manufacturing and Distribution
<b>13</b>	Program-Specific Guidance about Commercial Radiopharmacy Licenses
<b>14</b>	Program-Specific Guidance about Well Logging, Tracer, and Field Flood Study Licenses
<b>15</b>	Guidance about Changes of Control and about Bankruptcy Involving Byproduct, Source, or Special Nuclear Materials Licenses
<b>16</b>	Program-Specific Guidance about Licenses Authorizing Distribution to General Licensees

<b>Volume No.</b>	<b>Volume Title</b>
<b>17</b>	Program-Specific Guidance about Special Nuclear Material of Less Than Critical Mass Licenses
<b>18</b>	Program-Specific Guidance about Service Provider Licenses
<b>19</b>	Guidance for Agreement State Licensees About NRC Form 241 “Report of Proposed Activities in Non-Agreement States, Areas of Exclusive Federal Jurisdiction, or Offshore Waters” and Guidance for NRC Licensees Proposing to Work in Agreement State Jurisdiction (Reciprocity)
<b>20</b>	Program-Specific Guidance about Administrative Licensing Procedures
<b>21</b>	Program-Specific Guidance about Possession Licenses for Procedures of Radioactive Materials Using an Accelerator
<b>22</b>	Reserved

The current document, NUREG-1556, Volume 1, Revision 2, “Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,” is intended for use by applicants, licensees, and NRC staff. This revision provides a general update to the previous information contained in NUREG-1556, Volume 1, Revision 1, issued November 2001, to incorporate certain security requirements and other regulatory and policy changes that have been implemented since the last revision was published.

This report takes a risk-informed, performance-based approach to licensing portable gauges. A team composed of staff from NRC Headquarters, NRC regional offices, and Agreement States prepared this document, drawing on their collective experience in radiation safety in general and as specifically applied to portable gauges.

NUREG-1556, Volume 1, Revision 2, is not a substitute for NRC regulations. The approaches and methods described in this report are provided for information only. Methods and solutions different from those described in this report may be acceptable if they include a basis for the staff to make the determinations needed to issue or continue a license.

---

Brian J. McDermott, Director  
 Division of Materials Safety and State Agreements  
 Office of Federal and State Materials and Environmental Management Programs

## **ACKNOWLEDGMENTS**

The working group thanks the individuals listed below for assisting in the review and update of the report. All participants provided valuable insights, observations, and recommendations.

The working group would like to thank the staff in the regional offices of the NRC and all of the States who provided comments and technical information that assisted in the development of this report.

The working group also thanks Lisa Dimmick, John O'Donnell, Monica Orendi, Tara Weidner, and Duane White for developing the formatting and language used in many parts of the report.

### **The Participants for this Revision**

Bielecki, Jessica  
Chidakel, Susan  
Cook, Jackie  
Herrera, Tomas  
Juran, Brandon  
Lodhi, Sattar  
McDaniel, Keith  
Mullauer, James R.  
Reichard, Michael



## ABBREVIATIONS

ALARA	as low as is reasonably achievable
Bq	Becquerel
CFR	<i>Code of Federal Regulations</i>
DOT	United States Department of Transportation
IN	information notice
mrem	Millirem
mSv	Millisievert
NMSS	Office of Nuclear Materials Safety and Safeguards
NRC	United States Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
OMB	Office of Management and Budget
RIS	regulatory issue summary
RSO	radiation safety officer
SSD	sealed source and device
Sv	Sievert
TLD	thermoluminescent dosimeters





# 1. PURPOSE OF REPORT

This report provides guidance to an applicant applying for a portable gauge license and also provides the U.S. Nuclear Regulatory Commission (NRC) with the appropriate criteria for evaluating such applications. This document uses the terms “byproduct material,” “licensed material,” and “radioactive material” interchangeably. Within this document, the phrases “portable gauge” and “gauge” are also used interchangeably.

This report addresses the variety of radiation safety issues associated with portable gauges of different types. Portable gauges are of many different designs and may contain different sealed sources based, in part, on their intended use (e.g., to measure moisture content, density, thickness of asphalt, paint analysis). Because of differences in design, manufacturers can provide appropriate instructions and recommendations for proper operation and maintenance. In addition, with gauges of varying designs, the sealed sources may be oriented in different locations within the devices, resulting in different radiation safety challenges. Applicants should obtain this information from the manufacturers or suppliers if such information is not provided with the portable gauge. This report does not address the research and development of portable gauges or the commercial aspects of the manufacturing, distribution, and servicing of such devices.

Chapter 8 of this report identifies the information needed to complete NRC Form 313, “Application for Materials License” (see Appendix A), for the use of sealed sources containing byproduct material in portable gauges. The Office of Management and Budget (OMB) has approved the information collection requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 30, “Rules of General Applicability to Domestic Licensing of Byproduct Material,” and NRC Form 313 under OMB Clearance Nos. 3150-0017 and 3150-0120, respectively.

The format within this document for each item of technical information is as follows:

- Regulations—references the regulations applicable to the item
- Criteria—outlines the criteria used to evaluate the applicant’s response
- Discussion—provides additional information about the topic
- Response from Applicant—provides suggested response or responses, offers the option of an alternative reply, or indicates that no response is needed on that topic during the licensing process

Notes and references are self-explanatory and may not be found for each item on NRC Form 313.

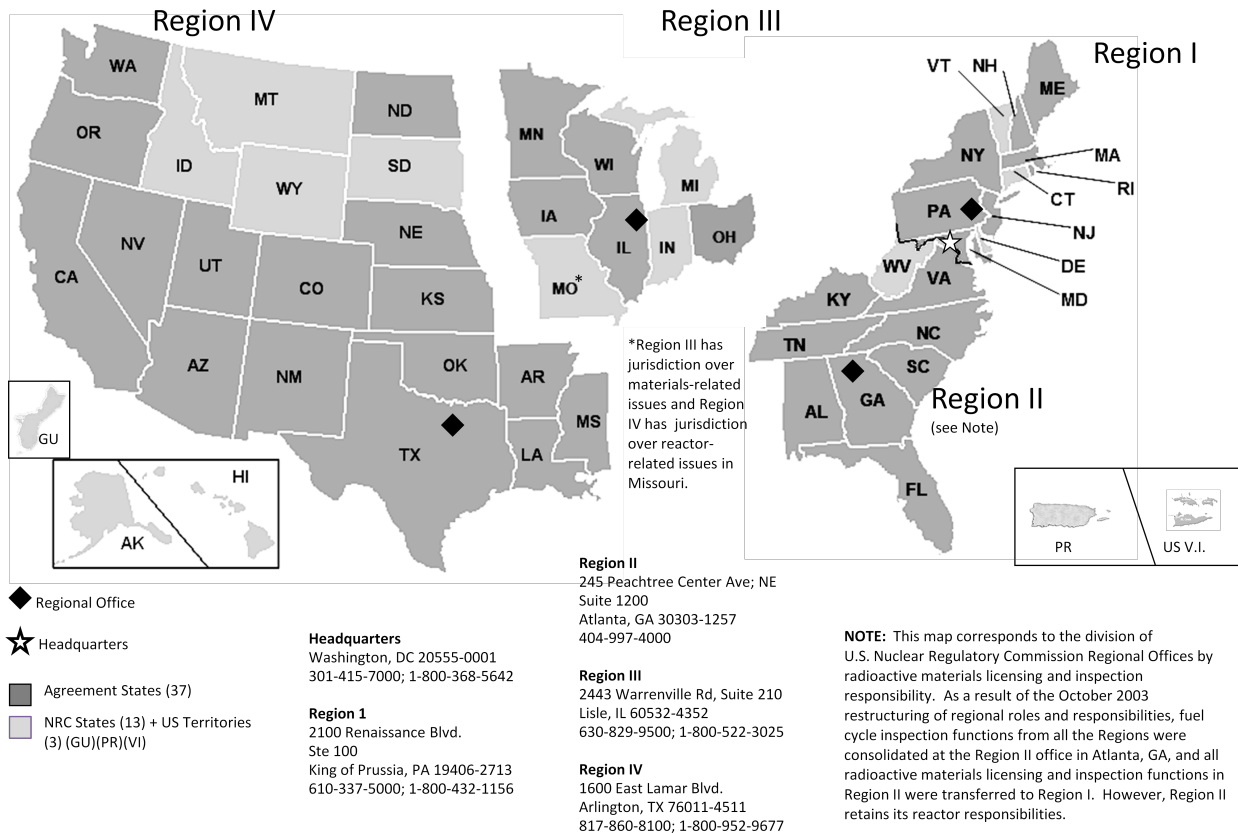
NRC Form 313 does not have sufficient space for applicants to provide full responses to Items 5 through 11, as indicated on the form. Applicants should address those items on separate sheets of paper and submit them along with the completed NRC Form 313. For the convenience and streamlined handling of portable gauge applications, Appendix B, “Suggested Format for Providing Information Requested in Items 5 through 11 of U.S. Nuclear Regulatory Commission Form 313,” may be used to provide supporting information.



## 2. AGREEMENT STATES

Certain States, called Agreement States (see Figure 2.1), have entered into agreements with the NRC that give them the authority to license and inspect byproduct, source, and special nuclear materials, in quantities not sufficient to form a critical mass, which are used or possessed within their borders. Any applicant, other than a Federal entity, who wishes to possess or use licensed material in one of these Agreement States should contact the responsible officials in that State for guidance on preparing an application. These applications should be filed with State officials, not with the NRC. In areas under exclusive federal jurisdiction within an Agreement State, NRC continues to be the regulatory authority.

**Locations of NRC Offices and Agreement States**



**Figure 2.1 U.S. map: locations of NRC offices and Agreement States**

In the special situation of work at Federally controlled sites in Agreement States, it is necessary to ascertain the jurisdictional status of the land to determine whether the NRC or the Agreement State has regulatory authority. These areas can also include tribal lands of federally recognized

Indian Tribes<sup>1</sup>. The NRC has regulatory authority over land determined to be “exclusive Federal jurisdiction,” while the Agreement State has jurisdiction over nonexclusive Federal jurisdiction land. Applicants are responsible for determining in advance the jurisdictional status of the specific areas where they plan to conduct licensed operations. The NRC recommends that applicants contact their local office of the Federal agency controlling the site (e.g., contract officer, base environmental health officer, district office staff) for assistance in determining the jurisdictional status of the land and to provide the information in writing to ensure compliance with NRC or Agreement State regulatory requirements, as appropriate. Additional guidance on determining jurisdictional status is found in the All Agreement States Letter (SP-96-022), dated February 16, 1996, which is available at <http://nrc-stp.ornl.gov/>. Once on the Web site, use the link for FSME Letters in the left hand column under Resources & Tools. The link will take you to another Web page where you can search for letters to the Agreement States.

Table 2.1 provides a quick way to check on whether the NRC or an Agreement State has regulatory authority.

**Table 2.1 Who Regulates the Activity?**

<b>Applicant and Proposed Location of Work</b>	<b>Regulatory Agency</b>
Federal agency or Federally recognized Indian Tribe <sup>2</sup> regardless of location (except the U.S. Department of Energy and, under most circumstances, its prime contractors are exempt from licensing, in accordance with 10 CFR 30.12, “Persons using byproduct material under certain Department of Energy and Nuclear Regulatory contracts”)	NRC
Non-Federal entity in non-Agreement State, District of Columbia, U.S. territory or possession, or in offshore Federal waters	NRC
Non-Federal entity in Agreement State at non-Federally controlled site	Agreement State
Non-Federal entity in Agreement State at Federally controlled site <b>not</b> subject to exclusive Federal jurisdiction	Agreement State

<sup>1</sup>For the purposes of this guidance, an “Indian tribe” is defined as an Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994. A list of federally recognized tribes is available at [www.bia.gov](http://www.bia.gov).

<sup>2</sup>The NRC can exercise jurisdiction as the regulatory authority on tribal land of a Federally recognized Indian Tribe. Section 274b Agreements do not give States the authority to regulate nuclear material in these areas. However, there are a few States that exercise regulatory authority over these areas. Companies owned or operated by Federally recognized Indian Tribe members or non-tribal members that wish to possess or use licensed material on tribal lands should contact the appropriate NRC regional office check the jurisdictional status of the tribal lands request a license application from the appropriate regulatory agency.

Non-Federal entity in Agreement State at Federally controlled site subject to exclusive Federal jurisdiction	NRC
Non-Federal entity in Agreement State conducting portable gauge operations at a reactor facility with an operating license	Agreement State
Non-Federal entity in Agreement State conducting portable gauge operations at a reactor facility under construction, prior to the issuance of an operating license or combined operating license	Agreement State

**Reference:** A current list of Agreement States (including names, addresses, and telephone numbers of responsible officials) is available at the Office of Federal and State Materials and Environmental Management Programs' public Web site, <http://nrc-stp.ornl.gov>. As an alternative, a request for the list can be made to an NRC regional office.



### 3. MANAGEMENT RESPONSIBILITY

The NRC recognizes that effective radiation safety program management is vital to achieving safe and compliant operations. Consistent compliance with NRC regulations provides reasonable assurance that licensed activities will be conducted safely and that effective management will result in increased safety and compliance.

“Management” as used in this volume refers to the processes for conduct and control of a radiation safety program and to the individuals who are responsible for those processes and who have *authority to provide necessary resources* to achieve regulatory compliance.

#### 3.1 Commitments and Responsibilities

Pursuant to 10 CFR 30.32(c), each application shall be signed by the applicant or licensee or a person duly authorized to act for and on the behalf of the applicant or licensee. If it is not clear whether the application was signed by someone duly authorized to act for and on the behalf of the applicant or licensee, NRC license reviewers may ask for additional assurances that the individual that signed the application is duly authorized to act for and on the behalf of the applicant or licensee. The signature on an application acknowledges the licensee’s commitments and responsibilities for the following:

- Radiation safety, security, and control of radioactive materials and compliance with regulations;
- Completeness and accuracy of the radiation safety records and all information provided to the NRC (10 CFR 30.9, “Completeness and accuracy of information”);
- Knowledge about the contents of the license and application;
- Compliance with current NRC and U.S. Department of Transportation (DOT) regulations and the licensee’s operating, emergency, and security procedures;
- Commitment to provide adequate resources (including space, equipment, personnel, time, and, if needed, contractors) to the radiation protection program to ensure that the public and workers are protected from radiation hazards and compliance with regulations is maintained;
- Selection and assignment of a qualified individual to serve as the radiation safety officer (RSO) for licensed activities and confirmation that the RSO has independent authority to stop unsafe operations and will be given sufficient time to fulfill radiation safety duties and responsibilities;
- Commitment to ensure that radiation workers have adequate training;
- Prevention of discrimination of employees engaged in protected activities (10 CFR 30.7, “Employee protection”);

- Commitment to provide information to employees about the employee protection and deliberate misconduct provisions in 10 CFR 30.7 and 10 CFR 30.10, “Deliberate misconduct,” respectively;
- Commitment to obtain NRC’s prior written consent before transferring control of the license (see Section 9.1 of this report); and
- Notification of the appropriate NRC regional administrator in writing, immediately following the filing of petition for voluntary or involuntary bankruptcy (10 CFR 30.34(h)), as discussed further in Section 8.2.1 of this report.

For information on NRC inspection, investigation, enforcement, and other compliance programs, see the current version of the NRC’s Enforcement Policy and Inspection Procedures available in the NRC’s online library at <http://www.nrc.gov/reading-rm.html>.

### **3.2 Safety Culture**

Individuals and organizations performing regulated activities are expected to 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, certificate holders, permit holders, authorization holders, holders of quality assurance program approvals, vendors and suppliers of safety-related components, and applicants for a license, certificate, permit, authorization, or quality assurance program approval, subject to NRC authority.

“Nuclear safety culture” is defined in the Safety Culture Policy Statement 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 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, particularly in goal conflict situations (e.g., production versus safety, schedule versus safety, and cost of the effort versus safety). Refer to Table 3.1 for the traits of a positive nuclear safety culture from NRC’s safety culture policy statement.

The NRC, as the regulatory agency with an independent oversight role, reviews the performance of individuals and organizations to determine compliance with requirements and commitments through its existing inspection and assessment processes. However, NRC’s safety culture policy statement and traits are not incorporated into the regulations. Many of the safety culture traits may, be inherent to an organization’s existing radiation safety practices and programs. For instance, the security requirement for portable gauge licensees to use physical controls to secure portable gauges from unauthorized removal may correspond with the “work processes” safety culture trait “the process of planning and controlling work activities to ensure that safety is maintained.”

Refer to Appendix K for the NRC’s safety culture policy statement. More information on NRC activities relating to safety culture can be found at: <http://www.nrc.gov/about-nrc/regulatory/enforcement/safety-culture.html>.



**Table 3.1 Traits of a Positive Nuclear Safety Culture**

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



## 4. APPLICABLE REGULATIONS

It is the applicant's or licensee's responsibility to obtain and have available up-to-date copies of applicable regulations, to read and understand the requirements of each of these regulations, and to comply with each applicable regulation. The following parts of Title 10 of the *Code of Federal Regulations* (10 CFR) contain regulations applicable to portable gauges. These parts will apply to many, if not all, licensees.

The current versions of these parts can be found under the "Basic References" link at the NRC's online library at <http://www.nrc.gov/reading-rm.html>; for viewing in a browser, the following list includes direct links to the rules:

- [10 CFR Part 2](#), "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders"
- [10 CFR Part 19](#), "Notices, Instructions and Reports to Workers: Inspection and Investigations"
- [10 CFR Part 20](#), "Standards for Protection Against Radiation"
- [10 CFR Part 21](#), "Reporting of Defects and Noncompliance"
- [10 CFR Part 30](#), "Rules of General Applicability to Domestic Licensing of Byproduct Material"
- [10 CFR Part 71](#), "Packaging and Transportation of Radioactive Material"

In 10 CFR Part 71, the NRC requires that licensees or applicants who transport licensed material, or who may offer such material to a carrier for transport, must comply with the applicable DOT requirements that are found in 49 CFR Parts 170 through 189.
---

- [10 CFR Part 150](#), "Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters under Section 274"
- [10 CFR Part 170](#), "Fees for Facilities, Materials, Import and Export Licenses, and Other Regulatory Services Under the Atomic Energy Act of 1954, as Amended"
- [10 CFR Part 171](#), "Annual Fees for Reactor Operating Licenses, and Fuel Cycle Licenses and Materials Licenses, Including Holders of Certificates of Compliance, Registrations, and Quality Assurance Program Approvals and Government Agencies Licensed by the NRC"

Copies of the above documents may be obtained by calling the Government Printing Office order desk toll-free at (866) 512-8600, in Washington, DC, at (202) 512-1800, or online at <http://bookstore.gpo.gov>.

