

**NEW YORK STATE  
DEPARTMENT OF HEALTH  
BUREAU OF ENVIRONMENTAL RADIATION PROTECTION  
INDUSTRIAL UNIT**



**Radiation Guide 1.6**

***GUIDE FOR THE PREPARATION OF APPLICATIONS  
FOR THE USE OF SEALED SOURCES IN  
INDUSTRIAL RADIOGRAPHY***

## I. INTRODUCTION

### **APPLICATIONS THAT DO NOT FOLLOW THE FORMAT AND CONTENT OF THIS GUIDE CANNOT BE REVIEWED AND WILL BE RETURNED FOR REVISION.**

#### **A. Purpose of Guide**

This describes the type of information needed by the New York State Department of Health staff to evaluate an application for a license for the use of sealed sources in industrial radiography devices. These are devices employing radioactive sources for the purpose of examining the structure of materials by nondestructive methods.

The New York State Department of Health licenses industrial use of radioactive materials and may issue separate licenses to an individual or company for different uses of radioactive material. Industrial radiography will always be authorized in a separate license due to the particular hazard of the sources used.

The applicant should carefully study the regulations and this guide, and should submit all information requested. The Department will request additional information when necessary to provide reasonable assurance that the applicant has established an adequate radiation safety program. However, such requests will delay final action on the application. Compliance with commitments made in the application will be evaluated during periodic unannounced inspections and failure to implement commitments may be grounds for suspension or revocation of the license.

#### **B. Applicable Regulations**

The New York State Department of Health issues licenses for the use of radioactive materials under the regulations of Part 38 of Title 12 NYCRR. The statutory authority for the rules and regulations is found in the General Business Law, Section 483; and Labor Law, Section 27.

Since this guide refers frequently to the Department's regulations for industrial radiography, we have prepared an indexed version of section 38.34 of Code Rule 38 for your convenience and a copy is included with this guide.

#### **C. As Low As Is Reasonably Achievable (ALARA)**

Part 38 requires that persons who operate or permit the operation of radiation installations shall make every effort to maintain radiation exposures and releases of radioactive material as far below the limits of Part 38 as is reasonably achievable. License applicants must give consideration to the ALARA philosophy in the development of plans for work with radioactive materials.

## II. FILING AN APPLICATION

A license application for a specific license to possess and use radioactive material in industrial radiography should be submitted on Form DOSH 236, Application For Radioactive Materials License. The applicant should complete all required items on the application form in sufficient detail for the application review staff to determine that the applicant's equipment, facilities, personnel training and qualifications, and radiation protection program are adequate to protect health and minimize danger to life and property.

Since the space provided on Form DOSH 236 is limited, the applicant should append separate sheets of paper for item 6 and items 11-15 listed in the form. Each separate sheet should contain the item number and the application date in the lower right corner. When completely filled out, Form DOSH 236 should be signed and dated by the Chief Executive Officer (CEO) of the company or a person authorized to sign such documents for the CEO.

One copy of the application, with all attachments, should be retained by the applicant, since the license will require as a condition that the licensee follow the statements and representations set forth in the application and any supplement to it. The original and one copy should be mailed to:

**New York State Department of Health,  
Bureau of Environmental Radiation Protection  
Industrial Unit  
Flanigan Square  
547 River Street  
Troy, New York 12180-2216**

Applications received without fees will not be processed and the fee is non-refundable.

### III. CONTENTS OF AN APPLICATION

The following paragraphs explain the information requested on Form DOSH-236

Item 1.

Enter the name and corporate address of the applicant and the telephone number of company management. The name of the firm must appear exactly as it appears on legal papers authorizing the conduct of business.

Item 2A & B

List all addresses and locations where radioactive material will be used or stored, if other than that in Item 1. A post office box number should not be stated as the address for a place of use. These addresses and locations will become part of the license conditions, if the license application is approved, and the addresses of locations at which radioactive materials are located or stored may not be changed without obtaining a license amendment. All locations of use must be zoned for commercial or industrial use. Indicate if sources are to be used at temporary jobsite.

Item 3.

Enter the nature of the business the applicant is engaged in and the name and telephone number (including area code) of the individual to be contacted in connection with this application.

Item 4.

Enter the license number of any previous or current licenses authorizing use of radioactive materials (including General Licenses) and the name of the issuing agency. If a license has ever been suspended or revoked, describe the circumstances on additional sheets. Indicate whether this is an application for a new license, or a renewal in one of the appropriate box above Item 1 on the application form. Also indicate the radiation guide number used with the application.

**ITEMS 5 THRU 17 MUST BE SUBMITTED ON SEPARATE 8 1/2" X 11" SHEETS. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THIS GUIDE.**

Items 5, 6, & 7.

List the department(s), and all individuals who will use or directly supervise the use of radioactive material (the radiation safety officer and all industrial radiographers).

**A. Radiation Safety Officer**

State the name and title of the person designated by, and responsible to management for the coordination of the radiation safety program. This person will be the radiation safety officer and should have the training described below.

The Radiation Safety Officer (RSO) must ensure that radiation safety activities are being performed in accordance with approved procedures and regulatory requirements in the daily operation of the licensee's program.

- (1) The RSO's qualification must include:
  - (i) Completion of the training and testing required for industrial radiographers; and
  - (ii) 2 years of documented experience in industrial radiographic operations, with at least 40 hours of formal classroom training with respect to the oversight of radiation protection programs.
  
- (2) The specific duties of the RSO include, but are not limited to, the following:
  - (i) To establish and oversee operating, emergency, and ALARA procedures, and to review them regularly to ensure that the procedures are current and conform with these rules;
  - (ii) To oversee and approve all phases of the training program for radiographic personnel so that appropriate and effective radiation protection practices are taught;
  - (iii) To ensure that required radiation surveys and leak tests are performed and documented in accordance with these rules, including any corrective measures when levels of radiation exceed established limits;
  - (iv) To ensure that personnel monitoring devices are calibrated and used properly by occupationally-exposed personnel, that records are kept of the monitoring results, and that timely notifications are made as required by subdivision (c) of Section 38.29 of Code Rule 38; and
  - (v) To ensure that operations are conducted safely and to assume control and have the authority to institute corrective actions, including stopping of operations, when necessary in emergency situations or unsafe conditions.

