

Consolidated Guidance About Materials Licenses

Program-Specific Guidance About Portable Gauge Licenses

Final Report

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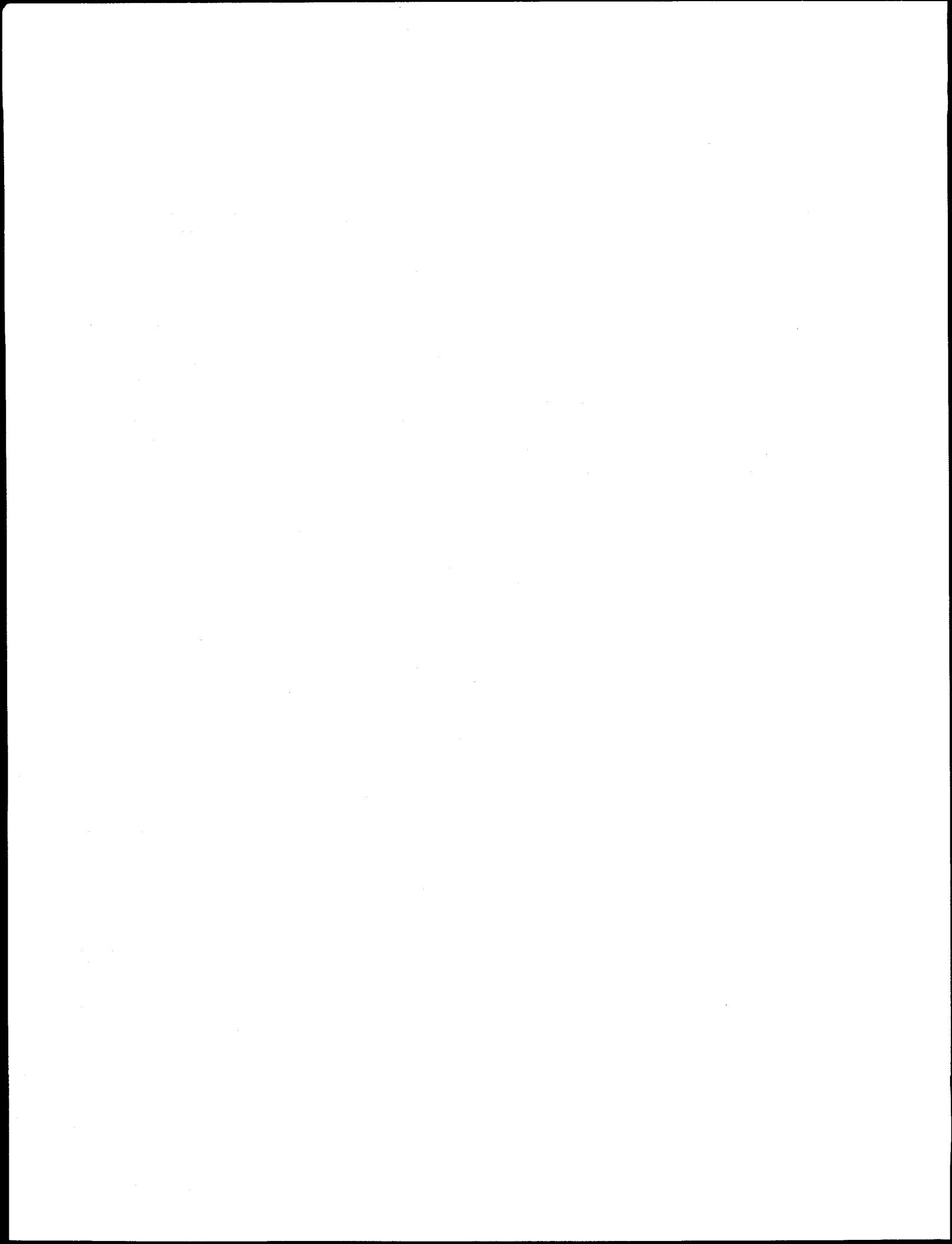
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Abstract

As part of its redesign of the materials licensing process, NRC is consolidating and updating numerous guidance documents into a single comprehensive repository as described in NUREG-1539 and draft NUREG-1541. NUREG-1556, Vol. 1, is the first program-specific guidance developed for the new process and will serve as a template for subsequent program-specific guidance. This document is intended for use by applicants, licensees, and NRC staff and will also be available to Agreement States. This document supersedes the guidance previously found in draft Regulatory Guide DG-0008, "Applications for the Use of Sealed Sources in Portable Gauging Devices," and in NMSS Policy and Guidance Directive 2-07, "Standard Review Plan for Applications for Use of Sealed Sources in Portable Gauging Devices." This final report takes a more risk-informed, performance-based approach to licensing portable gauges, and reduces the information (amount and level of detail) needed to support an application to use these devices. It incorporates many suggestions submitted during the comment period on draft NUREG-1556, Vol. 1. When published, this final report should be used in preparing portable gauge license applications. NRC staff will use this final report in reviewing these applications.



Contents

	<u>Page</u>
ABSTRACT.....	iii
CONTENTS	v
LIST OF APPENDICES	vi
LIST OF TABLES	vi
LIST OF FIGURES	vi
FOREWORD	vii
ACKNOWLEDGMENT	ix
ABBREVIATIONS	x
1 PURPOSE OF REPORT.....	1-1
2 AGREEMENT STATES.....	2-1
3 MANAGEMENT RESPONSIBILITY.....	3-1
4 APPLICABLE REGULATIONS	4-1
5 HOW TO FILE.....	5-1
5.1 PAPER APPLICATION.....	5-1
5.2 ELECTRONIC APPLICATION.....	5-2
6 WHERE TO FILE	6-1
7 LICENSE FEES	7-1
8 CONTENTS OF AN APPLICATION	8-1
8.1 ITEM 1: LICENSE ACTION TYPE	8-1
8.2 ITEM 2: APPLICANT'S NAME AND MAILING ADDRESS	8-1
8.3 ITEM 3: ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED	8-2
8.4 ITEM 4: PERSON TO BE CONTACTED ABOUT THIS APPLICATION	8-3
8.5 ITEM 5: RADIOACTIVE MATERIAL - SEALED SOURCES AND DEVICES	8-3
8.6 ITEM 5: RADIOACTIVE MATERIAL - FINANCIAL ASSURANCE AND RECORD KEEPING FOR DECOMMISSIONING	8-4
8.7 ITEM 6: PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED	8-5
8.8 ITEM 7: INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE - RADIATION SAFETY OFFICER (RSO)	8-6
8.9 ITEM 8: TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS ..	8-7
8.10 ITEM 9: FACILITIES AND EQUIPMENT	8-8
8.11 ITEM 10: RADIATION SAFETY PROGRAM - AUDIT PROGRAM	8-8
8.12 ITEM 10: RADIATION SAFETY PROGRAM - TERMINATION OF ACTIVITIES	8-9
8.13 ITEM 10: RADIATION SAFETY PROGRAM - INSTRUMENTS	8-10
8.14 ITEM 10: RADIATION SAFETY PROGRAM - MATERIAL RECEIPT AND ACCOUNTABILITY	8-11
8.15 ITEM 10: RADIATION SAFETY PROGRAM - OCCUPATIONAL DOSIMETRY	8-12
8.16 ITEM 10: RADIATION SAFETY PROGRAM - PUBLIC DOSE	8-14
8.17 ITEM 10: RADIATION SAFETY PROGRAM - OPERATING AND EMERGENCY PROCEDURES	8-16
8.18 ITEM 10: RADIATION SAFETY PROGRAM - LEAK TESTS	8-19
8.19 ITEM 10: RADIATION SAFETY PROGRAM - MAINTENANCE	8-20
8.20 ITEM 10: RADIATION SAFETY PROGRAM - TRANSPORTATION	8-22
8.21 ITEM 11: WASTE MANAGEMENT - GAUGE DISPOSAL AND TRANSFER	8-22
8.22 ITEM 12: FEES	8-23
8.23 ITEM 13: CERTIFICATION	8-23
9 AMENDMENTS AND RENEWALS TO A LICENSE	9-1
APPENDICES	
ADDENDUM	

List of Appendices

- A United States Nuclear Regulatory Commission Form 313
- B Suggested Format for Providing Information Requested in Items 5 through 11 of NRC Form 313
- C Information Needed for Change of Ownership or Control Application
- D Criteria for Acceptable Training Courses for Portable Gauge Users
- E Typical Duties and Responsibilities of the Radiation Safety Officer
- F Portable Gauge Audit Checklist
- G Information Needed to Support Applicant's Request to Perform Non-Routine Maintenance
- H Operating and Emergency Procedures
- I Dosimetry-related Guidance
 - Part 1: Guidance for Demonstrating that Unmonitored Individuals are Not Likely to Exceed 10 Percent of the Allowable Limits*
 - Part 2: Guidance for Demonstrating that Individual Members of the Public will not Receive Doses Exceeding the Allowable Limits*
- J Requests to Perform Leak Testing and Sample Analysis
- K Major DOT Regulations; Sample Bill of Lading
- L Sample Portable Gauge License
- M Review Checklist for Portable Gauge Application

List of Tables

	<u>Page</u>
TABLE 2.1 WHO REGULATES THE ACTIVITY?	2-1
TABLE I.1 DOSIMETRY EVALUATION	I-3
TABLE I.2 INFORMATION KNOWN ABOUT EACH GAUGE	I-7
TABLE I.3 CALCULATIONAL METHOD, PART 1—HOURLY AND ANNUAL DOSE RECEIVED FROM GAUGE 1	I-8
TABLE I.4 CALCULATIONAL METHOD, PART 1—HOURLY AND ANNUAL DOSE RECEIVED FROM GAUGE 2	I-8
TABLE I.5 CALCULATIONAL METHOD, PART 1—HOURLY AND ANNUAL DOSE RECEIVED FROM GAUGE 3	I-9
TABLE I.6 CALCULATIONAL METHOD, PART 1—TOTAL HOURLY AND ANNUAL DOSE RECEIVED FROM GAUGES 1, 2, AND 3	I-9
TABLE I.7 CALCULATIONAL METHOD, PART 2—ANNUAL DOSE RECEIVED FROM GAUGES 1, 2, AND 3	I-10
TABLE I.8 CALCULATIONAL METHOD, PART 3—SUMMARY OF INFORMATION	I-11
TABLE I.9 CALCULATIONAL METHOD, PART 3—ANNUAL DOSE RECEIVED FROM GAUGES 1, 2, AND 3	I-11
TABLE I.10 COMBINATION MEASUREMENT-CALCULATIONAL METHOD.....	I-14

List of Figures

	<u>Page</u>
FIGURE 1.1 WHERE IS THE RADIOACTIVE SOURCE?	1-1
FIGURE 2.1 U.S. MAP.....	2-2
FIGURE 8.1 RSO RESPONSIBILITIES..	8-6
FIGURE 8.2 MATERIAL RECEIPT AND ACCOUNTABILITY.....	8-11
FIGURE 8.3 ANNUAL DOSE LIMITS FOR RADIATION WORKERS.....	8-13
FIGURE 8.4 STORING GAUGES.....	8-15
FIGURE 8.5 PROPER HANDLING.....	8-17
FIGURE 8.6 SECURITY.	8-18
FIGURE 8.7 MAINTENANCE.	8-20
FIGURE 8.8 TRANSPORTATION.	8-22
FIGURE I.1 DIAGRAM OF OFFICE AND GAUGE STORAGE AREA.	I-6

FOREWORD

The United States Nuclear Regulatory Commission (NRC) is using Business Process Redesign (BPR) techniques to redesign its materials licensing process. This effort is described in *NUREG-1539, "Methodology and Findings of the NRC's Materials Licensing Process Redesign."* A critical element of the new process is consolidating and updating numerous guidance documents into a NUREG-series of reports.

The current document (NUREG-1556, Vol. 1, "Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses," dated May 1997) provides the first program-specific guidance for the new process and will serve as the template for subsequent documents. It is intended for use by applicants, licensees, *NRC* license reviewers, and other *NRC* personnel. It supersedes the guidance for applicants and licensees previously found in Draft Regulatory Guide DG-0008, "Applications for the Use of Sealed Sources in Portable Gauging Devices," dated May 1995, and the guidance for licensing staff previously found in Policy and Guidance Directive PG 2-07, "Standard Review Plan for Applications for the Use of Sealed Sources in Portable Gauging Devices," dated September 1994. NUREG-1556, Vol. 1, incorporates comments received on DG-0008 as well as many suggestions submitted during the comment period on draft NUREG-1556, Vol. 1. See the Addendum for a summary of comments and staff responses.

NUREG-1556, Vol. 1, takes a graded (or risk-informed) and performance-based approach to licensing portable gauges, i.e., it reduces the amount of information needed from an applicant seeking to possess and use a relatively safe device. These portable gauges containing sealed sources of radioactive material incorporate features engineered to enhance their safety. *NRC*'s considerable experience with these licensees indicates that radiation exposures to workers are generally low, if workers follow basic safety procedures, and that sealed sources have not been damaged even when run over by heavy construction equipment.

A team composed of *NRC* staff from headquarters and regional offices prepared draft NUREG-1556, Vol. 1, and revised it to reflect suggestions received during the public comment period. The team drew on its collective experience in radiation safety in general and as specifically applied to portable gauges. A representative of *NRC*'s Office of the General Counsel provided a legal perspective. A representative of an Agreement State participated in preparing draft NUREG-1556, Vol. 1, and provided licensing, inspection, and enforcement insight into the views and practices of her State. However, this final report has not been endorsed by that representative or any Agreement State.

NUREG-1556, Vol. 1, "Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses," dated May 1997, represents a transition from the current paper-based process to the new electronic process. Text shown in bold italics indicates information that will be linked electronically allowing the user, by simply "pointing and clicking," to see the actual text of regulations, acronyms and abbreviations, and other referenced documents.

FOREWORD

The performance-based approach in NUREG-1556, Vol. 1, gives licensees greater flexibility than previously permitted under licenses based on applications prepared according to DG-0008. This permits licensees to make more changes in their radiation safety program without amending their licenses, thus reducing the regulatory burden on licensees and the NRC staff. Accordingly, existing portable gauge licensees have the option of submitting a complete application using NUREG-1556, Vol. 1, at the time they file an amendment request. Licensees choosing this option should incorporate the requested change into the complete application, submit it with the appropriate amendment fee, and indicate that the complete application is an amendment request to take advantage of the new guidance. When the staff has reviewed the request and resolved any outstanding issues, the staff will amend the license in its entirety without changing the expiration date.

Licensees wishing to renew their licenses should submit a complete application according to NUREG-1556, Vol. 1. The staff's action will be similar to that described for amendments, but will include an extension of the license's expiration date. By following this procedure, the staff expects all existing portable gauge licenses to be converted to the more performance-based format within a few years.

NUREG-1556, Vol. 1, "Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses," dated May 1997, is also available electronically by visiting *NRC*'s Home Page (<http://www.nrc.gov>) and choosing Nuclear Materials, then Business Process Redesign Project, then Library, and then NUREG-1556, Vol. 1.

This report describes and makes available to the public information on: methods acceptable to the *NRC* staff for implementing specific parts of the Commission's regulations; techniques the staff uses in evaluating applications, including specific problems or postulated accidents; and data the *NRC* staff needs to review applications for licenses. NUREG-1556, Vol. 1, "Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses," dated May 1997, is not a substitute for *NRC* regulations, and compliance is not required. The approaches and methods described in this report are provided for information only. Methods and solutions different from those described in this report will be acceptable if they provide a basis for the staff to make the determinations needed to issue or continue a license.

Donald A. Cool, Director
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Abbreviations

AIT	Augmented Inspection Team
ALARA	As low as reasonably achievable
Bq	Becquerel
DOE	United States Department of Energy
DOT	United States Department of Transportation
GPO	Government Printing Office
IN	Information Notice
mrem	Millirem
mSv	Millisievert
NIST	National Institute of Standards and Technology
NMSS	Office of Nuclear Materials Safety and Safeguards
NRC	United States Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
OC	Office of the Controller
OCR	Optical character reader
OMB	Office of Management and Budget
RQ	Reportable Quantities
RSO	Radiation Safety Officer
SS&D BBS	Sealed Source and Devices Bulletin Board System
SSD	Sealed Source and Device
Sv	Sievert
TEDE	Total effective dose equivalent
TI	Transportation Index
TLD	Thermoluminescent dosimeters

1 PURPOSE OF REPORT

This report provides guidance to an applicant in preparing a portable gauge license application as well as *NRC* criteria for evaluating a portable gauge license application. It is not intended to address the research and development of gauging devices or the commercial aspects of manufacturing, distribution, and service of such devices. Within this document, the phrases, "portable gauge" or "gauging devices," and the term "gauge" may be used interchangeably.

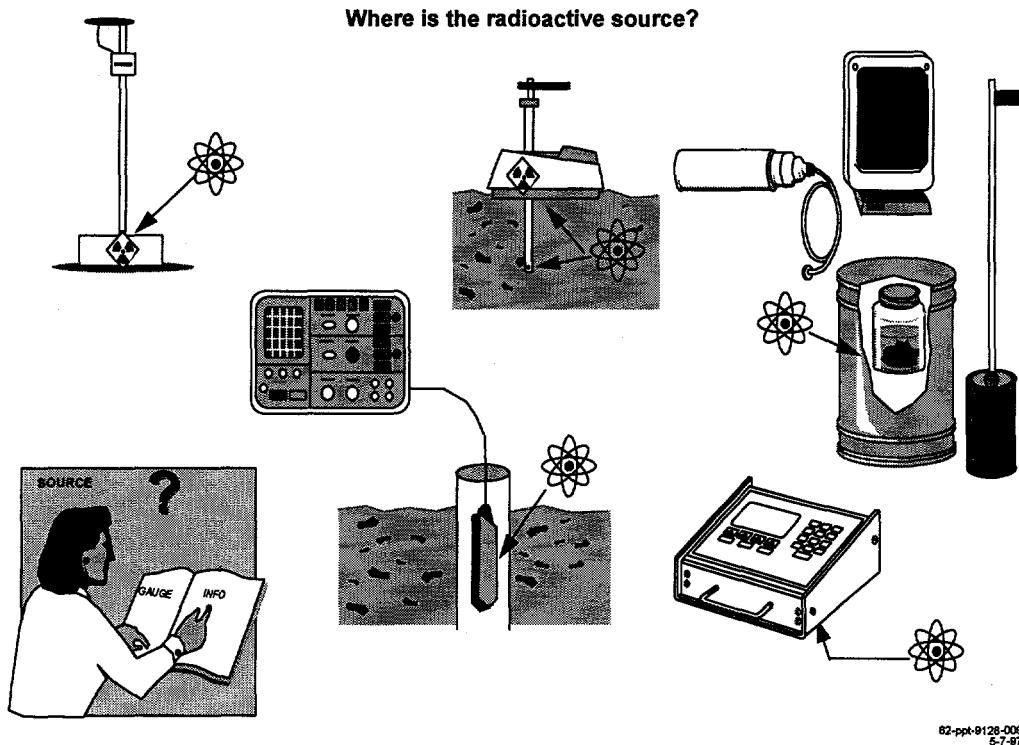


Figure 1.1 Where is the Radioactive Source? *The wide variety of portable gauge designs include placing the sealed source in different locations, resulting in different radiation safety problems.*

This report addresses the variety of radiation safety issues associated with portable gauges of many designs. As shown in Figure 1.1, portable gauges are of many different designs based, in part, on their intended use (e.g., to measure moisture, density, thickness of asphalt, liquid level). Because of differences in design manufacturers 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 problems.

This report identifies the information needed to complete *NRC Form 313 (Appendix A)*, "Application for Material License," for the use of sealed sources in portable gauging devices. The information collection requirements in 10 CFR Part 30 and *NRC Form 313* have been

PURPOSE OF REPORT

approved under the Office of Management and Budget (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 judge the adequacy of the applicant's response;
- **Discussion**—provides additional information on the topic sufficient to meet the needs of most readers; and
- **Response from Applicant**—provides suggested response(s), 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, the answers to those items are to be provided on separate sheets of paper and submitted with the completed *NRC Form 313*. For the convenience of applicants and for streamlined handling of portable gauge applications in the new materials licensing process, use *Appendix B* to provide supporting information, attach it to *NRC Form 313*, and submit them to *NRC*.

Appendices C through K contain additional information on various radiation safety topics. *Appendix L* is a sample portable gauge license; it contains the conditions most often found on these licenses, although not all licenses will have all conditions. *Appendix M* is a checklist that *NRC* staff can use to review applications and applicants can use to check for completeness.

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, or special nuclear materials used or possessed within their borders. A current list of Agreement States (including names, addresses, and telephone numbers of responsible officials) may be obtained upon request from *NRC*'s Regional or Field Offices. Any applicant other than a Federal agency who wishes to possess or use licensed material in one of these Agreement States needs to contact the responsible officials in that State for guidance on preparing an application; file these applications with State officials, not with the *NRC*.

In general, *NRC*'s materials licensees who wish to conduct operations at temporary jobsites in an Agreement State should contact that State's radiation control program office for information about State regulations. To ensure compliance with Agreement State reciprocity requirements, a licensee should request authorization well in advance of scheduled use.

In the special situation of work at Federally-controlled sites in Agreement States, it is necessary to know the jurisdictional status of the land in order to determine whether *NRC* or the Agreement State has regulatory authority. *NRC* has regulatory authority over land determined to be "exclusive Federal jurisdiction," while the Agreement State has jurisdiction over non-exclusive Federal jurisdiction land. Licensees are responsible for finding out, in advance, the jurisdictional status of the specific areas where they plan to conduct licensed operations. *NRC* recommends that licensees ask their local contact for the Federal agency controlling the site (e.g., contract officer, base environmental health officer, district office staff) to help determine the jurisdictional status of the land and to provide the information in writing, so that licensees can comply with *NRC* or Agreement State regulatory requirements, as appropriate. Additional guidance on determining jurisdictional status is found in *All Agreement States Letter, SP-96-022*, dated February 16, 1996, which is available from *NRC* upon request.

Table 2.1 provides a quick way to check on which agency, if any, has regulatory authority.

Table 2.1, Who Regulates the Activity?

APPLICANT AND PROPOSED LOCATION OF WORK	REGULATORY AGENCY
Federal agency regardless of location (except that Department of Energy [<i>DOE</i>] and, under most circumstances, its prime contractors are exempt from licensing [<i>10 CFR 30.12</i>]))	<i>NRC</i>
Non-Federal entity in non-Agreement State, US territory or possession	<i>NRC</i>
Non-Federal entity in Agreement State at non-Federally controlled site	Agreement State
Non-Federal entity in Agreement State at Federally-controlled site NOT subject to exclusive Federal jurisdiction	Agreement State
Non-Federal entity in Agreement State at Federally-controlled site subject to exclusive Federal jurisdiction	<i>NRC</i>

AGREEMENT STATES

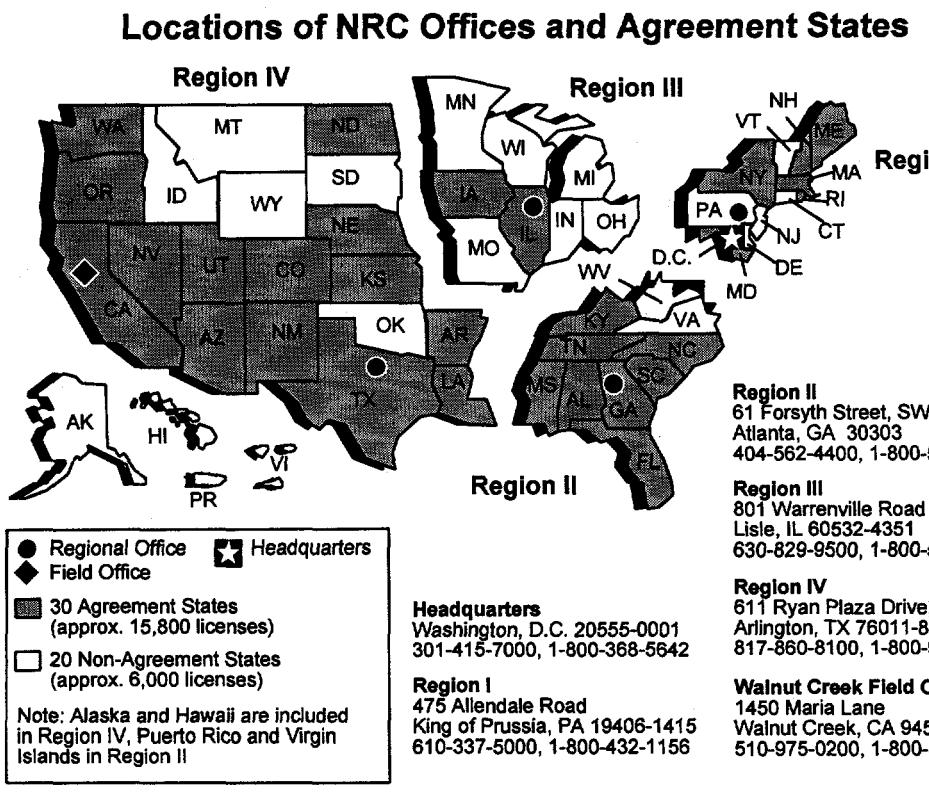


Figure 2.1 U.S. Map. Location of NRC Offices and Agreement States.