A single copy of the above documents may be requested from the NRC's regional offices (see Figure 2.1 for addresses and telephone numbers). In addition, 10 CFR Parts 1 through 199 can

be found on the NRC's Web site at <http://www.nrc.gov/reading-rm/doc-collections/> under Regulations (10 CFR).

NRC regulations and amendments can also be accessed from the "NRC Library" link on the NRC's public Web site at <http://www.nrc.gov>. The NRC and all other Federal agencies publish amendments to their regulations in the *Federal Register*.

## 5. HOW TO FILE

### 5.1 Paper Application

Applicants for a materials license should do the following:

- Use the most recent guidance in preparing an application.
- Complete NRC Form 313 (Appendix A) Items 1 through 4, 12, and 13 on the form itself.
- Complete NRC Form 313 Items 5 through 11 on supplementary pages or use Appendix B.
- Provide sufficient detail for the NRC to determine that equipment, facilities, training, experience, and the radiation safety program are adequate to protect health and safety and minimize danger to life and property.
- For each separate sheet other than NRC Form 313 and Appendix B submitted with the application, identify and cross-reference submitted information to the item number on the application or the topic to which it refers.
- Submit all documents, typed, on 8-1/2 x 11-inch paper.
- Avoid submitting proprietary information and personally identifiable information.
- If submitted, proprietary information and other sensitive information (e.g., personal privacy and security related) should be clearly identified per 10 CFR 2.390, "Public inspections, exemptions, requests for withholding" (see Chapter 6).
- Submit an original, signed application.
- Retain one copy of the license application for future reference.

Applications must be signed by the applicant, licensee, or a person duly authorized as required by 10 CFR 30.32(c) (see Section 8.13).
--

### 5.2 Where to File

Applicants wishing to possess or use licensed material in any State, U.S. territory, or U.S. possession subject to NRC jurisdiction must file an application with the NRC regional office for the locale in which the material will be possessed or used. Figure 2.1 identifies NRC's four regional offices and their respective areas for licensing purposes and the Agreement States. Note that all materials applications are submitted to Regions I, III, or IV. All applicants for materials licenses located in the Region II geographical area should send their applications to Region I.

In general, applicants wishing to possess or use licensed material in Agreement States must file an application with the Agreement State and not with the NRC. However, if work will be conducted at Federally controlled sites, or federally recognized Indian Tribal lands, in Agreement States, applicants must first determine the jurisdictional status of the land in order to determine whether the NRC or the Agreement State has regulatory authority. See Chapter 2 for additional information.

### **5.3 Transfer to Electronic Format**

Paper applications received by the NRC are scanned through an optical character reader and converted to an electronic format. To ensure a smooth transfer to an electronic format, applicants should do the following:

- Submit printed or typewritten—not handwritten—text on smooth, crisp paper that will feed easily into the scanner.
- Choose typeface designs that are sans serif, such as Arial, Helvetica, Future, or Univers (the text of this document is in the Arial font).
- Use 12-point or larger font.
- Avoid stylized characters, such as script or italics.
- Ensure that the print is clear and sharp.
- Ensure that there is high contrast between the ink and paper (black ink on white paper is best).

It is anticipated that the NRC may provide mechanisms for filing applications through the Internet. If this occurs, the NRC will provide additional filing instructions as the agency implements these new mechanisms.

## 6. IDENTIFYING AND PROTECTING SENSITIVE INFORMATION

All licensing applications, except for portions containing sensitive information, will be made available for review in the NRC's Public Document Room and electronically at the NRC Library. For more information on the NRC Library, visit [www.nrc.gov](http://www.nrc.gov).

The licensee should identify, mark, and protect sensitive information against unauthorized disclosure to the public. Licensing applications that contain sensitive information should be marked as indicated below in accordance with 10 CFR 2.390 before the information is submitted to the NRC. Key examples are as follows:

- **Proprietary Information/Trade Secrets:** If it is necessary to submit proprietary information or trade secrets, follow the procedure in 10 CFR 2.390(b). Failure to follow this procedure could result in disclosure of the proprietary information to the public or substantial delays in processing the application.
- **Personal Privacy Information:** Personal information about employees or other individuals should not be submitted unless specifically requested by the NRC. Examples of private information are social security number, home address, home telephone number, date of birth, and radiation dose information. If private information is submitted, it should be separated from the public portion of the application and clearly marked as follows: "Privacy Act Information—Withhold under 10 CFR 2.390." For further information, see Regulatory Issue Summary (RIS) 2007-04, "Personally Identifiable Information Submitted to the U.S. Nuclear Regulatory Commission," dated March 9, 2007, which can be found on the NRC's Generic Communications webpage under Regulatory Issue Summaries: <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/>.
- **Security-Related Information:** Following the events of September 11, 2001, the NRC changed its procedures to avoid release of information that terrorists could use to plan or execute an attack against facilities or citizens in the United States. As a result, certain types of information are no longer routinely released and are treated as sensitive unclassified information. For example, certain information about the quantities and locations of radioactive material at licensed facilities, and associated security measures, are no longer released to the public. Therefore, sensitive security-related information in an application should be marked: "Security Related—Withhold under 10 CFR 2.390." For further information, see RIS 2005-31, "Control of Security-Related Sensitive Unclassified Non-Safeguards Information Handled by Individuals, Firms, and Entities Subject to NRC Regulation of the Use of Source, Byproduct, and Special Nuclear Material," dated December 22, 2005, which can be found on the NRC's Generic Communications webpage under Regulatory Issue Summaries: <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/>. Additional information on procedures and any updates is available at <http://www.nrc.gov/reading-rm/sensitive-info.html>.





## 7. APPLICATION AND LICENSE FEES

Each application for which a fee is specified must be accompanied by the appropriate fee. Refer to 10 CFR 170.31, "Schedule of fees for materials licenses and other regulatory services, including inspections, and import and export licenses," to determine the amount of the fee. The NRC will not issue a license until the fee is received. Consult 10 CFR 170.11, "Exemptions," for information on exemptions from these fees. Once the technical review has begun, no fees will be refunded; application fees will be charged regardless of the NRC's disposition of an application or the withdrawal of an application.

Most NRC licensees are also subject to annual fees; refer to 10 CFR 171.16, "Annual fees: Materials licensees, holders of certificates of compliance, holders of sealed source and device registrations, holders of quality assurance program approvals, and government agencies licensed by the NRC." Consult 10 CFR 171.11 for information on exemptions from annual fees and 10 CFR 171.16(c) on reduced annual fees for licensees that qualify as "small entities."

Direct all questions about the NRC's fees or completion of Item 12 of NRC Form 313 to the Office of the Chief Financial Officer at NRC Headquarters in Rockville, MD, (301) 415-7554. Information about fees may also be obtained by calling NRC's toll-free number, (800) 368-5642, extension 415-7554. The e-mail address is [Fees.Resource@nrc.gov](mailto:Fees.Resource@nrc.gov).



## 8. CONTENTS OF AN APPLICATION

The following comments apply to the indicated items on NRC Form 313 (Appendix A).

All items in the application should be completed in enough detail for the NRC to determine that the proposed equipment, facilities, training and experience, and radiation safety program satisfy regulatory requirements and are adequate to protect public health and safety and minimize danger to life and property. Consideration shall be given, when developing the application, to the concepts of keeping exposure as low as is reasonably achievable (ALARA) and minimizing contamination.

10 CFR 20.1101(b) states: "The licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)." Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures as Low as Is Reasonably Achievable," discusses the ALARA concepts and philosophy. The application should document ALARA considerations, including establishing administrative action levels and monitoring programs.

10 CFR 20.1406, "Minimization of contamination," requires applicants for licenses to describe how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment; facilitate eventual decommissioning; and minimize, to the extent practicable, the generation of radioactive waste. As with ALARA considerations, applicants should address concerns for all aspects of their programs.

All information submitted to the NRC during the licensing process may be incorporated as part of the license and will be subject to review during inspection.

### 8.1 Item 1: License Action Type

Item 1 of NRC Form 313 states the following:

This is an application for (check appropriate item):

Type of Action	License No.
<input type="checkbox"/> A. New License	Not Applicable
<input type="checkbox"/> B. Amendment	XX-XXXXXX-XX
<input type="checkbox"/> C. Renewal	XX-XXXXXX-XX

Check box A for a new license request.

Check box B for an amendment to an existing license and provide the license number.

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

Licensees are required to request and obtain an amendment to the license before making changes to their radiation safety programs. The following are examples of changes that require amendment:

- a change of RSO
- changes in the mailing address
- changes in the address(es) of storage locations
- changes in licensed material, including increases in the possession limit of byproduct material and adding new types of gauges

See "Amendments and Renewals to a License" in Chapter 9 of this report.

### 8.2 Item 2: Applicant's Name and Mailing Address

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

Notify the NRC of changes in mailing address. Those addresses that are changed do not require a fee.

**Note:** The NRC must be notified before control of the license is transferred (see Section 9.1 ) or when bankruptcy proceedings have been initiated. See Section 8.2.1 below for more details.

### 8.2.1 Notification of Bankruptcy Proceedings

**Regulation:** 10 CFR 30.34(h)

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

**Discussion:** Even though a licensee may have filed for bankruptcy, the licensee remains responsible for all regulatory requirements. The NRC must know when licensees are in bankruptcy proceedings in order to determine whether all licensed material is accounted for and adequately controlled and whether there are any public health and safety concerns (e.g., contaminated facility). The NRC shares the results of its determinations with other involved entities (e.g., trustee), so that health and safety issues can be resolved before bankruptcy actions are completed.

**Response from Applicant:** None is required at the time of application for a new license. Licensees must immediately notify the NRC in writing following the filing of a voluntary or involuntary petition for bankruptcy by or against the licensee.

**Reference:** See NUREG-1556, Volume 15, “Consolidated Guidance about Materials Licenses: Guidance about Changes of Control and about Bankruptcy Involving Byproduct, Source, or Special Nuclear Materials Licenses.”

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

Most applicants need to provide two types of information in response to Item 3:

- the address where the gauges will be stored when gauges are not in the field
- specification of whether they intend to use the portable gauge at temporary job sites

Specify the street address, city, and State or other descriptive address (e.g., Highway 10, 5 miles east of the intersection of Highway 10 and State Route 234, Anytown, State). The descriptive address should be sufficient to allow an NRC inspector to find the facility location. A post office box address is not acceptable. In addition, the applicant may provide global positioning system coordinates, as appropriate, for each permanent storage or use facility and field station located in a remote area. A field station is a location in which licensed material may be stored or used and from which the applicant will dispatch equipment to job sites. If devices will not be stored at a dispatch site or field station, indicate this. The applicant should also state whether a location will be used to perform portable gauging operations or only for storage of portable gauges.

Documents that give the exact location of use and storage for materials greater than or equal to International Atomic Energy Agency (IAEA) Category 2 quantities should be marked “Security-Related Information—Withhold under 10 CFR 2.390.”

NRC prohibits long-term storage in vehicles or personal residences not listed on the license. As discussed in the above paragraph, in responding to Item 3, license applicants should also include a description of those locations, such as personal residences where portable gauges may be stored by licensee staff for dispatch to customer job sites.

An NRC-approved license amendment is required before receiving, using, and storing licensed material at an address or location not included with the application or already listed on the license.

Being granted an NRC license does not relieve a licensee from complying with other applicable Federal, State, or local regulations (e.g., local zoning requirements).

To conduct operations at temporary job sites (i.e., locations where work is conducted for limited periods of time), specify “temporary job sites anywhere in the United States where the NRC maintains jurisdiction.”

**Note:** As discussed later in Section 8.5.2, “Financial Assurance and Recordkeeping for Decommissioning,” licensees must maintain permanent records describing where licensed material was used or stored while the license was in effect. This is important for making future determinations about the release of these locations for unrestricted use (e.g., before the license is terminated). For portable gauge licensees, acceptable records are leak test records, sketches, and written descriptions of storage or use locations specifically listed on the license. Licensees only need to maintain this information for temporary job sites where sources have leaked.

#### **8.4 Item 4: Person To Be Contacted about This Application**

Identify the individual who can answer questions about the application, and include his or her telephone number. Also include business cell phone numbers and e-mail addresses. This individual, usually the RSO, will serve as the point of contact during the review of the application. If this individual is not a full-time employee of the licensed entity, his or her position and relationship to the licensee should be specified. The NRC should be notified if the person assigned to serve as a point of contact changes or if his or her telephone number, cell phone number, or e-mail address changes. Notification of a contact change is only in order to provide information and would not be considered an application for license amendment, unless the notification involves a change in the contact person who is also the RSO.

As indicated on NRC Form 313 (see Appendix A), Items 5 through 11 should be submitted on separate sheets of paper. Applicants may use Appendix B for this purpose and should note that using the suggested wording of responses and committing to use the model procedures in this report will facilitate the NRC’s review.

## **8.5 Item 5: Radioactive Material**

### **8.5.1 Sealed Sources and Devices**

**Regulations:** 10 CFR 30.32(g), 10 CFR 30.33(a)(2), 10 CFR 32.210

**Criteria:** Applicants must provide the manufacturer's name, model number, radionuclide, quantity, and nominal activity for each requested sealed source and the manufacturer and model number for each device. Licensees will be authorized to possess and use only those sealed sources and devices specifically approved and registered by the NRC or an Agreement State.

**Discussion:** The NRC and Agreement States perform safety evaluations of gauges before authorizing manufacturers to distribute portable gauges to licensees. The safety evaluation is documented in a Sealed Source and Device (SSD) registration certificate.

Licensees may not make any changes to the sealed source, device, or source/device combination that would alter the description or specifications from those indicated in the respective registration certificates without obtaining the NRC's prior permission in a license amendment. Such changes may necessitate a custom registration review, increasing the time needed to process a licensing action.

SSD registration certificates contain sections on "Conditions of Normal Use" and "Limitation and Other Considerations of Use." These sections may include limitations derived from conditions imposed by the manufacturer or distributor, by particular conditions of use that would reduce the radiation safety of the device, or by circumstances unique to the sealed source or device. For example, the working life of the device or the appropriate temperature and other environmental conditions may be specified. Except as specifically approved by the NRC, licensees are required to use gauges according to their respective SSD registration certificates. Accordingly, applicants should obtain a copy of the certificate and review it with the manufacturer or distributor, or with the NRC or the issuing Agreement State.

#### **Response from Applicant:**

- Identify each radionuclide and nominal activity in each gauge.
- Identify the manufacturer or distributor and model number of each type of gauge.
- State the total quantity of each type of portable gauge.

Confirm that the activity per source and maximum activity per gauge being requested will not exceed the maximum activity listed in the approved certificate of registration issued by the NRC or by an Agreement State.

**Note:**

Generally, portable gauge licensees possess small quantities of material below the Category 2 quantities described in the International Atomic Energy Agency's "Code of Conduct on the Safety and Security of Radioactive Sources." Refer to 10 CFR Part 20, Appendix E for a list of radionuclides of interest and Category 2 quantities.

If portable gauge licensees acquire a Category 2 quantity, applicants and licensees should visit the NRC's public Web site ([www.nrc.gov](http://www.nrc.gov)) and select the Nuclear Security tab at the top of the NRC home page for additional information regarding security of Category 2 licensed material.

Please contact the appropriate regional office for questions regarding the security of licensed material.

**Reference:** For more information about the SSD registration process, see the current version of NUREG-1556, Volume 3, "Consolidated Guidance about Materials Licenses: Applications for Sealed Source and Device Evaluation and Registration."

### 8.5.2 Financial Assurance and Recordkeeping for Decommissioning

**Regulations:** 10 CFR 30.34(b), 10 CFR 30.35

**Criteria:** Portable gauge licensees possessing sealed sources containing radioactive material in excess of the limits specified in 10 CFR 30.35, "Financial assurance and recordkeeping for decommissioning," must provide evidence of financial assurance for decommissioning.

Licensees are required to maintain, in an identified location, decommissioning records related to leaking sources and to structures and equipment in which gauges are used or stored. Licensees must transfer these records important to decommissioning either to the new licensee before licensed activities are transferred or assigned in accordance with 10 CFR 30.34(b), or to the appropriate NRC regional office before the license is terminated.

**Discussion:** The requirements for financial assurance are specific to the types and quantities of byproduct material authorized on a license. Most portable gauge applicants and licensees do not need to comply with the financial assurance requirements because the thresholds for sealed sources are  $3.7 \times 10^6$  gigabecquerels (100,000 curies) of cesium-137 or  $3.7 \times 10^3$  gigabecquerels (100 curies) of americium-241 or californium-252. In general, a licensee would need to possess hundreds of gauges before the financial assurance requirements would apply. Applicants and licensees desiring to possess gauges exceeding the threshold amounts must submit evidence of financial assurance. Licensees should may follow the guidance provided in NUREG-1757, Volume 3, "Consolidated NMSS Decommissioning Guidance—Financial Assurance, Recordkeeping and Timeliness."

NRC regulations also require that licensees maintain records important to decommissioning in an identified location. All portable gauge licensees need to maintain records of structures and equipment where gauges are used or stored at locations specifically listed in the license. As-built drawings (not blueprints) with modifications of structures and equipment shown, as appropriate, fulfill this requirement. If drawings are not available, licensees may substitute appropriate records concerning the areas and locations. In addition, if portable gauge licensees have experienced unusual occurrences (e.g., leaking sources, other incidents that involve the spread of contamination), they also need to maintain records about contamination that remains after cleanup or that may have spread to inaccessible areas.



**Response from Applicants:** No response is needed from most applicants. If financial assurance is required, submit evidence of financial assurance following the guidance in NUREG-1757, Volume 3.