Submit the documented qualifications of your proposed RSO.

## **B. Industrial Radiographers**

All persons who will act as industrial radiographers (conduct or personally supervise radiographic operations) must have, as a minimum, the training and skills specified below. The individual's experience in actual performance of industrial radiography with sealed sources as a radiographer's assistant must have been at least one year in length and the instruction described in paragraph (4) below should have been obtained in a formal course given for this purpose. If the radiographer has certification through an Agreement State program, such as the program conducted by Texas, or through the American Society for Nondestructive Testing, Inc. (ASNT), this will be accepted as documentation of training under paragraph (4), and as having passed a written test.

You must submit the names of all proposed radiographers; documentation of their experience; and documentation of paragraph (4) training in the form of a certificate of completion of a formal course, or of certification by a recognized program.

You must also submit your commitment to provide the instruction described in paragraph (2) and your means of confirming the individual's understanding of regulations, license requirements and your operating and emergency procedures; and confirming the individual's willingness to observe them.

You must also submit your procedures for conduct of an initial field evaluation demonstrating the competence described in paragraph (3).

**Radiographer Training and Skills:**

- (1) Instruction in the subjects outlined in paragraph (4);
- (2) Receipt of copies of, and instruction in, regulations contained in this Part; in the license under which the radiographer will perform radiography, and the licensee's operating and emergency procedures;
- (3) Competence to use the licensee's radiographic exposure devices, sealed sources, related handling tools, and survey instruments; and
- (4) Demonstration of understanding of these instructions and the following subjects:
  - (i) Fundamentals of radiation safety including:
    - (a) Characteristics of gamma radiation;
    - (b) Units of radiation dose and quantity of radioactivity;
    - (c) Hazards of exposure to radiation;
    - (d) Levels of radiation from licensed material; and
    - (e) Methods of controlling radiation dose (time, distance, and shielding);
  - (ii) Radiation detection instruments including:
    - (a) Use, operation, calibration and limitations of radiation survey instruments;
    - (b) Survey techniques; and
    - (c) Use of personnel monitoring equipment;
  - (iii) Equipment to be used including:
    - (a) Operation and control of radiographic exposure equipment, remote handling equipment, and storage containers, including pictures or models of source assemblies (pigtailed).
    - (b) Storage, control, and disposal of licensed material; and
    - (c) Maintenance of equipment.
  - (iv) The requirements of this Part (rule) and of pertinent Federal regulations; and
  - (v) Case histories of accidents in radiography.

### C. Radiographer's Assistants

You may not permit any individual to act as a radiographer's assistant until such individual:

- (1) Has received copies of and instruction in regulations contained in Code Rule 38; in the license under which the assistant radiographer will work; and the licensee's operating and emergency procedures;
- (2) Has demonstrated competence to use, under the personal supervision of the radiographer, the radiographic exposure devices, sealed sources, related handling tools, and radiation survey instruments that the assistant will use; and
- (3) Has demonstrated understanding of instructions and competence by successfully completing a written or oral test and a field examination on the subjects covered.

You must submit your program for training radiographer's assistants and for testing their understanding and competence.

#### Item 8 & 9

Please provide the following information for radioactive material and purpose of use.

- (a) List the radionuclide and mass number of the particular radionuclides to be used.
- (b) List the manufacturer and model number of the sources or source holders in the devices to be acquired.
- (c) List the maximum activity of sources to be used in each device.
- (d) Specify the name of the manufacturer of the devices to be used.
- (e) Specify the purpose for which the device you want to possess will be used

#### Items 10.-16.

Instead of responding under these headings please provide responses as directed under the following items A through O:

##### A. Equipment

Confirm that all radiographic exposure devices and associated equipment meets the requirements of 38.34(b), (c) and (d).

##### B. Survey Instruments

Confirm that survey instruments and their calibration meet the requirements of 38.34(e).

List the make, model and ranges of survey instruments to be used and the number available.

Identify the person or company (licensed by an Agreement State or NRC) that will calibrate survey meters for you at intervals not to exceed six months.

Describe the method you will use to check operability of meters before use on each day of use.

**C. Leak Testing and Replacing Sealed Sources**

Identify the person or company (licensed by an Agreement State or NRC) that will analyze leak test wipe samples for you at intervals not to exceed six months for each source; and identify the leak test kit to be used to take wipes and what staff will do this.

Confirm that sealed sources fastened to or contained in a radiographic exposure device will only be replaced by persons specifically authorized in a license to do this.

**D. Inventory, Inspection and Maintenance**

Confirm that physical inventories of all sealed sources will be conducted quarterly.

Confirm that inspection and maintenance of exposure devices, storage containers, associated equipment and source changers will be conducted in accordance with 38.34(h).

**E. Labeling and Security**

Confirm that labeling of source changers and storage containers will meet the requirements of 38.34(j).

Confirm that procedures for locking and securing exposure devices, source changers and storage containers will meet the requirements of 38.34(d) and (j).

**F. Training**

Describe your program for providing annual refresher training for radiographers and radiographer's assistants as required in 38.34(l)(3).

Describe your program and procedures for the semi-annual performance evaluation of each radiographer and radiographer's assistant as specified in 38.34(l)(4).

**G. Operating and Emergency Procedures**

Submit a copy of the operating and emergency procedures required by 38.34(m) and confirm that copies will be provided to all radiographers and radiographer's assistants.

**H. Personnel Monitoring**

Confirm that the personnel monitoring requirements specified in 38.34(n) will be implemented for each individual who will be involved in use of radioactive sources under the license, before any such use is permitted.

**I. Radiation Surveys**

Confirm that the requirements of 38.34(o) will be implemented; and that surveys demonstrating compliance with 38.19 (for restricting exposure to the general public) will be maintained for all radiography performed at temporary job sites. You have been provided with a model form that will satisfy this requirement and several others. Please confirm that you will use the model form or submit a form that calls for the same information.