Reference: *All Agreement States Letter, SP-96-022*, dated February 16, 1996, is available from NRC upon request.

3 MANAGEMENT RESPONSIBILITY

The *NRC* recognizes that effective radiation safety program management is vital to achieving safe and compliant operations. *NRC* also believes that consistent compliance with its regulations provides reasonable assurance that licensed activities will be conducted safely. *NRC* frequently finds ineffective management is the underlying cause of safety and compliance problems. Management refers to a senior-level manager who has responsibility for overseeing licensed activities.

To ensure adequate management involvement, a management representative must sign the submitted application acknowledging management's commitments and responsibility 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 *NRC* (*10 CFR 30.9*);
- Knowledge about the contents of the license and application;
- Committing adequate resources (including space, equipment, personnel, time, and, if needed, contractors) to the radiation protection program to ensure that public and worker safety is protected from radiation hazards and compliance with regulations is maintained; and
- Selecting and assigning a qualified individual to serve as the Radiation Safety Officer (RSO) for their licensed activities.

For information on *NRC* inspection, investigation, enforcement, and other compliance programs, see "General Statement of Policy and Procedures for *NRC* Enforcement Actions," (*NUREG-1600*), which is available from *NRC* upon request.

4 APPLICABLE REGULATIONS

It is the applicant's or licensee's responsibility to have up-to-date copies of applicable regulations, read them, and abide by each applicable regulation.

The following Parts of 10 CFR Chapter I contain regulations applicable to portable gauging devices:

- 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"

Part 71 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 requirements of the United States Department of Transportation (DOT) that are found in 49 CFR Parts 170 through 189. Copies of *DOT* regulations can be ordered from the Government Printing Office (GPO) whose address and telephone number are listed below.

- 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 *NRC*"

To request copies of the above documents, call *GPO*'s order desk in Washington, DC at (202) 512-1800. Order the two-volume bound version of Title 10, Code of Federal Regulations, Parts 0-50 and 51-199 from the *GPO*, Superintendent of Documents, Post Office Box 371954, Pittsburgh, Pennsylvania 15250-7954. Request copies of the above documents from *NRC*'s Regional or Field Offices (see Figure 2.1 for addresses and telephone numbers).

5 HOW TO FILE

5.1 PAPER APPLICATION

Applicants for a materials license should do the following:

- Be sure to 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*.
- For each separate sheet, other than *Appendix B*, that is submitted with the application, identify and key it 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 unless it is absolutely necessary.
- Submit an original, signed application and one copy.
- Retain one copy of the license application for future reference.

Deviations from the suggested wording of responses as shown in this document or submission of alternative procedures may require a custom review.

All license applications will be available for review by the general public in *NRC's* Public Document Rooms. If it is necessary to submit proprietary information, follow the procedure in *10 CFR 2.790*. Failure to follow this procedure could result in disclosure of the proprietary information to the public or substantial delays in processing the application. Employee personal information, i.e., home address, home telephone number, social security number, date of birth, radiation dose¹ information, should not be submitted unless specifically requested by *NRC*.

As explained in the Foreword to this document, *NRC's* new licensing process will be faster and more efficient, in part, through acceptance and processing of electronic applications. *NRC* will continue to accept paper applications. However, these will be scanned and put through an optical character reader (OCR) to convert them to electronic format. To ensure a smooth transition, applicants are requested to follow these suggestions:

- 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, Futura, Univers**; the text of this document is in a serif font called **Times New Roman**.
- Choose 12-point or larger font size.
- Avoid stylized characters such as script, italic, etc.
- Be sure the print is clear and sharp.

¹ In this document, dose or radiation dose is used as defined in *10 CFR 20.1003*, 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*.

- Be sure there is high contrast between the ink and paper (black ink on white paper is best).

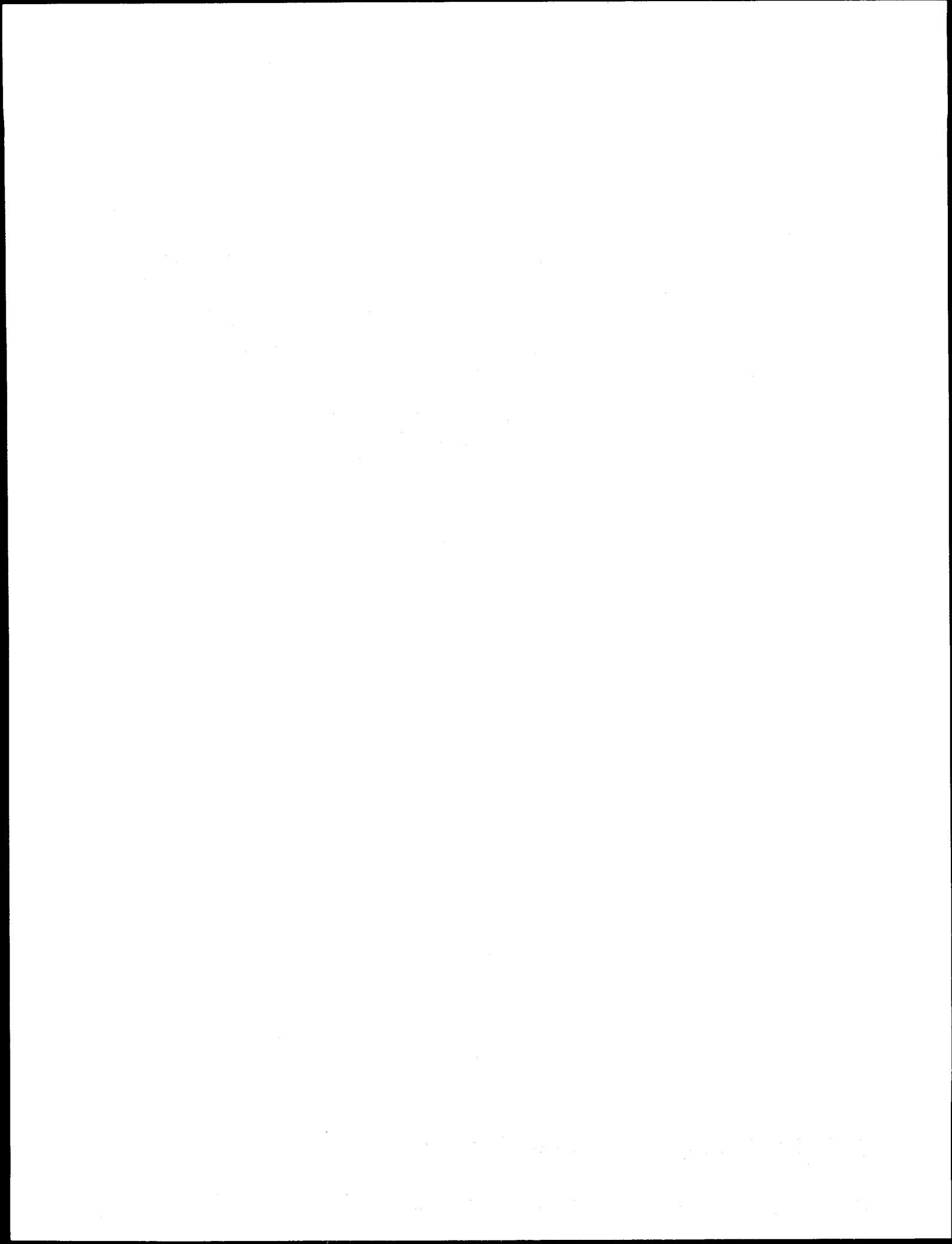
5.2 ELECTRONIC APPLICATION

As the electronic licensing process develops, it is anticipated that *NRC* will provide additional mechanisms for filing applications that could include filing via Fax, on diskettes or CD-ROM, and through the Internet. Additional filing instructions will be provided as these new mechanisms become available.

6 WHERE TO FILE

Applicants wishing to possess or use licensed material in any State or U. S. territory or possession subject to *NRC* jurisdiction must file an application with the *NRC* Regional Office for the locale in which the material will be possessed and/or used. Figure 2.1 shows *NRC*'s four Regional Offices and their respective areas for licensing purposes and identifies Agreement States. The Walnut Creek, California, Field Office, can respond to routine telephone inquiries.

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

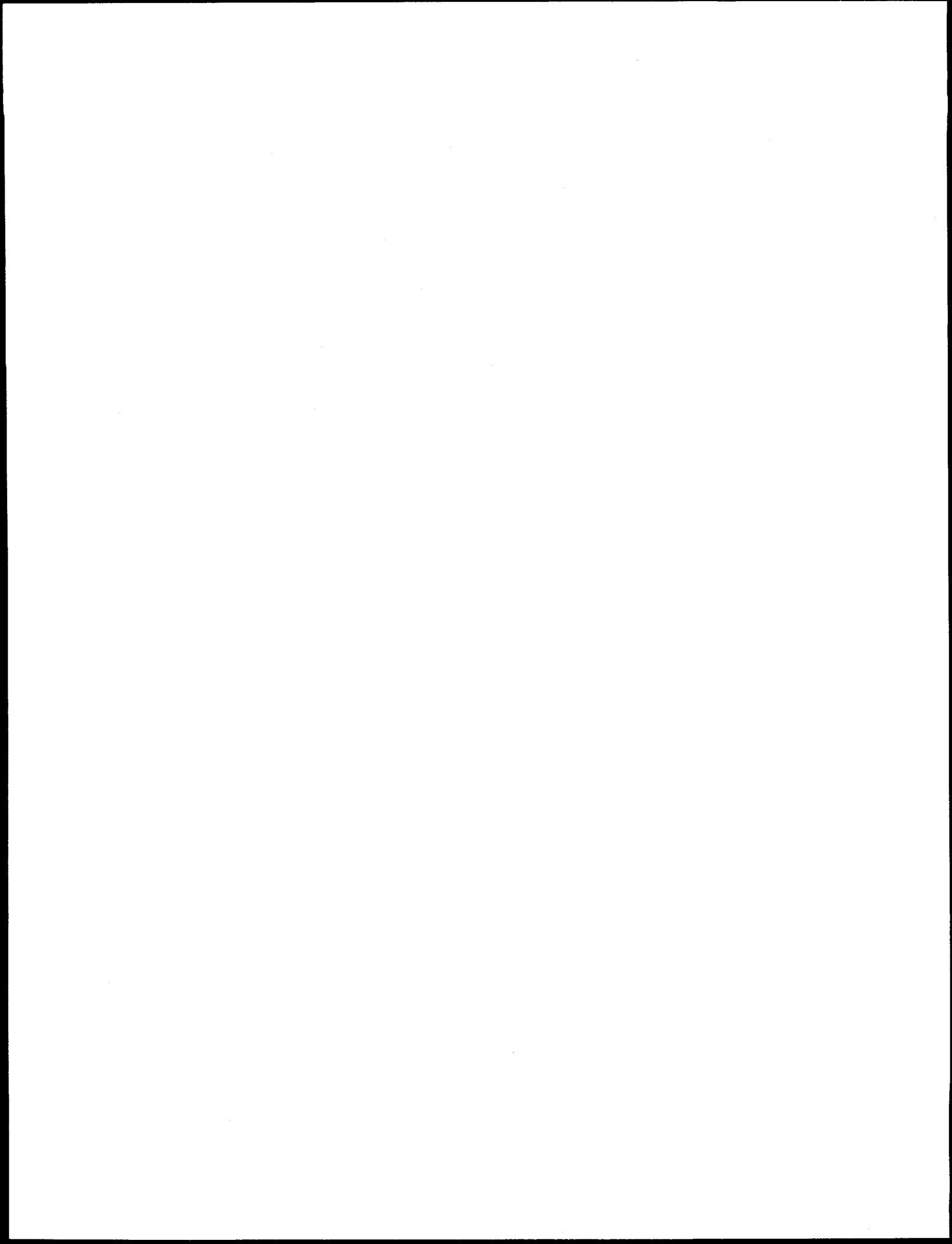


7 LICENSE FEES

Each application for which a fee is specified, including applications for new licenses and license amendments, must be accompanied by the appropriate fee. Refer to *10 CFR 170.31* to determine the amount of the fee. *NRC* will not issue the new license prior to fee receipt. Once 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*. Consult *10 CFR 171.11* for additional 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 *NRC*'s fees or completion of Item 12 of *NRC Form 313 (Appendix A)* to the Office of the Controller (OC) at *NRC* headquarters in Rockville, Maryland, (301) 415-7554. You may also call *NRC*'s toll free number (800) 368-5642 and then ask for extension 415-7554.



8 CONTENTS OF AN APPLICATION

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

8.1 ITEM 1: LICENSE ACTION TYPE

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 to License No.	XX-XXXXXX-XX
<input type="checkbox"/> C. Renewal of License no.	XX-XXXXXX-XX

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.

Note: *NRC* must be notified in the event of change of ownership or control and bankruptcy proceedings; see below for more details.

Timely Notification of Change of Ownership or Control:

Regulations: *10 CFR 30.34(b)*.

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

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

- Radioactive materials are possessed, used, or controlled only by persons who have valid *NRC* licenses;
- Materials are properly handled and secured;
- Persons using these materials are competent and committed to implementing appropriate radiological controls;

- A clear chain of custody is established to identify who is responsible for final disposal of gauge; and
- Public health and safety are not compromised by the use of such materials.

Response from applicant: None from an applicant for a new license; *Appendix C* identifies the information to be provided about changes of ownership or control.

Notification of Bankruptcy Proceedings

Regulation: *10 CFR 30.34(h)*

Criteria: Immediately following filing of 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.

Response from applicant: None at time of application for a new license.

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:

- Description of storage, use, and dispatch locations
- 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 (such as on Highway 10, 5 miles east of the intersection of Highway 10 and State Route 234, Anytown, State) for each permanent facility used as a location of storage or use, and each facility from which the applicant will dispatch gauge users to job sites for more than one customer. If gauges will NOT be stored at a dispatch site, so indicate. The descriptive address should be sufficient to allow an *NRC* inspector to find the storage location. A Post Office Box address is not acceptable.

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 for storage locations).

To conduct operations at temporary jobsites (i.e., locations where work is conducted for limited periods of time and from which gauge users are NOT dispatched to jobsites for other customers), specify "temporary job sites anywhere in the United States where *NRC* maintains jurisdiction." See Figure 2.1.

Note: As discussed later under "Financial Assurance and Record keeping for Decommissioning," licensees need to maintain permanent records on where licensed material was used or stored while the license was in force. 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 sketches or written descriptions of storage or use locations specifically listed on the license. Licensees do not need to maintain this information for temporary job sites where sources have never 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. This is typically the proposed radiation safety officer, unless the applicant has named a different person as the contact. The *NRC* will contact this individual if there are questions about the application.

Notify *NRC* if the contact person or his or her telephone number changes so that *NRC* can contact the applicant or licensee in the future with questions, concerns, or information. This notice is for "information only" and does not require a license amendment or a fee.

As indicated on *NRC Form 313 (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 deviations from the suggested responses and submission of alternative procedures may require custom review.

8.5 ITEM 5: RADIOACTIVE MATERIAL - SEALED SOURCES AND DEVICES

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

Criteria: Licensees will only be authorized for sealed sources and devices registered by *NRC* or an Agreement State.

Discussion: *NRC* or an Agreement State performs a safety evaluation of gauges before authorizing a manufacturer to distribute the gauges to specific licensees. The safety evaluation is documented in a Sealed Source and Device (SSD) Registration Certificate, also called an *SSD* Registration Sheet. When issuing a portable gauge license, *NRC* usually provides a generic authorization to allow the licensee to possess and use any sealed source/device combination that has been registered by *NRC* or an Agreement State. This method of authorization allows licensees flexibility in obtaining new source/device combinations without having to amend their licenses.

Consult with the proposed supplier to ensure that sources and devices conform to the sealed source and device designations registered with *NRC* or an Agreement State. Licensees may not make any changes to the sealed source, device, or source/device combination that would alter the description or specifications from those indicated in the respective registration certificates, without obtaining *NRC*'s prior permission in a license amendment.

Response from applicant:

- Identify each radionuclide that will be used in each source in the gauging device(s).
- Confirm that each sealed source, device, and source/device combination is registered as an approved sealed source or device by *NRC* or an Agreement State.
- Confirm that the activity per source will not exceed the maximum activity listed on the approved certificate of registration issued by *NRC* or by an Agreement State.

Note: Information on *SSD* registration certificates is also available electronically on *NRC*'s Sealed Source and Devices Bulletin Board System (SS&D BBS) which can be accessed, free of charge, on the FedWorld Information Service Network. For information on connecting to and using FedWorld, contact the FedWorld Help Desk at (703) 487-4608.

By mid-1997, *NRC* anticipates that the *SS&D BBS* will be discontinued when the database is completely transferred to a new electronic location. The address for the new electronic location is: <http://www.hsrn.ornl.gov/nrc/ssdrform.htm>. For information about the *SS&D BBS* or the new electronic location, contact the Registration Assistant at (301) 415-7231.

8.6 ITEM 5: RADIOACTIVE MATERIAL - FINANCIAL ASSURANCE AND RECORD KEEPING 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* must provide evidence of financial assurance for decommissioning.

Licensees are required to maintain, in an identified location, decommissioning records related to structures and equipment where gauges are used or stored and to leaking sources. Licensees must transfer 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 3.7×10^6 gigabecquerels (100,000 curies) of cesium-137 or 3.7×10^3 gigabecquerels (100 curies) of americium-241 or californium-252. Thus, a licensee would need to possess hundreds of gauges (typically containing about 0.30 gigabecquerels (8 millicuries) of cesium-137 and 1.5 gigabecquerels (40 millicuries) of americium-241) before the financial assurance requirements would apply. Since the standard portable gauge license does not specify the maximum number of gauges that the licensee may possess (allowing the licensee flexibility in obtaining gauges as needed without amending its license), it contains a condition requiring the licensee to limit its possession of gauges to quantities not requiring financial assurance for

decommissioning. Applicants and licensees desiring to possess gauges exceeding the threshold amounts must submit evidence of financial assurance.

The same regulation also requires 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 on the license. As-built drawings 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 spread of contamination), they also need to maintain records about contamination that remains after cleanup or that may have spread to inaccessible areas.

For portable gauge licensees whose sources have never leaked, acceptable records important to decommissioning are sketches or written descriptions of portable gauge storage or use locations specifically listed on the license. Similar information need not be maintained for temporary job sites.

Response from applicants: No response is needed from most applicants. If financial assurance is required, submit evidence.

Licensees must transfer 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.

Reference: *Regulatory Guide 3.66*, "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72," is available from *NRC* upon request.

8.7 ITEM 6: PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED

Regulations: *10 CFR 30.33(a)(1)*.

Criteria: 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 Sheet.

Response from applicant: If the gauging device(s) will be used for the purposes listed on the *SSD* Registration Sheet, state the following: Gauges will be used for the purposes described in their respective *SSD* Registration Sheets. If the gauging device(s) will be used for purposes other than those listed on the *SSD* Registration Sheet, specify these other purposes.

Note:

- 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.

8.8 ITEM 7: INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE - RADIATION SAFETY OFFICER (RSO)

Regulations: *10 CFR 30.33(a)(3)*.

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

- Portable gauge manufacturer's course for users or for *RSOs*
- Equivalent course that meets *Appendix D* criteria

Discussion: The person responsible for the radiation protection program is called the *RSO*. The *RSO* needs independent authority to stop operations that he or she considers unsafe. He or she must have sufficient time and commitment from management to fulfill certain duties and responsibilities to ensure that radioactive materials are used in a safe manner. Typical *RSO* duties are illustrated in Figure 8.1 and described in *Appendix E*. *NRC* requires the name of the *RSO* on the license to ensure that licensee management has always identified a responsible, qualified person and that the named individual knows of his or her designation as *RSO*.

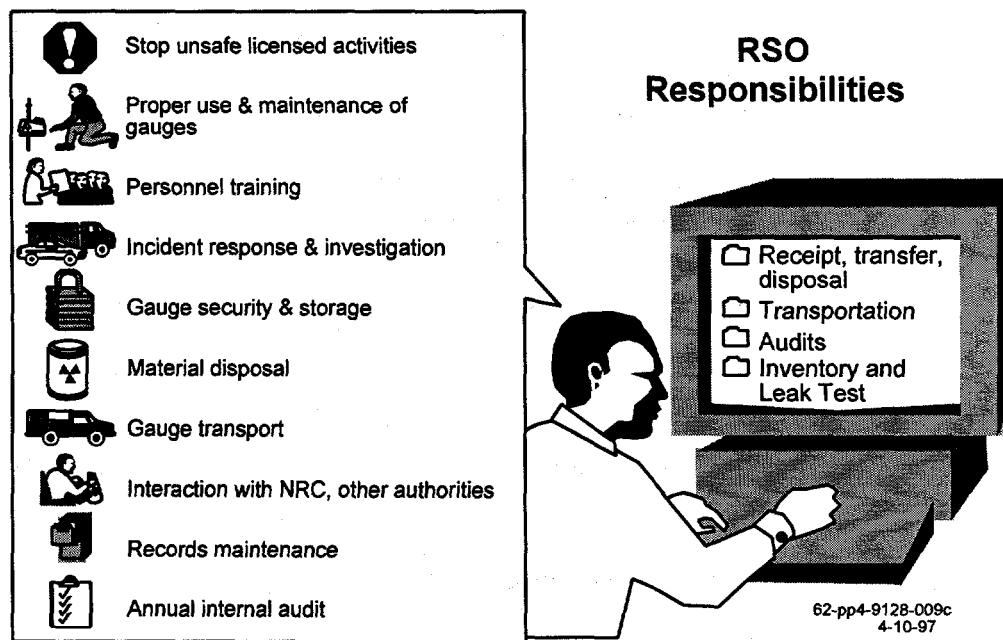


Figure 8.1 RSO Responsibilities. *Typical duties and responsibilities of RSOs.*

Response from Applicant: Provide either of the following:

- Name of the proposed *RSO*;

AND EITHER:

- Statement that: "Before obtaining licensed materials, the proposed *RSO* will have successfully completed one of the training courses described in Criteria in the section entitled 'Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer' in NUREG-1556, Vol. 1, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,' dated May 1997"; and
- Statement that: "Before being named as the *RSO*, future *RSOs* will have successfully completed one of the training courses described in Criteria in the section entitled 'Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer' in NUREG-1556, Vol. 1, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,' dated May 1997."

OR

- Alternative information demonstrating that the proposed RSO is qualified by training and experience.

Note:

- It is important to notify *NRC*, as soon as possible, of changes in the designation of the *RSO*; such notifications will be handled as administrative amendments not requiring fees as long as the application contains the commitment listed in the third bullet under "Response from Applicant."
- Alternative responses will be reviewed against the criteria listed above.