**Reference:** See NUREG-1757, Volume 3, “Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness”.

### **8.6 Item 6: Purpose(s) for Which Licensed Material Will Be Used**

**Regulation:** 10 CFR 30.33(a)(1)

**Criteria:** The proposed activity is authorized by the Atomic Energy Act of 1954, as amended, and devices will be used only for the purposes for which they were designed and according to the manufacturer’s recommendations for use as specified in an approved SSD registration certificate.

**Response from Applicant:** Specifically describe how each device will be used. If the gauging device(s) will be used for the purposes listed on the SSD registration certificate, or as recommended by the manufacturer, the applicant may so state. If the gauging device(s) will be used for purposes other than those listed on the SSD registration certificate, specify these other purposes and include a safety analysis supporting the request.

**Notes:**

- The typical portable gauge license authorizes use “to measure physical properties of materials.”
- Unusual uses will be evaluated on a case-by-case basis, and the authorized use condition will reflect approved uses.

### **8.7 Item 7: Individual(s) Responsible for Radiation Safety Program and Their Training and Experience**

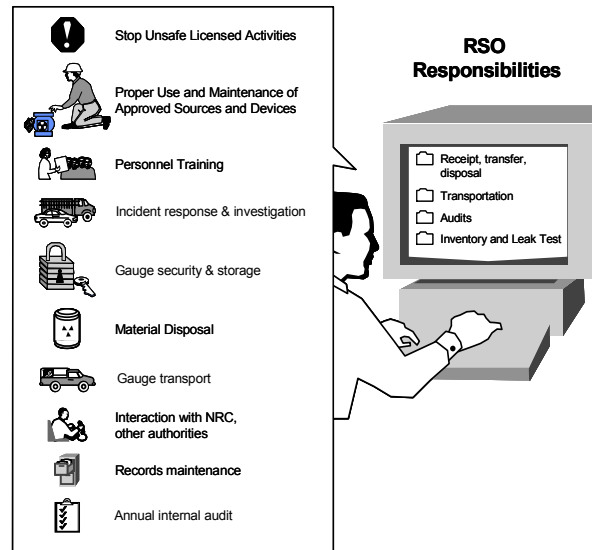
**Regulation:** 10 CFR 30.33(a)(3)

**Criteria:** RSOs must have adequate training and experience. In the past, the NRC has found successful completion of one of the following to be evidence of adequate training and experience:

- portable gauge manufacturer’s course for users and RSOs, with hands-on experience with portable gauges
- equivalent course that meets the criteria specified in Appendix C

**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 needs independent authority to stop operations that he or she considers to be unsafe. He or she must have sufficient time and commitment from management to fulfill his or her duties and

responsibilities to ensure that radioactive materials are used in a safe manner, approved radiation safety procedures are being implemented, and the required records of licensed activities are maintained. Typical RSO duties are illustrated in Figure 8.1 and described in Appendix D. The NRC requires the name of the RSO to be on the license to ensure that licensee management always has a responsible, qualified person identified and that the named individual knows of his or her designation as RSO.



1556-006b.ppt  
050200

**Figure 8.1 Typical duties and responsibilities of RSOs**

**Response from Applicant:** Provide both of the following:

- name of the proposed RSO
- documentation demonstrating that the proposed RSO is qualified by training and experience (i.e., certificate of completion of the RSO's course or the authorized user's course)

**Note:** Licensees need to inform the NRC of changes in the designation of the RSO and request an amendment to the license to name a replacement RSO.

Alternative responses will be reviewed against the criteria listed above.

### **8.8 Item 8: Training for Individuals Working in or Frequenting Restricted Areas (Instructions to Occupationally Exposed Workers and Ancillary Personnel)**

**Regulations:** 10 CFR 19.11, 10 CFR 19.12, 10 CFR 30.33

**Criteria:** Authorized users must have adequate training and experience in the use of portable gauges. In the past, the NRC has found successful completion of one of the following to be evidence of adequate training and experience:

- equivalent course that meets the criteria in Appendix C

**Discussion:** The individuals using the gauges are usually referred to as “authorized users.” Authorized users have the responsibility to ensure the surveillance, proper use, security, and routine maintenance of portable gauges containing licensed material.

**Response from Applicant:** Provide either of the following:

- the following statement: “Before using licensed materials, authorized users will have successfully completed one of the training courses described under “Criteria” in the section titled “Training for Individuals Working in or Frequenting Restricted Areas” in NUREG-1556, Volume 1, Revision 2, “Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses.”
- a description of the training for proposed gauge users

**Notes:**

- Records of the training of each authorized user should be maintained for at least 3 years after the last use of licensed material by the authorized user.
- Completion of online training should be supplemented by documentation of the individual’s hands-on training.
- Alternative responses will be evaluated against the criteria listed above.

**8.9 Item 9: Facilities and Equipment**

**Regulations:** 10 CFR 20.1101(b), 10 CFR 20.1201, 10 CFR 20.1301, 10 CFR 20.1801, 10 CFR 30.34(i)

**Criteria:** Licensees must ensure that radiation doses to authorized users and members of the public are maintained ALARA, and that all license material is secured from unauthorized access or removal.

**Discussion:** The key elements for portable gauge applicants are ensuring compliance with public dose limits and maintaining adequate security and control over the gauges. See Section 8.10 for additional information.

**Response from Applicant:** No information needed be submitted in response to this item.

## **8.10 Item 10: Radiation Safety Program**

### **8.10.1 Audit Program**

**Regulations:** 10 CFR 20.1101, 10 CFR 20.2102

**Criteria:** Licensees must review the content and implementation of their radiation protection programs at least annually to ensure the following:

- Programs comply with NRC and DOT regulations, and with the terms and conditions of the license.
- Occupational doses and doses to members of the public are ALARA (per 10 CFR 20.1101, "Radiation protection programs").
- Records of audits and other reviews of program content are maintained for at least 3 years.

**Discussion:** Appendix E contains a suggested audit program that is specific to the use of portable gauges and is acceptable to the NRC. All areas indicated in Appendix E may not be applicable to every licensee and may not need to be addressed during each audit.

Currently, the NRC's emphasis in inspections is to perform actual observations of work in progress. As part of their audit programs, applicants should consider performing performance based audits, which can include unannounced observations of gauge users in the field. The audit findings should be documented. It is essential that, once identified, problems be corrected comprehensively and in a timely manner. The licensee's senior management should review the audit findings.

With regard to audit records, 10 CFR 20.2102(a) requires, in part, licensees to maintain records of "audits and other reviews of program content and implementation. The NRC has found audit records that contain the following information to be acceptable: date of audit, name of person(s) who conducted the audit, persons contacted by the auditor(s), areas audited, audit findings, corrective actions, and followup.

**Response from Applicant:** The applicant is not required to, and should not, submit its audit program to the NRC for review during the licensing phase. The audit program will be reviewed during NRC inspections.

**References:** The following documents are available from the NRC upon request: Inspection Procedure 87124, "Fixed and Portable Gauge Programs," and Information Notice (IN) 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," dated May 1, 1996.

For information about NRC inspection and enforcement, see the current version of the NRC Enforcement Policy found on the NRC's public Web site.

### 8.10.2 Instruments

**Regulation:** 10 CFR 30.33(a)(2)

**Criteria:** A radiation survey meter should—

- be capable of detecting gamma radiation; and
- be checked for functionality before use (e.g., with the gauge or a check source).

**Discussion:** Each year, there are a number of incidents involving gauges at construction sites (e.g., construction equipment running over the gauge). It is important to determine as soon as possible after an incident, by the use of a radiation survey meter, whether the shielding and source are intact. Applicants should preplan how they will obtain and properly use an instrument (e.g., use an instrument located on site or obtain one from the applicant's home office, another licensee, a consultant, or a local emergency response organization).

**Response from Applicant:** Provide either of the following:

- the following statement: "We will either possess and use, or have access to and use, a radiation survey meter that meets the criteria in the section titled "Radiation Safety Program—Instruments" in NUREG-1556, Volume 1, Revision 2, "Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses," in the event of an incident."

**OR**

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

**Notes:**

- Alternative responses will be reviewed against the criteria listed above.
- Applicants who plan to perform nonroutine maintenance that requires removing the source or source rod from the gauge will need to possess and use a radiation survey meter that meets more stringent criteria. Refer to Section 8.10.8 and to Appendix F for more information.

### 8.10.3 Material Receipt and Accountability

**Regulations:** 10 CFR 30.34(e), 10 CFR 30.41, 10 CFR 30.51

**Criteria:** Licensees must do the following:

- Maintain records of receipt, transfer, and disposal of gauges.
- Conduct physical inventories at intervals not to exceed 6 months (or some other interval justified by the applicant and approved by the NRC) to account for all sealed sources.

**Discussion:** Licensed materials must be tracked “from cradle to grave” in order to ensure gauge accountability, identify when gauges could be lost, stolen, or misplaced, and ensure that, if the licensee possesses gauges exceeding threshold amounts, the licensee complies with the financial assurance requirements in 10 CFR 30.35. Many licensees record daily use of gauges in a log book as part of their accountability program; see the suggested operating procedures in Appendix G.

**Response from Applicant:** Provide either of the following:

- the following statement: “Physical inventories will be conducted at intervals not to exceed 6 months, to account for all sealed sources and devices received and possessed under the license.”

**OR**

- a description and justification of an alternate frequency and/or procedure to account for all sealed sources and devices received and possessed under the license

**Notes:**

- Inventory records should be maintained and should contain the following information:
  - radionuclide and amount (in units of becquerels (Bq) or curies) of byproduct material in each sealed source
  - manufacturer’s name, model number, and serial number (if appropriate) of each gauge containing byproduct material
  - location of each SSD
  - date of the inventory
  - name of the individual performing the inventory

#### **8.10.4 Occupational Dosimetry**

**Regulations:** 10 CFR 20.1201, 10 CFR 20.1207, 10 CFR 20.1208, 10 CFR 20.1501, 10 CFR 20.1502

**Criteria:** Applicants must do either of the following:

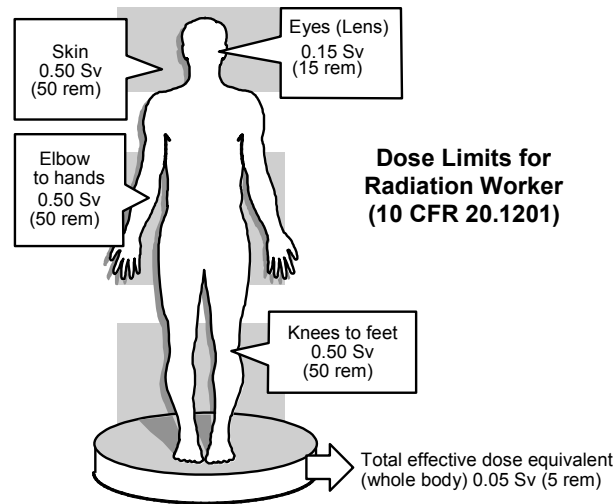
- Maintain, for inspection by the NRC, documentation demonstrating that unmonitored individuals are not likely to receive, in one year, a radiation dose<sup>1</sup> in excess of 10 percent of the allowable limits as shown in Figure 8.2.

**OR**

---

<sup>1</sup>In this document, dose or radiation dose is used as defined in 10 CFR 20.1003, “Definitions”; i.e., a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent. These latter terms are also defined in 10 CFR Part 20.

- Provide dosimetry processed and evaluated by a National Voluntary Laboratory Accreditation Program (NVLAP)-approved processor that is exchanged at a frequency recommended by the processor.



**Figure 8.2 Annual dose limits for radiation workers**

**Discussion:** The licensee is required to monitor exposure to individuals likely to receive greater than 10 percent of the annual dose limits. Under conditions of routine use (including weekly cleaning and lubrication of the gauge according to the manufacturer’s instructions), the typical portable gauge user does not require a personnel monitoring device (dosimetry). In many accidents in which a gauge has been run over and has been damaged, the shielding of the source remains intact. However, there have been several instances in which a source did not remain in the shielded position. In such cases, the user must exercise care to ensure that workers at the job site are alerted about the radiation and protected from radiation exposure. A gauge user also does not require dosimetry when proper emergency procedures are used. Part 1 of Appendix H provides guidance on preparing a written evaluation demonstrating that gauge users are not likely to exceed 10 percent of the applicable limits and, therefore, are not required to have personnel dosimetry.

When personnel monitoring is needed, most licensees use either film badges or thermoluminescent dosimeters (TLDs) that are supplied by an NVLAP-approved processor. Applicants must ensure that the processor is NVLAP-approved and consult the NVLAP-approved processor for its recommendations for exchange frequency and proper use of the dosimeter.

**Response from Applicant:** Provide any one of the following:

- the following statement: “We will maintain, for inspection by the NRC, documentation demonstrating that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10 percent of the allowable limits in 10 CFR Part 20.”

**OR**

- the following statement: “We will provide dosimetry processed and evaluated by an NVLAP-approved processor that is exchanged at a frequency recommended by the processor.”

**OR**

- a description of an alternative method for demonstrating compliance with the referenced regulations.

**Notes:**

- Many licensees choose to provide personnel dosimetry to their workers for reasons other than compliance with NRC requirements (e.g., to respond to worker requests, or to maintain records of personal exposures).

**Reference:** The National Institute of Standards and Technology maintains a directory of accredited laboratories at <http://ts.nist.gov>.

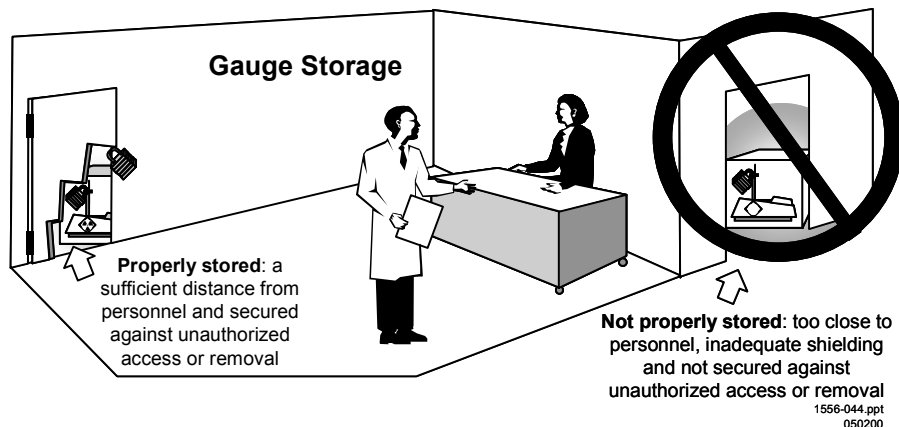
### **8.10.5 Public Dose**

**Regulations:** 10 CFR 20.1003, 10 CFR 20.1301, 10 CFR 20.1302, 10 CFR 20.1801, 10 CFR 20.1802, 10 CFR 20.2107

**Criteria:** Licensees must do the following:

- Ensure that licensed gauges will be used, transported, and stored in such a way that members of the public will not receive more than 1 millisievert (1 mSv) (100 millirem (100 mrem)) in one year, and that the dose from licensed operations in any unrestricted area will not exceed 0.02 mSv (2 mrem) in any one hour.
- Control and maintain constant surveillance over gauges that are not in storage and secure stored gauges from unauthorized removal or use.





**Figure 8.3 Storing gauges. Gauges should be stored away from occupied areas and must be secured against unauthorized removal.**

**Discussion:** Members of the public include persons who live, work, or may be near locations where portable gauges are used or stored and employees whose assigned duties do not include the use of licensed materials and who work in the vicinity where gauges are used or stored.

Operating, emergency, and security procedures for security and surveillance specified under 8.10.6 of this document should be sufficient to limit the exposure to the public during use or storage and after accidents. Public dose is controlled, in part, by ensuring that gauges not in use are stored securely (e.g., stored in a locked area) to prevent unauthorized access or use (see Figure 8.3). If gauges are not in storage, then authorized users must maintain constant surveillance to ensure that members of the public, who could be coworkers, do not get near the gauges or use them and thus receive unnecessary radiation exposure.

Public dose is also affected by the choice of storage location and conditions. There is always a radiation field around the gauge; therefore, it must be stored so that the radiation level in an unrestricted area (e.g., an office, the exterior surface of an outside wall, or occupied areas of a personal residence) does not result in a dose that exceeds 1 mSv (100 mrem) in a year or 0.02 mSv (2 mrem) in any one hour. Licensees should take time, distance, and shielding into consideration when choosing a permanent or temporary storage location. Decreasing the time spent near a gauge, increasing the distance from the gauge, and using shielding (i.e., brick, concrete, lead, or other solid walls) will reduce radiation exposure. As a rule of thumb, gauges should be stored as far away as possible from areas that are normally occupied by other employees and members of the public.

Licensees can determine the radiation levels adjacent to the storage location by either calculations or a combination of direct measurements and calculations using some or all of the following: typical known radiation levels provided by the manufacturer, the “inverse square” law to evaluate the effect of distance on radiation levels, and occupancy factors to account for the actual presence of the member of the public and of the gauge(s). See Part 2 of Appendix H for examples.

If, after making an initial evaluation, a licensee makes changes affecting the storage area (e.g., changing the location of gauges within the storage area, removing shielding, adding gauges, changing the occupancy of adjacent areas, moving the storage area to a new location),

then the licensee must ensure that gauges are properly secured, perform a new evaluation to ensure that the public dose limits are not exceeded, and take corrective action, as needed.

**Response from Applicant:** No response is required from the applicant in a license application, but the NRC will examine this matter during an inspection.