**J. Posting**

Describe how areas where radiography will be performed will be posted.



**K. Supervision and Staffing**

Confirm that radiographer's assistants will be supervised as specified in 38.34(r).

Confirm that for all work performed outside of a permanent radiographic installation, the radiographer will be accompanied by another radiographer or radiographer's assistant as described in 38.34(s).

**L. Utilization Logs**

Confirm that utilization logs will be maintained as specified in 38.34(x), and that all information (except for date returned to storage) will be entered before sealed sources are removed from storage for use.

**M. Records**

Confirm that all records will be maintained as specified in 38.34(t) through (ff).

**N. Documents at Temporary Job Sites**

Confirm that the documents required by 38.34(gg) will be maintained at temporary job sites, as will records documenting compliance with 38.19 for exposures to the general public.

**O. Notification of Incidents**

Confirm that any incidents described in 38.34(hh) or 38.29 will be reported to the Department as required, and that all persons who will perform work under this license will carry the Department's office and after-hours phone numbers at all times.

Item 17.

Waste Disposal. The applicant must plan for proper disposal of the sealed sources when their use has been discontinued. Due to the anticipated loss of access to commercial radioactive waste sites you should plan to return all sources to the supplier or manufacturer. You should submit confirmation that the supplier or manufacturer agrees to accept the sources back, and state that all sources to be possessed under the license will be obtained from suppliers that agree to accept them back.

Item 18

Certification. Provide the signature of the chief executive officer of the corporation or legal entity applying for the license or of an individual authorized by management to sign official documents and to certify that all information in this application is accurate to the best of the signator's knowledge and belief.

#### IV. ADDITIONAL DOCUMENTS TO BE SUBMITTED

In addition to the foregoing you must also submit:

1. A copy of a letter sent to the Police Department in each permanent use location listed in item 2 of the application, which informs them that radioactive materials will be on the premises and instructs them in any precautions to be taken and notifications to be made in the event of a fire or emergency.
2. A copy of a letter sent to the Fire Department in each permanent use location listed in item 2 of the application, which informs them that radioactive materials will be on the premises and includes a completed Form F100965-001, and instructs them in any precautions to be taken and notifications to be made in the event of a fire or emergency.
3. Proof that you have obtained the required Workers Compensation and Disability Benefits coverage, or that you are not required to provide coverage under Section 57 of the Workers' Compensation Law and Section 220, subd. 8 of the Disability Benefits Law (see enclosed forms). Such proof must be current at the time of license application.

#### V. AMENDMENTS TO LICENSES

Licensees are required to conduct their programs in accordance with statements, representations and procedures contained in the license application and supporting documents. The license must therefore be amended if the licensee plans to make any changes in the facilities, equipment, procedures, and authorized users or radiation safety officer, or the radioactive material to be used.

Applications for license amendments may be filed either on the application form or in letter form. The application should identify the license by number and should clearly describe the exact nature of the changes, additions, or deletions. References to previously submitted information and documents should be clear and specific and should identify the pertinent information by date, page and paragraph.

TABLE OF CONTENTS

(a) Definitions ..... 11

(b) Equipment..... 13

(c) Limits on levels of radiation ..... 14

(d) Locking and relocation of radiographic exposure devices ..... 15

(e) Radiation survey instruments ..... 16

(f) Leak testing and replacement of sealed sources ..... 16

(g) Quarterly Inventory ..... 17

(h) Inspection and maintenance..... 17

(i) Permanent radiographic installations..... 18

(j) Labels, storage, and transportation ..... 18

(k) Radiation Safety Officer ..... 19

(l) Training..... 20

(m) Operating and emergency procedures ..... 22

(n) Personnel monitoring..... 22

(o) Radiation surveys..... 24

(p) Security ..... 24

(q) Posting ..... 24

(r) Supervision ..... 25

(s) Operations conducted outside of a permanent radiographic installation..... 25

(t) Records of receipt and transfer ..... 25

(u) Records of radiation survey instruments ..... 25

(v) Records of leak testing..... 26

(w) Records of quarterly inventory ..... 26

(x) Utilization logs..... 26

(y) Records of inspection and maintenance ..... 26

(z) Records of permanent radiographic installations ..... 27

(aa) Records of training ..... 27

(bb) Copies of operating and emergency procedures..... 27

(cc) Records of personnel monitoring..... 27

(dd) Records of radiation surveys ..... 28

(ee) Form of records..... 28

(ff) Location of records ..... 28

(gg) Documents required at temporary job sites ..... 28

(hh) Notification of incidents ..... 29

### 38.34 ADDITIONAL REQUIREMENTS FOR INDUSTRIAL RADIOGRAPHY.

- (a) *Definitions.* As used in this section the following terms have these defined meanings:
- (1) "Associated Equipment" - equipment used in conjunction with a radiographic exposure device to make radiographic exposures that drives, guides or comes in contact with the source, (i.e., guide tube, control tube, crank, removable source stop, "J" tube).
  - (2) "Collimator" - a device used to limit the size, shape, and direction of the primary radiation beam.
  - (3) "Control (crank-out) device" - the control cable, the protective sheath and control drive mechanism used to move the sealed source from its shielded position in the radiographic device or camera to an unshielded position outside the device for the purpose of making a radiographic exposure.
  - (4) "Control tube" - protective sheath for guiding the control cable. The control tube connects the control drive mechanism to the radiographic exposure device.
  - (5) "Exposure head" - a device that locates the gamma radiography sealed source in the selected working position. (An exposure head is also known as a source stop.)
  - (6) "Field examination" - a demonstration of practical application of the principles learned in the classroom that should include use of all appropriate equipment and procedures.
  - (7) "Periodic training" - a periodic review conducted or provided by the licensee for its employees on radiation safety aspects of radiography. The review may include, as appropriate, the results of internal inspections, new procedures or equipment, accidents or errors that have been observed, and opportunities for employees to ask safety questions.
  - (8) "Permanent radiographic installation" - an enclosed shielded room, cell, or vault in which radiography is performed.
  - (9) "Projection sheath" (guide tube) - a flexible or rigid tube (i.e., "J" tube) for guiding the source assembly and the attached control cable from the exposure device to the exposure head or working position.
  - (10) "Radiographer" - any individual who has successfully completed the training and testing requirements specified in this section for radiographers, and who conducts or personally supervises radiographic operations at a site.
  - (11) "Radiographer's assistant" - any individual who has successfully completed the training and testing requirements specified in this section for a radiographer's assistant, and who must use radiographic exposure devices, sealed sources or related handling tools, or radiation survey instruments under the personal supervision of a radiographer.