8.9 ITEM 8: TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

Regulations: *10 CFR 19.11, 10 CFR 19.12, 10 CFR 30.7, 10 CFR 30.9, 10 CFR 30.10, 10 CFR 30.33.*

Criteria: Authorized users must have adequate training and experience. In the past, *NRC* has found successful completion of one of the following as evidence of adequate training and experience:

- Portable gauge manufacturer's course for users
- Equivalent course that meets *Appendix D* criteria

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 statement: "Before using licensed materials, authorized users will have successfully completed one of the training courses described in Criteria in the section entitled 'Training for Individuals Working In or Frequenting Restricted Areas' in NUREG-1556, Vol. 1, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,' dated May 1997."

OR

- A description of the training and experience for proposed gauge users.

Note:

- Records of training should be maintained.
- Alternative responses will be evaluated against the criteria listed above.

8.10 ITEM 9: FACILITIES AND EQUIPMENT

No information need be submitted in response to this item. The key elements for portable gauge applicants are ensuring compliance with public dose limits and maintaining adequate security and control over the gauges. These issues are covered under "Radiation Safety Program - Public Dose" and "Radiation Safety Program - Operating and Emergency Procedures."

8.11 ITEM 10: RADIATION SAFETY PROGRAM - AUDIT PROGRAM

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

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

- Compliance with *NRC* and *DOT* regulations, and the terms and conditions of the license;
- Occupational doses and doses to members of the public are as low as reasonably achievable (*ALARA*) (*10 CFR 20.1101*); and
- Records of audits and other reviews of program content are maintained for 3 years.

Discussion: *Appendix F* contains a suggested audit program that is specific to the use of portable gauges and is acceptable to *NRC*. All areas indicated in *Appendix F* 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 a part of their audit programs, applicants should consider performing unannounced audits of gauge users in the field to determine if, for example, Operating and Emergency Procedures are available, are being followed, etc.

It is essential that once identified, problems be corrected comprehensively and in a timely manner; Information Notice (IN) 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," provides guidance on this subject. The *NRC* will review the licensee's audit results and determine if corrective actions are thorough, timely, and sufficient to prevent recurrence. If violations are identified by the licensee and these steps are taken, the *NRC* can exercise discretion and may elect not to cite a violation. The *NRC*'s goal is to encourage prompt identification and prompt, comprehensive correction of violations and deficiencies. For additional information on *NRC*'s use of discretion on issuing violations, refer to "General Statement of Policy and Procedures for *NRC* Enforcement Actions," (NUREG 1600).

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

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.

References: The following documents are available from *NRC* upon request: *Manual Chapter 87110, Appendix A*, "Industrial/Academic/Research Inspection Field Notes," NUREG-1600, "General Statement of Policy and Procedures on *NRC* Enforcement Actions," and IN 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action."

8.12 ITEM 10: RADIATION SAFETY PROGRAM - TERMINATION OF ACTIVITIES

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

Criteria: The licensee must do the following:

- Notify *NRC*, in writing, within 60 days, when principal activities have not been conducted for a period of 24 months or a decision is made to permanently cease licensed activities.
- Certify the disposition of licensed materials by submission of *NRC Form 314*, "Certificate of Disposition of Materials," available from *NRC* upon request.
- Before a license is terminated, send the records important to decommissioning (as required by 10 CFR 30.35(g)) 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.

Discussion: For guidance on the disposition of licensed material, see the section on Waste Management - Gauge Disposal or Transfer. For guidance on decommissioning records, see the section on Radioactive Materials - Financial Assurance and Record keeping for Decommissioning.

Response from Applicant: The applicant is not required to submit a response to the *NRC* during the initial application. However, when the license expires or at the time the licensee ceases operations, then *NRC Form 314* must be submitted.

8.13 ITEM 10: RADIATION SAFETY PROGRAM - INSTRUMENTS

Regulations: *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 an instrument (e.g., use instrument located on site or obtain from the applicant's home office or a local emergency response organization).

Response from Applicant: Provide either of the following:

- A statement that: "We will either possess and use, or have access to and use, a radiation survey meter that meets the Criteria in the section entitled 'Radiation Safety Program - Instruments' in NUREG-1556, Vol. 1, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,' dated May 1997, in the event of an incident."

OR

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

Note:

- Alternative responses will be reviewed against the criteria listed above.
- Applicants who plan to perform non-routine 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 the section on Radiation Safety Program - Maintenance and *Appendix G* for more information.

8.14 ITEM 10: RADIATION SAFETY PROGRAM - 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 and
- Conduct physical inventories at intervals not to exceed 6 months (or some other interval justified by the applicant) to account for all sealed sources.

Discussion: As illustrated in Figure 8.2, 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 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 H*.

Cradle to Grave Accountability

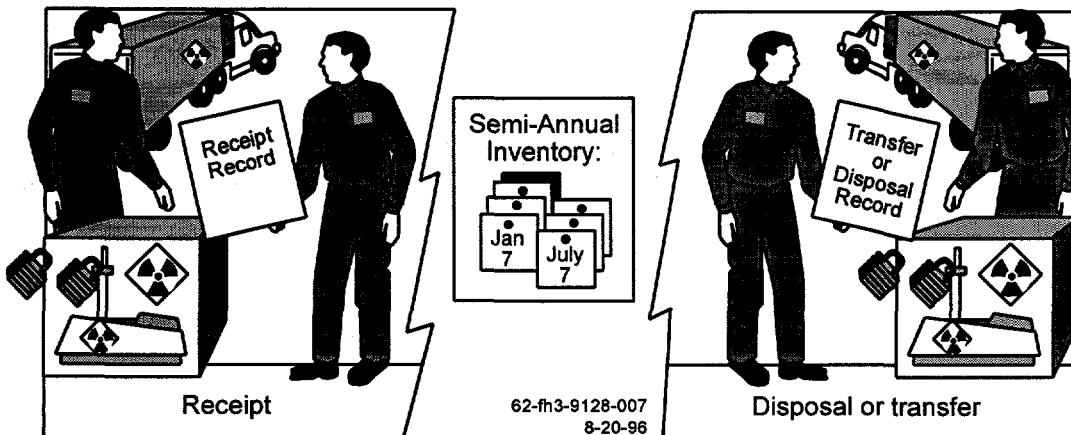


Figure 8.2 Material Receipt and Accountability. Licensees must maintain records of receipt and disposal and conduct semiannual inventories.

Response from Applicant: Provide either of the following:

- A statement that: "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 of the frequency and procedures for ensuring that no gauge has been lost, stolen, or misplaced and that, if the licensee possesses gauges exceeding threshold amounts, the licensee complies with financial assurance requirements in *10 CFR 30.35*.

Note:

- Alternative responses will be evaluated against the criteria listed above.
- Inventory records should be maintained and contain the following types of information:
 - Radionuclide and amount (in units of becquerels or curies) of byproduct material in each sealed source;
 - Manufacturer's name, model number, and serial number (if appropriate) of each device containing byproduct material;
 - Location of each sealed source and device;
 - Date of the inventory.

8.15 ITEM 10: RADIATION SAFETY PROGRAM - OCCUPATIONAL DOSIMETRY

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

Criteria: Applicants must do either of the following:

- Maintain, for inspection by *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 as shown in Figure 8.3.

OR

- 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.

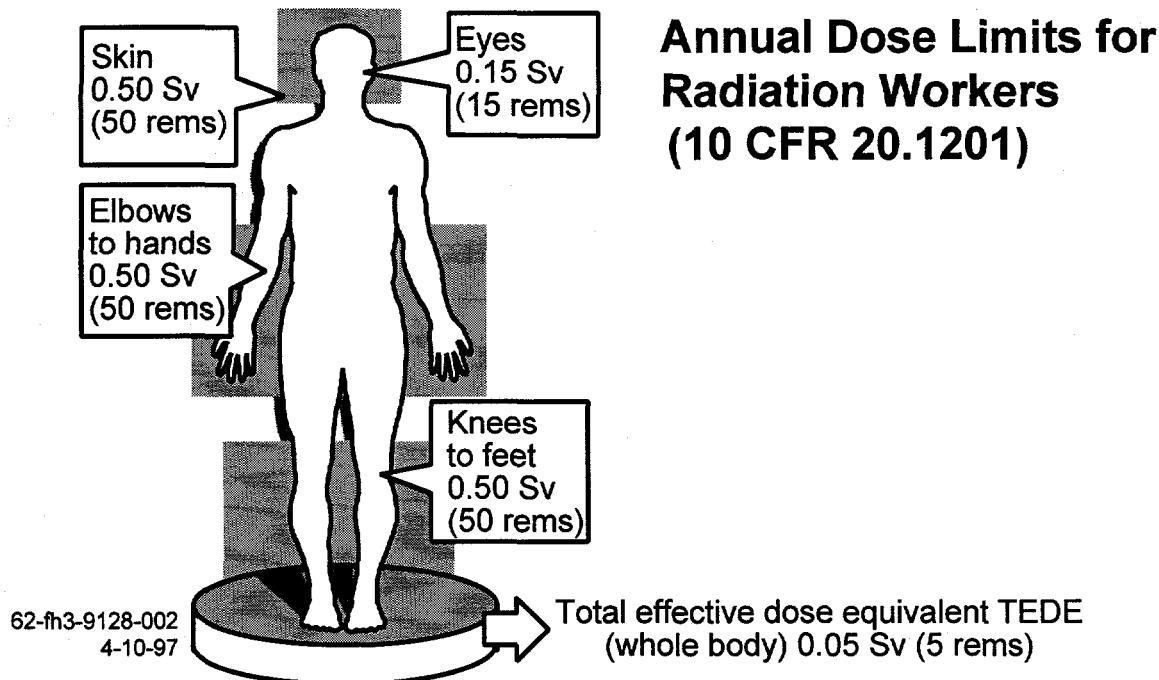


Figure 8.3 Annual Dose Limits for Radiation Workers.

Discussion: 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 most accidents where a gauge has been run over and has been damaged, the shielding of the source remains intact. A gauge user also does not require dosimetry when proper emergency procedures are used. Part 1 of *Appendix I* provides guidance on preparing a written evaluation demonstrating that gauge users are not likely to exceed 10 percent of the applicable limits and thus, 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 a *NVLAP*-approved processor. The exchange frequency for film badges is usually monthly due to technical concerns about film fading. The exchange frequency for *TLDs* is usually quarterly. Applicants should verify that the processor is *NVLAP*-approved. Consult the *NVLAP*-approved processor for its recommendations for exchange frequency and proper use.

Response from Applicant: Provide either of the following:

- "Either we will maintain, for inspection by *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 we will provide dosimetry processed and evaluated by a *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.

Note:

- Alternative responses will be evaluated against the criteria listed above.
- 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).

Reference: *National Institute of Standards and Technology (NIST) Publication 810*, "National Voluntary Laboratory Accreditation Program Directory," is published annually and is available for purchase from *GPO* and on the Internet at the following address:
<http://ts.nist.gov/ts/htdocs/210/214/dosim.htm>.

8.16 ITEM 10: RADIATION SAFETY PROGRAM - PUBLIC DOSE

Regulations: *10 CFR 20.1301, 10 CFR 20.1302, 10 CFR 20.1003, 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 the dose in any unrestricted area will not exceed 0.02 millisievert (mSv) [2 mrem (millirem)] in any one hour, from licensed operations.
- Control and maintain constant surveillance over gauges that are not in storage and secure stored gauges from unauthorized removal or use.

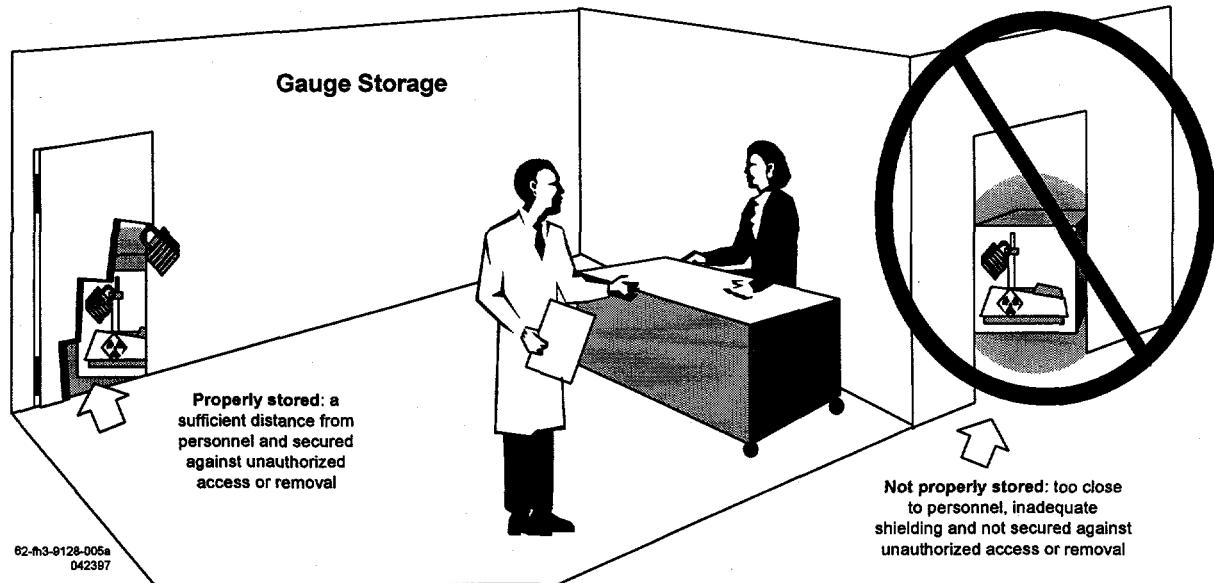


Figure 8.4 Storing Gauges. *Gauges should be stored away from occupied areas and secured against unauthorized removal.*

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 and emergency procedures regarding security and surveillance specified under that section 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 8.4. If gauges are not in storage, then authorized users must maintain constant surveillance to ensure that members of the public, who could be co-workers, cannot get near the gauges nor use them, and thus receive unneeded radiation exposure.

Public dose is also affected by the choice of storage location and conditions. Since a gauge presents a radiation field during storage, it must be stored so that the radiation level in an unrestricted area (e.g., an office or the exterior surface of an outside wall) does not exceed 1 mSv (100 mrem) in a year or 0.02 mSv (2 mrem) in any one hour. Use the concepts of time, distance, and shielding 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 the radiation exposure. As a rule of thumb, gauges should be stored as far away as possible from areas which are occupied by members of the public.

Licensees can determine the radiation levels adjacent to the storage location either by 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 I 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 this matter will be examined during an inspection.

8.17 ITEM 10: RADIATION SAFETY PROGRAM - OPERATING AND EMERGENCY PROCEDURES

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

Criteria: Each applicant must do the following:

- Develop, implement, and maintain operating and emergency 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 and
 - 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 use of surface casing or alternative procedures to ensure the source can move freely in the hole
 - provide instructions for procedures to follow to retrieve a stuck source
 - require reporting to *NRC*, pursuant to *10 CFR 30.50(b)(2)*, when a stuck source cannot be retrieved .

- Provide copies of operating and emergency procedures to all gauge users and at each job site.

Proper Handling of Incidents

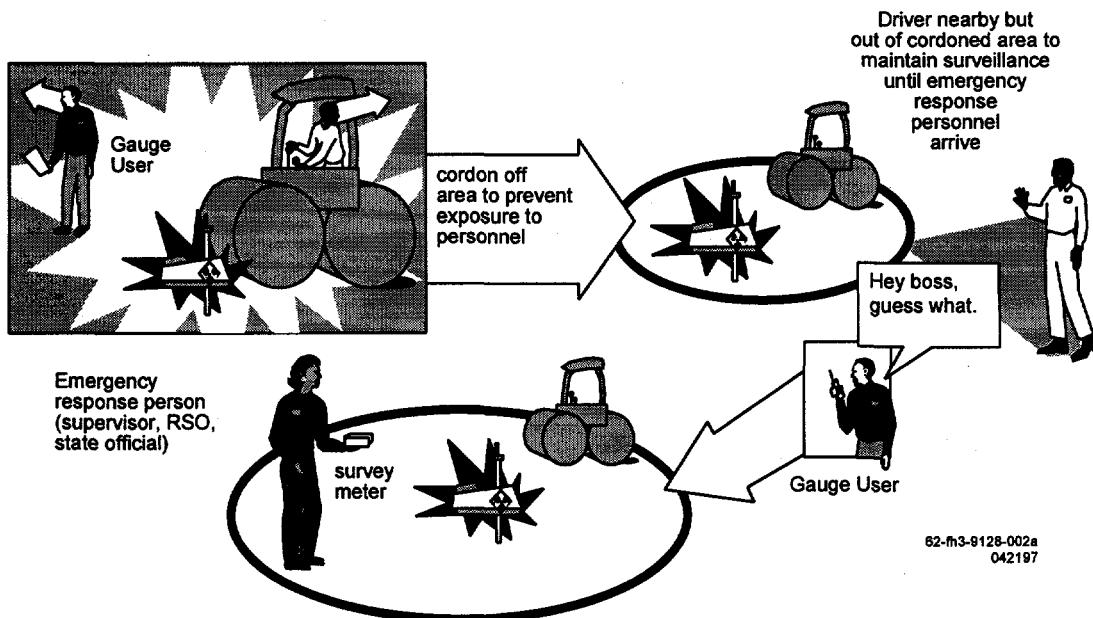


Figure 8.5 Proper Handling. Gauges are often damaged by heavy equipment at job sites and emergency procedures need to minimize radiation safety risk.

Discussion: Lost or stolen gauges and, as illustrated in Figure 8.5, gauges damaged by heavy equipment during use at job sites are the most common occurrences that present a potentially significant radiation safety risk. Figure 8.6 illustrates steps that should be taken to prevent loss, theft, or unauthorized use. Operating and emergency procedures should be developed to minimize these risks. NRC considers security of gauges extremely important and lack of security is a significant violation for which gauge licensees are fined. See *Appendix H* for sample 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 the hole is free of debris, it is not likely that debris will re-enter the cased hole, and the source will be able to move freely, it is acceptable for licensees to use 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 *NRC* when gauges are lost, stolen, or certain other conditions are met. Refer to the regulations for a description of when and where notifications are required.

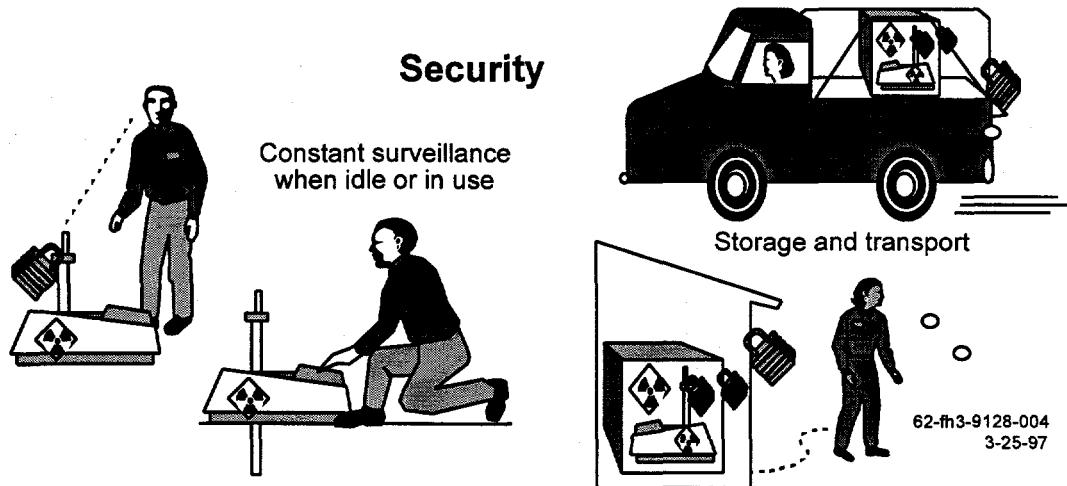


Figure 8.6 Security. *To avoid lost or stolen gauges, licensees must keep the gauges under constant surveillance, or secured against unauthorized use or removal.*

Response from Applicant: Do either of the following:

- State: "We will implement and maintain the operating and emergency procedures in *Appendix H* of NUREG-1556, Vol. 1, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,' dated May 1997 and provide copies of these procedures to all gauge users and at each job site."

OR

- State: "Operating and emergency procedures will be developed, implemented, and maintained, and will meet the criteria in the section entitled 'Radiation Safety Program - Operating and Emergency Procedures' in NUREG-1556, Vol. 1, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Portable Gauge Licenses,' dated May 1997."

OR

- Submit alternative procedures.

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

References: *NRC IN 93-18*: "Portable Moisture-Density Gauge User Responsibilities During Field Operations," and *NUREG/BR-0133*, "Working Safely with Nuclear Gauges," are available from *NRC* upon request.

8.18 ITEM 10: RADIATION SAFETY PROGRAM - LEAK TESTS

Regulations: *10 CFR 30.53.*

Criteria: *NRC* requires testing to determine whether there is any radioactive leakage from the source in the device. *NRC* finds testing to be acceptable if it is conducted by an organization approved by *NRC* or an Agreement State or according to procedures approved by *NRC* or an Agreement State.

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

Manufacturers, consultants, and other organizations may be authorized by *NRC* or an Agreement State to either perform the entire leak test sequence 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. Licensees may also be authorized to conduct the entire leak test sequence themselves.

Response from Applicant: Do either of the following:

- State: "Leak tests will be performed at intervals approved by the *NRC* or an Agreement State and specified in the Sealed Source and Device Registration Sheet. Leak tests will be performed by an organization authorized by *NRC* or an Agreement State to provide leak testing services to other licensees or using a leak test kit supplied by an organization authorized by *NRC* or an Agreement State to provide leak test kits to other licensees and according to the kit supplier's instructions."

OR

- Provide the information in *Appendix J* supporting a request to perform leak testing and sample analysis.

Note: Requests for authorization to perform leak testing and sample analysis will be reviewed on a case-by-case basis and, if approved, *NRC* staff will authorize via a license condition.

References: *Draft Regulatory Guide FC 412-4*, "Guide for the Preparation of Applications for the Use of Radioactive Materials in Leak-Testing Services," is available from *NRC* upon request.

8.19 ITEM 10: RADIATION SAFETY PROGRAM - 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; lubricate the shutter mechanism) must consider *ALARA* and ensure that the gauge functions as designed and source integrity is not compromised.

Non-routine 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 *NRC* or an Agreement State. Requests for specific authorization to perform non-routine maintenance or repair (see *Appendix G*) must demonstrate that personnel performing the work do the following:

- 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.

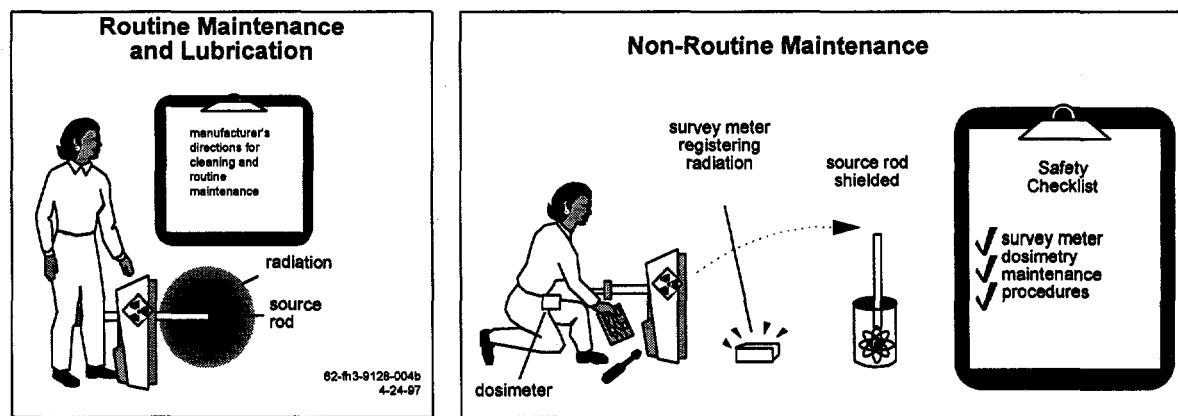


Figure 8.7 Maintenance. All licensees need to perform routine cleaning and lubrication to ensure proper operation of the gauge. For non-routine maintenance, most licensees rely on the gauge manufacturer or other service companies.