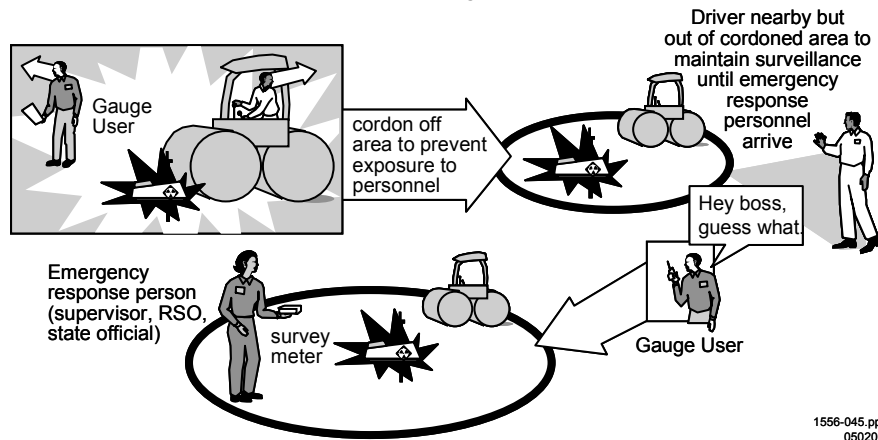
### **8.10.6 Operating, Emergency, and Security Procedures**

**Regulations:** 10 CFR 20.1101, 10 CFR 20.1801, 10 CFR 20.1802, 10 CFR 20.2201–2203, 10 CFR 30.34(e), 10 CFR 30.34(i), 10 CFR 30.50

**Criteria:** Each applicant should do the following:

- Develop, implement, and maintain operating, emergency, and security procedures containing the following elements:
  - instructions for using the portable gauge and performing routine maintenance according to the manufacturer’s recommendations and instructions
  - instructions for maintaining security during storage and transportation
  - instructions to keep the gauge under control and immediate surveillance during use
  - steps to take to keep radiation exposures ALARA
  - steps to maintain accountability during use
  - steps to control access to a damaged gauge
  - steps to take, and whom to contact, when a gauge has been damaged
- If gauges are used for measurements with the unshielded source extended more than 3 feet beneath the surface, licensees must do the following:
  - Require the use of surface casing or alternative procedures to ensure that the source can move freely in the hole.
  - Provide instructions for procedures to follow to retrieve a stuck source.
  - Require reporting to the NRC, under 10 CFR 30.50(b)(2), when a stuck source cannot be retrieved.
- Provide copies of operating, emergency, and security procedures to all gauge users and at each job site.

## Proper Handling of Incidents



**Figure 8.4 Proper handling. Gauges are often damaged by heavy equipment at job sites; therefore, emergency procedures need to be followed to minimize radiation safety risk.**

**Discussion:** Lost or stolen gauges and, as illustrated in Figure 8.-4, gauges damaged by heavy equipment during use at job sites are the most common occurrences that present a potentially significant radiation safety risk. Operating, emergency, and security procedures should be developed to minimize these risks. See Appendix G for guidance to develop security procedures.

Certain portable gauges are used to make measurements with the unshielded source extended more than 3 feet beneath the surface. Unless precautionary measures are taken, it is possible for the source to be buried under dirt or concrete that collapses around the source during the measurements. Precautionary measures need to be planned in advance to prevent these sources from being buried and to recover sources should they become stuck. To ensure that (1) the hole is free of debris, (2) it is not likely that debris will reenter the cased hole, and (3) the source will be able to move freely, the NRC will normally require the use of surface casing from the lowest depth to 12 inches above the surface. If it is not feasible to extend the casing 12 inches above the surface, licensees may cap the hole and use dummy probes before making measurements with an unshielded source to ensure that the hole is free of obstructions.

Notify the NRC when gauges are lost, stolen, damaged, or certain other conditions are met. Refer to the regulations for a description of when and where notifications are required.

**Response from Applicant:** Provide any one of the following:

- the following statement: “We will implement and maintain the operating and emergency procedures in Appendix G to NUREG-1556, Volume 1, Revision 2, “Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,” and will develop, implement and maintain security procedures using information in Appendix G. Copies of these procedures will be provided to all gauge users and at each job site.”

**OR**

- the following statement: “Operating, emergency, and security procedures will be developed, implemented, and maintained and will meet the criteria in the section titled “Radiation Safety Program—Operating, Emergency, and Security Procedures” in NUREG-1556, Volume 1, Revision 2, “Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses.””

**OR**

- alternative procedures

**Note:** Alternative procedures will be reviewed against the criteria listed above.

**References:** IN 93-18, “Portable Moisture-Density Gauge User Responsibilities During Field Operations,” dated March 10, 1993; IN 98-01, “Thefts of Portable Gauges,” dated January 15, 1998; IN 2001-11, “Thefts of Portable Gauges,” dated July 13, 2001; and NUREG/BR-0133, “Working Safely with Nuclear Gauges,” issued February 1996, are available from the NRC upon request.

### **8.10.7 Leak Tests**

**Regulation:** 10 CFR 30.53

**Criteria:** The NRC requires testing to determine whether there is any radioactive leakage from the source in the device. The NRC finds testing to be acceptable if it is conducted by an organization licensed by the NRC or an Agreement State. Licensees must maintain records of test results.

**Discussion:** When issued, a license will require performance of leak tests at intervals approved by the NRC or an Agreement State as specified in the SSD registration certificate. The measurement of the leak test sample is a quantitative analysis requiring that instrumentation used to analyze the sample be capable of detecting 185 Bq (0.005 microcurie) of radioactivity.

Manufacturers, consultants, and other organizations may be authorized by the NRC or an Agreement State to either perform the entire leak test process for other licensees or provide leak-test kits to licensees. In the latter case, the licensee is expected to take the leak test sample according to the gauge manufacturer’s and the kit supplier’s instructions and return it to the kit supplier for evaluation and reporting results. Leak test samples should be collected at the most accessible area where contamination would accumulate if the sealed source were leaking. Licensees may also be authorized to conduct the entire leak test process themselves.

**Response from Applicant:** The applicant should provide one of the following:

- The statement: “Leak tests will be performed at intervals approved by the NRC or an Agreement State and specified in the SSD registration certificate. Leak tests will be performed by an organization licensed by the NRC or an Agreement State to provide leak testing services to other licensees or using a leak test kit supplied by an organization licensed by the NRC or an Agreement State to provide leak test kits to other licensees and according to the kit supplier’s instructions.”

**OR**

- A request to perform leak test sample analysis. See Appendix I for information that will be needed to support the request.

**References:** See Appendix I.

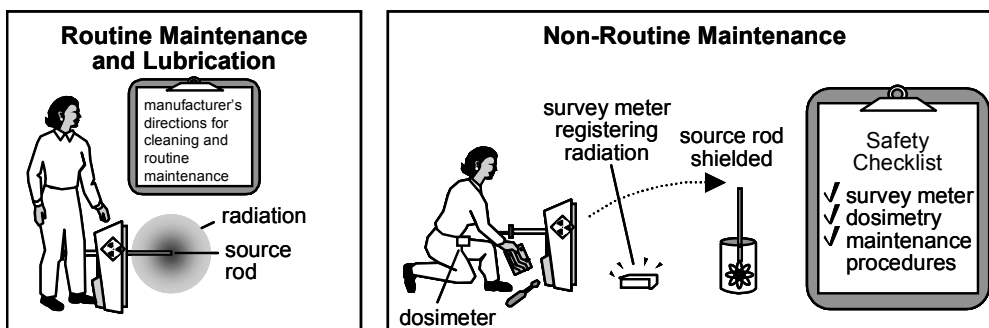
### 8.10.8 Maintenance

**Regulations:** 10 CFR 20.1101, 10 CFR 30.34(e)

**Criteria:** Licensees must routinely clean and maintain gauges according to the manufacturer's recommendations and instructions. For gauges with a source rod, radiation safety procedures for routine cleaning and lubrication of the source rod and shutter mechanism (e.g., to remove caked dirt, mud, asphalt, or residues from the source rod; to lubricate the shutter mechanism) must consider the possibility of receiving exposures to the whole body, as well as to the hands, from handling the source rod. Licensees, in accordance with 10 CFR 20.1101(b), are required to keep such exposures ALARA. Licensees should also ensure that the gauge functions as designed and source integrity is not compromised.

Nonroutine maintenance or repair (beyond routine cleaning and lubrication) that involves detaching the source or source rod from the device, and any other activities during which personnel could receive radiation doses exceeding NRC limits, must be performed by the gauge manufacturer or a person specifically authorized by the NRC or an Agreement State. Requests for specific authorization to perform nonroutine maintenance or repair (see Appendix F) must demonstrate that personnel performing the work—

- have adequate training and experience;
- use equipment and procedures that ensure compliance with regulatory requirements and consider ALARA; and
- ensure that the gauge functions as designed and that source integrity is not compromised.



1556-047.ppt  
050200

**Figure 8.5 Maintenance.** All licensees need to perform routine cleaning and lubrication to ensure proper operation of the gauge. For nonroutine maintenance, most licensees rely on the gauge manufacturer or other service companies.

**Discussion:** Figure 8.5 illustrates routine cleaning and lubrication and nonroutine maintenance. Generally, the NRC permits portable gauge licensees to perform routine maintenance of the gauges, provided that they follow the gauge manufacturer’s recommendations and instructions. Although manufacturers may use different terms, “routine maintenance” includes, but is not limited to, cleaning, lubrication, changing batteries or fuses, and repairing or replacing a handle. Routine maintenance does *not* include any activities that require removing the sealed source or source rod from the gauge.

Most licensees do not perform nonroutine maintenance or repair operations that require detaching the source or source rod from the gauge; they usually return the gauge to the manufacturer. Applicants seeking authorization to detach the source or source rod from the device must submit specific procedures for review. See Appendix F for more information.

**Response from Applicant:**

Routine cleaning and lubrication: Submit either of the following:

- the following statement: “We will implement and maintain procedures for routine maintenance of our gauges according to each manufacturer’s recommendations and instructions.”

**OR**

- alternative procedures for NRC review

Nonroutine maintenance or repair operations that require detaching the source or source rod from the gauge: Submit either of the following:

- the following statement: “We will send the gauge to the manufacturer or other person licensed by the NRC or an Agreement State to perform nonroutine maintenance or repair operations that require detaching the source or source rod from the gauge.”

**OR**

- a request to perform this work in house, using the information in Appendix F to support the request.

**Notes:**

- Alternative procedures for performing routine cleaning and lubrication will be reviewed according to the criteria listed above.
- Information requested in Appendix F will be reviewed on a case-by-case basis; if the request is approved, the license will contain a condition authorizing the licensee to perform nonroutine maintenance.

### 8.10.9 Transportation

**Regulations:** 10 CFR 20.1101, 10 CFR 71.5, 49 CFR Parts 171–178

**Criteria:** Applicants must develop, implement, and maintain safety programs for public transport of radioactive material to ensure compliance with DOT regulations.

**Discussion:** The NRC uses the provisions of 10 CFR 71.5, “Transportation of licensed material,” to examine and enforce transportation requirements found in 49 CFR, “Transportation,” applicable to portable gauge licensees. Appendix J lists major DOT regulations. See also Section 8.10.6 for guidance on preventing loss or theft of gauges when they are not in use.

- Some DOT requirements are overlooked by portable gauge licensees. The labeling of the transport container must be maintained in a legible condition. The licensee must properly block and brace the transportation case to ensure that the gauge does not shift during transport. The licensee must have emergency response information, including current emergency response telephone numbers that meet the requirements of Subpart G, “Emergency Response Information,” of 49 CFR Part 172, “Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans.” Initial and recurrent training must be given to all employees who transport portable gauges per the requirements of Subpart H, “Training,” of 49 CFR Part 172. The licensee shall maintain transportation shipping records in accordance with the requirements of Subpart C, “Shipping Papers,” of 49 CFR Part 172, including the proper shipping name, hazard class (7), United Nations (U.N.) identification number, the name of the shipper, and the name and activity of each radionuclide.

**Response from Applicant:** No response is needed from applicants during the licensing process; this issue will be reviewed during inspection.

**References:** “Radioactive Material Regulations Review” published by DOT, Pipeline and Hazardous Materials Safety Administration in December 2008 (can be obtained at <http://www.phmsa.dot.gov>).

### 8.11 Item 11: Waste Management—Gauge Disposal and Transfer

**Regulations:** 10 CFR 20.2001, 10 CFR 30.41, 10 CFR 30.51

**Criteria:** Licensed materials must be disposed of in accordance with NRC requirements by transfer to an authorized recipient. Appropriate records must be maintained.

**Discussion:** Significant problems can arise from improper gauge transfer or failure to dispose of gauges in a proper and timely manner. Such problems include the possession of radioactive materials by unauthorized individuals, which could result in exposures to members of the general public. When disposing of portable gauges, licensees must transfer them 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 possess the licensed material (i.e., their license specifically authorizes the type, form, and quantity of the byproduct material).

Before transferring radioactive material, the licensee must verify that the recipient is properly authorized to receive the licensed material using one of the methods described in 10 CFR 30.41, "Transfer of byproduct material." In addition, all packages containing radioactive sources must be prepared and shipped in accordance with NRC and DOT regulations. The licensee must maintain records of the transfer as required by 10 CFR 30.51, "Records."

**Response from Applicant:** The applicant does not need to provide a response to this item during the licensing process. However, the licensee should establish and include waste disposal procedures in its radiation safety program.

The next two items on NRC Form 313 should be completed on the form itself.

### **8.12 Item 12: License Fees**

On NRC Form 313, enter the appropriate fee category from 10 CFR 170.31 and the amount of the fee enclosed with the application. The appropriate fee is found in Category 3P.

Direct all questions about NRC fees or completion of Item 12 of NRC Form 313 to the Office of the Chief Financial Officer at NRC headquarters in Rockville, MD, (301) 415-7554. Information about fees may also be obtained by calling the NRC's toll-free number, (800) 368-5642, extension 415-7554. The e-mail address is [Fees.Resource@nrc.gov](mailto:Fees.Resource@nrc.gov).

### **8.13 Item 13: Certification**

Individuals acting in a private capacity are required to date and sign NRC Form 313. Otherwise, a representative of the corporation or legal entity filing the application must sign and date NRC Form 313 and include his or her title. The representative signing the application must be authorized to make binding commitments and to sign official documents on behalf of the applicant. As discussed previously in Chapter 3, "Management Responsibility," signing the application acknowledges management's commitment to and responsibility for the radiation protection program. The NRC will return all unsigned applications for proper signature.

#### **Notes:**

- It is a criminal offense to make a willful false statement or representation on applications or correspondence (18 U.S.C. 1001).
- When the application references commitments, those items become binding and are part of the license conditions and regulatory requirements.



## 9. AMENDMENTS AND RENEWALS TO A LICENSE

It is the licensee's obligation to keep the license current. If any of the information provided in the original application is to be modified or changed, the licensee must submit an application for a license amendment before the change takes place. The change is not in effect until the amendment has been issued. Also, to continue the license after its expiration date, the licensee must submit an application for a license renewal at least 30 days before the expiration date (10 CFR 2.109(a), 10 CFR 30.36(a)).

Applicants for license amendment or renewal should do the following:

- Use the most recent guidance in preparing an amendment or renewal request.
- Submit either an NRC Form 313 or a letter requesting amendment or renewal.
- Provide the license number and docket number.
- For renewals, provide a complete and up-to-date application if many outdated documents are referenced or there have been significant changes in regulatory requirements, the NRC's guidance, the licensee's organization, or the licensee's radiation protection program. Alternatively, describe clearly the exact nature of the changes, additions, and deletions.

### 9.1 Timely Notification of Transfer of Control

**Regulation:** 10 CFR 30.34(b)

**Criteria:** Licensees must provide full information and obtain the NRC's *prior, written consent* before transferring control of the license, or, as some licensees call it, "transferring the license."

**Discussion:** Transferring control may be the result of mergers, buyouts, or majority stock transfers. Although it is not the NRC's intent to interfere with the business decisions of licensees, it is necessary for licensees to obtain prior NRC written consent to ensure the following:

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

**Response from Applicant:** No response is required from an applicant for a new license. However, current licensees should refer to NUREG-1556, Volume 15 for more information about transfer of ownership.

## 10. APPLICATIONS FOR EXEMPTIONS

**Regulations:** 10 CFR 19.31, 10 CFR 20.2301, 10 CFR 30.11

**Criteria:** Licensees may request exemptions from regulations. The licensee must demonstrate that the exemption is authorized by law; will not endanger life, property, or the common defense and security; and is otherwise in the public interest.

**Discussion:** Various sections of the NRC's regulations address requests for exemptions (e.g., 10 CFR 19.31, "Application for exemptions"; 10 CFR 20.2301, "Applications for exemptions"; 10 CFR 30.11(a)). These regulations state that the NRC may grant an exemption, acting on its own initiative or on an application from a licensee.

Exemptions are not intended to revise regulations or apply to large classes of licensees and are generally limited to unique situations. Exemption requests must be accompanied by descriptions of the following:

- Exemption requested, basis, and justification for the requested exemption.
- Proposed compensatory safety measures intended to provide a level of health and safety equivalent to the regulation for which the exemption is being requested.
- Alternative methods for complying with the regulation and an explanation of why compliance with the existing regulation is not feasible.

Until the NRC has granted an exemption in writing, the agency expects strict compliance with all applicable regulations.
--

## 11. TERMINATION OF ACTIVITIES

**Regulations:** 10 CFR 30.34(b), 10 CFR 30.35(g), 10 CFR 30.36(d), 10 CFR 30.36(j)(1), 10 CFR 30.51(f)

**Criteria:** The licensee must do the following:

- Notify the NRC, in writing, within 60 days of any of the following:
  - Expiration of its license.
  - A decision to cease licensed activities permanently at the entire site.
  - A decision to cease licensed activities permanently in any separate building or outdoor area that contains residual radioactivity such that the building or area is unsuitable for release according to NRC requirements.
  - No principal activities having been conducted at the entire site under the license for a period of 24 months.
  - No principal activities having been conducted for a period of 24 months in any separate building or outdoor area, if it contains residual radioactivity making it unsuitable for release according to NRC requirements.
- Submit to the appropriate NRC regional office a completed NRC Form 314, “Certificate of Disposition of Materials” (or equivalent information), and a demonstration that the premises are suitable for release for unrestricted use (e.g., results of final leak tests).
- Before a license is terminated, send the records important to decommissioning to the appropriate NRC regional office. If licensed activities are transferred or assigned in accordance with 10 CFR 30.34(b), transfer records important to decommissioning to the new licensee in accordance with 10 CFR 30.35(g).