- (12) "Radiographic exposure device" - any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making radiographic exposure, (i.e., a camera, or a projector);
- (13) "Radiography" - the examination of the structure of materials by nondestructive methods, utilizing sealed sources of radioactive materials;
- (14) "Sealed source" - any radioactive material that is encased in a capsule designed to prevent leakage or escape of the radioactive material;
- (15) "Shielded position" - the location within the radiographic exposure device or source changer where the sealed source is secured and restricted from movement. (In this position the radiation exposure will be at a minimum. This position incorporates maximum shielding for the radioactive source.)
- (16) "Source assembly" - consists of the sealed source and a connector. May also include a stop ball used to secure the source in the shielded position. The connector attaches to the control cable.
- (17) "Source changer" - a device designed and used for replacement of sealed sources in radiographic exposure devices, including those also used for transporting and storage of sealed sources;
- (18) "Storage area" - any location, facility, or vehicle which is used to store or to secure a radiographic exposure device, a storage container, or a sealed source when it is not in use; and which is locked or has a physical barrier to prevent accidental exposure, tampering with, or unauthorized removal of the device, container, or source.
- (19) "Storage container" - a device in which sealed sources are stored.
- (20) "Temporary jobsite" - a place where licensed materials are present for the purpose of performing radiography, other than any permanent radiographic installation.

- (b) *Equipment.* Equipment used in industrial radiographic operations must meet the following minimum criteria:
- (1) Each radiographic exposure device and all associated equipment must meet the requirements specified in American National Standard N432-1980 "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography."<sup>1</sup>
  - (2) In addition to the requirements specified in subdivision (a) of this section, the following requirements apply to radiographic exposure devices and associated equipment.
    - (i) Each radiographic exposure device must have attached to it by the user, a durable, legible, clearly visible label bearing the --
      - (a) Chemical symbol and mass number of the radionuclide in the device;
      - (b) Activity and the date on which this activity was last measured;
      - (c) Model number and serial number of the sealed source;
      - (d) Manufacturer of the sealed source; and
      - (e) Licensee's name, addresses, and telephone number.
    - (ii) Radiographic exposure devices intended for use as Type B transport containers must meet the applicable requirements of 10 Code of Federal Regulations, Part 71.
    - (iii) Modification of any exposure devices and associated equipment is prohibited.
  - (3) In addition to the requirements specified in paragraphs (1) and (2) of this subdivision, the following requirements apply to radiographic exposure devices, source assemblies, and associated equipment that allow the source to be moved out of the device for routine operation.
    - (i) The coupling between the source assembly and the control cable must be designed in such a manner that the source assembly will not become disconnected if cranked outside the guide tube. The coupling must be such that it cannot be unintentionally disconnected under normal and reasonably foreseeable abnormal conditions.

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<sup>1</sup>This publication may be purchased from the American National Standards Institute, Inc., 11 West 42nd Street, 13th Floor, New York, NY 10036.

- (ii) The device must automatically secure the source assembly when it is cranked back into the fully shielded position within the device. This securing system may only be released by means of a deliberate operation on the exposure device.
  - (iii) The outlet fittings, lock box, and drive cable fittings on each radiographic exposure device must be equipped with safety plugs or covers which must be installed during storage and transportation to protect the source assembly from water, mud, sand or other foreign matter.
  - (iv) Each sealed source or source assembly must have attached to it or engraved on it, a durable, legible, visible label with the words: "DANGER -- RADIOACTIVE." The label must not interfere with the safe operation of the exposure device or associated equipment.
  - (v) Guide tubes must be used when moving the source out of the device.
  - (vi) The guide tube must have passed the crushing tests for the control tube as specified in ANSI N432 and a kinking resistance test that closely approximates the kinking forces likely to be encountered during use.
  - (vii) An exposure head or similar device designed to prevent the source assembly from passing out of the end of the guide tube must be attached to the outermost end of the guide tube during radiographic operations.
  - (viii) The guide tube exposure head connection must be able to withstand the tensile test for control units specified in ANSI N432.
  - (ix) Source changers must provide a system for assuring that the source will not be accidentally withdrawn from the changer when connecting or disconnecting the drive cable to or from a source assembly.
- (4) All newly manufactured radiographic exposure devices and associated equipment acquired by licensees after January 10, 1992 must comply with the requirements of this section.
  - (5) All radiographic exposure devices, source assemblies, and associated equipment in use after January 10, 1996 must comply with the requirements of this section.
  - (6) All associated equipment acquired after January 10, 1996 must be labeled to identify that the components have met the requirements of this section.
- (c) *Limits on levels of radiation for radiographic exposure devices, storage containers, and source changers.*
    - (i) Radiographic exposure devices measuring less than 10 centimeters (4 inches) from the sealed source storage position to any exterior surface of the device shall

have no radiation level in excess of 0.5 millisieverts (50 millirems) per hour at 15 centimeters (6 inches) from any exterior surface of the device.