Discussion: Figure 8.7 illustrates routine cleaning and lubrication and non-routine maintenance. Generally, *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, repairing or replacing a handle. Routine

maintenance does NOT include any activities that require removing the sealed source or source rod from the gauge.

The *NRC* license will state that any cleaning, maintenance, or repair of gauges that requires detaching the source or source rod from the gauge shall be performed only by the manufacturer or other persons specifically licensed by the Commission or an Agreement State to perform such services. Most licensees do not perform non-routine 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 G* for more information.

Response from applicant:

Routine cleaning and lubrication: Submit either of the following:

"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*'s review.

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

"We will send the gauge to the manufacturer or other person authorized by *NRC* or an Agreement State to perform non-routine maintenance or repair operations that require detaching the source or source rod from the gauge."

OR

The information listed in *Appendix G* supporting a request to perform this work "in-house."

Note:

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

8.20 ITEM 10: RADIATION SAFETY PROGRAM - TRANSPORTATION

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

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

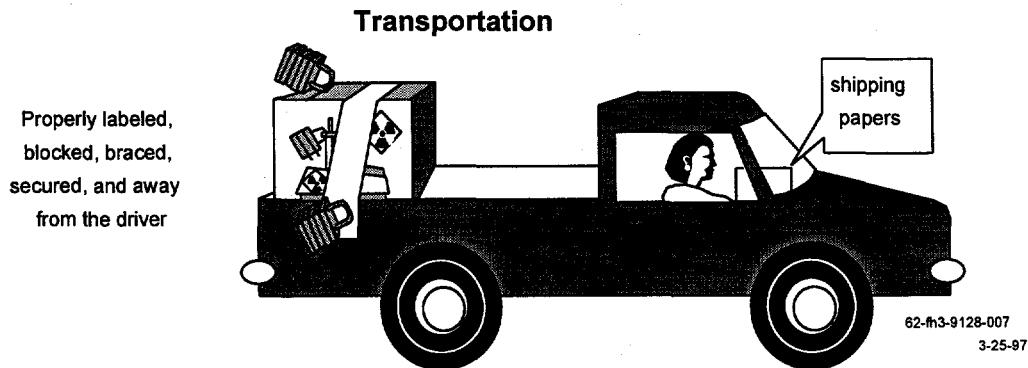


Figure 8.8 Transportation. Licensees often transport their gauges to and from job sites and must ensure compliance with Department of Transportation regulations.

Discussion: Figure 8.8 illustrates some *DOT* requirements often overlooked by portable gauge licensees. During an inspection, *NRC* uses the provisions of *10 CFR 71.5* and a *Memorandum of Understanding with DOT* to examine and enforce transportation requirements applicable to portable gauge licensees. *Appendix K* lists major *DOT* regulations and provides a sample shipping paper.

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

References: "*A Review of Department of Transportation Regulations for Transportation of Radioactive Materials (1983 revision)*" can be obtained by calling *DOT*'s Office of Hazardous Material Initiatives and Training at (202) 366-4900. *Memorandum of Understanding with DOT on the Transportation of Radioactive Material* (signed June 6, 1979) is available from *NRC* upon request.

8.21 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: 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 radionuclide and the use).

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

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.

Because of the difficulties and costs associated with disposal of americium-241 sealed neutron sources, applicants should preplan the disposal. Applicants may want to consider contractual arrangements with the source supplier as part of a purchase agreement.

The next two items on *NRC Form 313* are to be completed on the form itself.

8.22 ITEM 12: FEES

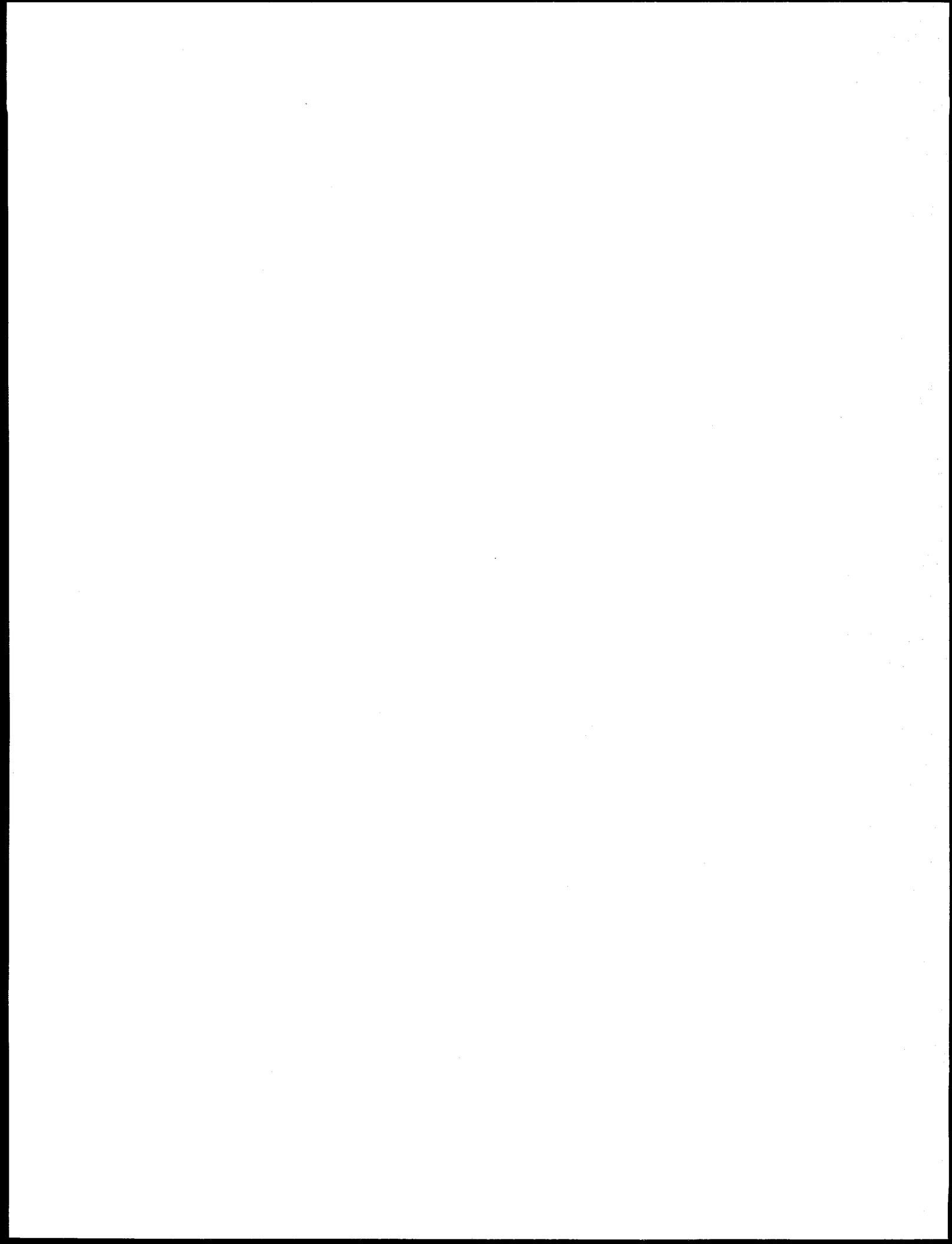
On *NRC Form 313*, enter the fee category and the amount of the fee enclosed with the application.

8.23 ITEM 13: CERTIFICATION

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

Note:

- 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 part of the licensing 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. 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, 10 CFR 30.36(a)*).

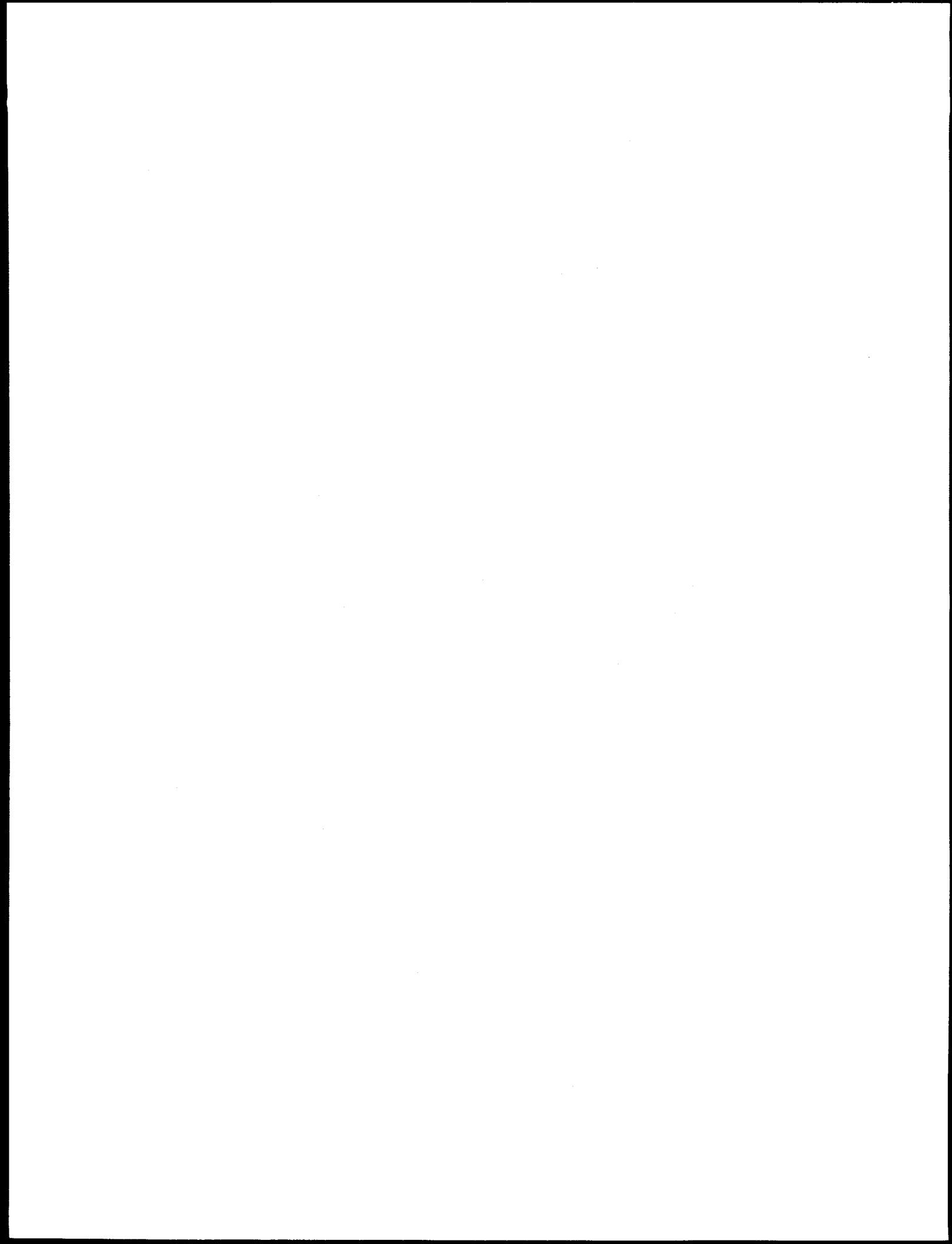
Applications for license amendment, in addition to the following, must provide the appropriate fee. For renewal and amendment requests applicants must do the following:

- Be sure to use the most recent guidance in preparing an amendment or renewal request.
- Submit in duplicate, either an *NRC Form 313* or a letter requesting amendment or renewal.
- Provide the license 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, NRC's guidance, the licensee's organization, or radiation protection program. Alternatively, describe clearly the exact nature of the changes, additions, and deletions.

The performance-based approach in NUREG-1556, Vol. 1, gives licensees greater flexibility than previously permitted under licenses based on applications prepared according to DG-0008. This permits licensees to make more changes in their radiation safety program without amending their licenses, thus reducing the regulatory burden on licensees and the NRC staff. Accordingly, existing portable gauge licensees have the option of submitting a complete application using NUREG-1556, Vol. 1, at the time they file an amendment request. Licensees choosing this option should incorporate the requested change into the complete application, submit it with the appropriate amendment fee, and indicate that the complete application is an amendment request to take advantage of the new guidance. When the staff has reviewed the request and resolved any outstanding issues, the staff will amend the license in its entirety without changing the expiration date.

Licensees wishing to renew their licenses should submit a complete application according to NUREG-1556, Vol. 1. The staff's action will be similar to that described for amendments, but will include an extension of the license's expiration date. By following this procedure, the staff expects all existing portable gauge licenses to be converted to the more performance-based format within a few years.

Deviations from the suggested wording of responses as shown in this document or submission of alternative procedures may require a custom review.



Appendix A

**United States
Nuclear Regulatory Commission
Form 313**

NRC FORM 313		U. S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0120	EXPIRES: 7/31/99																		
(7-96) 10 CFR 30, 32, 33 34, 35, 36, 39 and 40		APPLICATION FOR MATERIAL LICENSE		<p>Estimated burden per response to comply with this information collection request: 7 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. Forward comments regarding burden estimate to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0120), Office of Management and Budget, Washington, DC 20503. NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.</p>																			
<p>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.</p>																							
<p>APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:</p> <p>DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555-0001</p> <p>ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:</p> <p>IF YOU ARE LOCATED IN:</p> <p>CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:</p> <p>LICENSING ASSISTANT SECTION NUCLEAR MATERIALS SAFETY BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION I 475 ALLENDALE ROAD KING OF PRUSSIA, PA 19406-1415</p> <p>ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:</p> <p>NUCLEAR MATERIALS LICENSING SECTION U.S. NUCLEAR REGULATORY COMMISSION, REGION II 101 MARIETTA STREET, NW, SUITE 2900 ATLANTA, GA 30323-0199</p>			<p>IF YOU ARE LOCATED IN:</p> <p>ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:</p> <p>MATERIALS LICENSING SECTION U.S. NUCLEAR REGULATORY COMMISSION, REGION III 801 WARRENVILLE RD. LISLE, IL 60532-4351</p> <p>ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:</p> <p>NUCLEAR MATERIALS LICENSING SECTION U.S. NUCLEAR REGULATORY COMMISSION, REGION IV 811 RYAN PLAZA DRIVE, SUITE 400 ARLINGTON, TX 76011-8064</p>																				
<p>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.</p>																							
<p>1. THIS IS AN APPLICATION FOR (Check appropriate item)</p> <p><input type="checkbox"/> A. NEW LICENSE <input type="checkbox"/> B. AMENDMENT TO LICENSE NUMBER _____ <input type="checkbox"/> C. RENEWAL OF LICENSE NUMBER _____</p>			<p>2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip code)</p>																				
<p>3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED</p>			<p>4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION</p>																				
			<p>TELEPHONE NUMBER</p>																				
<p>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.</p>																							
<p>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.</p>			<p>6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.</p>																				
<p>7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.</p>			<p>8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.</p>																				
<p>9. FACILITIES AND EQUIPMENT.</p>			<p>10. RADIATION SAFETY PROGRAM.</p>																				
<p>11. WASTE MANAGEMENT.</p>			<p>12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)</p> <table border="1"> <thead> <tr> <th>FEES CATEGORY</th> <th>AMOUNT ENCLOSED \$</th> </tr> </thead> </table>			FEES CATEGORY	AMOUNT ENCLOSED \$																
FEES CATEGORY	AMOUNT ENCLOSED \$																						
<p>13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.</p> <p>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.</p> <p>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.</p>																							
<p>CERTIFYING OFFICER - TYPED/PRINTED NAME AND TITLE</p>			<p>SIGNATURE</p>		DATE																		
<p>FOR NRC USE ONLY</p> <table border="1"> <thead> <tr> <th>TYPE OF FEE</th> <th>FEES LOG</th> <th>FEES CATEGORY</th> <th>AMOUNT RECEIVED</th> <th>CHECK NUMBER</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td>\$</td> <td></td> <td></td> </tr> <tr> <td colspan="3">APPROVED BY</td> <td colspan="3">DATE</td> </tr> </tbody> </table>						TYPE OF FEE	FEES LOG	FEES CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS				\$			APPROVED BY			DATE		
TYPE OF FEE	FEES LOG	FEES CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS																		
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Appendix B

**Suggested Format
for
Providing Information
Requested in Items 5 through 11
of
NRC Form 313**

ITEMS 5 & 6: MATERIALS TO BE POSSESSED AND PROPOSED USES

YES	NO	RADIOISOTOPE	MANUFACTURER/ MODEL NO.	QUANTITY	MOST COMMON USE	SPECIFY OTHER USES NOT LISTED ON SSD CERTIFICATE
		Cesium-137	Sealed sources in compatible gauges as specified in Sealed Source and Device Registration Sheet	Not to exceed maximum activity per source as specified in Sealed Source and Device Registration Sheet	Measure Physical Properties of Materials	<input type="checkbox"/> Not applicable ----- <input type="checkbox"/> Uses are:
		Americium-241	Sealed neutron sources in compatible gauges as specified in Sealed Source and Device Registration Sheet	Not to exceed maximum activity per source as specified in Sealed Source and Device Registration Sheet	Measure Physical Properties of Materials	<input type="checkbox"/> Not applicable ----- <input type="checkbox"/> Uses are:
		Californium-252	Sealed neutron sources in compatible gauges as specified in Sealed Source and Device Registration Sheet	Not to exceed maximum activity per source as specified in Sealed Source and Device Registration Sheet	Measure Physical Properties of Materials	<input type="checkbox"/> Not applicable ----- <input type="checkbox"/> Uses are:
		Other (specify)				
<i>FINANCIAL ASSURANCE REQUIRED AND EVIDENCE OF FINANCIAL ASSURANCE PROVIDED</i>						

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
7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE - RADIATION SAFETY OFFICER Name: _____	Before obtaining licensed materials, the proposed <i>RSO</i> will have successfully completed one of the training courses described in Criteria in the section entitled "Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer" in NUREG-1556, Vol. 1, dated May 1997. AND Before being named as the <i>RSO</i> , future <i>RSOs</i> will have successfully completed one of the training courses described in Criteria in the section entitled "Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer" in NUREG-1556, Vol. 1, May 1997.	<input type="checkbox"/>	<input type="checkbox"/>
8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS	Before using licensed materials, authorized users will have successfully completed one of the training courses described in Criteria in the section entitled "Training for Individuals Working In or Frequenting Restricted Areas" in NUREG-1556, Vol. 1, dated May 1997.	<input type="checkbox"/>	<input type="checkbox"/>
9. FACILITIES AND EQUIPMENT	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 and Emergency Procedures".		Separate Item 9 Response Need Not Be Submitted With Application
10. RADIATION SAFETY PROGRAM - AUDIT PROGRAM	The applicant is <u>not</u> required to, and should not, submit its audit program to the <i>NRC</i> for review during the licensing phase.		Need Not Be Submitted With Application
10. RADIATION SAFETY PROGRAM - TERMINATION OF ACTIVITIES	The applicant is not required to submit a response to the termination of activities section during the initial application. However, when the license expires or at the time the licensee ceases operations, <i>NRC Form 314</i> must be submitted.		Need Not Be Submitted With Application
10. RADIATION SAFETY PROGRAM - SURVEY INSTRUMENTS	We will either possess and use, or have access to and use, a radiation survey meter that meets the Criteria in the section entitled "Radiation Safety Program - Instruments" in NUREG-1556, Vol. 1, dated May 1997, in the event of an incident.	<input type="checkbox"/>	<input type="checkbox"/>
10. RADIATION SAFETY PROGRAM - MATERIAL RECEIPT AND ACCOUNTABILITY	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.	<input type="checkbox"/>	<input type="checkbox"/>
10. RADIATION SAFETY PROGRAM - OCCUPATIONAL DOSIMETRY	Either we will maintain, for inspection by <i>NRC</i> , documentation demonstrating that unmonitored individuals are not likely to receive a radiation dose in excess of 10% of the allowable limits in 10 CFR Part 20 or we will provide dosimetry processed and evaluated by a <i>NVLAP</i> -approved processor that is exchanged at a frequency recommended by the processor.	<input type="checkbox"/>	<input type="checkbox"/>
10. RADIATION SAFETY PROGRAM - PUBLIC DOSE	The applicant is not required to submit a response to the public dose section during the licensing phase. This matter will be examined during an inspection.		Need Not Be Submitted With Application

ITEM NO. AND TITLE	SUGGESTED RESPONSE	YES	ALTERNATIVE PROCEDURES ATTACHED
10. RADIATION SAFETY PROGRAM - OPERATING & EMERGENCY PROCEDURES	<p>We will implement and maintain the operating and emergency procedures in <i>Appendix H</i> of NUREG-1556, Vol. 1, dated May 1997, and provide copies of these procedures to all gauge users and at each job site.</p> <p style="text-align: center;">OR</p> <p>Operating and emergency procedures will be developed, implemented, and maintained and will meet the criteria in the section entitled "Radiation Safety Program - Operating and Emergency Procedures" in NUREG-1556, Vol. 1, dated May 1997.</p>	<input type="checkbox"/>	<input type="checkbox"/>
10. RADIATION SAFETY PROGRAM - LEAK TEST	<p>Leak tests will be performed at intervals approved by the <i>NRC</i> or an Agreement State and specified in the Sealed Source and Device Registration Sheet. Leak tests will be performed by an organization authorized by <i>NRC</i> or an Agreement State to provide leak testing services for other licensees or using a leak test kit supplied by an organization authorized by <i>NRC</i> or an Agreement State to provide leak test kits to other licensees and according to the kit supplier's instructions.</p>	<input type="checkbox"/>	<input type="checkbox"/> The information in <i>Appendix J</i> supporting a request to perform leak testing and sample analysis is attached.
10. RADIATION SAFETY PROGRAM - MAINTENANCE	<p>ROUTINE CLEANING & LUBRICATION</p> <p>We will implement and maintain procedures for routine maintenance of our gauges according to each manufacturer's recommendations and instructions.</p>	<input type="checkbox"/>	<input type="checkbox"/>
	<p>NON-ROUTINE MAINTENANCE</p> <p>We will send the gauge to the manufacturer or other person authorized by <i>NRC</i> or an Agreement State to perform non-routine maintenance or repair operations that require the removal of the source or source rod from the gauge.</p>	<input type="checkbox"/>	<input type="checkbox"/> The information listed in <i>Appendix G</i> supporting a request to perform non-routine maintenance in-house is attached.
10. RADIATION SAFETY PROGRAM - TRANSPORTATION	<p>The applicant is <u>not</u> required to submit its response to transportation during the licensing process. However, this issue will be reviewed during inspection.</p>	Need Not Be Submitted With Application	
11. WASTE MANAGEMENT - GAUGE DISPOSAL & TRANSFER	<p>The applicant is <u>not</u> required to submit a response to waste management during the licensing process. However, the licensee should develop, implement, and maintain gauge transfer and disposal procedures in its radiation protection program.</p>	Need Not Be Submitted With Application	

Appendix C

Information Needed for Change of Ownership or Control Application

Licensees must provide full information and obtain *NRC's prior written consent* before transferring ownership or control of the license; some licensees refer to this as "transferring the license." Provide the following information concerning changes of ownership or control by the applicant (transferor and/or transferee, as appropriate). If any items are not applicable, so state.

1. The new name of the licensed organization. If there is no change, the licensee should so state.
2. The new licensee contact and telephone number(s) to facilitate communications.
3. Any changes in personnel having control over licensed activities (e.g., officers of a corporation) and any changes in personnel named in the license such as radiation safety officer, authorized users, or any other persons identified in previous license applications as responsible for radiation safety or use of licensed material. The licensee should include information concerning the qualifications, training, and responsibilities of new individuals.
4. An indication of whether the transferor will remain in non-licensed business without the license.
5. A complete, clear description of the transaction, including any transfer of stocks or assets, mergers, etc., so that legal counsel is able, when necessary, to differentiate between name changes and changes of ownership.
6. A complete description of any planned changes in organization, location, facility, equipment, or procedures (i.e., changes in operating or emergency procedures).
7. A detailed description of any changes in the use, possession, location, or storage of the licensed materials.
8. Any changes in organization, location, facilities, equipment, procedures, or personnel that would require a license amendment even without the change of ownership.
9. An indication of whether all surveillance items and records (e.g., calibrations, leak tests, surveys, inventories, and accountability requirements) will be current at the time of transfer. Provide a description of the status of all surveillance requirements and records.
10. Confirmation that all records concerning the safe and effective decommissioning of the facility, pursuant to *10 CFR 30.35(g), 40.36(f), 70.25(g), and 72.30(d)*; public dose; and waste disposal by release to sewers, incineration, radioactive material spills, and on-site burials, have been transferred to the new licensee, if licensed activities will continue at the same location, or to the *NRC* for license terminations.
11. A description of the status of the facility. Specifically, the presence or absence of contamination should be documented. If contamination is present, will decontamination occur before transfer? If not, does the successor company agree to assume full liability for the decontamination of the facility or site?