**Discussion:** Typically, a portable gauge termination request will meet the above criteria if the licensee has performed the following steps:

- Dispose of or transfer the gauges to an NRC or Agreement State licensee authorized to possess these devices as described in Section 8.11 “Waste Management—Gauge Disposal and Transfer.”
- Copy applicable decommissioning records as described in Section 8.5.2 “Financial Assurance and Recordkeeping for Decommissioning.” Typically, this includes transfer records and final leak test records. See Section 8.5.2 for additional recordkeeping requirements if leaking sealed sources or other incidents that involve the spreading of contamination have occurred.
- Submit a completed NRC Form 314 and a copy of the applicable decommissioning records to the appropriate NRC regional office.

**Response from Applicant:** The applicant is not required to submit a response to the NRC during the initial application. The licensee's obligations in this matter begin when the license expires or at the time the licensee ceases operations, whichever is earlier. These obligations are to undertake the necessary decommissioning activities, to submit NRC Form 314 or equivalent information, and to perform any other actions summarized in "Criteria" above.

**Reference:** NRC Form 314 is available at <http://www.nrc.gov/reading-rm/doc-collections/forms>.



**APPENDIX A**

**U.S. NUCLEAR REGULATORY COMMISSION FORM 313**





## United States Nuclear Regulatory Commission Form 313

<b>NRC FORM 313</b> (1-2012) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	<b>APPROVED BY OMB: NO. 3150-0120</b>	<b>EXPIRES: (03/31/2012)</b>		
<h3 style="margin: 0;">APPLICATION FOR MATERIALS LICENSE</h3>		Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Information Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to <a href="mailto:Infocollects.Resource@nrc.gov">Infocollects.Resource@nrc.gov</a> , and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.			
INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.					
APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:  OFFICE OF FEDERAL & STATE MATERIALS AND ENVIRONMENTAL MANAGEMENT PROGRAMS DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555-0001  ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:  IF YOU ARE LOCATED IN:  ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,  SEND APPLICATIONS TO:  LICENSING ASSISTANCE TEAM DIVISION OF NUCLEAR MATERIALS SAFETY U.S. NUCLEAR REGULATORY COMMISSION, REGION I 475 ALLENDALE ROAD KING OF PRUSSIA, PA 19406-1415		IF YOU ARE LOCATED IN:  ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:  MATERIALS LICENSING BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION III 2443 WARRENVILLE ROAD, SUITE 210 LISLE, IL 60532-4352  ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING,  SEND APPLICATIONS TO:  NUCLEAR MATERIALS LICENSING BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION IV 1600 E. LAMAR BOULEVARD ARLINGTON, TX 76011-4511			
PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.					
1. THIS IS AN APPLICATION FOR <i>(Check appropriate item)</i>  <input type="checkbox"/> A. NEW LICENSE  <input type="checkbox"/> B. AMENDMENT TO LICENSE NUMBER _____  <input type="checkbox"/> C. RENEWAL OF LICENSE NUMBER _____		2. NAME AND MAILING ADDRESS OF APPLICANT <i>(Include ZIP code)</i>			
3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED		4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION  TELEPHONE NUMBER			
SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.					
5. RADIOACTIVE MATERIAL a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.		6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.			
7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.		8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.			
9. FACILITIES AND EQUIPMENT.		10. RADIATION SAFETY PROGRAM.			
11. WASTE MANAGEMENT.		12. LICENSE FEES <i>(See 10 CFR 170 and Section 170.31)</i> FEE CATEGORY _____ AMOUNT ENCLOSED \$ _____			
13. CERTIFICATION. <i>(Must be completed by applicant)</i> THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.  THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF. WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.					
CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE		SIGNATURE	DATE		
FOR NRC USE ONLY					
TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			\$		
APPROVED BY				DATE	



**APPENDIX B**

**SUGGESTED FORMAT FOR PROVIDING INFORMATION REQUESTED  
IN ITEMS 5 THROUGH 11 OF  
U.S. NUCLEAR REGULATORY COMMISSION FORM 313**



**Items 5 and 6: Materials To Be Possessed and Proposed Uses**

Yes	No	Radionuclide	Manufacturer or Distributor Model No.	Quantity	Use as Listed on SSD Registration Certificate	Specify Other Uses Not Listed on SSD Registration Certificate
		Cesium-137	Gauge manufacturer or distributor and model number of the gauge: _____	Specify activity per source and number of gauges requested. _____ _____ _____	Yes <input type="checkbox"/> Specific description of the gauge use: _____ _____ _____ _____ _____ _____	<input type="checkbox"/> Not applicable _____ <input type="checkbox"/> Uses are: _____  (Submit safety analysis supporting safe use)
		Americium-241	Gauge manufacturer or distributor and model number of the gauge: _____	Specify activity per source and number of gauges requested. _____ _____ _____	Yes <input type="checkbox"/> Specific description of the gauge use: _____ _____ _____ _____ _____ _____	<input type="checkbox"/> Not applicable _____ <input type="checkbox"/> Uses are: _____  (Submit safety analysis supporting safe use.)

Yes	No	Radionuclide	Manufacturer or Distributor Model No.	Quantity	Use as Listed on SSD Registration Certificate	Specify Other Uses Not Listed on SSD Registration Certificate
		Californium-252	Gauge manufacturer or distributor and model number of the gauge: _____	Specify activity per source and number of gauges requested. _____ _____ _____	Yes <input type="checkbox"/> Specific description of the gauge use: _____ _____ _____ _____ _____ _____	<input type="checkbox"/> Not applicable _____ <input type="checkbox"/> Uses are: _____ (Submit safety analysis supporting safe use.)
		Radium-226	Gauge manufacturer or distributor and model number of the gauge and number of gauges of each model that is being requested: _____	Specify activity per source and number of gauges requested. _____ _____	Yes <input type="checkbox"/> Specific description of the gauge use: _____ _____	<input type="checkbox"/> Not applicable _____ <input type="checkbox"/> Uses are: _____ (Submit safety analysis supporting safe use.)
		Other Isotope (Specify):	Gauge manufacturer or distributor and model number of the gauge: _____	Specify activity per source and number of gauges requested. _____ _____	Yes <input type="checkbox"/> Specific description of the gauge use: _____ _____	<input type="checkbox"/> Not applicable _____ <input type="checkbox"/> Uses are: _____ (Submit safety analysis supporting safe use.)
		Is financial assurance required? If yes, submit evidence of financial assurance				

**Items 7 through 11: Training and Experience,  
Facilities and Equipment, Radiation Safety Program,  
and Waste Disposal**

Item No. and Title	Suggested Response	Yes	Alternative Procedures Attached
<p><b>7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE—RADIATION SAFETY OFFICER</b></p> <p>Name: _____</p>	<p>Provide documentation of the training of the proposed RSO.</p>	<p>Submit applicable documentation.</p>	
<p><b>8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS</b></p>	<p>Before using licensed materials, authorized users will have successfully completed one of the training courses described in the “Criteria” part of the section titled “Training for Individuals Working in or Frequenting Restricted Areas” in NUREG-1556, Vol. 1, Rev. 2.</p>	<p style="text-align: center;"><input type="checkbox"/></p>	<p style="text-align: center;"><input type="checkbox"/></p>
<p><b>9. FACILITIES AND EQUIPMENT</b></p>	<p>No information needs to be submitted in response to this item; key issues are addressed under “Radiation Safety Program—Public Dose” and “Radiation Safety Program—Operating, Emergency, and Security Procedures” below.</p>	<p><b>Need Not Be Submitted with Application</b></p>	
<p><b>10.1 RADIATION SAFETY PROGRAM—AUDIT PROGRAM</b></p>	<p>The applicant is <i>not</i> required to, and should not, submit its audit program to the NRC for review during the licensing phase. The audit program will be reviewed during NRC inspections.</p>	<p><b>Need Not Be Submitted with Application</b></p>	
<p><b>10.2 RADIATION SAFETY PROGRAM—SURVEY INSTRUMENTS</b></p>	<p>We will either possess and use, or have access to and use, a radiation survey meter that meets the criteria in the section titled “Radiation Safety Program—Instruments” in NUREG-1556, Vol. 1, Rev. 2, “Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,” in the event of an incident.</p>	<p style="text-align: center;"><input type="checkbox"/></p>	<p style="text-align: center;"><input type="checkbox"/></p>





Item No. and Title	Suggested Response	Yes	Alternative Procedures Attached
<b>10.7 RADIATION SAFETY PROGRAM—LEAK TEST</b>	Leak tests will be performed at intervals approved by the NRC or an Agreement State and specified in the SSD registration certificate. Leak tests will be performed by an organization licensed by the NRC or an Agreement State to provide leak testing services to other licensees or using a leak test kit supplied by an organization licensed by the NRC or an Agreement State to provide leak test kits to other licensees and according to the kit supplier's instructions.	<input type="checkbox"/>	<input type="checkbox"/> <b>The information in Appendix I supporting a request to perform the collection of leak test samples and sample analysis is attached.</b>
<b>10.8 RADIATION SAFETY PROGRAM—MAINTENANCE</b>	<p><i>Routine Cleaning and Lubrication</i> We will implement and maintain procedures for routine maintenance of our gauges according to each manufacturer's recommendations and instructions.</p> <p><i>Nonroutine Maintenance</i> We will send the gauge to the manufacturer or other person authorized by the NRC or an Agreement State to perform nonroutine maintenance or repair operations that require detaching the source or source rod from the gauge.</p>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/> <b>The information listed in Appendix F supporting a request to perform nonroutine maintenance in house is attached.</b>
<b>10.9 RADIATION SAFETY PROGRAM—TRANSPORTATION</b>	The applicant is <i>not</i> required to submit its response about transportation during the licensing process. This issue will be reviewed during inspection.		<b>Need Not Be Submitted with Application</b>
<b>11. WASTE MANAGEMENT—GAUGE DISPOSAL AND TRANSFER</b>	The applicant is <i>not</i> required to submit a response about waste management during the licensing process. However, the licensee should establish and include waste disposal procedures in its radiation safety program.		<b>Need Not Be Submitted with Application</b>



## **APPENDIX C**

### **CRITERIA FOR ACCEPTABLE TRAINING COURSES FOR PORTABLE GAUGE USERS**



## **Course Content**

Acceptable course content for training courses for portable gauge users includes the following:

- 1.5 to 2 hours of radiation safety and regulatory requirements, emphasizing practical subjects important to safe use of the gauge; radiation versus contamination; internal versus external exposure; concepts of time, distance, and shielding to minimize exposure; control and surveillance of gauges; location of the sealed source within the portable gauge; inventory; recordkeeping; incidents; licensing and inspection by the regulatory agency; need for complete and accurate information; employee protection; and deliberate misconduct
- 1.5 to 2 hours of practical training to include portable gauge theory, operating procedures, emergency procedures, security, maintenance, and transportation procedures; and field training emphasizing radiation safety, including dry runs of setting up and making measurements with the gauge, controlling and maintaining surveillance over the portable gauge, performing routine cleaning and lubrication, packaging and transporting the gauge, storing the gauge, and following emergency and security procedures.

## **Course Examination**

Prospective gauge users participating in training courses should achieve at least a 70-percent score on a 25- to 50-question, closed-book, written test. The test should include the following:

- an emphasis on radiation safety of portable gauge storage, security of gauges while on job sites, use, sealed source location, maintenance, and transportation, rather than the theory and art of making portable gauge measurements
- review of correct answers to missed questions with the prospective gauge user following the scoring of the test

## **Instructor Training and Experience**

Instructors should have, at a minimum, the following:

- successful completion of a portable gauge user course
- successful completion of an 8-hour radiation safety course or RSO training course
- documentation of 8 hours of hands-on experience with portable gauges

**Note:** Maintain records of training for 3 years after the last use of licensed material by the authorized user.

## **Online Courses**

Online training for portable gauge users is acceptable. The online training topics should follow the suggested Course Content on the previous page. Any online training should be supplemented by the practical training also described under Course Content. The applicant/licensee should demonstrate how it will meet the training described under Course Content and may consider providing a copy of the curricula covered in the course.

Online training courses should also include an examination described under Course Examination.

## **APPENDIX D**

### **TYPICAL DUTIES AND RESPONSIBILITIES OF THE RADIATION SAFETY OFFICER**





The RSO's duties and responsibilities (illustrated in Figure 8.1) typically include ensuring the following:

- Licensed activities that the RSO considers unsafe are stopped.
- Possession, use, storage, and maintenance of sources and gauges are consistent with the limitations in the license, the Sealed Source and Device Registration Certificate(s), and the manufacturer's recommendations and instructions.
- Individuals who use gauges are properly trained.
- When necessary, personnel monitoring devices are used and exchanged at the proper intervals; records of the results of such monitoring are maintained.
- Gauges are properly secured.
- Proper authorities are notified in case of accident, damage to gauges, fire, or theft.
- Unusual occurrences involving the gauge (e.g., accident, damage) are investigated, cause(s) and appropriate corrective action(s) identified, and corrective action(s) taken.
- Audits are performed at least annually and documented, and corrective actions are taken.
- Licensed material is transported in accordance with all applicable NRC and DOT requirements.
- Licensed material is disposed of properly.
- All required records are maintained.
- An up-to-date license is maintained, and amendment and renewal requests are submitted in a timely manner.
- Up-to-date operating, emergency, and security procedures are developed, maintained, distributed, and implemented.
- Nonroutine operations are performed by the manufacturer, distributor, or person specifically authorized by the NRC or an Agreement State.
- Documentation is maintained to demonstrate, by measurement or calculation, that the total effective dose equivalent to the individual member of the public likely to receive the highest dose from the licensed operation does not exceed the annual limit in 10 CFR 20.1301, "Dose limits for individual members of the public."
- When the licensee identifies violation(s) of regulations or license conditions or program weaknesses, corrective action(s) are developed, implemented, and documented.
- Posting of documents required by 10 CFR 19.11, "Posting of notices to workers," (10 CFR Part 19, license documents, operating procedures, NRC Form 3, "Notice to

Employees,” dated October 2008), and 10 CFR 21.6, “Posting Requirements,” (10 CFR Part 21 Section 206 of the Energy Reorganization Act of 1974, procedures adopted under Part 21), or posting a notice indicating where these documents can be examined.

**APPENDIX E**  
**PORTABLE GAUGE AUDIT CHECKLIST**



**Note:** All areas indicated in audit notes may not be applicable to every license and may not need to be addressed during each audit.

Licensee's Name: \_\_\_\_\_ License No.: \_\_\_\_\_

Auditor: \_\_\_\_\_ Date of Audit: \_\_\_\_\_ Telephone No.: \_\_\_\_\_

Audit Date Range: \_\_\_\_\_

\_\_\_\_\_  
(Signature)

### 1. AUDIT HISTORY

- a. Last audit of this location conducted on (date) \_\_\_\_\_.
- b. Were previous audits conducted yearly? (10 CFR 20.1101)
- c. Were records of previous audits maintained? (10 CFR 20.2102)
- d. Were any deficiencies identified during the last two audits or 2 years, whichever is longer?
- e. Were corrective actions taken? (Look for repeated deficiencies.)

### 2. ORGANIZATION AND SCOPE OF PROGRAM

- a. If the mailing address or places of use changed, was the license amended?
- b. If ownership changed or bankruptcy was filed, was prior NRC consent obtained or was the NRC notified?
- c. If the RSO was changed, was the license amended?
- d. Does the license authorize all of the NRC-regulated radionuclides contained in the gauges possessed?
- e. Are the gauges as they are described in the SSD registration certificate? Are copies of SSD registration certificates available? Does the licensee have the manufacturers' manuals for operation and maintenance? (10 CFR 32.210)
- f. Are gauges used as authorized?

### 3. TRAINING AND INSTRUCTIONS TO WORKERS

- a. Were all workers who are likely to exceed 100 mrem/year instructed per 10 CFR 19.12, Was refresher training provided as needed?
- b. Is each gauge operator trained in accordance with license requirements?
- c. Are training records maintained for each gauge operator?

- d. Did interviews with operators reveal that they know the emergency and security procedures?
- e. Did this audit<sup>1</sup> include observation of operators using the gauge in a field situation? Operating the gauge? Performing routine cleaning and lubrication? Transporting the gauge? Storing the gauge?
- f. Did the operator demonstrate safe handling and security during transportation, use, and storage?
- g. Was hazardous material (HAZMAT) training (required at least once every 3 years) provided as required? (49 CFR 172.700, 49 CFR 172.701, CFR 172.702, 49 CFR 172.703, 49 CFR 172.704)

#### **4. RADIATION SURVEY INSTRUMENTS**

- a. If the licensee possesses its own survey meter, does the survey meter meet NRC criteria?
- b. If the licensee does not possess a survey meter, are specific plans made to have one available?
- c. Is the survey meter needed for nonroutine maintenance calibrated as required? (10 CFR 20.1501)
- d. Are calibration records maintained? (10 CFR 20.2103(a))

#### **5. GAUGE INVENTORY**

- a. Is a record kept showing the receipt of each gauge? (10 CFR 30.51(a)(1))
- b. Are all gauges physically inventoried every 6 months?
- c. Are records of inventory with appropriate information maintained?

#### **6. PERSONNEL RADIATION PROTECTION**

- a. Are ALARA considerations incorporated into the radiation protection program? (10 CFR 20.1101(b))
- b. Is documentation kept showing that unmonitored users receive less than 10 percent of the limit?
- c. Did unmonitored users' activities change during the year in a way that could put them over 10 percent of limit?
- d. If yes to c. above, was a new evaluation performed?

---

<sup>1</sup> The audit should consider performing a performance-based review consisting of field observations and tours.