- (ii) Radiographic exposure devices measuring a minimum of 10 centimeters (4 inches) from the sealed source storage position to any exterior surface of the device, and all storage containers for sealed sources or for radiographic exposure devices, shall have no radiation level in excess of 2 millisieverts (200 millirems) per hour at any exterior surface, and 0.1 millisieverts (10 millirems) per hour at one meter from any exterior surface. The radiation levels specified are with the sealed source in the shielded (i.e., "off") position.
- (2) Paragraph (1) of this subdivision applies to all equipment manufactured prior to January 10, 1992. After January 10, 1996, radiographic equipment other than storage containers and source changers must meet the requirements of subdivision (b) of this section, and subdivision (c) applies only to storage containers.
- (d) *Locking and relocation of radiographic exposure devices, storage containers, and source changers.*
- (1) Locked radiographic exposure devices and storage containers shall be physically secured to prevent tampering.
    - (i) Each radiographic exposure device shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The exposure device or its container shall be kept locked, (and if a keyed lock, with the key removed at all times), when not under the direct surveillance of a radiographer or a radiographer's assistant or as otherwise may be authorized in subdivision (p) of this section. In addition, during radiographic operations the sealed source assembly shall be manually secured in the shielded position each time the source is returned to that position, in those exposure devices manufactured prior to January 10, 1992.
    - (ii) Each sealed source storage container and source changer shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. Storage containers and source changers shall be kept locked when containing sealed sources except when under the direct surveillance of a radiographer or a radiographer's assistant.
  - (2) Radiographic exposure devices, source changers, and storage containers, prior to being moved from one location to another, shall be disassembled, safety plugs or covers applied, locked and physically secured to prevent accidental loss, tampering or removal of licensed material; and shall be surveyed to assure that the sealed source is in the shielded position before being moved.



(e) *Radiation survey instruments.*

- (1) The licensee shall keep sufficient calibrated and operable radiation survey instruments at each temporary jobsite to make the radiation surveys required by this Part (rule). Instrumentation required by this section shall have a range such that 0.02 millisieverts (2 millirems) per hour through 0.01 Sievert (1 rem) per hour can be measured. Survey instruments shall be checked for operability prior to use. This may be accomplished by evaluating the instrument response to the previously measured fields at the projection sheath port or the control cable sheath port on a radiographic exposure device.
- (2) The licensee shall have each radiation survey instrument required under paragraph (1) of this subdivision calibrated --
  - (i) at intervals not to exceed 6 months and after instrument servicing, except for battery changes;
  - (ii) for linear scale instruments, at two points located approximately 1/3 and 2/3 of full-scale on each scale; for logarithmic scale instruments, at midrange of each decade, and at two points of at least one decade; and for digital instruments, at appropriate points; and
  - (iii) so that an accuracy within plus or minus 20 percent of the calibration standard can be demonstrated on each scale.
- (3) The licensee shall maintain records of the results of the instrument calibrations in accordance with subdivision (u) of this section.

(f) *Leak testing and replacement of sealed sources.*

- (1) The replacement of any sealed source fastened to or contained in a radiographic exposure device and leak testing of any sealed source, shall be performed only by persons specifically authorized by an Agreement State or the United States Nuclear Regulatory Commission to do so.
- (2) Testing and recordkeeping requirements.
  - (i) Each licensee who uses a sealed source shall have the source tested for leakage at intervals not to exceed 6 months.
  - (ii) The licensee shall maintain records of the leak tests in accordance with subdivision (v) of this section.
  - (iii) In the absence of a certificate from the transferor that a test has been made within the 6 months before the transfer, the sealed source may not be used until tested.

- (3) Method of testing. The wipe of a sealed source must be performed using a leak test kit or method approved by an Agreement State or the United States Nuclear Regulatory Commission, and must be analyzed by a person or company so approved. The wipe sample must be taken from the nearest accessible point to the sealed source where contamination might accumulate.
- (4) Any test conducted pursuant to paragraphs (2) and (3) of this subdivision which reveals the presence of 185 Bq (0.005 microcuries) or more of removable radioactive material shall be considered evidence that the sealed source is leaking. The licensee shall immediately withdraw the equipment involved from use and shall cause it to be decontaminated and repaired or to be disposed of, in accordance with this Part (rule). A report shall also be filed, within 5 days of the test, with the Department.

(g) *Quarterly Inventory.*

- (1) Each radiography licensee shall conduct a quarterly physical inventory to account for all sealed sources received and possessed under a license.
- (2) The licensee shall maintain records of the quarterly inventory in accordance with subdivision (w) of this section.

(h) *Inspection and maintenance of radiographic exposure devices, storage containers, associated equipment, and source changers.*

- (1) The licensee shall visually check for obvious defects in radiographic exposure devices, storage containers, associated equipment, and source changers prior to use each day the equipment is used to ensure that the equipment is in good working condition and that required labeling is present. If defects are found, the equipment must be removed from service until repaired, and a record must be made in accordance with subdivision (y) of this section.
- (2) Each licensee shall have a program for inspection and routine maintenance of radiographic exposure devices, source changers, associated equipment and storage containers prior to the first use and at intervals not to exceed 3 months thereafter to ensure the proper functioning of components important to safety. If defects are found, the equipment must be removed from service until repaired. Records of such inspection, maintenance, removal from service and repair must be made in accordance with subdivision (y) of this section.
- (3) Each exposure device using depleted uranium (DU) shielding and an "S" tube configuration shall be periodically tested for depleted uranium contamination. This test could be performed by the licensee using available test kits or the exposure device could be returned to the manufacturer for such testing. This test shall be undertaken at intervals not to exceed 12 months and should such testing reveal the presence of DU

contamination, the exposure device must be removed from use and arrangements for proper disposal in accordance with this Part (rule) must be made.

(i) *Permanent radiographic installations.*

- (1) Permanent radiographic installations shall have high radiation area entrance controls of the types described in subdivision (d) of Section 38.25 of this Part (rule), and shall also meet the following special requirements.
- (2) Each entrance that is used for personnel access to the high radiation area in a permanent radiographic installation to which this section applies shall have both visible and audible warning signals to warn of the presence of radiation. The visible signal shall be actuated by radiation whenever the source is exposed. The audible signal shall be actuated when an attempt is made to enter the installation while the source is exposed.
- (3) The alarm system must be tested for proper operation at intervals not to exceed 3 months and the beginning of each day of equipment use. The daily test shall include a check of the visible and audible signals by a crank out of the exposure device prior to use of the room. If a control device or alarm is operating improperly, it shall be immediately labeled as defective and repaired before industrial radiographic operations are resumed. Test records shall be maintained in accordance with subdivision (z) of this Section.