12. A description of any decontamination plans, including financial assurance arrangements of the transferee, as specified in *10 CFR 30.35, 40.36, and 70.25*. Include information about how the transferee and transferor propose to divide the transferor's assets, and responsibility for any cleanup needed at the time of transfer.
13. Confirmation that the transferee agrees to abide by all commitments and representations previously made to *NRC* by the transferor. These include, but are not limited to: maintaining decommissioning records required by *10 CFR 30.35(g)*; implementing decontamination activities and decommissioning of the site; and completing corrective actions for open inspection items and enforcement actions.

With regard to contamination of facilities and equipment, the transferee should confirm, in writing, that it accepts full liability for the site, and should provide evidence of adequate resources to fund decommissioning; or the transferor should provide a commitment to decontaminate the facility before change of control or ownership.

With regard to open inspection items, etc., the transferee should confirm, in writing, that it accepts full responsibility for open inspection items and/or any resulting enforcement actions; or the transferee proposes alternative measures for meeting the requirements; or the transferor provides a commitment to close out all such actions with *NRC* before license transfer.

14. Documentation that the transferor and transferee agree to the change in ownership or control of the licensed material and activity, and the conditions of transfer; and the transferee is made aware of all open inspection items and its responsibility for possible resulting enforcement actions.
15. A commitment by the transferee to abide by all constraints, conditions, requirements, representations, and commitments identified in the existing license. If not, the transferee must provide a description of its program, to ensure compliance with the license and regulations.

Appendix D

Criteria for Acceptable Training Courses for Portable Gauge Users

Criteria for Acceptable Training Courses for Portable Gauge Users

COURSE CONTENT

- 1.5 to 2 hours of radiation safety and regulatory requirements, emphasizing practical subjects important to safe use of the gauge: radiation vs. contamination; internal vs. external exposure; *ALARA* concept; use of time, distance, and shielding to minimize exposure; control and surveillance of gauges; location of sealed source within the portable gauge; inventory; recordkeeping; incidents; licensing and inspection by regulatory agency; need for complete and accurate information; employee protection; deliberate misconduct
- 1.5 to 2 hours of practical explanation of portable gauge theory and operation; operating, emergency, maintenance, and transportation procedures, and field training emphasizing radiation safety and including test 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 procedures

COURSE EXAMINATION

- 25-50 question, closed-book written test -- 70 percent grade
 - Emphasis on radiation safety of portable gauge storage, 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 prospective gauge user immediately following the scoring of the test

COURSE INSTRUCTOR QUALIFICATIONS

Instructor should have either:

- Bachelor's degree in a physical or life science or engineering
- Successful completion of a portable gauge user course
- Successful completion of an 8 hour radiation safety course AND
- 8 hours hands-on experience with portable gauges

OR

- Successful completion of portable gauge user course
- Successful completion of 40 hour radiation safety course; AND
- 30 hours of hands-on experience with portable gauges.

Note: Licensees should maintain records of training.

Appendix E

Typical Duties and Responsibilities of the Radiation Safety Officer

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

- Stopping licensed activities that the *RSO* considers unsafe
- Possession, use, storage, and maintenance of sources and gauges are consistent with the limitations in the license, the Sealed Source and Device Registration sheet(s), and manufacturer's recommendations and instructions
- Individuals using 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 are identified, and corrective action is taken
- Audits are performed at least annually and documented, and corrective actions taken
- Licensed material is transported in accordance with all applicable *DOT* requirements
- Licensed material is disposed of properly
- Appropriate records are maintained
- Up-to-date license is maintained and amendment and renewal requests submitted in a timely manner

Appendix F

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. _____

(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 last two audits or two 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 filed, was *NRC* prior consent obtained or was *NRC* notified?
- c. If the *RSO* was changed, was license amended? Does new *RSO* meet *NRC* training requirements?
- d. If the designated contact person for *NRC* changed, was *NRC* notified?
- e. Does the license authorize all of the *NRC*-regulated radionuclides contained in gauges possessed?
- f. Are the gauges as described in the Sealed Source and Device (*SSD*) Registration Certificate or Sheet? Have copies of (or access to) *SSD* Certificates? Have manufacturers' manuals for operation and maintenance? *[10 CFR 32.210]*
- g. Are the actual uses of gauges consistent with the authorized uses listed on the license?
- h. Is *RSO* fulfilling his/her duties?

3. TRAINING AND INSTRUCTIONS TO WORKERS

- a. Were all workers who are likely to exceed 100 mrem/yr instructed per *[10 CFR 19.12]*? Refresher training provided, as needed *[10 CFR 19.12]*?
- b. Did each gauge operator attend an approved course prior to using gauges?
- c. Are training records maintained for each gauge operator?
- d. Did interviews with operators reveal that they know the emergency procedures?
- e. Did this audit include observations of operators using the gauge in a field situation?
- f. Operating gauge? Performing routine cleaning and lubrication? Transporting gauge? Storing gauge?

- g. Did the operator demonstrate safe handling and security during transportation, use and storage?
- h. HAZMAT training 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 it meet the *NRC's* 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 non-routine 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 received physically inventoried every six months?
- c. Are records of inventory results 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 $\leq 10\%$ of limit? *[10 CFR 20.1502(a)]*
- c. Did unmonitored users' activities change during the year which could put them over 10% of limit?
- d. If yes to c. above, was a new evaluation performed?
- e. Is external dosimetry required (user receiving $> 10\%$ of limit)? And is dosimetry provided to users?
 - 1) Is the dosimetry supplier *NVLAP* approved? *[10 CFR 20.1501(c)]*
 - 2) Are the dosimeters exchanged monthly for film badges and at industry recommended frequency for *TLDs*?
 - 3) Are dosimetry reports reviewed by the *RSO* when they are received?
 - 4) Are the records *NRC* Forms or equivalent? *[10 CFR 20.2104(d), 10 CFR 20.2106(c)]*
 - *NRC-4* "Cumulative Occupational Exposure History" completed?
 - *NRC-5* "Occupational Exposure Record for a Monitoring Period" completed?

- 5) If a worker declared her pregnancy, did licensee comply with *10 CFR 20.1208*?
 - 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. Records maintained? [*10 CFR 20.2103, 10 CFR 20.2107*]

8. OPERATING AND EMERGENCY PROCEDURES

- a. Have operating and emergency procedures been developed?
- b. Do they contain the required elements?
- c. Does each operator have a current copy (telephone numbers) of the operating and
- d. emergency procedures?
- e. Did any emergencies occur? If so, and were they handled properly by operator? Were appropriate corrective actions taken?

9. LEAK TESTS

- a. Was each sealed source leak tested every 6 months or at other prescribed intervals?
- b. Was the leak test performed as described in correspondence with *NRC* and according to the license?
- c. Are records of results retained with the appropriate information included?
- d. Were any sources found leaking and if yes, was *NRC* notified?

10. MAINTENANCE OF GAUGES

- a. Are manufacturer's procedures followed for routine cleaning and lubrication of gauge?
- b. Does the source or source rod remain attached to the gauge during cleaning?
- c. Is non-routine 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 *10 CFR 20.1301* limits)?

11. TRANSPORTATION

- a. DOT-7A or other authorized packages used? [*49 CFR 173.415, 49 CFR 173.416(b)*]
- b. Package performance test records on file?
- c. Special form sources documentation? [*49 CFR 173.476(a)*]
- d. Package has 2 labels (ex. Yellow-II) with TI, Nuclide, Activity, and Hazard Class? [*49 CFR 172.403, 49 CFR 173.441*]
- e. Package properly marked? [*49 CFR 172.301, 49 CFR 172.304, 49 CFR 172.310, 49 CFR 172.324*]
- f. Package closed and sealed during transport? [*49 CFR 173.475(f)*]
- g. Shipping papers prepared and used? [*49 CFR 172.200(a)*]
- h. Shipping papers contain proper entries? {Shipping name, Hazard Class, Identification Number (UN Number), Total Quantity, Package Type, Nuclide, RQ, Radioactive Material, Physical and Chemical Form, Activity, 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. Shipping papers within drivers reach and readily accessible during transport? [*49 CFR 177.817(e)*]
- j. Secured against movement? [*49 CFR 177.834*]
- k. Placarded on vehicle, if needed? [*49 CFR 172.504*]
- l. Proper overpacks, if used? [*49 CFR 173.25*]
- m. Any incidents reported to DOT? [*49 CFR 171.15, 16*]

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

- a. Describe the type, location, and results of measurements. Do any radiation level 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? Reported? [*10 CFR 20.2203, 10 CFR 30.50*]
- d. If any events (as described in items a through c above) did occur, what was root cause? Were corrective actions appropriate?
- e. Is the licensee aware of telephone number for *NRC* Emergency Operations Center? [(301) 816-5100]

14. POSTING AND LABELING

- a. *NRC-3 "Notice to Workers" posted? [10 CFR 19.11]*
- b. *NRC regs., license documents posted or a notice posted? [10 CFR 19.11, 10 CFR 21.6]*
- c. *Other posting and labeling? [10 CFR 20.1902, 10 CFR 20.1904]*

15. RECORD KEEPING FOR DECOMMISSIONING

- a. *Records kept of information important to decommissioning? [10 CFR 30.35(g)]*
- b. *Records include all information outlined in [10 CFR 30.35(g)]?*

16. BULLETINS AND INFORMATION NOTICES

- a. *NRC Bulletins, NRC Information Notices, NMSS Newsletters, received?*
- b. *Appropriate training and action taken in response?*

17. SPECIAL LICENSE CONDITIONS OR ISSUES

- a. *Did auditor review special license conditions or other issues (e.g., non-routine maintenance)?*

18. DEFICIENCIES IDENTIFIED IN AUDIT; CORRECTIVE ACTIONS

- a. *Summarize problems/deficiencies identified during audit.*
- b. *If problems/deficiencies identified in this audit, describe corrective actions planned or taken. Are corrective actions planned or taken at ALL licensed locations (not just location audited)?*
- c. *Provide any other recommendations for improvement.*

19. EVALUATION OF OTHER FACTORS

- a. *Senior licensee management is appropriately involved with the radiation protection program and/or Radiation Safety Officer (RSO) oversight?*
- b. *RSO has sufficient time to perform his/her radiation safety duties?*
- c. *Licensee has sufficient staff to support the radiation protection program?*

Appendix G

**Information Needed
to
Support Applicant's Request
to
Perform Non-Routine Maintenance**

Non-routine maintenance or repair (beyond routine cleaning and lubrication) involves detaching the source or source rod from the device and any other activities during which personnel could receive radiation doses exceeding *NRC* limits. See Figure 8.7. 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.

A typical moisture-density gauge contains 0.37 gigabecquerels (10 millicuries) of cesium-137 and 1.5 gigabecquerels (40 millicuries) of americium-241 as a neutron source. In about 9 minutes, an unshielded cesium-137 source of this activity can deliver 0.05 sievert (5 rems) to a worker's hands or fingers (i.e., extremities), assuming the extremities are 1 centimeter from the source. Some gauges contain sources of even higher activities with correspondingly higher dose rates. The threshold for extremity monitoring is 0.05 sievert (5 rems) per year.

Thus, applicants wishing to perform non-routine 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, provide the following information:

- Describe the types of work, maintenance, cleaning, repair, etc., 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 assist in the evaluation of the qualifications of individuals who will conduct the work and the radiation safety procedures they will follow.
- Identify who will perform non-routine maintenance, their training and experience, and why they are competent to perform non-routine maintenance.
- Submit 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., use of shielded containers or shielding);
 - the source or source rod is secured against unauthorized removal access or under constant surveillance;
 - appropriate labels and signs are used; and
 - manufacturer's instructions and recommendations are followed.
- Confirm that individuals performing non-routine maintenance on gauges will always wear both whole body and extremity monitoring devices or that an evaluation will be available to demonstrate that these individuals are not likely to receive, in one year, more than 10 percent of the applicable dose limits. The dose limits are illustrated in Figure 8.3.

APPENDIX G

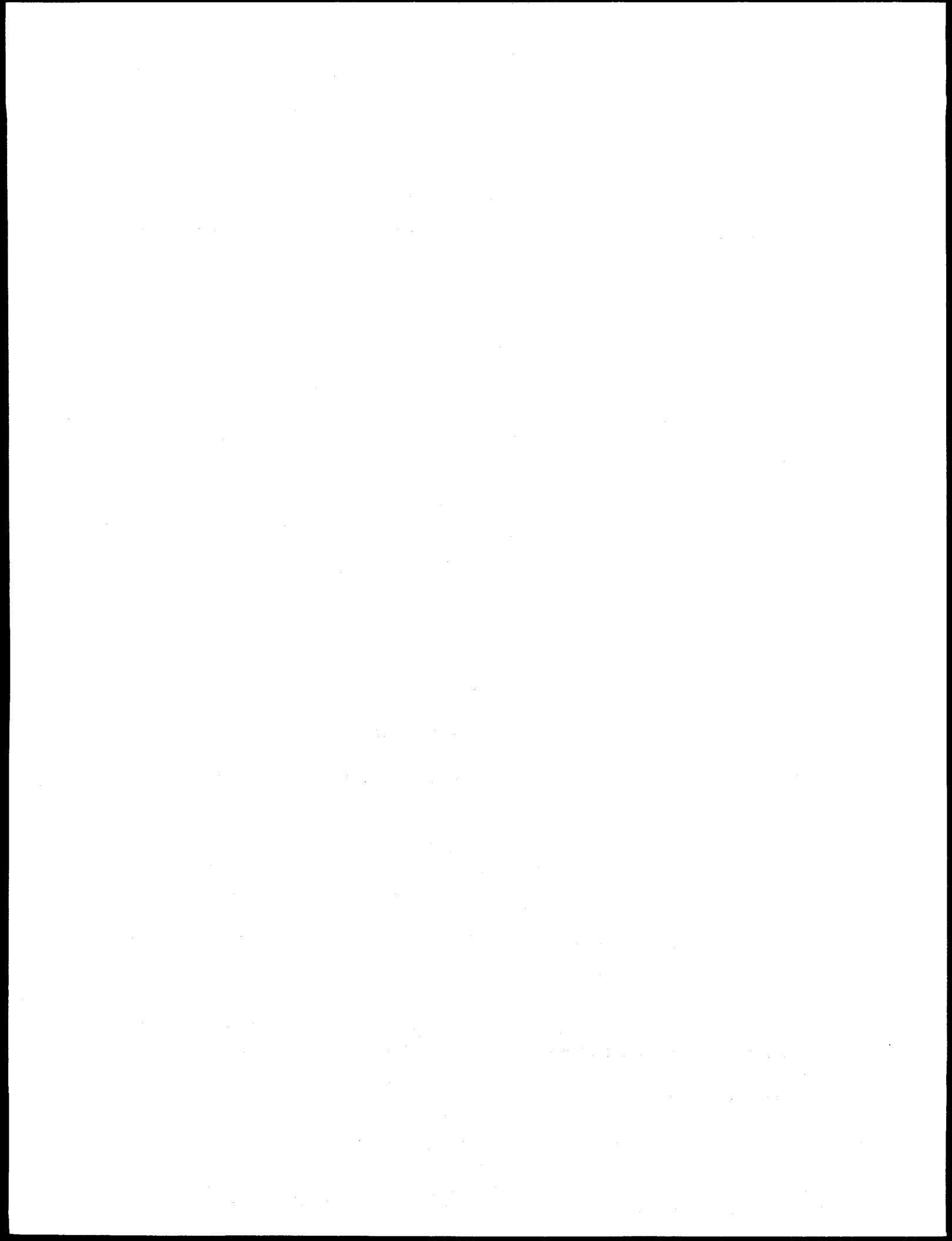
- Verify possession of at least one survey instrument meeting the following criteria:
 - Be capable of detecting gamma radiation;
 - Be capable of measuring from 0.01 to 0.5 mSv/hr [1 to 50 mrem/hr];
 - Be calibrated at least annually with radionuclide point sources emitting radiation of the type and energy of the sealed sources in the gauge;
 - Be calibrated at least 2 points located at approximately 1/3 and 2/3 of each scale; readings within $\pm 20\%$ are acceptable;
 - Be calibrated by a person specifically licensed by the *NRC* or an Agreement State to calibrate radiation detection instruments; and
 - Be 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*).

- Describe steps to be taken to ensure that radiation levels in areas where non-routine maintenance will take place do not exceed *10 CFR 20.1301* limits. 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 non-routine maintenance; and
 - 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 H

Operating and Emergency Procedures



Operating Procedures

- If personnel dosimetry is provided:
 - Always wear your assigned thermoluminescent dosimeter (*TLD*) or film badge when using the gauge.
 - Never wear another person's *TLD* or film badge.
 - Never store your *TLD* or film badge 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 jobsite(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 Department of Transportation (*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 actions 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 jobsite, place the gauge in a secured storage location (e.g., locked in the trunk of a car or locked in a storage shed).
- Prior to 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 and brace the case to prevent movement during transportation. Lock the case in or to the vehicle.
- 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 re-enter the cased hole) so that the unshielded source can move freely (e.g., use a dummy probe to verify that the hole is free of obstructions).
- After making changes affecting the 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 gauges.

Emergency Procedures:

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

- 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 there is no contamination present.
- Gauge users and other potentially contaminated individuals should not leave the scene until emergency assistance arrives.

- Notify the persons in the order listed below of the situation:

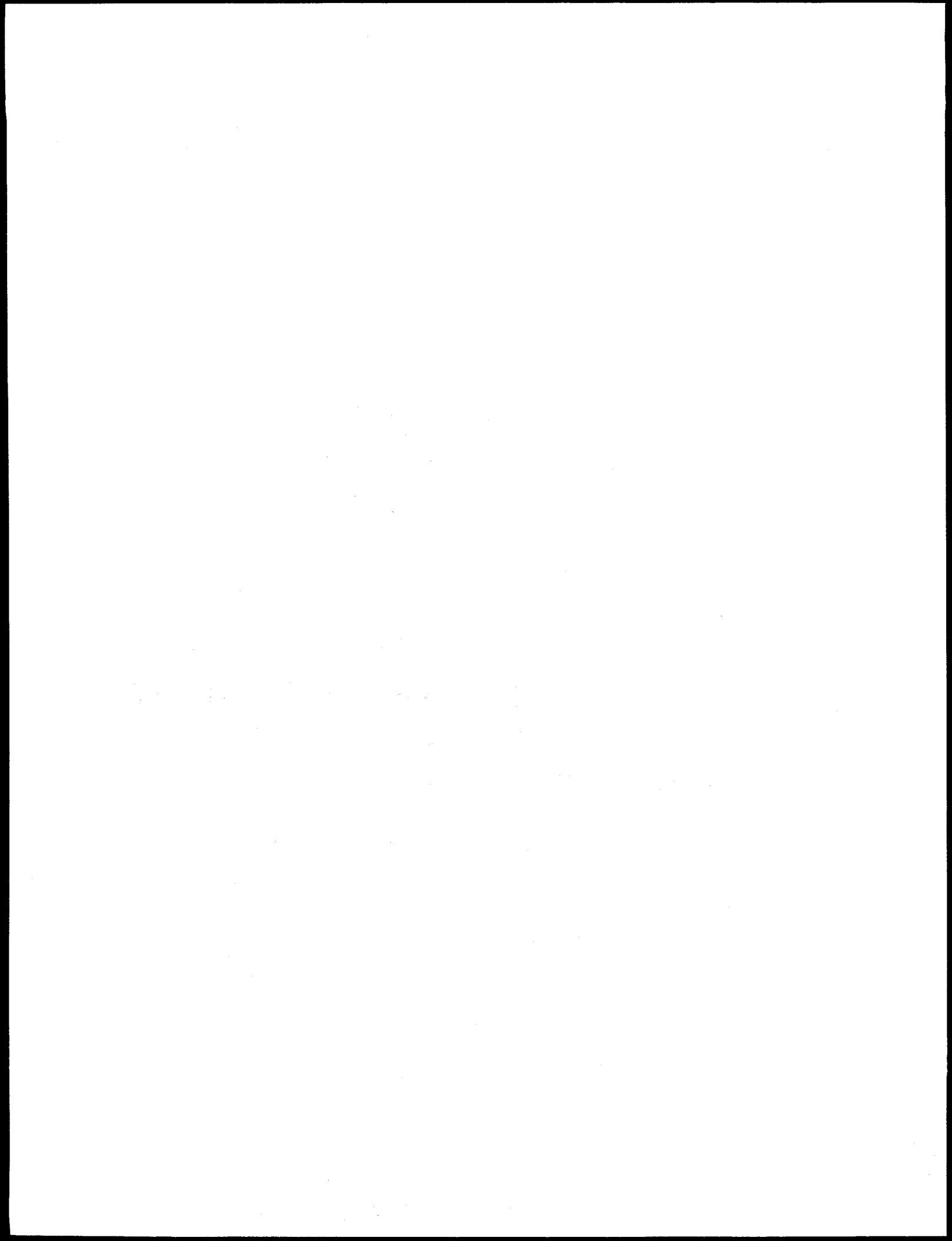
NAME*	WORK PHONE NUMBER*	HOME PHONE NUMBER*
--------------	---------------------------	---------------------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

- * Fill in with (and update, as needed) the names and telephone numbers of appropriate personnel (e.g., the Radiation Safety Officer (*RSO*), or other knowledgeable licensee staff, licensee's consultant, gauge manufacturer) to be contacted in case of emergency.
- Follow the directions provided by the person contacted above.

RSO 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 jobsite 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 the *NRC* as required. (Even if not required to do so, you may report ANY incident to *NRC* by calling *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* 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*.