- e. Is external dosimetry required (user receiving greater than 10 percent of limit)? Is dosimetry provided to users? If yes, please address the following:
  - i. Is the dosimetry supplier approved by the National Voluntary Laboratory Accreditation Program? (10 CFR 20.1501(c))
  - ii. Are the dosimeters exchanged at the appropriate frequency?
  - iii. Are dosimetry reports reviewed and signed by the RSO?
  - iv. Are the records NRC forms or equivalent? (10 CFR 20.2104(d), 10 CFR 20.2106(c))
    - Is NRC Form 4, "Cumulative Occupational Exposure History," completed?
    - Is NRC Form 5, "Occupational Exposure Record for a Monitoring Period," completed?
  - v. If a worker declared her pregnancy, did the licensee comply with 10 CFR 20.1208, "Dose equivalent to an embryo/fetus"? Were records kept of embryo/fetus dose per 10 CFR 20.2106(e)?
- f. Are records of exposures, surveys, monitoring, and evaluations maintained? (10 CFR 20.2102, 10 CFR 20.2103, 10 CFR 20.2106)

## **7. PUBLIC DOSE**

- a. Are gauges stored in a manner to keep doses below 100 mrem in a year? (10 CFR 20.1301(a)(1))
- b. Has a survey or evaluation been performed per 10 CFR 20.1501(a)? Have there been any additions or changes to the storage, security, or use of surrounding areas that would necessitate a new survey or evaluation?
- c. Do unrestricted area radiation levels exceed 2 mrem in any one hour? (10 CFR 20.1301(a)(2))
- d. Are gauges being stored in a manner that would prevent unauthorized use or removal? (10 CFR 20.1801)
- e. Are records of surveys maintained? (10 CFR 20.2103, 10 CFR 20.2107)

## **8. OPERATING, EMERGENCY, AND SECURITY PROCEDURES**

- a. Have operating, emergency, and security procedures been developed?
- b. Do they contain the required elements?
- c. Does each operator have a current copy of the operating, emergency, and security procedures, including current emergency telephone numbers?

## **9. LEAK TESTS**

- a. Were leak tests performed every 6 months or at other authorized intervals?
- b. Were leak tests performed in accordance with license requirements?
- c. Are records of leak test results retained with all of the required information included?

- d. Were any sources found leaking and, if yes, was the NRC notified?

## 10. MAINTENANCE OF GAUGES

- a. Are manufacturer's procedures followed for routine cleaning and lubrication of the gauge?
- b. Does the source rod remain attached to the gauge during cleaning?
- 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 10 CFR 20.1301, "Dose limits for individual members of the public")?

## 11. TRANSPORTATION

- a. Were DOT-7A or other authorized packages used? (49 CFR 173.415, 49 CFR 173.416(b))
- b. Are package performance test records on file?
- c. For any special form source, is the International Atomic Energy Agency Certificate of Competent Authority or safety analysis documentation maintained on file? (49 CFR 173.476(a))
- d. Did the package have two labels (ex. Yellow-II) with transportation index (TI), nuclide, activity, and hazard class? (49 CFR 172.403, 49 CFR 173.441)
- e. Was the package properly marked? (49 CFR 172.301, 49 CFR 172.304, 49 CFR 172.310, 49 CFR 172.324)
- f. Was the package closed and sealed during transport? (49 CFR 173.475(f))
- g. Were shipping papers prepared and used? (49 CFR 172.200(a))
- h. Did the shipping papers contain proper entries (e.g., shipping name, hazard class, identification number (United Nations (UN)) number), total quantity, package type, nuclide, reportable quantities, radioactive material, physical and chemical form, activity, category of label, 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)
- i. Were the shipping papers within the driver's reach and readily accessible during transport? (49 CFR 177.817(e))
- j. Was the package secured against movement? (49 CFR 177.834)
- k. Was the vehicle placarded, if needed? (49 CFR 172.504)



- l. Were overpacks, if needed, used properly? (49 CFR 173.25)
- m. Were any incidents reported to the U.S. Department of Transportation?  
(49 CFR 171.15, 16)

## **12. AUDITOR'S INDEPENDENT SURVEY MEASUREMENTS (IF MADE)**

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

## **13. NOTIFICATION AND REPORTS**

- a. Was any radioactive material lost or stolen? Were reports made? (10 CFR 20.2201, 10 CFR 30.50)
- b. Did any reportable incidents occur? Were reports made? (10 CFR 20.2202, 10 CFR 30.50)
- c. Did any overexposures and high radiation levels occur? Were they reported?  
(10 CFR 20.2203, 10 CFR 30.50)
- d. If any events (as described in items 13.a through c) did occur, what was the root cause?  
Were the corrective actions appropriate?
- e. Is the licensee aware of the telephone number for the NRC Emergency Operations  
Center? ((301) 816-5100)

## **14. POSTING AND LABELING**

- a. Is NRC Form 3, "Notice to Employees," posted? (10 CFR 19.11)
- b. Are NRC regulations and license documents posted, or is a notice posted stating where  
these documents are located? (10 CFR 19.11, 10 CFR 21.6)
- c. Is there any other posting and labeling? (10 CFR 20.1902, 10 CFR 20.1904)

## **15. RECORDKEEPING FOR DECOMMISSIONING**

- a. Are records kept of information important to decommissioning? (10 CFR 30.35(g))
- b. Do records include all information outlined? (10 CFR 30.35(g))

## **16. GENERIC COMMUNICATIONS AND NEWSLETTER**

- a. Are NRC regulatory issue summaries, NRC INs, and Office of Federal and State  
Materials and Environmental Management Programs quarterly newsletters received?
- b. Is appropriate training and action taken in response?

## **17. SPECIAL LICENSE CONDITIONS OR ISSUES**

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

**18. DEFICIENCIES IDENTIFIED IN AUDIT; CORRECTIVE ACTIONS**

- a. Summarize problems and/or deficiencies identified during the audit.
- b. If problems and/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)?
- c. Provide any other recommendations for improvement.
- d. Were deficiencies brought to the attention of management?

**19. EVALUATION OF OTHER FACTORS**

- a. Is senior licensee management appropriately involved in the radiation protection program and/or RSO oversight?
- b. Does the RSO have sufficient time to perform his or her radiation safety duties?
- c. Does the licensee have sufficient staff to support the radiation protection program?

**APPENDIX F**

**INFORMATION NEEDED TO SUPPORT APPLICANT'S REQUEST TO  
PERFORM NONROUTINE MAINTENANCE**



Nonroutine maintenance or repair (beyond routine cleaning and lubrication,—see Figure 8.5 of NUREG-1556, Volume 1, Revision 2) may involve detaching the source rod from the portable gauge and any other activities during which personnel could receive radiation doses exceeding NRC limits. If this maintenance or repair is not performed properly, with attention to good radiation safety principles, the gauge may not operate as designed and personnel performing these tasks could receive radiation doses exceeding NRC limits.

In a short period of time (5 – 10 minutes) a typical moisture density gauge with its sources unshielded can deliver 0.05 sievert (5 rem) to a worker's hands or fingers (i.e., extremities), assuming the extremities are 1 centimeter from the sources. The threshold for extremity monitoring is 0.05 Sv (5 rem) per year.

Thus, applicants wishing to perform nonroutine maintenance must use personnel with special training and follow appropriate procedures consistent with the manufacturer's instructions and recommendations that address radiation safety concerns (e.g., use of radiation survey meter, shielded container for the source, personnel dosimetry). Accordingly, applicants must provide the following information:

- Describe the types of work (e.g., maintenance, cleaning, repair) to be performed that necessitate detaching the source or source rod from the device or that could cause personnel to receive radiation doses exceeding NRC limits. The principal reason for obtaining this information is to help evaluate the qualifications of individuals who will conduct the work and the radiation safety procedures they will follow.
- Identify who will perform nonroutine maintenance and provide their training and experience in performing nonroutine maintenance.
- Provide procedures for safe handling of the radioactive source while the source or source rod is detached from the gauge. These procedures should ensure the following:
  - Doses to personnel and members of the public are within regulatory limits and ALARA (e.g., accomplished by the use of shielded containers or shielding).
  - The source or source rod is secured against unauthorized removal access or is under constant surveillance.
  - Appropriate labels and signs are used.
  - Manufacturer's instructions and recommendations are followed.
- Confirm that individuals performing nonroutine maintenance on gauges will always wear both whole-body and extremity-monitoring devices. The dose limits are illustrated in Figure 8.2 of NUREG-1556, Volume 1, Revision 2.
- Verify possession of at least one survey instrument meeting the following criteria:
  - capable of detecting gamma radiation
  - capable of measuring from 0.01 to 0.5 mSv per hour (1 to 50 millirem per hour)

- calibrated at least annually
- calibrated at least two points, each located at approximately one-third and two-thirds of each scale; readings within plus or minus 20 percent are acceptable
- calibrated by a person specifically licensed by the NRC or an Agreement State to calibrate radiation detection instruments
- checked for functionality prior to use (e.g., with the gauge or a check source)

**Note:** Records of instrument calibration must be maintained for 3 years after the record is made 10 CFR 20.2103, “Records of surveys”.

- Describe steps to be taken to ensure that radiation levels in areas where nonroutine maintenance will take place do not exceed the limits under 10 CFR 20.1301, “Dose Limits for individual members of the public.” For example, applicants can do the following:
  - Commit to performing surveys with a survey instrument (as described above).
  - Specify where and when surveys will be conducted during nonroutine maintenance.
  - Commit to maintaining, for 3 years from the date of the survey, records of the survey (e.g., who performed the survey, date of the survey, instrument used, measured radiation levels correlated to location of those measurements), as required by 10 CFR 20.2103.

## **APPENDIX G**

### **OPERATING, EMERGENCY, AND SECURITY PROCEDURES**





## **Operating Procedures**

- If personnel dosimetry is provided, do the following:
  - Always wear the assigned dosimetry when using the gauge.
  - Never wear another person's dosimetry.
  - Never store dosimetry near the gauge.
- Before removing the gauge from its place of storage, ensure that, where applicable, each gauge source is in the fully shielded position and that, in gauges with a movable rod containing a sealed source, the source rod is locked (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 a log book (that remains at the storage location), including the date(s) of use, name(s) of the authorized users who will be responsible for the gauge, and the temporary job site(s) where the gauge will be used.
- Block and brace the gauge to prevent movement during transport and lock the gauge in or to the vehicle. Follow all applicable DOT requirements when transporting the gauge.
- Use the gauge according to the manufacturer's instructions and recommendations.
- Do not touch the unshielded source rod with your fingers, hands, or any part of your body.
- Do not place hands, fingers, feet, or other body parts in the radiation field from an unshielded source.
- Unless absolutely necessary, do not look under the gauge when the source rod is being lowered 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.
- After completing each measurement in which the source is unshielded, immediately return the source to the shielded position.
- Always maintain constant surveillance and immediate control of the gauge when it is not in storage. At job sites, do not walk away from the gauge when it is left on the ground. Take action necessary to protect the gauge and yourself from danger of moving heavy equipment.
- Always keep unauthorized persons away from the gauge.
- Perform routine cleaning and maintenance according to the manufacturer's instructions and recommendations.
- When the gauge is not in use at a temporary job site, place the gauge in a secured storage location.

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

- 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 it is returned to storage.
- If gauges are used for measurements with the unshielded source extended more than 3 feet beneath the surface, use piping, tubing, or other casing material to line the hole from the lowest depth to 12 inches above the surface. If the piping, tubing, or other casing material cannot extend 12 inches above the surface, cap the hole liner or take other steps to ensure that the hole is free of debris (and it is unlikely that debris will reenter the cased hole) so that the unshielded source can move freely (e.g., use a dummy probe to verify that the hole is free of obstructions).
- After making changes affecting the gauge storage area (e.g., changing the location of gauges within the storage area, removing shielding, adding gauges, changing the occupancy of adjacent areas, moving the storage area to a new location), reevaluate compliance with public dose limits and ensure proper security of the gauges.

### **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 (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 the situation is assessed and radiation levels are known. However, perform first aid for any injured individuals and remove them from the area only when medically safe to do so.
- If any heavy equipment is involved, detain the equipment and operator until it is determined that there is no contamination present.
- Gauge users and other potentially contaminated individuals should not leave the scene until emergency assistance arrives.
- Notify the following persons, in the order listed below, of the situation:

NAME <sup>1</sup>	WORK PHONE NUMBER <sup>1</sup>	HOME PHONE NUMBER <sup>1</sup>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Follow the directions provided by the person contacted above.

**Radiation Safety Officer and Licensee Management**

- Arrange for a radiation survey to be conducted as soon as possible by a knowledgeable person using appropriate radiation detection instrumentation. This person could be a licensee employee using a survey meter located at the job site or a consultant. To accurately assess the radiation danger, it is essential that the person performing the survey be competent in the use of the survey meter.
- If gauges are used for measurements with the unshielded source extended more than 3 feet below the surface, contact persons listed on the emergency procedures need to
- know the steps to be followed to retrieve a stuck source and to convey those steps to the staff on site.
- Make necessary notifications to local authorities as well as to the NRC as required. (Even if it is not required, *any* incident may be reported to the NRC by calling the NRC's Emergency Operations Center at (301) 816-5100, which is staffed 24 hours a day and accepts collect calls.) NRC notification is required when gauges containing licensed material are lost or stolen, when gauges are damaged or involved in incidents that result in doses in excess of 10 CFR 20.2203, "Reports of exposures, radiation levels, and concentrations of radioactive material exceeding the constraints or limits," and when it becomes apparent that attempts to recover a source stuck below the surface will be unsuccessful.
- Reports to the NRC must be made within the reporting timeframes specified by the regulations.
- Reporting requirements are found in 10 CFR 20.2201–2203 and 10 CFR 30.50.

---

<sup>1</sup>Fill in with (and update, as needed) the names and telephone numbers of appropriate personnel (e.g., the RSO or other knowledgeable licensee staff, licensee's consultant, gauge manufacturer) to be contacted in case of emergency.

## **Information to Consider when Developing Security Procedures**

Different licensees have developed various methods of complying with 10 CFR 30.34(i) requirements. The following information provides guidance to assist the licensee in developing security procedures.

NRC regulations require a portable gauge licensee to use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal whenever the portable gauge is not under the control and constant surveillance of the licensee. See 10 CFR 30.34(i).

**Note:** “Control and maintain constant surveillance” of portable gauges means being immediately present or in close proximity to the portable gauge so as to be able to prevent unauthorized removal of the portable gauge. The objective of security requirements is to reduce the opportunity for unauthorized removal and/or theft by providing a delay and deterrent mechanism.

The security requirements of 10 CFR 30.34(i) apply whenever gauges are not under control and constant surveillance, including (1) storage on vehicles, (2) storage at temporary facilities (e.g., residence, hotel, job site trailer), and (3) storage at permanent facilities. At all times, licensees are required to maintain control and constant surveillance of the portable gauge when it is in use and, at a minimum, use two independent physical controls to secure the portable gauge from unauthorized removal while it is in storage. The physical controls used should be designed and constructed of materials suitable for securing the portable gauge from unauthorized removal, and both physical controls must be defeated in order for the portable gauge to be removed. The construction and design of the physical controls should be such that they will deter theft by requiring a more determined effort to remove the portable gauge. The security procedures should ensure that the two physical barriers chosen increase the deterrence value over that of a single barrier, and that the two physical barriers would make unauthorized removal of the portable gauge more difficult.

For example, using two chains may not be the most effective means of control. To provide adequate security, licensees are encouraged to use combinations of physical controls. 10 CFR 30.34(i) requires that each portable gauge licensee shall use a minimum of two independent physical controls. For example, if two chains are used, each chain and lock combination should be physically robust enough to provide both a deterrence and a reasonable delay mechanism. When two chains or cables are used, the second chain or cable should be substantially more robust and more difficult to cut than the first chain or cable.

If possible, the licensee should consider storing its portable gauges inside a locked facility or other nonportable structure overnight, instead of storing them in a vehicle.

As long as the licensee maintains constant control and surveillance while transporting the portable gauges, the licensee need only comply with the DOT requirements for transportation (e.g., placarding, labeling, shipping papers, blocking and bracing). However, if the licensee leaves the vehicle and portable gauge unattended (e.g., while visiting a gas station, restaurant, store), the portable gauge must be secured by two independent controls as required by 10 CFR 30.34(i).

While transporting a portable gauge, a licensee should not modify the transportation case if it is being used as the Type A container for transporting the device. This includes, but is not limited

to, drilling holes to mount the case to the vehicle or to mount brackets or other devices used for securing the case to the vehicle. 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 in accordance with DOT regulations.

Physical controls may include, but are not limited to, 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 trunk of a car, inside a locked vehicle, a locked shelter, a secured fenced-in area, a locked garage, a locked nonportable cabinet, a locked room, or a secured building. To assist licensees, the list below provides some common examples of the use of two independent physical controls.

### **Securing a Portable Gauge at a Licensed Facility**

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

#### **The following are examples of how two independent physical controls can be used to secure a portable gauge when it is stored at a licensed facility:**

- (1) The portable gauge or transportation case containing the portable gauge is stored inside a locked storage shed within a secured outdoor area, such as a fenced parking area with a locked gate.
- (2) The portable gauge or transportation case containing the portable gauge is stored in a room with a locked door within a secured building, access to which the licensee controls by lock and key or by a security guard.
- (3) The portable gauge or transportation case containing the portable gauge is stored inside a locked, nonportable cabinet inside a room with a locked door, if the building is not secured.
- (4) The portable gauge or transportation case containing the portable gauge is stored in a separate secured area inside a secured mini-warehouse or storage facility.
- (5) The portable gauge or transportation case containing the portable gauge is physically secured to the inside structure of a secured mini-warehouse or storage facility.

## Securing a Portable Gauge in a Vehicle

The regulations in 10 CFR Part 71.5, "Transportation of Licensed Material," require that licensees who transport licensed material, or who may offer such material to a carrier for transport, must comply with the applicable DOT requirements that are found in 49 CFR.

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

A vehicle may be used for storage; however, the NRC and DOT recommend that this practice only be used for short periods of time, or when a portable gauge is in transit. A portable gauge should only be kept in a vehicle overnight if it is not practicable to provide temporary storage in a permanent structure. When a portable gauge is being stored in a vehicle, the licensee is specifically required to use a minimum of two independent physical controls to secure the portable gauge.

**The following are examples of how two independent physical controls approved by the NRC can be used to secure portable gauges in a vehicle:**

- (1) The locked transportation case containing the portable gauge is physically secured to a vehicle with brackets, and a chain or steel cable (attached to the vehicle) is wrapped around the transportation case such that the case cannot be opened unless the chain or cable is removed. In this example, the locked transportation case would count as one control because the brackets would prevent easy removal of the case. Looping the chain or cable only through the transportation case handle is not acceptable. See Figure G.1 for an example of a secured transportation case.