(j) *Labels, storage, and transportation precautions.*

(1) *Labels.*

- (i) The licensee may not use a source changer or container to store licensed material unless the source changer or the container has securely attached to it a durable, legible, and clearly visible label. The label must contain the radiation symbol specified in Section 38.25 of this chapter and the wording "CAUTION (OR DANGER) RADIOACTIVE MATERIAL -- DO NOT HANDLE, NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY).
- (ii) The licensee may not transport licensed material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with the requirements of Section 38.31 of this Part (rule).

(2) *Security precautions during storage and transportation.*

- (i) Locked radiographic exposure devices and storage containers shall be physically secured to prevent tampering or removal by unauthorized personnel. The licensee shall store licensed material in a manner which will minimize danger from explosion or fire.

- (ii) The licensee shall lock and physically secure the transport package containing licensed material in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal of the licensed material from the vehicle.

(k) *Radiation Safety Officer.*

The Radiation Safety Officer shall ensure that radiation safety activities are being performed in accordance with approved procedures and regulatory requirements in the daily operation of the licensee's program.

(1) The RSO's qualification shall include:

- (i) completion of the training and testing requirements of paragraph (1)(1) of this Section; and
- (ii) two years of documented experience in industrial radiographic operations, with at least 40 hours of formal classroom training with respect to the oversight of radiation protection programs.

(2) The specific duties of the RSO include, but are not limited to, the following:

- (i) To establish and oversee operating, emergency, and ALARA procedures, and to review them regularly to ensure that the procedures are current and conform with these rules;
- (ii) To oversee and approve all phases of the training program for radiographic personnel so that appropriate and effective radiation protection practices are taught;
- (iii) To ensure that required radiation surveys and leak tests are performed and documented in accordance with these rules, including any corrective measures when levels of radiation exceed established limits;
- (iv) To ensure that personnel monitoring devices are calibrated and used properly by occupationally-exposed personnel, that records are kept of the monitoring results, and that timely notifications are made as required by subdivision (c) of Section 38.29 of this Part (rule); and
- (v) To ensure that operations are conducted safely and to assume control and have the authority to institute corrective actions, including stopping of operations, when necessary in emergency situations or unsafe conditions.

(1) *Training.*

- (1) The licensee shall not permit any individual to act as radiographer until such individual:
  - (i) has been instructed in the subjects outlined in paragraph (6) of this subdivision;
  - (ii) has received copies of, and instruction in, regulations contained in this Part; in the license under which the radiographer will perform radiography, and the licensee's operating and emergency procedures;
  - (iii) has demonstrated competence to use the licensee's radiographic exposure devices, sealed sources, related handling tools, and survey instruments; and
  - (iv) has demonstrated understanding of the instructions in this paragraph by successful completion of a written test and a field examination on the subjects covered in paragraph (6) of this subdivision.
  
- (2) The licensee shall not permit any individual to act as a radiographer's assistant until such individual:
  - (i) has received copies of and instruction in regulations contained in this Part; in the license under which the assistant radiographer will work; and the licensee's operating and emergency procedures;
  - (ii) has demonstrated competence to use, under the personal supervision of the radiographer, the radiographic exposure devices, sealed sources, related handling tools, and radiation survey instruments that the assistant will use; and
  - (iii) has demonstrated understanding of the instructions in this paragraph by successfully completing a written or oral test and a field examination on the subjects covered.
  
- (3) The licensee shall provide periodic training for radiographers and radiographer's assistants at least once during each calendar year.
  
- (4) The licensee shall conduct a semi-annual inspection program of the job performance of each radiographer and radiographer's assistant to ensure that these regulations, license requirements, and the applicant's operating and emergency procedures are followed. The inspection program must:
  - (i) Include observation of the performance of each radiographer and radiographer's assistant during an actual radiographic operation at intervals not to exceed 6 months; and
  - (ii) provide that, if a radiographer or a radiographer's assistant has not participated in a radiographic operation for more than 3 months since the last inspection, that

individual's performance must be observed and recorded the next time the individual participates in a radiographic operation.

- (5) The licensee shall maintain records of the above training; to include written, oral, and field examinations, periodic training, and semi-annual inspections of job performance in accordance with subdivision (aa) of this Section.
- (6) The licensee shall include the following subjects in the training required in paragraph (1)(i) of this subdivision:
  - (i) fundamentals of radiation safety including:
    - (a) characteristics of gamma radiation;
    - (b) units of radiation dose and quantity of radioactivity;
    - (c) hazards of exposure to radiation;
    - (d) levels of radiation from licensed material; and
    - (e) methods of controlling radiation dose (time, distance, and shielding);
  - (ii) radiation detection instruments including:
    - (a) use, operation, calibration, and limitations of radiation survey instruments;
    - (b) survey techniques; and
    - (c) use of personnel monitoring equipment;
  - (iii) equipment to be used including:
    - (a) operation and control of radiographic exposure equipment, remote handling equipment, and storage containers, including pictures or models of source assemblies (pigtailed).
    - (b) storage, control, and disposal of licensed material; and
    - (c) maintenance of equipment.
  - (iv) the requirements of this Part (rule) and of pertinent Federal regulations; and
  - (v) case histories of accidents in radiography.

(m) *Operating and emergency procedures.*

- (1) Operating and emergency procedures must include instructions in at least the following:
  - (i) the handling and use of licensed sealed sources and radiographic exposure devices to be employed, such that no person is likely to be exposed to radiation doses in excess of the limits established in this Part (rule);
  - (ii) methods and occasions for conducting radiation surveys;
  - (iii) methods for controlling access to radiographic areas;
  - (iv) methods and occasions for locking and securing radiographic exposure devices, storage containers and sealed sources;
  - (v) personnel monitoring and the use of personnel monitoring equipment;
  - (vi) transporting sealed sources to field locations, including packing of radiographic exposure devices and storage containers in the vehicles, placarding of vehicles when needed, and control of the sealed sources during transportation;
  - (vii) the inspection and maintenance of radiographic exposure devices and storage containers;
  - (viii) steps that must be taken immediately by radiography personnel in the event a pocket dosimeter is found to be off-scale;
  - (ix) the procedure(s) for identifying and reporting equipment malfunction, as required by subparagraph (b)(2)(iii) of Section 38.29 of this Part (rule).
  - (x) the procedure for notifying proper persons in the event of an accident;
  - (xi) minimizing exposure of persons in the event of an accident;
  - (xii) source recovery procedure if licensee will perform source recovery; and
  - (xiii) form of records.
- (2) The licensee shall maintain copies of current operating and emergency procedures in accordance with subdivision (bb) of this Section.