Appendix I

Dosimetry-related Guidance

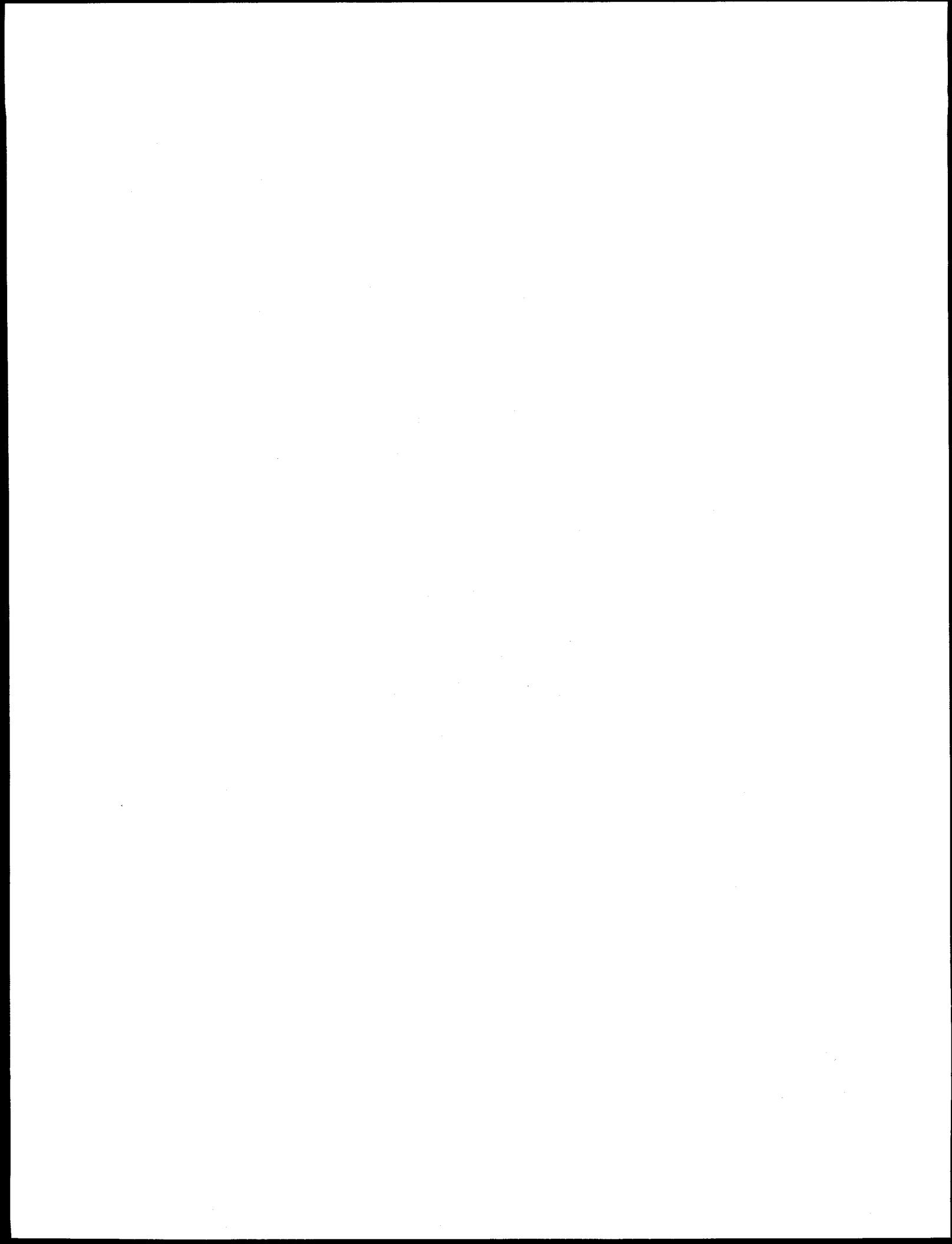
Part 1:

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% of the applicable regulatory limits in *10 CFR 20.1201*. To demonstrate that dosimetry is *not* required, a licensee needs to have available, for inspection, an evaluation to demonstrate that its workers are not likely to exceed 10% of the applicable annual limits.

The most common way that individuals *might* exceed 10% of the applicable limits is by performing frequent routine cleaning and lubrication of gauges. Thus, a licensee would need to evaluate the doses its workers might receive in performing these tasks to assess whether dosimetry is required.

EXAMPLE

One gauge manufacturer has estimated the doses to the extremities and whole body of a person performing routine cleaning and lubrication of one of its series of gauges. Each gauge in the series is authorized to contain up to 0.33 gigabecquerels (9 millicuries) of Cs-137 and either 1.63 gigabecquerels (44 millicuries) of Am-241 or 2.44 megabecquerels (66 microcuries) of Cf-252. The manufacturer based its estimate on observations of individuals performing the recommended procedure according to good radiation safety practices. The manufacturer had the following types of information:

- Time needed to perform the entire procedure (e.g., 10 min)
- 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 min)
- 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/min])

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] **TEDE** (whole body) and
- 0.45 mSv [45 mrem] to the hands.

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

The applicable limit for the extremities is 500 mSv (50 rems) per year and 10% of that value is 50 mSv (5 rems or 5000 millirems) per year. If one cleaning/lubrication delivers 0.45 mSv (45

mrem), then an individual could perform 111 of these operations each year and remain within 10% of the applicable limit.

Based on the above specific situation, 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 need to 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 need to 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 Sheet maintained by the *NRC* and Agreement States.

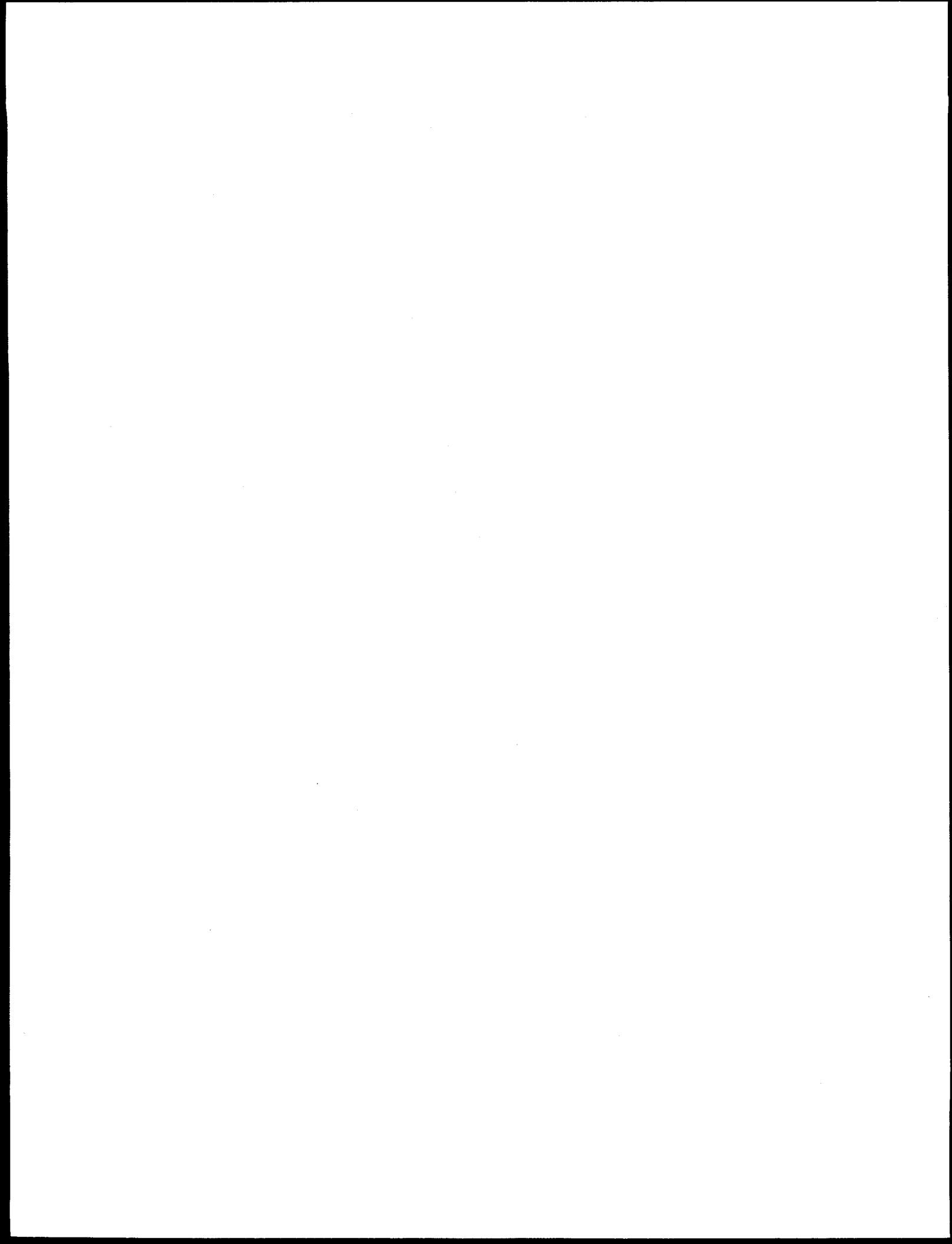
Table I-1 may be helpful in documenting a licensee's evaluation.¹

Licensees should review evaluations periodically and revised them as needed. They need to check assumptions used in their evaluations to ensure that they continue to be 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 they 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, the purchase of new gauges containing sources of different activities, different radionuclides, or different cleaning/lubrication procedures would require a new evaluation.

¹For 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.

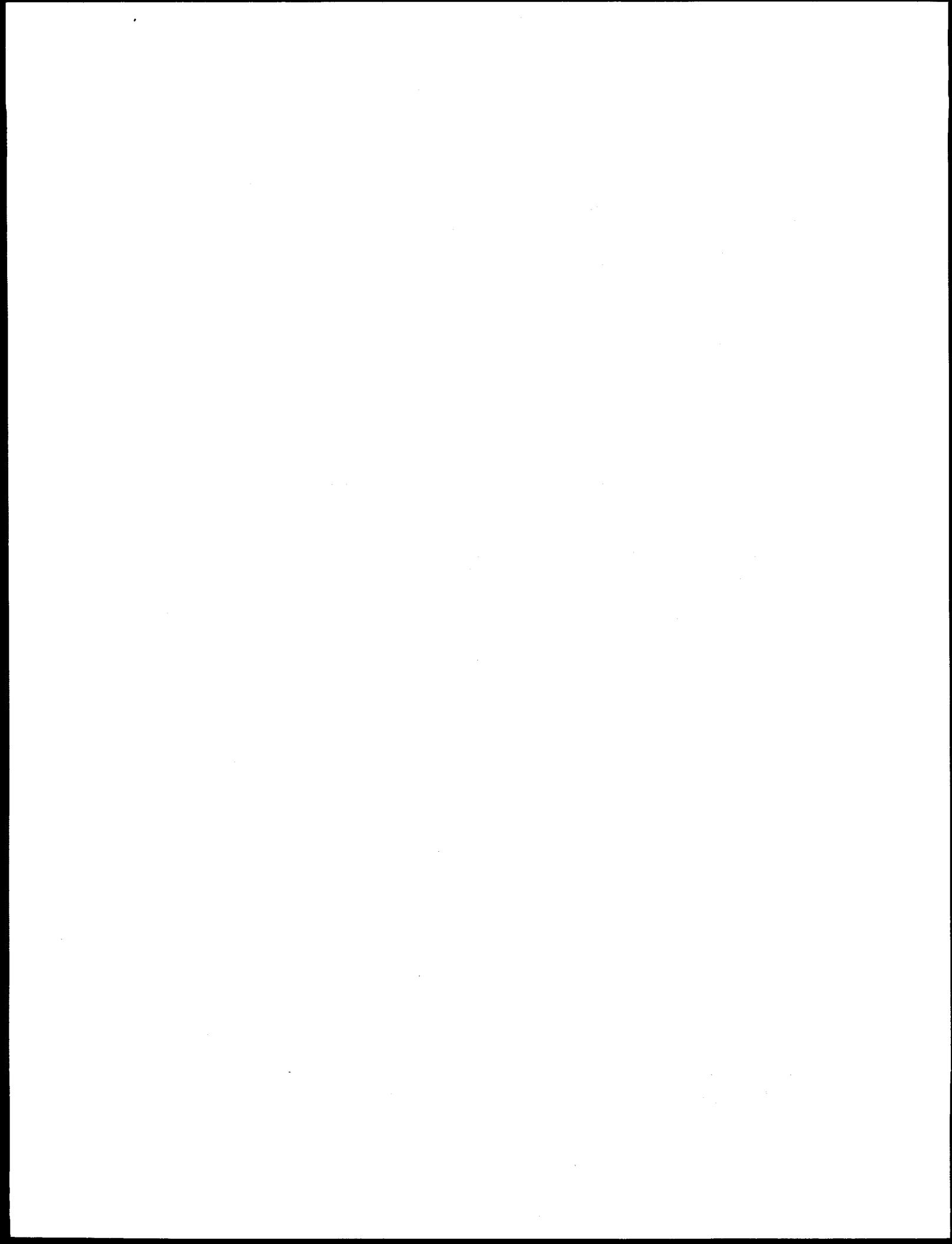
Table I.1, Dosimetry Evaluation

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 which the individual will encounter, determined using measured or manufacturer-provided data.	_____ mrem/hr	
C.	Time the hands were exposed to the unshielded source	_____ minutes/60	_____ hour
D.	Expected extremity dose rate which 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	
Formula: (_____ #hours in Row A) x (_____ mrem/hr in Row B) = (_____ estimated mrem) x (_____ # of clean 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 clean and lubrications conducted each year) = _____ mrem **Extremity Dose Equivalent			
*Whole Body Dose Equivalent <i>less than</i> 500 mrem requires no dosimetry			
**Extremity Dose Equivalent <i>less than</i> 5000 mrem requires no dosimetry			



Appendix I, Part 2

**Guidance for Demonstrating that
Individual Members of the Public will not
Receive Doses Exceeding
the Allowable Limits**



Licensees must ensure that:

- The radiation dose received by individual members of the public does not exceed 1 millisievert (1 mSv) [100 millirems (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 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.

- 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, and nonradioactive equipment storage areas. 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 or a combination of calculations and measurements (e.g., using an environmental *TLD*) are often used to prove compliance.

CALCULATIONAL METHOD²

The calculational method takes a tiered approach, going through 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 Sealed Source & Device (SSD) Registration Sheet 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 the calculational 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 portion 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

²For 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.

through Part 1 or Part 2. The results of these calculations typically result in higher radiation levels than would exist at typical facilities, but provide a method for estimating conservative doses which 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 Radiation Safety Officer (RSO), to determine if the company is complying with *NRC*'s regulations.

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

A Bird's Eye View of Office and Gauge Storage Area

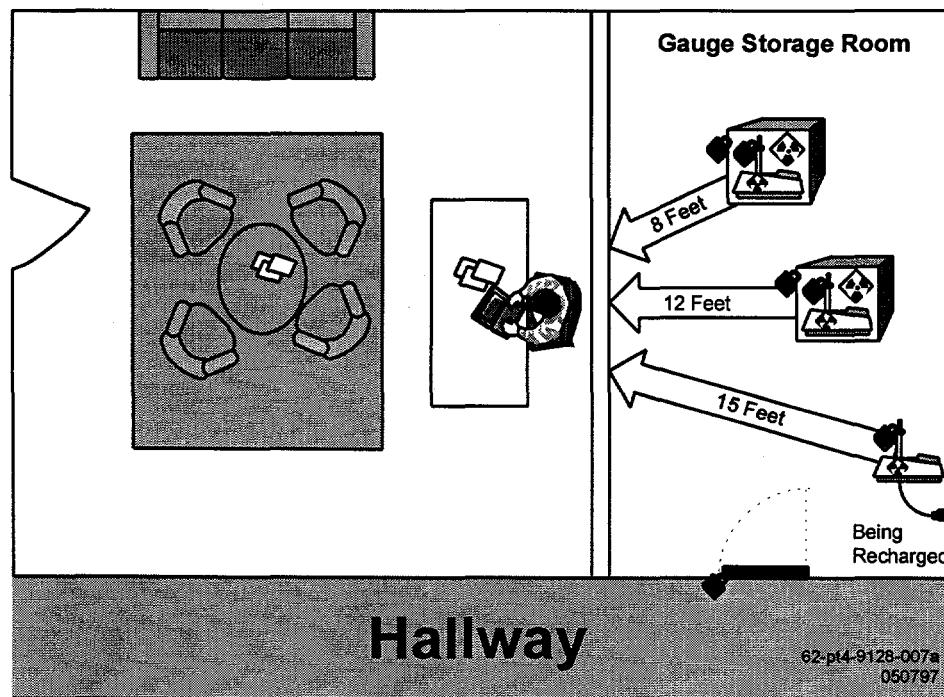


Figure I-1, Diagram of Office and Gauge Storage Area. This sketch shows the areas described in Examples 1 and 2.

Table I.2, Information Known about Each Gauge

DESCRIPTION OF KNOWN INFORMATION	GAUGE 1	GAUGE 2	GAUGE 3
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 ft 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*. So, taking a "worst case" approach, he assumes: 1) the gauges are constantly present (i.e., 24 hr/d), 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 hr/d). Joe proceeds to calculate the dose she might receive hourly and yearly from each gauge as shown in Tables I-3, I-4, and I-5 below.

Table I.3, Calculational Method, Part 1—Hourly and Annual Dose Received from Gauge 1

		GAUGE 1	
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 ²	(1) ²	1
3	Square of the distance (ft) from the gauge to the secretary's desk in an unrestricted area, in ft ²	(8) ²	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 hr/d x 365 d/yr = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGE 1 , in mrem in a year	0.031 x 24 x 365 = 0.031 x 8760 = 272	

Table I.4, Calculational Method, Part 1—Hourly and Annual Dose Received from Gauge 2

		GAUGE 2	
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	8	8
2	Square of the distance (ft) at which the Step 1 rate was measured, in ft ²	(1) ²	1
3	Square of the distance (ft) from the gauge to the secretary's desk in an unrestricted area, in ft ²	(12) ²	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 hr/d x 365 d/yr = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGE 2 , in mrem in a year	0.056 x 24 x 365 = 0.056 x 8760 = 491	

Table I.5, Calculational Method, Part 1—Hourly and Annual Dose Received from Gauge 3

		GAUGE 3	
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 ²	(3) ²	9
3	Square of the distance (ft) from the gauge to the secretary's desk in an unrestricted area, in ft ²	(15) ²	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 hr/d x 365 d/yr = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGE 3 , in mrem in a year	0.08 x 24 x 365 = 0.08 x 8760 = 701	

To determine the total hourly and total annual dose received, Joe adds the pertinent data from the preceding tables.

Table I.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 I-3, I-4, and I-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 I-3, I-4, and I-5, in mrem in a year	272	491	701	272 + 491 + 701 = 1464

NOTE: The Sum in Step 7 demonstrates compliance with the 2 mrem in any one hour limit. 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 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 hr/d. 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 (i.e., 24 hr/d), all three gauges remain in storage with no other use). He then recalculates the annual dose received.

Table I.7, Calculational Method, Part 2—Annual Dose Received from Gauges 1, 2, and 3

Step No.	Description	Results
9	A. Average number of hours per day that individual spends in area of concern (e.g., secretary sits at desk 5 hr/day; the remainder 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/week)	3
	C. Average number of weeks per year in area (e.g., secretary works all year)	52
10	Multiply the results of Step 9.A. by the results of Step 9.B. by the results of Step 9.C. = 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	$0.167 \times 780 = 130$

NOTE: If Step 11 exceeds 100 mrem in a year, proceed to Part 3 of the calculational method.

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

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.

Table I.8, Calculational Method, Part 3—Summary of Information

INFORMATION ON WHEN GAUGES ARE PRESENT IN THE STORAGE AREA:			
<ul style="list-style-type: none"> • GAUGE 1: an old gauge located in the storage area continuously (24 hr/d) • GAUGE 2: a new gauge located in the storage area continuously (24 hr/d) 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			
<ul style="list-style-type: none"> • 5 hours per day • 3 days per week • 52 weeks per year 			

Table I.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 hours per day gauge is in storage while secretary is present	5	5	2
13	Average number of days per week gauge is in storage while secretary is present	3	3	3
14	Average number of weeks per year 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 actions.

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*.

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.

RECORD KEEPING: *10 CFR 20.2107* 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 2080 hours (i.e., a "work" year of 40 hr/wk for 52 wk/yr) 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 G-M 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.

Licensees may also choose to use environmental *TLDs*³ 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 I-1 and Table I-2 for information. 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 work space for 30 days. Joe chose a winter month so 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 the *TLD* received 100 mrem.

³*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 CaF₂ that are used for environmental monitoring.

Table I.10, Combination Measurement-Calculational Method

Step No.	Description	Input Data and Results
PART 1		
1	Dose received by <i>TLD</i> , in mrem	100
2	Total hours <i>TLD</i> exposed	$24 \text{ hr/d} \times 30 \text{ d/mo} = 720$
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 $365 \text{ d/yr} \times 24 \text{ hr/d} = 8760$ hours in one year = MAXIMUM ANNUAL DOSE RECEIVED FROM GAUGES , in mrem in a year	$365 \times 24 \times 0.14 = 8760 \times 0.14 = 1226$

NOTE: For the conditions described above, Step 3 indicates that the dose received in any one hour is less than the 2 mrem in any one hour limit. However, if there are any changes, then the licensee would need to reevaluate the potential doses which could be received in any one 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

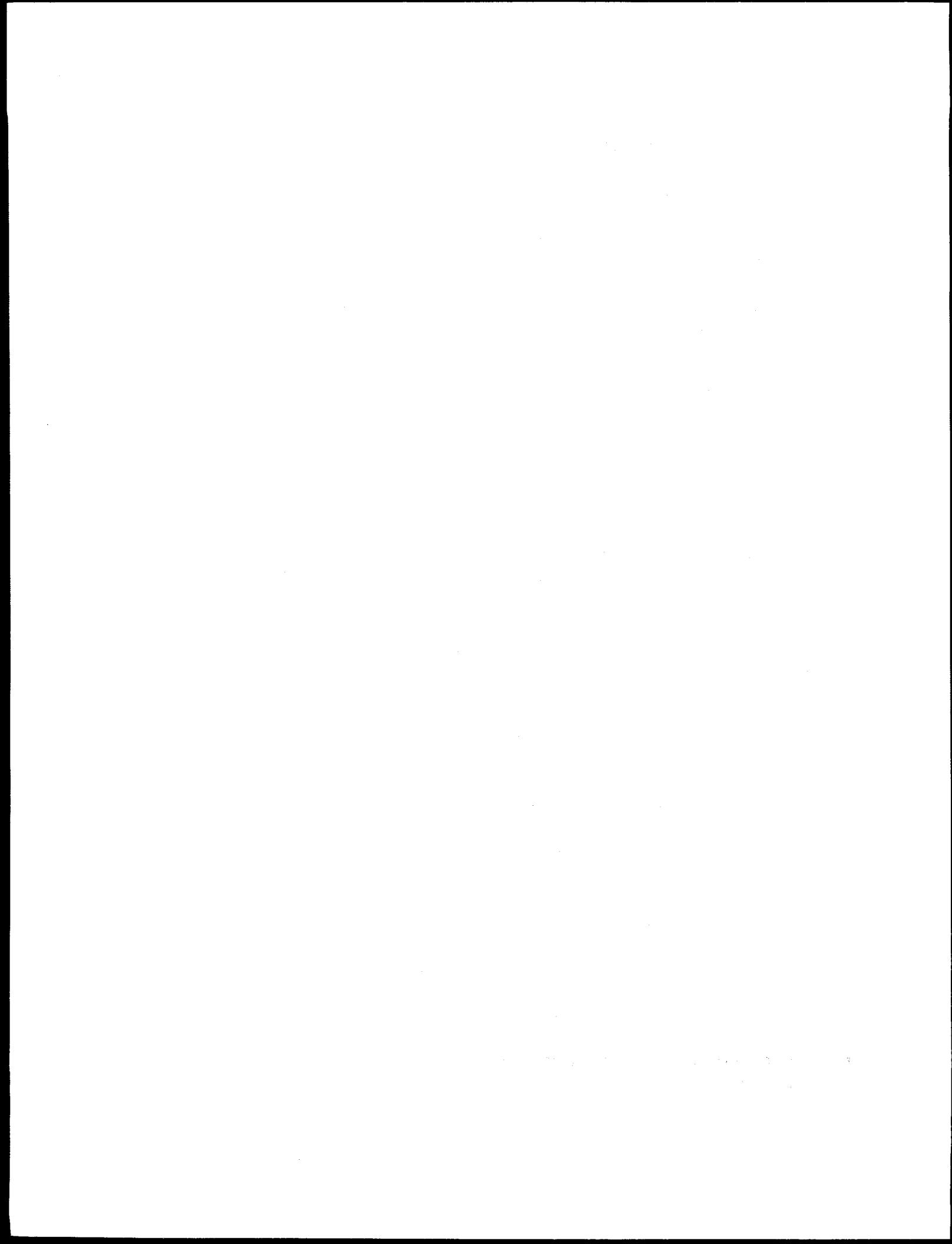
At this point Joe can adjust for a realistic estimate of the time the secretary spends in the area as he did in Part 2 of Example 1.

PART 3

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 the gauges were in storage--i.e., 24 hr/d for the 30 days that the *TLD* was in place.)

Appendix J

Requests to Perform Leak Testing and Sample Analysis



Information to be Provided Supporting Request

- Identify the individual who will make the analysis and provide his or her qualifications to make quantitative measurements of radioactivity.
- Commit to performing leak testing at the frequency specified in the appropriate SSD Registration Certificate.
- Specify how and where test samples will be taken on the gauge. Describe materials used and methods of handling samples to prevent or minimize exposure to personnel.
- Specify the type of instrument(s) that will be used for measurement, the counting efficiency, and minimum levels of detection for each radionuclide to be measured.

Note: An instrument capable of making quantitative measurements should be used; hand-held survey meters will not normally be considered adequate for measurements.