**Figure G.1: Transportation Case**

- (2) The portable gauge or transportation case containing the portable gauge is stored in a box physically attached to a vehicle, and the box is secured with (1) two independent locks, (2) two separate chains or steel cables attached independently to the vehicle in such a manner that the box cannot be opened without the removal of the chains or cables, or (3) one lock and one chain or steel cable is attached to the vehicle in such a manner that the box cannot be opened without the removal of the chain or cable. See Figure G.2 for an example of a box physically attached to a vehicle.



**Figure G.2: Box physically attached to a vehicle**

- (3) The portable gauge or transportation case containing the portable gauge is stored in a locked trunk, camper shell, van, or other similar enclosure and is physically secured to the vehicle by a chain or steel cable in such a manner that one would not be able to open the case or remove the portable gauge without removal of the chain or cable.

**Note:** The photos in Figures G.1 and G.2 are only two examples of securing portable gauges. There are other ways that licensees may choose to secure their portable gauges.



## **Securing a Portable Gauge at a Temporary Job Site or at Locations Other than a Licensed Facility**

When a job requires storage of a portable gauge at a temporary job site or at a location other than a licensed facility, the licensee should use a permanent structure for storage, if practicable to do so. When storing a portable gauge in temporary or permanent residential quarters, the licensee should limit access by storing the gauge in a separate room away from residents and other members of the public. The licensee must also meet the radiation exposure limits specified in 10 CFR Part 20, "Standards for Protection against Radiation." When a portable gauge is stored at a temporary job site or at a location other than an authorized facility, the licensee is required to use a minimum of two independent physical controls to secure the portable gauge.

### **The following are examples of how two independent physical controls are used to secure portable gauges at these locations:**

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



**APPENDIX H**  
**DOSIMETRY-RELATED GUIDANCE**



## **Part 1: Guidance for Demonstrating that Unmonitored Individuals Are Not Likely To Exceed 10 Percent of the Allowable Limits**

Dosimetry is required for individuals likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of the applicable regulatory limits in 10 CFR 20.1201, "Occupational Dose Limits for Adults." Therefore, a licensee should evaluate the doses its workers receive in performing these tasks to assess whether dosimetry is required.

### **Example**

The most common way that individuals *might* exceed 10 percent of the applicable limits is by performing frequent routine cleaning and lubrication of gauges. Therefore, a licensee should evaluate the doses its workers receive in performing these tasks to assess whether dosimetry is required. Gauge manufacturers can provide estimated doses to the extremities and whole body of a person performing routine cleaning and lubrication of one of their series of gauges. The manufacturer based its estimate on observations of individuals performing the recommended procedure according to good radiation safety practices. The manufacturer used the following types of information:

- time needed to perform the entire procedure (e.g., 10 minutes)
- expected dose rate received by the whole body of the individual, associated with the shielded source and determined using measured or manufacturer-determined data (e.g., 0.2 mSv/hr (20 mrem/hr) at contact with the shield)
- time the hands were exposed to the unshielded source (e.g., 3 minutes)
- expected dose rate received by the extremities of the individual, associated with the unshielded source and determined using measured or manufacturer-determined data for the typical distance that the hands would be from the sealed source (e.g., 9 mSv/hr (900 mrem/hr) or 0.15 mSv/hr (15 mrem/minute)).

From this information, the manufacturer estimated that the individual performing each routine cleaning and lubrication could receive the following:

- less than 0.04 mSv (4 mrem) total effective dose equivalent (TEDE) (whole body)
- 0.45 mSv (45 mrem) to the hands

The applicable limit TEDE (whole body) is 50 mSv (5 rem) per year, and 10 percent of that value is 5 mSv (500 mrem) per year. If one cleaning and lubrication delivers 0.04 mSv (4 mrem), then an individual could perform 125 of these operations each year and remain within 10 percent of the applicable limit.

The applicable limit for the extremities is 500 mSv (50 rem) per year, and 10 percent of that value is 50 mSv (5 rem or 5,000 millirem) per year. If one cleaning and lubrication delivers 0.45 mSv (45 mrem), then an individual could perform 111 of these operations each year and remain within 10 percent of the applicable limit.

Based on this example, no dosimetry is required if an individual performs fewer than 111 procedures per year.

### Guidance to Licensees

Licensees who wish to demonstrate that they are *not* required to provide dosimetry to their workers must prepare a written evaluation similar to that shown in the example above. The expected dose rates, times, and distances used in the above example may *not* be appropriate to individual licensee situations. In their evaluations, licensees must use information appropriate to the various types of gauges on which they will perform routine cleaning and lubrication; this information is generally available from gauge manufacturers or the SSD registration certificate maintained by the NRC and Agreement States.

Table H-1 may be helpful in documenting a licensee's evaluation.<sup>1</sup>

Licensees should review evaluations periodically and revised them as needed. They should check assumptions used in their evaluations to ensure that the assumptions are up to date and accurate. For example, if workers became lax in following good radiation safety practices in the example used above, the extremities could be closer to the unshielded source, and the workers would receive more than 0.15 mSv (15 mrem) per minute. Alternatively, workers could perform the task more slowly than the estimated 10 minutes total and 3 minutes with the hands near the unshielded source. Also, using new gauges containing sources of different activities, different radionuclides, or different cleaning and lubrication procedures requires a new evaluation.

---

<sup>1</sup>For ease of use by most portable gauge licensees, the examples in this appendix use conventional units. The conversions to SI units are as follows: 1 ft = 0.305 m; 1 mrem = 0.01 mSv.

**Table H-1 Dosimetry Evaluation**

Dosimetry Evaluation for _____		Model _____	Portable Gauge
A.	Time needed to perform the entire routine cleaning and lubrication procedure on the gauge	_____ minutes/60	_____ hour
B.	Expected whole-body dose rate that the individual will encounter, determined using measured or manufacturer-provided data	_____ mrem/hr	
C.	Time the <i>hands</i> were exposed to the unshielded source	_____ minutes/60	_____ hour
D.	Expected extremity dose rate that the individual will encounter, determined using measured or manufacturer-provided data for the unshielded source at the typical distance from the hands to the unshielded source	_____ mrem/hr	

F. Formula: ( \_\_\_\_\_ #hours in Row A) x ( \_\_\_\_\_ mrem/hr in Row B) = ( \_\_\_\_\_ estimated mrem) x ( \_\_\_\_\_ # of cleaning and lubrications conducted each year) = \_\_\_\_\_ mrem

Whole Body Dose Equivalent\*

Formula: ( \_\_\_\_\_ #hours in Row C) x ( \_\_\_\_\_ mrem/hr in Row D) = ( \_\_\_\_\_ estimated mrem) x ( \_\_\_\_\_ # of cleaning and lubrications conducted each year) = \_\_\_\_\_ mrem

Extremity Dose Equivalent\*\*

\* An expected Whole Body Dose Equivalent *less than* 500 mrem requires no dosimetry.  
 \*\* An expected Extremity Dose Equivalent *less than* 5000 mrem requires no dosimetry.

## **Part 2: Guidance for Demonstrating that Individual Members of the Public Will Not Receive Doses Exceeding the Allowable Limits**

Licensees must ensure the following:

- The radiation dose received by individual members of the public does not exceed 1 mSv (100 mrem) in one calendar year resulting from the licensee's possession and/or use of licensed materials.

**Members of the public include persons who live, work, or may be near locations where portable gauges are used or stored. (For storage of gauges in personal residences, occupants are considered to be members of the public.) Employees whose assigned duties do not include the use of licensed materials but who work in the vicinity where gauges are used or stored are also considered to be members of the public.**

- The radiation dose in unrestricted areas does not exceed 0.02 mSv (2 mrem) in any one hour.

**Typical unrestricted areas may include offices, shops, laboratories, areas outside buildings, property, nonradioactive equipment storage areas, and occupied areas of personal residences. The licensee does not control access to these areas for purposes of controlling exposure to radiation or radioactive materials. However, the licensee may control access to these areas for other reasons, such as security.**

Licensees must show compliance with both portions of the regulation. Calculations and/or measurements (e.g., using a dosimeter to monitor an area) are often used to prove compliance.

### **Calculational Method<sup>2</sup>**

The calculational method takes a tiered approach, using a three-part process starting with a worst case situation and moving toward more realistic situations. It makes the following simplifications: (1) each gauge is a point source, (2) typical radiation levels encountered when the source is in the shielded position are taken from either the SSD registration certificate or the manufacturer's literature, and (3) no credit is taken for any shielding found between the gauges and the unrestricted areas.

Part 1 of this method is simple but conservative. It assumes that an affected member of the public is present 24 hours a day and uses only the "inverse square law" to determine if the distance between the gauge and the affected member of the public is sufficient to show compliance with the public dose limits. Part 2 considers not only distance, but also the time that the affected member of the public is actually in the area under consideration. Part 3 considers distance and the amount of time that both the gauge and the affected member of the public are present. Using this approach, licensees make only those calculations that are needed to demonstrate compliance. In many cases, licensees will need to use the calculational method through Part 1 or Part 2. The results of these calculations typically result in higher radiation

---

<sup>2</sup>For ease of use by most portable gauge licensees, the examples in this appendix use conventional units. The conversions to SI units are as follows: 1 ft = 0.305 m; 1 mrem = 0.01 mSv.

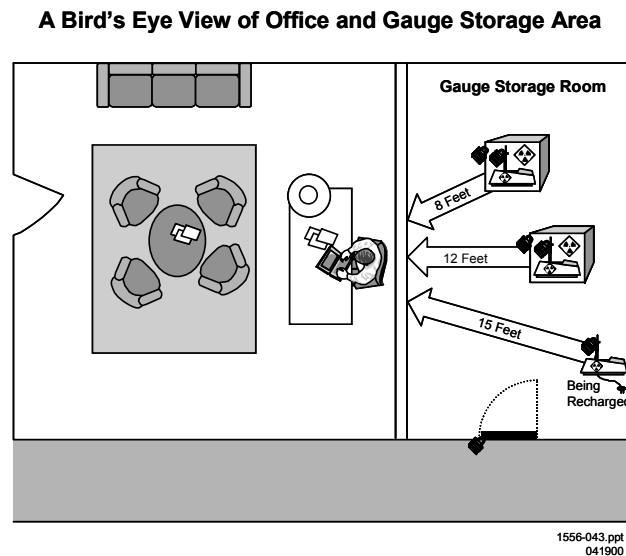


levels than would exist at typical facilities but provide a method for estimating conservative doses that could be received.

### Example 1

To better understand the calculational method, we will look at Moisture-Density Measurements, Inc., a portable gauge licensee. Yesterday, the company's president noted that the new gauge storage area is very close to his secretary's desk and he asked Joe, the RSO, to determine if the company is complying with NRC regulations.

The secretary's desk is near the wall separating the reception area from the designated, locked, gauge storage area, where the company stores its three gauges. Joe measures the distances from each gauge to the wall and looks up in the manufacturer's literature the radiation levels that individuals would encounter for each gauge. Figure H-1 is Joe's sketch of the areas in question, and Table H-2 summarizes the information Joe has about each gauge.



**Figure H-1 Diagram of office and gauge storage area. This sketch shows the areas described in Examples 1 and 2.**

**Table H-2 Information Known about Each Gauge**

<b>DESCRIPTION OF KNOWN INFORMATION</b>	<b>GAUGE 1</b>	<b>GAUGE 2</b>	<b>GAUGE 3</b>
How gauge is stored	Gauge in transport container	Gauge in transport container	Gauge out of transport container and being recharged
Dose rate in mrem/hr encountered at specified distance from the gauge (from manufacturer's literature)	2 mrem/hr at 1 ft	8 mrem/hr at 1 ft	2 mrem/hr at 3 ft
Distance in feet to secretary's chair	8 ft	12 ft	15 ft

Example 1, Part 1

Joe's first thought is that the distance between the gauges and the secretary's chair may be sufficient to show compliance with the regulation in 10 CFR 20.1301, "Dose Limits for Individual Members of the Public." So, taking a "worst case" approach, he assumes that (1) the gauges are constantly present (i.e., 24 hours per day), (2) all three gauges remain in storage with no other use, and (3) the secretary is constantly sitting in the desk chair (i.e., 24 hours per day). Joe proceeds to calculate the dose the secretary might receive hourly and yearly from each gauge, as shown in Tables H-3, H-4, and H-5 below.

**Table H-3 Calculational Method, Part 1—  
Hourly and Annual Dose Received from Gauge 1**

		<b>GAUGE 1</b>	
<b>Step No.</b>	<b>Description</b>	<b>Input Data</b>	<b>Results</b>
1	Dose received in an hour at known distance from gauge (e.g., from manufacturer's data), in mrem/hr	2	2
2	Square of the distance (ft) at which the Step 1 rate was measured, in ft <sup>2</sup>	(1) <sup>2</sup>	1
3	Square of the distance (ft) from the gauge to the secretary's desk in an unrestricted area, in ft <sup>2</sup>	(8) <sup>2</sup>	64
4	Multiply the results of Step 1 by the results of Step 2 (this is an intermediate result)	2 x 1 = 2	
5	Divide the result of Step 4 by the result of Step 3 to calculate the dose received by an individual at the secretary's desk = HOURLY DOSE RECEIVED FROM GAUGE 1, in mrem in an hour	2/64 = 0.031	
6	Multiply the result of Step 5 by 24 hours per day x 365 days per year = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGE 1, in mrem in a year	0.031 x 24 x 365 = 0.031 x 8,760 = 272	

**Table H-4 Calculational Method, Part 1—  
Hourly and Annual Dose Received from Gauge 2**

		<b>GAUGE 2</b>	
<b>Step No.</b>	<b>Description</b>	<b>Input Data</b>	<b>Results</b>
1	Dose received in an hour at known distance from gauge (e.g., from manufacturer's data), in mrem/hr	8	8
2	Square of the distance (ft) at which the Step 1 rate was measured, in ft <sup>2</sup>	(1) <sup>2</sup>	1
3	Square of the distance (ft) from the gauge to the secretary's desk in an unrestricted area, in ft <sup>2</sup>	(12) <sup>2</sup>	144
4	Multiply the results of Step 1 by the results of Step 2 (this is an intermediate result)	8 x 1 = 8	
5	Divide the result of Step 4 by the result of Step 3 to calculate dose received in an hour by an individual at the secretary's desk = HOURLY DOSE RECEIVED FROM GAUGE 2, in mrem in an hour	8/144 = .056	
6	Multiply the result of Step 5 by 24 hours per day x 365 days per year = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGE 2, in mrem in a year	0.056 x 24 x 365 = 0.056 x 8,760 = 491	

**Table H-5 Calculational Method, Part 1—  
Hourly and Annual Dose Received from Gauge 3**

		<b>GAUGE 3</b>	
Step No.	Description	Input Data	Results
1	Dose received in an hour at known distance from gauge (e.g., from manufacturer's data), in mrem/hr	2	2
2	Square of the distance (ft) at which the Step 1 rate was measured, in ft <sup>2</sup>	(3) <sup>2</sup>	9
3	Square of the distance (ft) from the gauge to the secretary's desk in an unrestricted area, in ft <sup>2</sup>	(15) <sup>2</sup>	225
4	Multiply the results of Step 1 by the results of Step 2 (this is an intermediate result)	2 x 9 = 18	
5	Divide the result of Step 4 by the result of Step 3 to calculate dose received by an individual at the secretary's desk = HOURLY DOSE RECEIVED FROM GAUGE 3, in mrem in an hour	18/225 = 0.08	
6	Multiply the result of Step 5 by 24 hours per day x 365 days per year = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGE 3, in mrem in a year	0.08 x 24 x 365 = 0.08 x 8,760 = 701	

To determine the total hourly and total annual dose received, Joe adds the pertinent data from the preceding tables (see Table H-6).

**Table H-6 Calculational Method, Part 1—  
Total Hourly and Annual Dose Received from Gauges 1, 2, and 3**

Step No.	Description	Gauge 1	Gauge 2	Gauge 3	Sum
7	TOTAL HOURLY DOSE RECEIVED from Step 5 of Tables H-3, H-4, and H-5, in mrem in an hour.	0.031	0.056	0.08	0.031 + 0.056 + 0.08 = 0.167
8	TOTAL ANNUAL DOSE RECEIVED from Step 6 of Tables H-3, H-4, and H-5, in mrem in a year.	272	491	701	272 + 491 + 701 = 1464

**NOTE:** The Sum in Step 7 demonstrates compliance with the limit of 2 mrem in any one hour. Reevaluate if assumptions change. If the Sum in Step 8 exceeds 100 mrem/yr, proceed to Part 2 of the calculational method.

At this point, Joe is pleased to see that the total dose that an individual could receive in any one hour is only 0.167 mrem, but he notes that an individual could receive a dose of 1,464 mrem in a year, much higher than the 100-mrem limit.

Example 1, Part 2

Joe reviews his assumptions and recognizes that the secretary is not at the desk 24 hours per day. He decides to make a realistic estimate of the number of hours the secretary sits in the chair at the desk, keeping his other assumptions constant (i.e., the gauges are constantly present (24 hours per day) and all three gauges remain in storage with no other use). He then recalculates the annual dose received (see Table H-7).

**Table H-7 Calculational Method, Part 2—  
Annual Dose Received from Gauges 1, 2, and 3**

<b>Step No.</b>	<b>Description</b>	<b>Results</b>
9	A. Average number of hours per day that individual spends in area of concern (e.g., secretary sits at desk 5 hours per day; the rest of the day the secretary is away from the desk area copying, filing, etc.)	5
	B. Average number of days per week in area (e.g., secretary is part time and works 3 days a week)	3
	C. Average number of weeks per year in area (e.g., secretary works all year)	52
10	Multiply the results of Step 9A by the results of Step 9B by the results of Step 9C = AVERAGE NUMBER OF HOURS IN AREA OF CONCERN PER YEAR	$5 \times 3 \times 52 = 780$
11	Multiply the sum in Step 7 by the results of Step 10 = ANNUAL DOSE RECEIVED FROM GAUGES CONSIDERING REALISTIC ESTIMATE OF TIME SPENT IN AREA OF CONCERN, in mrem in a year	$0.167 \times 780 = 130$

Although Joe is pleased to note that the calculated annual dose received is significantly lower, he realizes that it still exceeds the limit of 100 mrem per year.