(n) *Personnel monitoring.*

- (1) The licensee shall not permit any individual to act as a radiographer or a radiographer's assistant unless, at all times during radiographic operations, each such individual wears a direct reading pocket dosimeter, an alarm ratemeter, and either a film badge or a

thermoluminescent dosimeter (TLD) except that for permanent radiography facilities where other appropriate alarming or warning devices are in routine use, the wearing of an alarming ratemeter is not required. Pocket dosimeters shall have a range from zero to 2 millisieverts (200 millirems) and shall be recharged at the start of each shift. In cases where the exposure will be greater than 2 millisieverts (200 millirems) an exemption must be applied for to use a pocket dosimeter with a higher endpoint. Each film badge and TLD shall be assigned to and worn by only one individual. Film badges and TLDs must be replaced at least monthly. After replacement, each film badge or TLD must be promptly processed.

- (2) Pocket dosimeters must be read and the exposures recorded at the beginning and end of each shift, and records shall be maintained in accordance with subdivision (cc) of this Section.
- (3) Pocket dosimeters shall be checked at periods not to exceed 12 months for correct response to radiation, and records shall be maintained in accordance with subdivision (cc) of this Section. Acceptable dosimeters shall read within plus or minus 30 percent of the true radiation exposure.
- (4) If an individual's pocket dosimeter is found to be off-scale, and the possibility of radiation exposure cannot be ruled out as the cause, his film badge or TLD shall be immediately sent for processing. In addition, the individual shall not work with licensed material until a determination of his radiation exposure has been made. This determination shall be made by the RSO or his/her designee. The results of this determination must be included in the records maintained in accordance with subdivision (cc) of this Section.
- (5) If a film badge or TLD is lost or damaged, the worker shall cease work immediately until a replacement film badge or TLD is provided and the exposure is calculated for the time period from issuance to loss or damage of the film badge or TLD.
- (6) Reports received from the film badge or TLD processor must be retained in accordance with subdivision (cc) of this Section.
- (7) Each alarm ratemeter must:
  - (i) be checked to ensure that the alarm functions properly (sounds) prior to use at the start of each shift;
  - (ii) be set to give an alarm signal at a preset dose rate of 5 mSv/hr (500 mrem/hr); with an accuracy of plus or minus 20 percent of the true radiation dose rate;
  - (iii) require special means to change the preset alarm function;
  - (iv) have the alarm function turned "on" at all times during radiographic operations; and



- (v) be calibrated at periods not to exceed 12 months for correct response to radiation. The licensee shall maintain records of alarm ratemeter calibrations in accordance with subdivision (cc) of this Section.

(o) *Radiation surveys.*

The licensee shall:

- (1) Maintain at least one calibrated and operable radiation survey instrument that meets the requirements of subdivision (e) of this Section at each location of its radiographic operations whenever radiographic operations are being performed, including a source exchange; and at the storage area, as defined in subdivision (a) of this Section, whenever a radiographic exposure device, a storage container, or source is being placed in storage.
- (2) Conduct a survey of the camera with a radiation survey instrument after each exposure to determine that the sealed source has been returned to its shielded position.
- (3) Conduct a survey of the source guide tube to determine that the source has been returned to its shielded position prior to exchanging films, repositioning the collimator, or dismantling equipment.
- (4) Conduct a survey with a radiation survey instrument any time the source is exchanged and whenever a radiographic exposure device is placed in a storage area, as defined in subdivision (a) of this section to determine that the sealed source is in its shielded position.
- (5) For recordkeeping requirements see subdivision (dd) of this Section.

(p) *Security.*

During each radiographic operation the radiographer or radiographer's assistant shall maintain a continuous direct visual surveillance of the operation to protect against unauthorized entry into a high radiation area, as defined in this Part (rule), except:

- (1) where the high radiation area is equipped with a control device or an alarm system as described in subdivision (d) of Section 38.25 of this Part (rule), or
- (2) where the high radiation area is locked to protect against unauthorized or accidental entry.

(q) *Posting.*

Notwithstanding any provisions in paragraph (b)(2) of Section 38.25 of this Part (rule), areas in which radiography is being performed shall be conspicuously posted as required by paragraph (b)(1) of Section 38.25 of this Part (rule).

(r) *Supervision of radiographers' assistants.*

Whenever a radiographer's assistant uses radiographic exposure devices, uses sealed sources or related source handling tools, or conducts radiation surveys required by paragraph (o)(2) of this Section to determine that the sealed source has returned to the shielded position after an exposure, the assistant shall be under the personal supervision of a radiographer. The personal supervision shall include:

- (1) the radiographer's personal presence at the site where the sealed sources are being used;
- (2) the ability of the radiographer to give immediate assistance if required, and
- (3) the radiographer's watching the assistant's performance of the operations referred to in this section.

(s) *Requirements for radiographic operations conducted outside of a permanent radiographic installation.*

Whenever radiography will be performed outside of a permanent radiographic installation the radiographer must be accompanied by another qualified radiographer, or an individual with at least the qualifications of a radiographer's assistant, who is observing the operations and is capable of providing immediate assistance to prevent unauthorized entry. Radiography may not be performed if only one qualified individual is present.

(t) *Records of receipt and transfer of sealed sources.*

- (1) Each licensee shall maintain records showing the receipts and transfers of sealed sources.
- (2) These records shall include the date, the individual making the record, the radionuclide, number of curies, and make, model, and serial number of each sealed source and device, as appropriate.
- (3) The licensee shall retain the records required by paragraph (1) of this subdivision for 3 years after the record is made.