- Specify the standard sources used to calibrate the instrument; for each, specify the radionuclide, quantity, accuracy, and traceability to primary radiation standards.

Note: Accuracy of standards should be within $\pm 5\%$ of the stated value and traceable to a primary radiation standard such as those maintained by the National Institutes of Standards and Technology (NIST).

- Include a sample calculation for conversion of the measurement data to becquerels (or microcuries).
- Provide instructions on actions to take and persons to be notified if sources are found to be leaking.

Model Procedure for Performing Leak Testing and Analysis

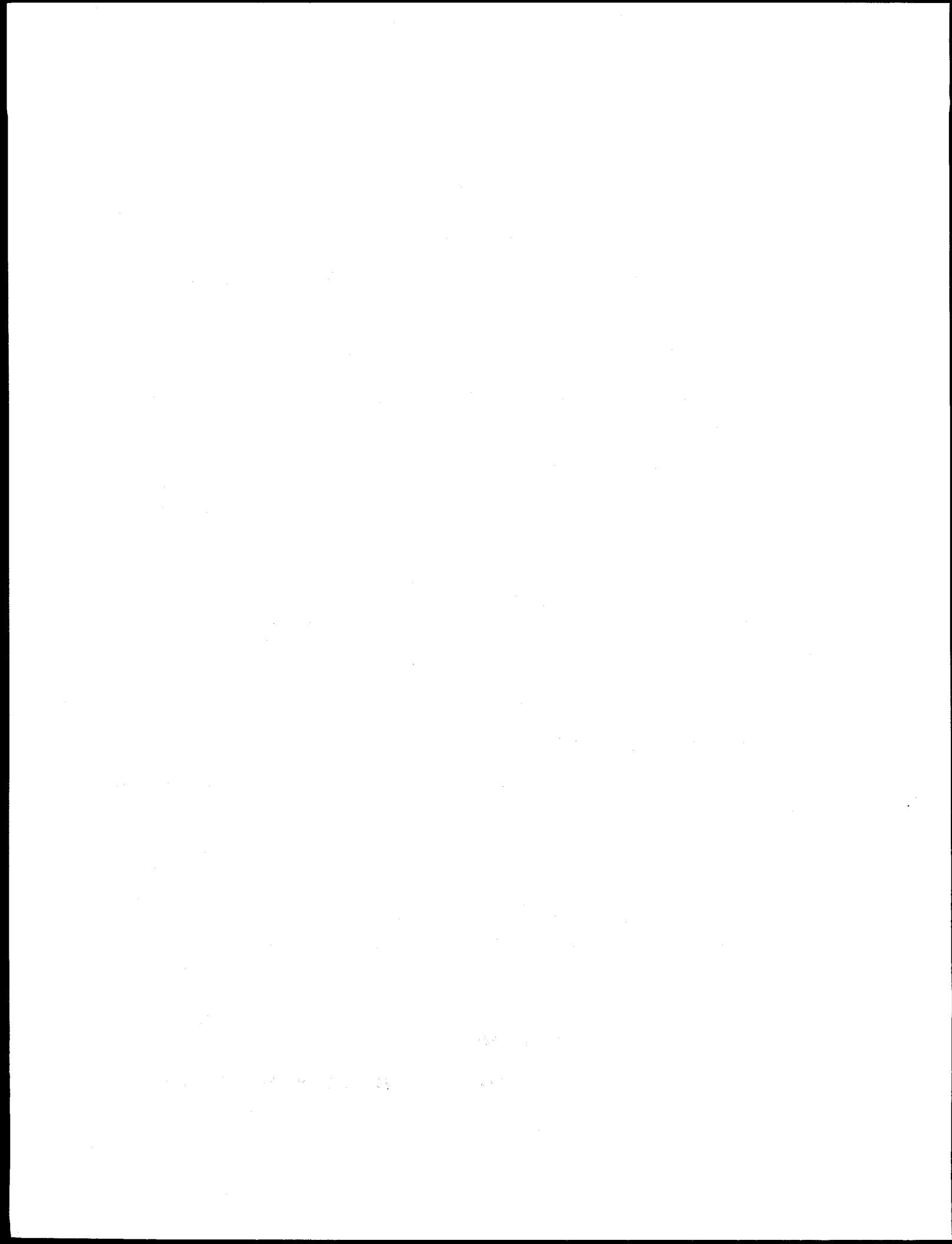
- For each source to be tested, list identifying information such as gauge serial number, radionuclide, activity.
- If available, use a survey meter to monitor exposure.
- Prepare a separate wipe sample (e.g., cotton swab or filter paper) for each source.
- Number each wipe to correlate with identifying information for each source.
- Wipe the most accessible area where contamination would accumulate if the sealed source were leaking.

APPENDIX J

- Using the instrument identified to, and approved by, *NRC*, count and record background count rate.
- Check the instrument's counting efficiency using standard source of the same radionuclide as the source being tested or one with similar energy characteristics. Calculate efficiency.
- Count each wipe sample; determine net count rate.
- For each sample, calculate and record estimated activity in becquerels (or microcuries).
- Sign and date the list of sources, data and calculations.
- If the wipe test activity is 185 becquerels (0.005 microcurie) or greater, notify the *RSO*, so that the source can be withdrawn from use and disposed of properly. Also notify *NRC*.

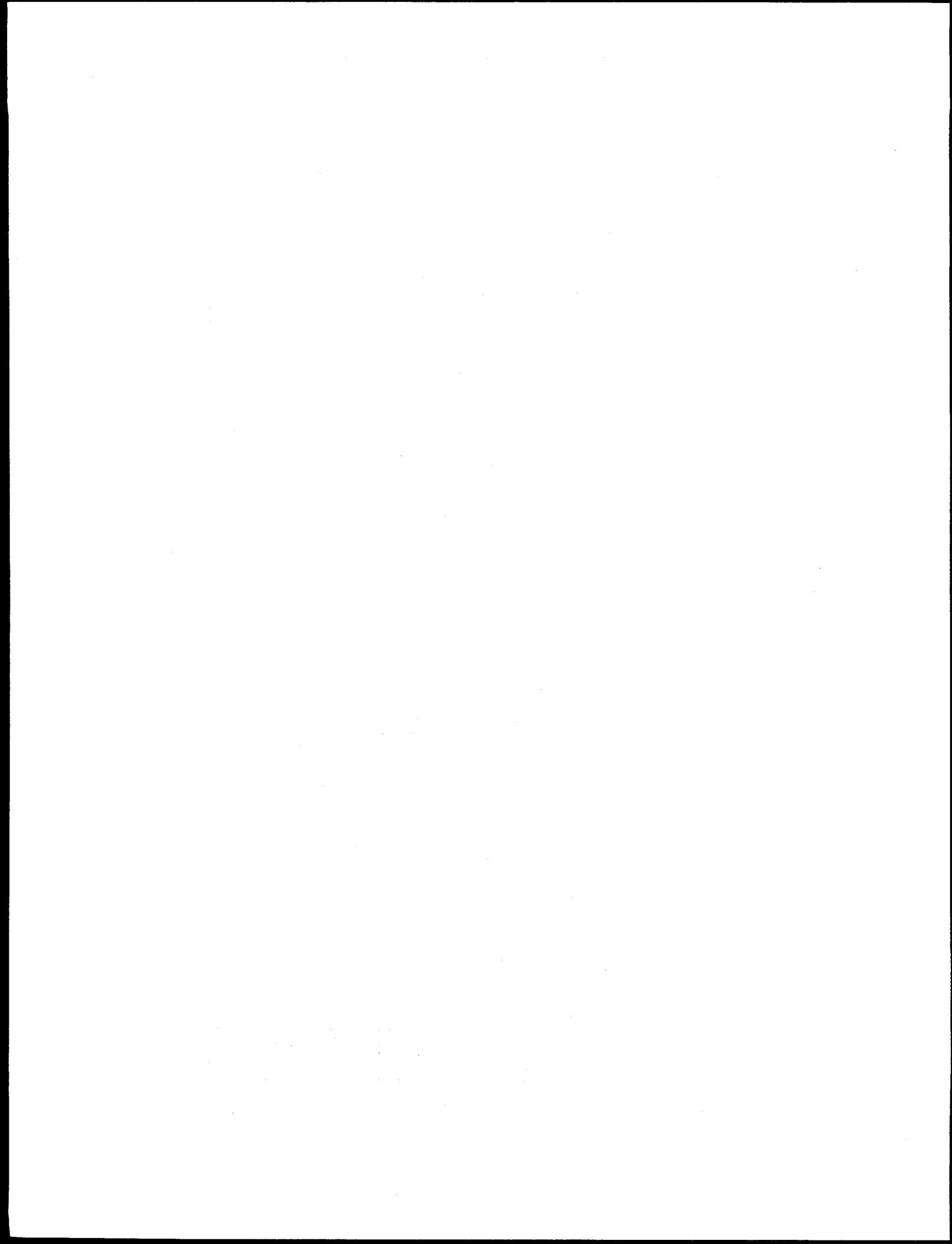
Appendix K

Major DOT Regulations; Sample Bill of Lading



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:

- Table of Hazardous Materials and Special Provisions **49 CFR 172.101**, and App. A, Table 2: Hazardous materials table, list of hazardous substances and reportable quantities
- Shipping Papers **49 CFR 172.200-204**: general entries, description, additional description requirements, shipper's certification
- Package Markings **49 CFR 172.300, 49 CFR 172.301, 49 CFR 172.303, 49 CFR 172.304, 49 CFR 172.310, 49 CFR 172.324**: General marking requirements for non-bulk packagings, prohibited marking, marking requirements, radioactive material, hazardous substances in non-bulk packaging
- Package Labeling **49 CFR 172.400, 49 CFR 172.401, 49 CFR 172.403, 49 CFR 172.406, 49 CFR 172.407, 49 CFR 172.436, 49 CFR 172.438, 49 CFR 172.440**: General labeling requirements, prohibited labeling, radioactive materials, placement of labels, specifications for radioactive labels
- Placarding of Vehicles **49 CFR 172.500, 49 CFR 172.502, 49 CFR 172.504, 49 CFR 172.506, 49 CFR 172.516, 49 CFR 172.519, 49 CFR 172.556**: Applicability, prohibited and permissive placarding, general placarding requirements, providing and affixing placards: highway, visibility and display of placards, RADIOACTIVE placard
- Emergency Response Information, Subpart G, **49 CFR 172.600, 49 CFR 172.602, 49 CFR 172.604**: Applicability and general requirements, emergency response information, emergency response telephone number
- Training, Subpart H, **49 CFR 172.702, 49 CFR 172.704**: Applicability and responsibility for training and testing, training requirements
- Radiation Protection Program for Shippers and Carriers, Subpart I, **49 CFR 172.800**, etc.
- Shippers - General Requirements for Shipments and Packaging, Subpart I, **49 CFR 173.403, 49 CFR 173.410, 49 CFR 173.412, 49 CFR 173.415, 49 CFR 173.433, 49 CFR 173.435, 49 CFR 173.441, 49 CFR 173.475, 49 CFR 173.476**: Definitions, general design requirements, additional design requirements for Type A packages, authorized Type A packages, requirement for determining A_1 and A_2 , table of A_1 and A_2 values for radionuclides, radiation level limit, quality control requirements prior to each shipment, approval of special form radioactive materials
- Carriage by Public Highway **49 CFR 177.816, 49 CFR 177.817, 49 CFR 177.834(a), 49 CFR 177.842**: Driver training, shipping paper, general requirements (secured against movement), Class 7 (radioactive) material



STRAIGHT BILL OF LADING
ORIGINAL—NOT NEGOTIABLE

Appendix K

Shipper No. _____

Carrier No. _____

Page 1 of 1

(Name of carrier)

(SCAC)

Date _____

TO: Builders, Inc. ** Consignee On Collect on Delivery shipments, the letters "COD" must appear before consignee's name or as otherwise provided in Item 430, Sec. 1.		FROM: Shipper Moisture Density Measurements, Inc. ** 1234 A Street, NW ** Street Origin
Street 5678 Jefferson Davis Highway ** Destination Arlington, VA** Zip Code 22222** Route		Washington, DC 20000** Vehicle Number
No. of Units & Container Type HM	BASIC DESCRIPTION Proper Shipping Name, Hazard Class Identification Number (UN or NA) per 172.101, 172.202, 172.203 n.o.s. 7 UN2974 0.41GBq (11 mCi) Cs-137 and 1.9GBq (50 mCi) Am-241:Be (61 mCi) RADIOACTIVE - YELLOW II TI = 0.4 ** USDOT 7A TYPE A Emergency Response Telephone No.: 1-800-000-0000 (24 hr/d) ** ** SUBSTITUTE APPROPRIATE INFORMATION FOR YOUR GAUGE AND YOUR SHIPMENT	TOTAL QUANTITY (Weight, Volume, Gallons, etc.) WEIGHT (Subject to Correction) RATE CHARGES (For Carrier Use Only)

PLACARDS TENDERED: YES NO

REMIT
C.O.D. TO:
ADDRESS

COD

Amt: \$

C.O.D. FEE:
PREPAID \$
COLLECT \$

TOTAL CHARGES: \$

FREIGHT CHARGES

FREIGHT PREPAID **COLLECT**

Check box if charges are to be collected

Note — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

\$ _____ per _____

I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked and labeled, and are in all respects in proper condition for transport by **Rail** = **Highway** = **Water** (DELETE NON-APPLICABLE MODE OF TRANSPORT) according to applicable international and national governmental regulations.

John Jones
Signature

Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consigner)

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of

said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER

CARRIER

PER

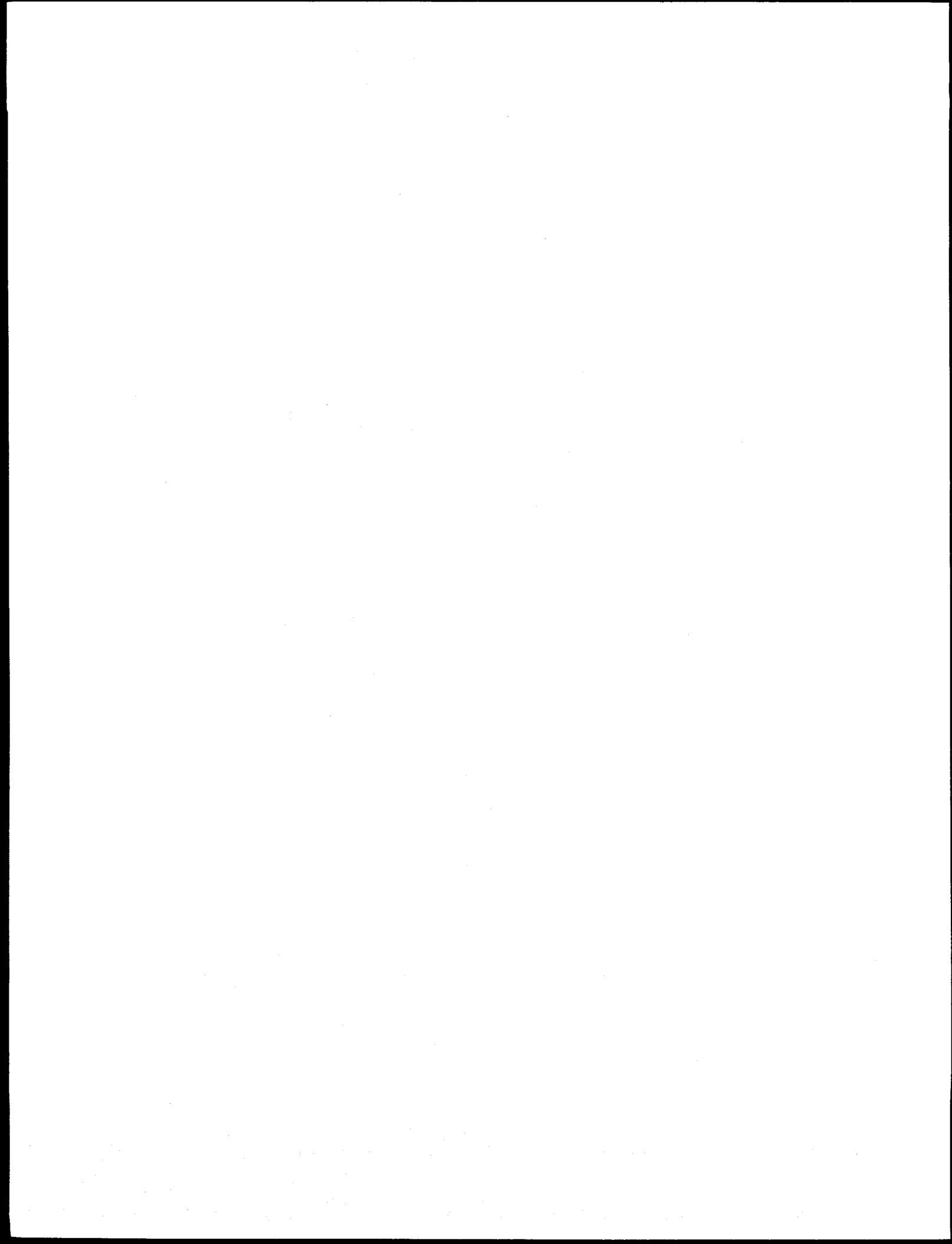
PER

DATE

1

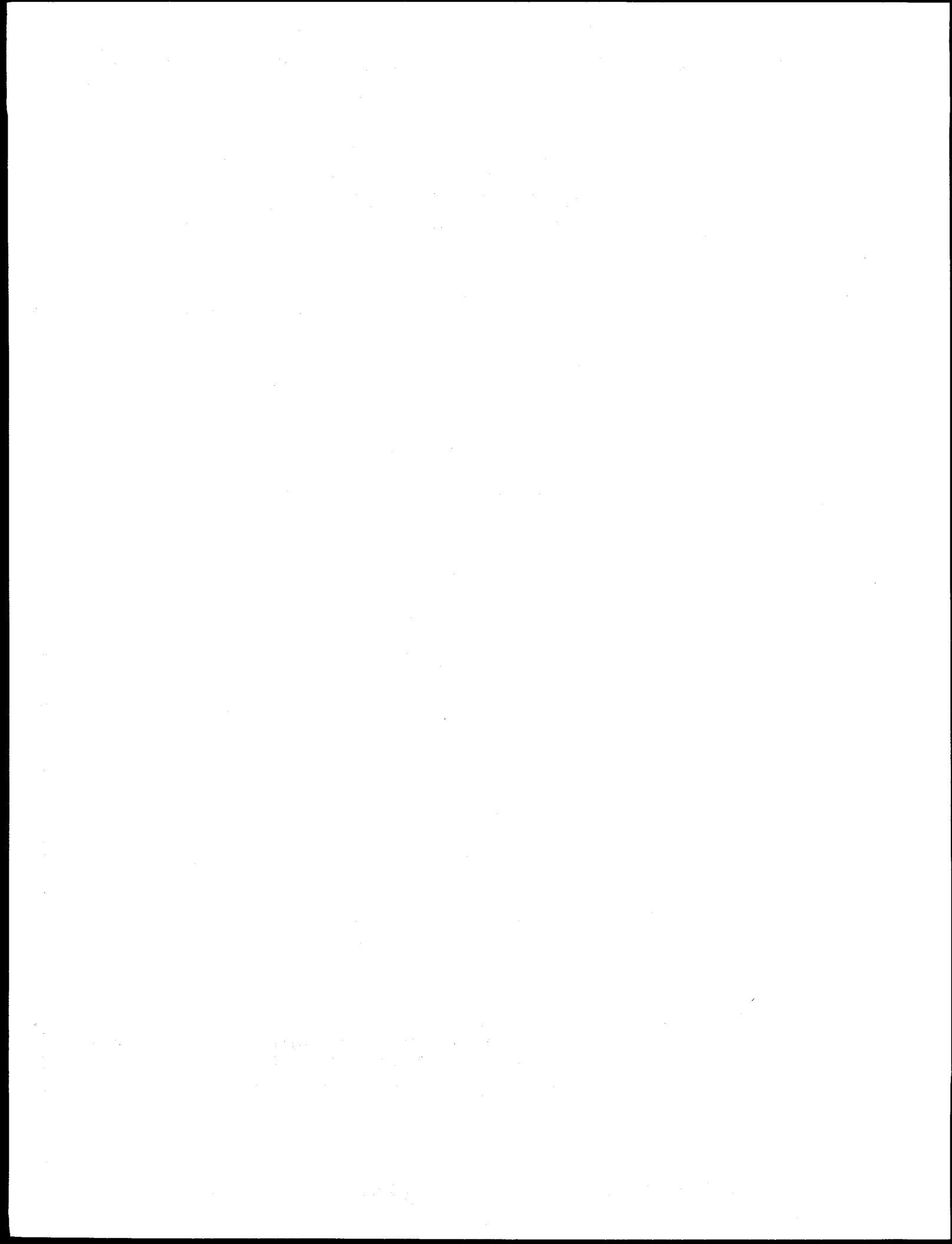
Permanent post-office address of shipper:

STYLE F65 LABELMASTER, Div. of American Labelmark Co., Chicago, IL 60646 312/478-0900



Appendix L

Sample Portable Gauge License



MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		In accordance with application dated May 1, 1997,	
1. Moisture Density Measurements, Inc. 2. 1234 A Street, NW Washington, DC 20001		3. License Number	08-00000-00
		4. Expiration Date	(Insert a date, last day of the month. 10 years after issuance date)
		5. Docket or Reference No	030-00000
6. Byproduct, Source, and/or Special Nuclear Material		7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
A. Cesium-137		A. Sealed sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible portable gauging device as specified in Item 9 of this license	A. No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State
B. Americium-241		B. Sealed neutron sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible portable gauging device as specified in Item 9 of this license	B. No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State

NOTE: IF OTHER ISOTOPES ARE REQUESTED, USE THE ABOVE FORMAT FOR EACH AUTHORIZED ISOTOPE.

9. Authorized Use

A. and B. To be used, for measuring physical properties of materials, in portable gauging devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with an NRC or Agreement State specific license authorizing distribution to persons specifically authorized by an NRC or Agreement State license to receive, possess, and use the devices.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number	08-00000-00
Docket or Reference Number	030-00000

CONDITIONS

10. Licensed material may be used or stored at the licensee's facilities located at (insert addresses specified by applicant) and may be used at temporary jobsites of the licensee anywhere in the United States where the U. S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material. (This condition is used on licenses issued to non-Federal entities.)

OR

Licensed material may be used or stored at the licensee's facilities located at (insert addresses specified by applicant) and may be used at temporary jobsites anywhere in the United States. (This condition is used on licenses issued to Federal agencies.)

11. Licensed material shall only be used by, or under the supervision and in the physical presence of, individuals who have received the training described in (letter, application) dated (fill in date).

12. The Radiation Safety Officer (RSO) for this license is (insert name of RSO). (This condition is used on licenses where NRC reviews the qualifications of the RSO on a case-by-case basis; licensee pays amendment fees to change RSO.)

12. A. The Radiation Safety Officer (RSO) for this license is (insert name of RSO).
 B. Before assuming the duties and responsibilities as RSO for this license and before obtaining licensed material, (insert name of RSO) shall have successfully completed one of the training courses described in Criteria in Section 8.8 of NUREG-1556, Volume 1, dated INSERT CORRECT DATE. (This condition is used on licenses where the licensee has committed to the language in NUREG-1556, Vol. 1 and no technical review would be needed for change of RSO, so no amendment fee would be charged.)

13. A. Sealed sources shall be tested for leakage and/or contamination at intervals not to exceed the intervals specified in the certificate of registration issued by NRC under 10 CFR 32.210 or by an Agreement State.
 B. In the absence of a certificate from a transferor indicating that a leak test has been made within the intervals specified in the certificate of registration issued by NRC under 10 CFR 32.210 or by an Agreement State prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
 C. Sealed sources need not be tested if they are in storage and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

NRC FORM 374A
(7-94)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE
SUPPLEMENTARY SHEET

PAGE 3 OF 5 PAGES

License Number

08-00000-00

Docket or Reference Number

030-00000

CONDITIONS

(Continued)

D. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U. S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50 (b)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region insert appropriate Region and address. The report shall specify the source involved, the test results, and corrective action taken.