Example 1, Part 3

Again Joe reviews his assumptions and recognizes that the gauges are not always in storage when the secretary is seated at the desk. As he examines the situation, he realizes he must consider each gauge individually (see Tables H-8 and H-9).

**Table H-8 Calculational Method, Part 3—Summary of Information**

INFORMATION ON WHEN GAUGES ARE PRESENT IN THE STORAGE AREA:

- GAUGE 1: an old gauge located in the storage area continuously (24 hours per day).
- GAUGE 2: a new gauge located in the storage area continuously (24 hours per day) for 8 months of the year; for the remaining 4 months of the year it is at temporary job sites.
- GAUGE 3: a new gauge located in the storage area overnight; it is used every day at temporary job sites all year and returned to the storage location at the end of each day. The gauge is usually present during the secretary's first and last hours of work each day.

INFORMATION FROM EXAMPLE 1, PART 2 ON WHEN THE SECRETARY IS SITTING AT THE DESK:

- 5 hours per day
- 3 days per week
- 52 weeks per year

**Table H-9 Calculational Method, Part 3—  
Annual Dose Received from Gauges 1, 2, and 3**

Step No.	Description	GAUGE 1	GAUGE 2	GAUGE 3
12	Average number of <i>hours per day</i> gauge is in storage while secretary is present	5	5	2
13	Average number of <i>days per week</i> gauge is in storage while secretary is present	3	3	3
14	Average number of <i>weeks per year</i> gauge is in storage while secretary is present	52	32	52
15	Multiply the results of Step 12 by the results of Step 13 by the results of Step 14 = TOTAL HOURS EACH GAUGE IS STORED PER YEAR WHILE SECRETARY IS PRESENT	$5 \times 3 \times 52 = 780$	$5 \times 3 \times 32 = 480$	$2 \times 3 \times 52 = 312$
16	Multiply the results of Step 15 by the results of Step 7 = ANNUAL DOSE RECEIVED FROM EACH GAUGE, in mrem in a year	$780 \times 0.031 = 24$	$480 \times 0.056 = 27$	$312 \times 0.08 = 25$
17	Sum the results of Step 16 for each gauge = TOTAL ANNUAL DOSE RECEIVED CONSIDERING REALISTIC ESTIMATE OF TIME SPENT IN AREA OF CONCERN AND TIME GAUGE IS IN STORAGE, in mrem in a year.	$24 + 27 + 25 = 76$		

**NOTE:** If the result in Step 17 is greater than 100 mrem/yr, the licensee must take corrective action.

Joe is pleased that the result in Step 17 shows compliance with the 100 mrem/yr limit. Had the result in Step 17 been higher than 100 mrem/yr, then Joe could have done one or more of the following:

- Consider whether the assumptions used to determine occupancy and the time each gauge is in storage are accurate, revise the assumptions as needed, and recalculate using the new assumptions.
- Calculate the effect of any shielding located between the gauge storage area and the secretarial workstation—such calculation is beyond the scope of this appendix.
- Take corrective action (e.g., move gauges within storage area, move the storage area, move the secretarial workstation) and perform new calculations to demonstrate compliance.
- Designate the area outside the storage area as a restricted area and the secretary as an occupationally exposed individual. This would require controlling access to the area for purposes of radiation protection and training the secretary as required by 10 CFR 19.12, “Instruction to Workers.”

Note that, in the example, Joe evaluated the unrestricted area outside only one wall of the gauge storage area. Licensees also need to make similar evaluations for other unrestricted areas and to keep in mind the ALARA principle, taking reasonable steps to keep radiation dose received below regulatory requirements. In addition, licensees need to be alert to changes in situations (e.g., moving any of the gauges closer to the secretarial workstation, adding a gauge to the storage area, changing the secretary to a full-time worker, or changing the estimate of the portion of time spent at the desk) and to perform additional evaluations, as needed.

**RECORDKEEPING:** In 10 CFR 20.2107, “Records of Dose to Individual Members of the Public,” the NRC requires licensees to maintain records demonstrating compliance with the dose limits for individual members of the public.

### **Combination Measurement—Calculational Method**

This method, which allows the licensee to take credit for shielding between the gauge and the area in question, begins by measuring radiation levels in the areas, as opposed to using manufacturer-supplied rates at a specified distance from each gauge. These measurements must be made with calibrated survey meters sufficiently sensitive to measure background levels of radiation. However, licensees must exercise caution when making measurements with currently calibrated radiation survey instruments. A maximum dose of 1 mSv (100 mrem) received by an individual over a period of 2,080 hours (40 hours per week for 52 weeks per year) is equal to less than 0.5 microsievert (0.05 mrem) per hour.

This rate is well below the minimum sensitivity of most commonly available Geiger-Mueller survey instruments.

Instruments used to make measurements for calculations must be sufficiently sensitive. An instrument equipped with a scintillation-type detector (e.g., NaI(Tl)) or a micro-R meter used in making very low gamma radiation measurements should be adequate.

Licenses may also choose to use environmental TLDs<sup>3</sup> in unrestricted areas next to the gauge storage area for monitoring. This direct measurement method would provide a definitive measurement of actual radiation levels in unrestricted areas without any restrictive assumptions. Records of these measurements can then be evaluated to ensure that rates in unrestricted areas do not exceed the 1 mSv/yr (100 mrem/yr) limit.

### Example 2

As in Example 1, Joe is the RSO for Moisture-Density Measurements, Inc., a portable gauge licensee. The company has three gauges stored in a designated, locked storage area that adjoins an unrestricted area where a secretarial work station is located. See Figure H-1 and Table H-2 for information about storing gauges near an unrestricted area. Joe wants to see if the company complies with the public dose limits at the secretarial station.

During the winter, while all the gauges were in storage, Joe placed an environmental TLD badge in the secretarial workspace for 30 days. Joe chose a winter month so that he did not have to keep track of the number of hours that each gauge was in the storage area. The TLD processor sent Joe a report indicating that the TLD received 100 mrem.

**Table H-10 Combination Measurement—Calculational Method**

Step No.	Description	Input Data and Results
<b>PART 1</b>		
1	Dose received by TLD, in mrem	100
2	Total hours TLD exposed	24 hr/d x 30 d/mo = 720
3	Divide the results of Step 1 by the results of Step 2 to determine HOURLY DOSE RECEIVED, in mrem in an hour	0.14
4	Multiply the results of Step 3 by 365 days per year x 24 hours per day = 8,760 hours in one year = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGES, in mrem in a year	365 x 24 x 0.14 = 8,760 x 0.14 = 1,226

**NOTE:** For the conditions described above, Step 3 indicates that the dose received in any 1 hour is less than the limit of 2 mrem in any 1 hour. However, if there are any changes, then the licensee would need to reevaluate the potential doses that could be received in any 1 hour. Step 4 indicates that the annual dose received would be much greater than the 100 mrem in a year allowed by the regulations.

### PART 2

At this point, Joe can adjust for a realistic estimate of the time the secretary spends in the area, as he did in Part 2 of Example 1.

<sup>3</sup> TLDs used for personnel monitoring (e.g., LiF) may not have sufficient sensitivity for this purpose. Generally, the minimum reportable dose received is 0.1 mSv (10 mrem). Suppose a TLD monitors dose received and is changed once a month. If the measurements are at the minimum reportable level, the annual dose received could have been about 1.2 mSv (120 mrem), a value in excess of the 1 mSv/yr (100 mrem/yr) limit. If licensees use TLDs to evaluate compliance with the public dose limits, they should consult with their TLD supplier and choose more sensitive TLDs, such as those containing CaF<sub>2</sub>, that are used for environmental monitoring.



Step No.	Description	Input Data and Results
<b>PART 3</b>		
<p>If the results of Joe's evaluation in Part 2 show that the annual dose received in a year exceeds 100 mrem, then he can make adjustments for realistic estimates of the time spent in the area of concern while the gauges are actually in storage, as in Part 3 of Example 1. (Recall that the TLD measurement was made while all of the gauges were in storage; i.e., 24 hours per day for the 30 days that the TLD was in place.)</p>		



## **APPENDIX I**

### **REQUESTS TO PERFORM LEAK TESTING AND SAMPLE ANALYSIS**



## **Model Leak Test Program**

### **Training**

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

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

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

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

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

### **Facilities and Equipment**

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

$$MDA = \frac{2.71 + 4.65 \sqrt{(bkg \times t)}}{t \times E} = \text{Minimum Detectable Activity}$$

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

**For example,**

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

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

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

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

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

$$\text{Bq} = \frac{478.55 \text{ disintegration}}{\text{minutes}} \times \frac{\text{minute}}{60 \text{ seconds}} = 7.976 \text{ Bq}$$

**Frequency for Conducting Leak Tests of Sealed Sources**

Leak tests will be conducted at the frequency specified in the respective Sealed Source and Device Registration Certificate.

**Procedure for Performing Leak Testing and Analysis**

- For each source to be tested, list identifying information such as the manufacturer's name, model number, serial number, radionuclide, and activity of the sealed source.
- If one is available, use a survey meter to monitor exposure.
- Prepare a separate wipe sample (e.g., cotton swab or filter paper) for each source.
- Number each wipe to correlate with identifying information for each source.
- Wipe the most accessible area where contamination would accumulate if the sealed source were leaking (see manufacturer's instructions).
- Select an instrument that is sensitive enough to detect 185 Bq (0.005 microcuries) of the radionuclide.
- Using the selected instrument, count and record background count rate.
- Check the instrument's counting efficiency using a standard source of the same radionuclide as the source being tested or one with similar energy characteristics. Accuracy of standards should be within plus or minus 5 percent of the stated value and traceable to primary radiation standards such as those maintained by the National Institute of Standards and Technology.

- Calculate efficiency.

For example:  $\frac{[(\text{cpm from } \textit{std}) - (\text{cpm from } \textit{bkg})]}{\text{activity of std in Bq}} = \text{efficiency in cpm/Bq}$

where: cpm = counts per minute  
*std* = standard  
*bkg* = background  
 Bq = becquerel

- Count each wipe sample; determine net count rate.
- For each sample, calculate and record estimated activity in Bq (or millicuries).

For example:  $\frac{[(\text{cpm from wipe sample}) - (\text{cpm from } \textit{bkg})]}{\text{efficiency in cpm/Bq}} = \text{Bq on wipe sample}$

- Sign and date the list of sources, data, and calculations. Retain records for 3 years (under 10 CFR 20.2103(a)). If the wipe test activity is 185 Bq (0.005 microcurie) or greater, notify the RSO so that the source can be withdrawn from use and disposed of properly. Also notify the NRC.





**APPENDIX J**

**MAJOR U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS**



10 CFR 71.5, "Transportation of Licensed Material," requires compliance with DOT regulations in 49 CFR, "Transportation." The major areas in the DOT regulations that are most relevant for transportation of typical portable gauges that are shipped as Type A quantities are as follows:

- 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans."
  - (1) Table of Hazardous Materials and Special Provisions (Subpart B)
    - Purpose and use of hazardous materials (49 CFR 172.101)
    - list of hazardous substances and reportable quantities (49 CFR 172.101 Appendix A, Table 2)
  - (2) Shipping Papers (Subpart C)
    - preparation and retention of shipping papers (49 CFR 172.201)
    - description of hazardous material on shipping papers (49 CFR 172.202)
    - additional description requirements (49 CFR 172.203)
    - shipper's certification (49 CFR 172.204)
  - (3) Package Markings (Subpart D)
    - general marking requirements for non-bulk packagings (49 CFR 172.301)
    - prohibited marking (49 CFR 172.303)
    - marking requirements (49 CFR 172.304)
    - Class 7 (radioactive) materials (49 CFR 172.310)
    - hazardous substances in non-bulk packagings (49 CFR 172.324)
  - (4) Package Labeling (Subpart E)
    - general labeling requirements (49 CFR 172.400)
    - prohibited labeling (49 CFR 172.401)
    - Class 7 (radioactive) material (49 CFR 172.403)
    - placement of labels (49 CFR 172.406)
    - label specifications (49 CFR 172.407)
    - RADIOACTIVE WHITE-I label (49 CFR 172.436)
    - RADIOACTIVE YELLOW-II label (49 CFR 172.438)
    - RADIOACTIVE YELLOW-III label (49 CFR 172.440)
  - (5) Placarding of Vehicles (Subpart F)
    - applicability of placarding requirements (49 CFR 172.500)
    - prohibited and permissive placarding (49 CFR 172.502)
    - general placarding requirements (49 CFR 172.504)
    - providing and affixing placards: highway (49 CFR 172.506)
    - visibility and display of placards (49 CFR 172.516)
    - general specifications for placards (49 CFR 172.519)
    - RADIOACTIVE placard (49 CFR 172.556)
  - (6) Emergency Response Information (Subpart G)
    - applicability and general requirements (49 CFR 172.600)
    - emergency response information (49 CFR 172.602)
    - emergency response telephone number (49 CFR 172.604)
  - (7) Training (Subpart H)
    - applicability and responsibility for training and testing (49 CFR 172.702)
    - training requirements (49 CFR 172.704)

- 49 CFR Part 173, “Shippers—General Requirements for Shipments and Packagings,” Class 7 (Radioactive) Materials (Subpart I)
  - definitions (49 CFR 173.403)
  - general design requirements (49 CFR 173.410)
  - additional design requirements for Type A packages (49 CFR 173.412)
  - authorized Type A packages (49 CFR 173.415)
  - requirements for determining basic radionuclide values, and for listing of radionuclides on shipping papers and labels (49 CFR 173.433)
  - table of A1 and A2 values for radionuclides (49 CFR 173.435)
  - radiation level limitations and exclusive use provisions (49 CFR 173.441)
  - quality control requirements prior to each shipment of Class 7 (radioactive) materials (49 CFR 173.475)
  - Approval of special form Class 7 (radioactive) materials (49 CFR 173.476)
  
- 49 CFR Part 177, “Carriage by Public Highway”
  - (1) General Information and Regulations (Subpart A)
    - driver training (49 CFR 177.816)
    - shipping papers (49 CFR 177.817)
  - (2) Loading and Unloading (Subpart B)
    - general requirements (packages secured in a motor vehicle (49 CFR 177.834(a))
    - Class 7 (radioactive) material (49 CFR 177.842)

**APPENDIX K**

**SAFETY CULTURE STATEMENT OF POLICY**



## Safety Culture

The safety culture policy statement was published in the *Federal Register* (76 FR 34773) on June 14, 2011 and can be found at: <http://www.gpo.gov/fdsys/pkg/FR-2011-06-14/pdf/2011-14656.pdf>. It is also posted in NRC's Agencywide Documents Access and Management System (ADAMS) Accession Number ML11146A047.

### Safety Culture Policy Statement

The purpose of this Statement of Policy is to set forth the Commission'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 includes all licensees, certificate holders, permit holders, authorization holders, holders of quality assurance program approvals, vendors and suppliers of safety-related components, and applicants for a license, certificate, permit, authorization, or quality assurance program approval, subject to NRC authority. The Commission encourages the Agreement States, Agreement State licensees and other organizations interested in nuclear safety to support the development and maintenance of a positive safety culture, as articulated in this Statement of Policy.

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 NRC will not monitor or trend values. These will be the organization's responsibility as part of its safety culture program.

Organizations should ensure that 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 NRC 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 NRC'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 that 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*—Communications maintain 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 in order 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. It should be noted that these traits were not developed to be used for inspection purposes.

It is the Commission'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 Commission recognizes the diversity of these organizations and acknowledges that some organizations have already spent significant time and resources in the development of a positive safety culture. The Commission will take this into consideration as the regulated community addresses the Statement of Policy.



<b>NRC FORM 335</b> (12-2010) NRCMD 3.7	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	<b>1. REPORT NUMBER</b> (Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.) NUREG-1556, Volume 1, Revision 2
<b>BIBLIOGRAPHIC DATA SHEET</b> (See instructions on the reverse)		
<b>2. TITLE AND SUBTITLE</b> Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses (NUREG-1556, Volume 1, Revision 2) - Draft Report for Comment	<b>3. DATE REPORT PUBLISHED</b>	
	MONTH May	YEAR 2012
	<b>4. FIN OR GRANT NUMBER</b>	
<b>5. AUTHOR(S)</b>  Jackie Cook, Tomas Herrera, Brandon Juran, Sattar Lodhi, Keith McDaniel, James Mullauer, and Michael Reichard	<b>6. TYPE OF REPORT</b>  Technical	
	<b>7. PERIOD COVERED (Inclusive Dates)</b>  November 2001 to April 2012	
<b>8. PERFORMING ORGANIZATION - NAME AND ADDRESS</b> (If NRC, provide Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.) Division of Materials Safety and State Agreements Office of Federal and State Materials and Environmental Management Programs 11545 Rockville Pike Rockville, MD 20852		
<b>9. SPONSORING ORGANIZATION - NAME AND ADDRESS</b> (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.) Same as above		
<b>10. SUPPLEMENTARY NOTES</b>		
<b>11. ABSTRACT (200 words or less)</b> This technical report contains information intended to provide program-specific guidance and assist applicants and licensees in preparing applications for materials licenses for portable gauges. In particular, it describes the types of information needed to complete U.S. Nuclear Regulatory Commission (NRC) Form 313, "Application for Materials License." This document describes both the methods acceptable to the NRC license reviewers in implementing the regulations and the techniques used by the reviewers in evaluating the application to determine if the proposed activities are acceptable for licensing purposes.		
<b>12. KEY WORDS/DESCRIPTORS</b> (List words or phrases that will assist researchers in locating the report.) NUREG-1556 Volume 1 Portable Gauges Moisture Density Gauges License	<b>13. AVAILABILITY STATEMENT</b> unlimited	
	<b>14. SECURITY CLASSIFICATION</b> (This Page) unclassified	
	(This Report) unclassified	
	<b>15. NUMBER OF PAGES</b>	
	<b>16. PRICE</b>	



Federal Recycling Program





**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, DC 20555-0001  
-----  
OFFICIAL BUSINESS