(u) *Records of radiation survey instruments.*

- (1) Each licensee shall maintain records of the calibrations of their radiation survey instruments.
- (2) The licensee shall retain the records required by paragraph (1) of this subdivision for 3 years after the record is made.

- (v) *Records of leak testing and replacement of sealed sources.*
- (1) Each licensee shall maintain records of leak test results in units of Becquerels (curies).
  - (2) The licensee shall retain the records required by paragraph (1) of this subdivision for 3 years after the record is made.
- (w) *Records of quarterly inventory.*
- (1) Each licensee shall maintain records of the quarterly inventory.
  - (2) The record shall include the quantities and kinds of radioactive material (including the model number, the serial number and manufacturer), location of sealed sources, the name of the individual conducting the inventory, and the date of the inventory.
  - (3) The licensee shall retain the records required by paragraph (1) of this subdivision for 3 years after the record is made.
- (x) *Utilization logs.*
- (1) Each licensee shall maintain current utilization logs at the address specified in the license, showing for each sealed source the following information:
    - (i) a description, including the make, model number, and serial number of the radiographic exposure device or storage container in which the sealed source is located;
    - (ii) the identity and signature of the radiographer to whom assigned; and
    - (iii) the plant or site where used and dates of use, including the dates removed and returned to storage.
  - (2) The licensee shall retain the logs required by paragraph (1) of this subdivision for 3 years after the log is made.
- (y) *Records of inspection and maintenance of radiographic exposure devices, storage containers, associated equipment, and source changers.*
- (1) Each licensee shall maintain records of inspection and maintenance of radiographic exposure devices, storage containers, associated equipment, and source changers.
  - (2) The record shall include the date of check, name of inspector, equipment involved, any defects found, and repairs made.
  - (3) The licensee shall retain the records required by paragraph (1) of this subdivision for 3 years after the record is made.

(z) *Records of permanent radiographic installations.*

- (1) Each licensee shall maintain records of alarm system tests.
- (2) The licensee shall retain the records required by paragraph (1) of this subdivision for 3 years after the record is made.

(aa) *Records of training.*

- (1) Each licensee shall maintain records of training of each radiographer and each radiographer's assistant, to include copies of written tests, dates of oral tests, and field examinations.
- (2) Each licensee shall maintain records of periodic training for each radiographer and each radiographer's assistant. The records must list the topics discussed, the dates of the reviews, and the attendees.
- (3) The licensee shall retain the records required by paragraphs (1) and (2) of this subdivision for 3 years after the record is made.

(bb) *Copies of operating and emergency procedures.*

- (1) Each licensee shall maintain a copy of current operating and emergency procedures.
- (2) The licensee shall retain the records until the commissioner terminates the license.
- (3) If procedures are superseded, the licensee shall retain the superseded material for 3 years after each change.

(cc) *Records of personnel monitoring.*

- (1) Each licensee shall maintain records of daily exposures recorded from pocket dosimeter readings, and of yearly checks for correct dosimeter response to radiation within plus or minus 30 percent of true radiation exposure.
- (2) The licensee shall retain the records required by paragraph 1 of this subdivision for 3 years after the record is made.
- (3) Each licensee shall maintain records of reports received from the film badge or TLD processor.
- (4) The licensee shall retain the records required by paragraph 3 until the commissioner terminates the license.
- (5) Each licensee shall maintain records of the calibrations of alarm ratemeters for 3 years after the record is made.

(dd) *Records of radiation surveys.*

- (1) Each licensee shall maintain records of the survey of a radiographic exposure device and source guide tube after the last exposure of the work day, after any source exchange, and whenever a device is placed in a storage area.
- (2) The licensee shall retain the records required by paragraph (1) of this subdivision for 3 years after the record is made.

(ee) *Form of records.*

Each record required by this part must be legible throughout the specified retention period. The record may be the original or a reproduced copy, or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of reproducing a clear copy throughout the required retention period. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records, such as letters, drawings, and specifications, must include all pertinent information, such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

(ff) *Location of records.*

All records required by this Part (rule) must be maintained for inspection at the address listed on the license. However, if this address is not located within New York State the licensee shall, at the request of the commissioner, bring such records as pertain to use of radiation sources in New York State, to such location within the State as the commissioner may direct for the purpose of inspection.

(gg) *Documents required at temporary job sites.*

Each licensee conducting operations at a temporary job site shall maintain copies of the following documents and records at the temporary job site until the radiographic operation is completed:

- (1) operating and emergency procedures required by subdivision (m) of this Section.
- (2) evidence of latest calibration of the radiation survey instruments in use at the site required by subdivision (u) of this Section.
- (3) the latest survey records, required by subdivision (dd) of this Section.
- (4) the shipping papers for the transportation of radioactive materials; and

- (5) when operating under reciprocity pursuant to Section 38.15 of this Part (rule), a copy of the license authorizing use of licensed materials.

(hh) *Notification of incidents.*

- (1) In addition to the reporting requirements specified in Section 38.29 of this Part (rule), each licensee shall provide a written report to the commissioner of the occurrence of any of the following incidents involving radiographic equipment:
  - (i) unintentional disconnection of the source assembly from the control cable;
  - (ii) inability to retract the source assembly to its full shielded position and secure it in this position;
  - (iii) failure of any component (critical to safe operation of the device) to properly perform its intended function.
- (2) The licensee shall include the following information in each report submitted under paragraph (1) of this subdivision, and in each report of overexposure submitted under subdivision (c) of Section 38.29 of this Part (rule) which involve failure of safety components of radiography equipment:
  - (i) a description of the equipment problem;
  - (ii) cause of each incident, if known;
  - (iii) manufacturer and model number of equipment involved in the incident;
  - (iv) place, time and date of the incident;
  - (v) actions taken to establish normal operations;
  - (vi) corrective actions taken or planned to prevent recurrence;
  - (vii) qualifications of personnel involved in the incident.