E. Tests for leakage and/or contamination shall be performed by persons specifically licensed by the Commission or an Agreement State to perform such services. In addition, the licensee is authorized to collect leak test samples but not perform the analysis; analysis of leak test samples must be performed by persons specifically licensed by the Commission or an Agreement State to perform such services. (This condition is used for licensees NOT authorized to perform leak test analysis.)

E. Tests for leakage and/or contamination shall be performed by the licensee or other persons specifically licensed by the Commission or an Agreement State to perform such services. In addition, the licensee is authorized to collect leak test samples for analysis by persons specifically licensed by the Commission or an Agreement State to perform such services. (This condition is used for licensees authorized to collect AND analyze leak test samples.)

14. Sealed sources or source rods containing licensed material shall not be opened or sources removed or detached from source rods or gauges by the licensee, except as specifically authorized.

15. The licensee shall conduct a physical inventory every 6 months, or at other interval approved by NRC, to account for all sources and/or devices received and possessed under the license.

16. Each portable gauge shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The gauge or its container must be locked when in transport, storage, or when not under the direct surveillance of an authorized user.

17. Except for maintaining labeling as required by 10 CFR Part 20 or 71, the licensee shall obtain authorization from NRC before making any changes in the sealed source, device, or source-device combination that would alter the description or specifications as indicated in the respective Certificates of Registration issued either by the Commission pursuant to 10 CFR 32.210 or by an Agreement State.

18. Any cleaning, maintenance, or repair of the gauges that requires detaching the source or source rod from the gauge shall be performed only by the manufacturer or

NRC FORM 374A (7-94)	U.S. NUCLEAR REGULATORY COMMISSION	PAGE 4 OF 5 PAGES
		License Number 08-00000-00
		Docket or Reference Number 030-00000

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

CONDITIONS

(Continued)

other persons specifically licensed by the Commission or an Agreement State to perform such services. [This condition is used if the licensee is not authorized to perform non-routine maintenance.]

OR

The licensee may detach the source or source rod from gauges for the purpose of cleaning, maintenance, or repair of the gauge(s) in accordance with procedures outlined in (letter, application) dated (fill in date). [This condition is used if the licensee is authorized to perform non-routine maintenance.]

19. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

20. The licensee may not possess and use materials authorized in Items 6, 7, and 8, until:

- The licensee has constructed the facilities and obtained the equipment described in the application and supporting documentation; and
- The licensee has notified the U. S. Nuclear Regulatory Commission, Region (insert Region number and address), that the activities authorized by the license will be initiated.

21. In accordance with the requirements set forth in 10 CFR 30.36(d), the licensee shall notify the U. S. Nuclear Regulatory Commission, Region (insert Region number and address), in writing, of a decision not to complete the facility, acquire equipment, or possess and use authorized material.

22. A. If the licensee uses unshielded sealed sources extended more than 3 feet below the surface, the licensee shall use surface casing that extends from the lowest depth to 12 inches above the surface and other appropriate procedures to reduce the probability of the source or probe becoming lodged below the surface. If it is not feasible to extend the casing 12 inches above the surface, the licensee shall implement procedures to ensure that the cased hole is free of obstruction before making measurements.

B. If a sealed source or a probe containing sealed sources becomes lodged below the surface and it becomes apparent that efforts to recover the sealed source or probe may not be successful, the licensee shall notify the U. S. Nuclear Regulatory Commission and submit the report required by 10 CFR 30.50(b)(2) and (c). The licensee shall not abandon the sealed source or probe without obtaining the Commission's prior written consent.

23. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance. (Do NOT use this license condition if applicant provides evidence of financial assurance.)

NRC FORM 374A
(7-94)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE
SUPPLEMENTARY SHEET

	PAGE 5 OF 5 PAGES
License Number	08-00000-00
Docket or Reference Number	030-00000

CONDITIONS

(Continued)

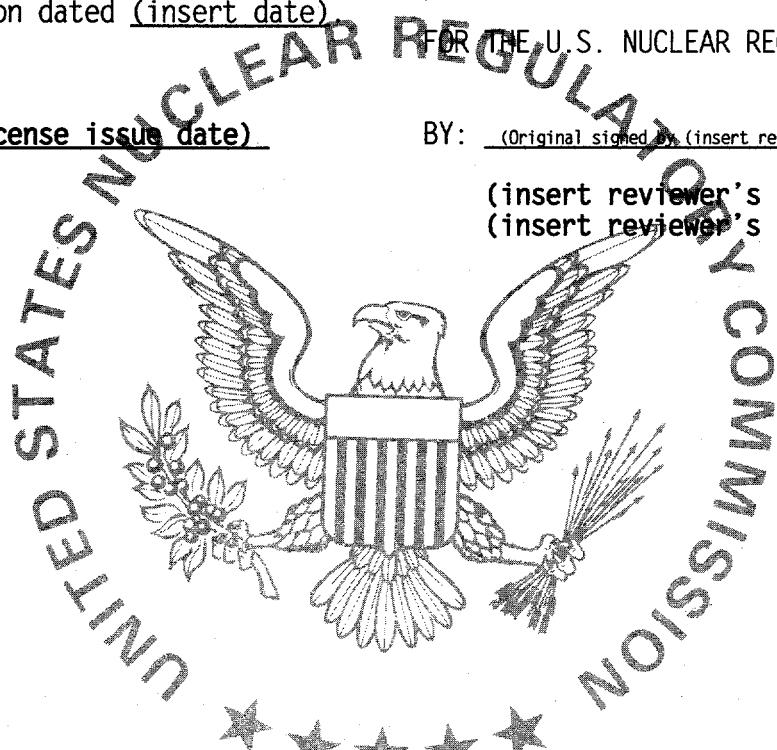
24. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated (insert date)

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

DATE: (insert license issue date)BY: (Original signed by (insert reviewer's name))

(insert reviewer's name)
(insert reviewer's NRC address)



Appendix M

Review Checklist for Portable Gauge Application

ITEM 1: ACTION TYPE

ACTION TYPE:	ADMINISTRATIVE REVIEW:
<input type="checkbox"/> New	<input type="checkbox"/> Current Guidance Used
<input type="checkbox"/> Amendment	<input type="checkbox"/> References in Application Based On Current Regulations
<input type="checkbox"/> Renewal	<input type="checkbox"/> All Attachments Referenced Included
	<input type="checkbox"/> Signature on Application

ITEM 2: LEGAL IDENTITY

NAME:	
-------	--

ITEMS 2 & 3: ADDRESS

STORAGE & LOCATION OF USE ADDRESS:	MAILING ADDRESS:
Temporary Job Sites <input type="checkbox"/> YES <input type="checkbox"/> NO	

ITEM 4: PERSON TO BE CONTACTED ABOUT THIS APPLICATION

CONTACT PERSON:	
TELEPHONE NUMBER:	

ITEMS 5 AND 6: MATERIAL TO BE POSSESSED AND USES

YES	NO	RADIOISOTOPE	MFG./MODEL NO.	QUANTITY	MOST COMMON USE	SPECIFY OTHER USES NOT LISTED ON SSD CERTIFICATE
		Cesium-137	Sealed sources in compatible gauges as specified in Sealed Source & Device Registration Sheet	Not to exceed maximum activity per source as specified in Sealed Source & Device Registration Sheet	Measure Physical Properties of Materials	<input type="checkbox"/> Not applicable <input type="checkbox"/> Uses are:
		Americium-241	Sealed neutron sources in compatible gauges as specified in Sealed Source & Device Registration Sheet	Not to exceed maximum activity per source as specified in Sealed Source & Device Registration Sheet	Measure Physical Properties of Materials	<input type="checkbox"/> Not applicable <input type="checkbox"/> Uses are:
		Californium-252	Sealed neutron sources in compatible gauges as specified in Sealed Source & Device Registration Sheet	Not to exceed maximum activity per source as specified in Sealed Source & Device Registration Sheet	Measure Physical Properties of Materials	<input type="checkbox"/> Not applicable <input type="checkbox"/> Uses are:
		Other (specify)				
<u>FINANCIAL ASSURANCE REQUIRED AND EVIDENCE OF FINANCIAL ASSURANCE PROVIDED</u>						

ITEMS 7 THROUGH 11: TRAINING AND EXPERIENCE, FACILITIES AND EQUIPMENT, RADIATION SAFETY PROGRAM, AND WASTE MANAGEMENT

ITEM NUMBER AND TITLE	SUGGESTED RESPONSE	APPLICANT'S RESPONSE			
		YES	NO	OTHER	
				YES	NO
ITEM 7 INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE - RADIATION SAFETY OFFICER NAME _____	<p>Before obtaining licensed materials, the proposed <i>RSO</i> will have successfully completed one of the training courses described in Criteria in the section entitled "Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer" in NUREG-1556, Vol. 1, dated May 1997.</p> <p>AND</p> <p>Before being named as the <i>RSO</i>, future <i>RSOs</i> will have successfully completed one of the training courses described in Criteria in the section entitled "Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer" in NUREG-1556, Vol. 1, dated May 1997.</p> <p><i>Optional Response</i></p> <p>Criteria for Acceptable Training Courses for Radiation Safety Officer/Portable Gauge Users</p> <p>Course Content</p> <ul style="list-style-type: none"> • 1.5-2 hours of radiation safety and regulatory requirements • 1.5-2 hours practical explanation of gauge theory and operation (including test runs) <p>Course Examination</p> <ul style="list-style-type: none"> • 25- to 50-question written (closed book) test -- 70 percent grade <p>Course Instructor Qualifications</p> <ul style="list-style-type: none"> • Bachelor's degree in a physical or life science or engineering with successful completion of both a portable gauge user course and 8-hour radiation safety course and 8 hours hands-on experience with portable gauges. <p>OR</p>				

ITEM NUMBER AND TITLE	SUGGESTED RESPONSE	APPLICANT'S RESPONSE			
		YES	NO	OTHER	
		YES	NO		
ITEM 7 (CONTINUED)	<ul style="list-style-type: none"> An individual with the following training: <ul style="list-style-type: none"> Successful completion of portable gauge user course Successful completion of 40-hour radiation safety course 30 hours of hands-on experience with portable gauges. 				
ITEM 8 TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS	<p>Before using licensed materials, authorized users will have successfully completed one of the training courses described in Criteria in the section entitled "Training for Individuals Working In or Frequenting Restricted Areas" in NUREG-1556, Vol. 1, dated May 1997.</p> <p><i>Optional Response</i> Review optional response against criteria listed under Item 7.</p>				
ITEM 9 FACILITIES AND EQUIPMENT	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 and Emergency Procedures."	Separate Item 9 Response Need Not Be Submitted With Application			
ITEM 10 RADIATION SAFETY PROGRAM - AUDIT PROGRAM	The applicant is <u>not</u> required to, and should not, submit its audit program to the <i>NRC</i> for review during the licensing phase	Need Not Be Submitted With Application			
ITEM 10 RADIATION SAFETY PROGRAM - TERMINATION OF ACTIVITIES	The applicant is <u>not</u> required to submit a response to the termination of activities section during the initial application. However, when the license expires or at the time the licensee ceases operations, <i>NRC Form 314</i> must be submitted.	Need Not Be Submitted With Application			

ITEM NUMBER AND TITLE	SUGGESTED RESPONSE	APPLICANT'S RESPONSE			
		YES	NO	OTHER	
				YES	NO
ITEM 10 RADIATION SAFETY PROGRAM - INSTRUMENTS	<p>We will either possess and use, or have access to and use, a radiation survey meter that meets the Criteria in the section entitled "Radiation Safety Program - Instruments" in NUREG-1556, Vol. 1, dated May 1997, in the event of an incident.</p> <p><i>Optional Response</i></p> <p>A radiation survey meter should satisfy the following criteria:</p> <ul style="list-style-type: none"> • Be capable of detecting gamma radiation • Be checked for functionality before use 				
ITEM 10 RADIATION SAFETY PROGRAM - MATERIAL RECEIPT AND ACCOUNTABILITY	<p>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.</p> <p><i>Optional Response</i></p> <p>Frequency and procedures to ensure: no gauge lost, stolen or misplaced, and if possession exceeds threshold, comply with financial assurance requirements in 10 CFR 30.35.</p>				
ITEM 10 RADIATION SAFETY PROGRAM - OCCUPATIONAL DOSIMETRY	<p>Either we will maintain, for inspection by NRC, documentation demonstrating that unmonitored individuals are not likely to receive a radiation dose in excess of 10% of the allowable limits in 10 CFR Part 20 or we will provide dosimetry processed and evaluated by a NVLAP-approved processor that is exchanged at a frequency recommended by the processor.</p> <p><i>Optional Response</i></p> <p>Alternative response demonstrates compliance with 10 CFR Part 20 requirements.</p>				
ITEM 10 RADIATION SAFETY PROGRAM - PUBLIC DOSE	The applicant is <u>not</u> required to submit a response to public dose section during the licensing phase. This matter will be examined during an inspection.	Need Not Be Submitted With Application			

ITEM NUMBER AND TITLE	SUGGESTED RESPONSE	APPLICANT'S RESPONSE			
		YES	NO	OTHER	
		YES	NO		
ITEM 10 RADIATION SAFETY PROGRAM - OPERATING & EMERGENCY PROCEDURES	<p>We will implement and maintain the operating and emergency procedures in <i>Appendix H</i> of NUREG-1556, Vol. 1, dated May 1997 and provide copies of these procedures to all gauge users and at each job site.</p> <p>OR</p> <p>Operating and emergency procedures will be developed, implemented, and maintained and will meet the criteria in the section entitled "Radiation Safety Program - Operating and Emergency Procedures" in NUREG-1556, Vol. 1, dated May 1997.</p> <p><u>Optional Response</u></p> <ul style="list-style-type: none"> • Instructions to use gauge and perform routine maintenance per manufacturer's recommendations and instructions • Instructions to maintain security during storage and transportation • Instructions to keep the gauge under control and immediate surveillance during use • Steps to take to keep radiation exposures <i>ALARA</i> • 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 greater than 3 feet beneath the surface: use of surface casing or other procedures to ensure free movement of source in hole; instructions, procedures to retrieve a stuck source; <i>NRC</i> reporting requirements • Copies provided to personnel and available at each job site 				

ITEM NUMBER AND TITLE	SUGGESTED RESPONSE	APPLICANT'S RESPONSE			
		YES	NO	OTHER	
				YES	NO
ITEM 10 RADIATION SAFETY PROGRAM - LEAK TEST	<p>Leak tests will be performed at intervals approved by the <i>NRC</i> or an Agreement State and specified in the Sealed Source and Device Registration Sheet. Leak tests will be performed by an organization authorized by <i>NRC</i> or an Agreement State to provide leak testing services for other licensees or using a leak test kit supplied by an organization authorized by <i>NRC</i> or an Agreement State to provide leak test kits to other licensees and according to the kit supplier's instructions.</p> <p><i>Optional Response</i></p> <p>Provide the information in <i>Appendix J</i> supporting a request to perform leak testing and sample analysis:</p> <ul style="list-style-type: none"> • Individual who will make the analysis; qualifications to make quantitative measurements • Leak test frequency as specified in the appropriate Sealed Source and Device Registration Sheet. • How and where test samples taken; materials to be used; methods of handling samples to prevent or minimize exposure to personnel. • Type of instrument(s) used, counting efficiency, and minimum levels of detection for each radionuclide <p><i>Note: An instrument capable of making quantitative measurements should be used; hand-held survey meters will not normally be considered adequate for measurements.</i></p> <ul style="list-style-type: none"> • Standard calibration sources including for each: the radionuclide, quantity, accuracy, and traceability to primary radiation standards <p><i>Note: Accuracy of standards should be within $\pm 5\%$ of the stated value and traceable to a primary radiation standard such as those maintained by the National Institutes of Standards and Technology (NIST).</i></p> <ul style="list-style-type: none"> • Sample calculation to convert measurement data to becquerels (or microcuries) • Instructions on actions, notifications regarding leaking source 				

ITEM NUMBER AND TITLE	SUGGESTED RESPONSE	APPLICANT'S RESPONSE			
		YES	NO	OTHER	
				YES	NO
ITEM 10 RADIATION SAFETY PROGRAM - MAINTENANCE	<p><u>ROUTINE CLEANING & LUBRICATION</u></p> <p>We will implement and maintain procedures for routine maintenance of our gauges according to each manufacturer's recommendations and instructions.</p> <p><i>Optional Response</i></p> <ul style="list-style-type: none"> • Considers <i>ALARA</i> • Ensures gauge functions as designed • Ensures source integrity not compromised <p><u>NON-ROUTINE MAINTENANCE</u></p> <p>We will send the gauge to the manufacturer or other person authorized by <i>NRC</i> or an Agreement State to perform non-routine maintenance or repair operations that require the removal of the source or source rod from the gauge.</p> <p><i>Optional Response</i></p> <p>Provide the information listed in <i>Appendix G</i> supporting a request to perform non-routine maintenance in-house.</p> <ul style="list-style-type: none"> • Types of work to be performed • Who will perform maintenance, training, experience, why competent • Handling procedures: doses to public, personnel <i>ALARA</i> and reg. limits; security; posting; mfg. instructions and recommendations • Use of whole body and extremity monitoring or evaluation to demonstrate that individuals are not likely to receive greater than 10% of allowable limits • Possess survey instrument (detects gamma radiation; range 1-50 mrem/hr; annual calibration w/point source at 2 points/scale; readings within $\pm 20\%$; calibrated by <i>NRC</i>/Agreement State licensee; checked before use) • <i>10 CFR 20.1301</i> surveys (when and where instrument survey performed, records for 3 years) 				
ITEM 10 RADIATION SAFETY PROGRAM - TRANSPORTATION	The applicant is <u>not</u> required to submit a response to transportation section during the licensing process. However, this issue will be reviewed during inspection.			Need Not Be Submitted With Application	

ITEM NUMBER AND TITLE	SUGGESTED RESPONSE	APPLICANT'S RESPONSE			
		YES	NO	OTHER	
		YES	NO		
ITEM 11 WASTE DISPOSAL - GAUGE DISPOSAL & TRANSFER	The applicant is <u>not</u> required to submit a response to waste management section during the licensing process. However, the licensee should develop, implement, and maintain gauge transfer and disposal procedures in its radiation safety program.			Need Not Be Submitted With Application	

ADDENDUM

SUMMARY OF COMMENTS RECEIVED ON DRAFT NUREG-1556, VOLUME 1

On October 3, 1996, *NRC* announced in the *Federal Register* (61 FR 51729) that draft NUREG-1556, Vol. 1, was available for comment. *NRC* requested that comments be submitted within 90 days of publication of the draft report. *NRC* also mailed copies of the document to its portable gauge licensees and made the document available electronically on *NRC*'s Home Page.

During the comment period, *NRC* published another notice in the *Federal Register* (61 FR 64768) asking for volunteers to participate in a January 1997 pilot test of the document's content, format, and usefulness. Four applicants for new portable gauge licenses, one consultant (who is also an *NRC* licensee), four gauge manufacturers, and representatives of three Agreement States participated in the pilot test. At *NRC*'s request, each of the participants (and a distributor of one manufacturer's gauge) provided oral or written comments on the draft report.

Also during the comment period, an *NRC* portable gauge licensee reported a significant exposure, possibly in excess of *NRC*'s regulatory limits, to the hands of one of its gauge users. *NRC* established an Augmented Inspection Team (*AIT*) to determine the safety significance of the apparent overexposure. The *AIT* concluded that the following were root causes of the overexposure:

- the gauge user had inadequate knowledge of the gauge, radiation safety, and operating procedures, handled the gauge improperly, and performed unauthorized maintenance on the gauge;
- licensee management failed to adhere to its procedures for training gauge users;
- licensee management's oversight of its training program and daily use of the gauge was inadequate.

The team charged with addressing comments received on draft NUREG-1556, Volume 1, specifically requested comments from four *AIT* members, particularly on the issue of gauge user training.

In all, *NRC* received comments from 21 individuals, representing five gauge manufacturers or distributors, eight licensees, four Agreement States, and four *NRC* staff. All comments are available for inspection in *NRC*'s Public Document Room. Thirteen comments were specifically solicited in connection with the pilot test and four as a result of the *AIT*.

With one exception, the comments were highly favorable, with compliments on the user-friendly text and graphics. Favorable comments included the following: "reeks of common sense and logic," "when I got it, I fell in love with it," "easy to read and use," "good approach," "logical format," and "graphics worked well." One commenter stated that the document is too detailed and complex for the typical portable gauge applicant.

Commenters suggested changes (primarily editorial) in the text and graphics and also addressed the following substantive issues:

- Training: As a result of the *AIT*'s findings, the writing team revised the description of an acceptable training program to emphasize practical radiation safety and regulatory information and hands-on experience.
- Different types of gauges: Draft NUREG-1556, Volume 1, assumed a gauge design in which a Cs-137 source is extended into soil or other material to make measurements. While gauges of this design are commonly used, other designs need to be recognized. The text and graphics were revised to accommodate gauges of different designs, including recommendations to follow manufacturers' instructions for their routine use and maintenance.
- Clarification on the type of survey instrument needed: Draft NUREG-1556, Volume 1, indicated that when survey instruments are needed the meters need to be able to detect the radiation emitted by the radioactive source in the gauge. Several commenters questioned whether they need neutron detectors since many gauges contain Am-241:Be or Cf-252 neutron sources. Based on the precedent set in 10 CFR Part 39, the ruggedness of the sealed sources, and their integrity even after construction accidents, the writing team determined that a neutron detector is not needed. It concluded that an instrument sensitive to gamma radiation would be sufficient and would be typical of the type of instrument available from first responders. The text was revised accordingly.
- Public dose: Several commenters said that portable gauge licensees need more assistance in understanding how to comply with the public dose limits and the types of records that would be needed. The writing team expanded Appendix I to include a new Part 2 to explain how licensees can demonstrate compliance with the public dose limits, and included example calculations and a reminder about the need to maintain records.

The writing team accommodated commenters' suggestions to the greatest extent possible; however, some recommendations were not implemented for one or more of the following reasons.

- For those topics in an application where there is a clear regulatory requirement, *NRC* will not require an applicant, as part of its application, to confirm its intention to comply with the regulations. Thus, for example, under the topics of Audit, Public Dose, Transportation, and Waste Management, *NRC* does not require a commitment to comply with the pertinent *NRC* or *DOT* regulations.
- *NRC* is not requesting, as part of an application, information such as e-mail address or Fax number that might be helpful in communicating with an applicant. Requests for this type of information would require *OMB* clearance and will be considered the next time *NRC* requests renewal of the information collection requirements in *NRC Form 313* or seeks approval of electronic filing of applications.
- If a regulation specifies no recordkeeping or reporting requirements, *NRC* is not requiring them as license conditions. Such conditions need *OMB* clearance, which *NRC* will request in the near future.

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER
(Assigned by NRC, Add Vol., Supp., Rev.,
and Addendum Numbers, if any.)

NUREG-1556, Vol. 1

2. TITLE AND SUBTITLE

Consolidated Guidance about Materials Licenses:
Program-Specific Guidance about Portable Gauge Licenses

Final Report

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10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

As part of its redesign of the materials licensing process, NRC is consolidating and updating numerous guidance documents into a single comprehensive repository as described in NUREG-1539 and draft NUREG-1541. NUREG-1556, Vol. 1, is the first program-specific guidance developed for the new process and will serve as a template for subsequent program-specific guidance. This document is intended for use by applicants, licensees, and NRC staff and will also be available to Agreement States. This document supersedes the guidance previously found in draft Regulatory Guide DG-0008, "Applications for the Use of Sealed Sources in Portable Gauging Devices," and in NMSS Policy and Guidance Directive 2-07, "Standard Review Plan for Applications for Use of Sealed Sources in Portable Gauging Devices." This final report takes a more risk-informed, performance-based approach to licensing portable gauges, and reduces the information (amount and level of detail) needed to support an application to use these devices. It incorporates many suggestions submitted during the comment period on draft NUREG-1556, Vol. 1. When published, this final report should be used in preparing portable gauge license applications. NRC staff will use this final report in reviewing these applications.

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