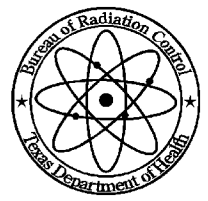


BUREAU OF RADIATION CONTROL
REGULATORY GUIDE
TEXAS DEPARTMENT OF HEALTH



REGULATORY GUIDE 2.1

GUIDANCE FOR RADIOACTIVE MATERIAL - INDUSTRIAL RADIOGRAPHY

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Regulatory Guides are issued to describe and make available acceptable methods of implementing specific sections of 25 Texas Administrative Code, Chapter 289 (**Texas Regulations for Control of Radiation**), to delineate techniques used by the staff in evaluating specific issues, or to provide guidance to applicants, licensees, or registrants. Regulatory Guides are **NOT** substitutes for regulations and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the Texas Department of Health, Bureau of Radiation Control, to make necessary determinations to issue or continue a license or certificate of registration.

Comments and suggestions for improvements in these Regulatory Guides are encouraged at all times and they will be revised, as appropriate, to accommodate comments and to reflect new information or experience. Comments should be sent to the Deputy Director, Standards and Special Projects, Bureau of Radiation Control, Texas Department of Health, 1100 W. 49th Street, Austin, Texas 78756-3189.

Regulatory guides may be reproduced or may be obtained by contacting the agency at (512) 834-6688 or accessing the Bureau of Radiation Control web page at www.tdh.state.tx.us/ech/rad/pages/brc.htm

I. Introduction

A. Licensing Process

The acquisition, possession, use, manufacture, production, transport, transfer, and processing of radioactive material in Texas shall be authorized by the Texas Department of Health, Bureau of Radiation Control (agency). The agency issues such authorization in the form of a license. A license indicates what type, quantity, form, and use of radioactive material is authorized and any special conditions under which the radioactive material shall be used. This guide describes the process for application for a license and for amendment, renewal, and termination of a license.

B. Inspection Process

Once a radioactive material license is issued, the agency will conduct periodic inspections of a licensee's facility and operations to ensure compliance with the agency rules and any conditions listed on the license. This guide describes the inspection process.

C. Agency Contacts

The agency maintains an Internet site. The site contains the rules and forms referenced in this regulatory guide, as well as information on who to contact at the agency with questions, information on the activities and structure of the agency, topics of interest about radiation, and links to other radiation-related web sites.

The agency universal resource locator is:

<http://www.tdh.state.tx.us/ech/rad/pages/brc.htm>

If you do not have access to the world-wide web and need additional information, please call (512) 834-6688 and ask for the following.

1. Industrial Licensing Program - for questions regarding the regulation of industrial radiography and the application for radioactive material license and any related correspondence.
2. Industrial Radiographer Certification Program - for questions regarding certification of industrial radiographers.
3. Radioactive Materials Inspection Program - for questions regarding compliance actions.

4. Standards Program - for questions regarding copies of rules and regulatory guides or the development of and any revisions to the rules.
5. Accounting Program - for questions regarding fees.

II. Applicable Regulations

- A. The requirements of the following sections of Title 25, Texas Administrative Code (TAC), Chapter 289 (also known as the *Texas Regulations for Control of Radiation*) apply to the use of radioactive material in industrial radiographic operations:

| | |
|----------|--|
| §289.201 | General Provisions |
| §289.202 | Standards for Protection Against Radiation |
| §289.203 | Notices, Instructions, and Reports to Workers; Inspections |
| §289.204 | Fees for Certificates of Registration, Radioactive Material Licenses, Emergency Planning and Implementation, and Other Regulatory Services |
| §289.205 | Hearing and Enforcement Procedures |
| §289.251 | Exemptions, General Licenses, and General License Acknowledgements |
| §289.252 | Licensing of Radioactive Material |
| §289.255 | Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography |
| §289.257 | Packaging and Transportation of Radioactive Material |

- B. You will be provided one printed copy of the applicable sections of the rules. It is the licensee's responsibility to ensure that its facility and any additional authorized sites are provided with copies of the applicable rules. These rules may be duplicated or can be downloaded from the agency Internet site. For a charge, you may request rules on disk or additional hard copies.

III. License Fees

- A. A fee shall be submitted with each new application. Refer to §289.204 to determine the fee that should accompany the application. Review of the application will not begin until the proper fee is received by the agency. The check or money order should be made payable to the Texas Department of Health.

- B. Once a license has been issued, a nonrefundable fee must be paid annually for each radioactive material license. The fee must be paid in full each year on or before the last day of the expiration month of the license. For example, if the license expires September 30, 2003, the annual fees are due on or before September 30 of each calendar year. You will receive a bill from the agency for your annual fee approximately 90 days prior to the annual fee due date.
- C. Do not submit a fee with the request for renewal or amendment. If an amendment changes or adds a category of license or adds an additional authorized use site, the annual fee will be adjusted accordingly. The adjustments will be reflected on your next annual fee bill.

IV. Licensing Process

A. Completing the Application

1. Submit BRC Form 252-2, "Application for Radioactive Material License," for the use of radioactive material in industrial radiographic operations.
2. Complete all items on the application in sufficient detail to allow the licensing reviewers to make a complete evaluation of the program for use of radioactive material in industrial radiography.
3. Submit two copies of the application and all attachments and keep a complete copy for your records.
4. Complete Items 1-7 and 14 on the application. For Items 8 through 13, the information should be submitted on additional pages.
5. Identify each separate sheet or document submitted with the application by referencing the application item number to which it refers.
6. Submit all documentation, including pages, sketches, and drawings, on 8-1/2 x 11 inch paper to ease handling and review. If larger drawings are necessary, they should be folded to 8-1/2 x 11 inches.

Items 1-14 of the application are discussed below:

Item 1 - NAME AND MAILING ADDRESS OF APPLICANT: Enter the company name and mailing address. The applicant is the organization or person legally responsible for the possession and use of the radioactive material. The address specified here must be your mailing address for correspondence. This may or may not be the same as the address where the material will be stored or used.

The agency will not issue a license addressed to a company or person residing outside the state of Texas.

Item 2 - LOCATIONS WHERE RADIOACTIVE MATERIAL WILL BE USED: Specify all locations of storage or use by designating the street address, city, and state, or by designating a descriptive address (i.e. 5 miles east on Highway 10, Anytown, State). A post office box address is not acceptable in Item 2.

Item 3 - THIS APPLICATION IS FOR: This item is self explanatory, mark the appropriate box. Only complete the application for renewal if specifically informed to do so by the agency.

Item 4 - LOCATION WHERE RECORDS WILL BE KEPT: Provide the appropriate information even though it may be the same as the information in Item 1. If applying for additional authorized use/storage sites, please specify which site will be designated as the main site (e.g., home office or office location of the RSO). Please note that each permanent site where radioactive material will be stored or used is required to maintain records pertinent to the operations at that site. Copies of all required records also need to be maintained for agency review at the designated main site.

Item 5 - INDIVIDUAL USERS AND THEIR TITLES: Submit a list of all radiographer trainers to be listed on the radioactive material license. If proposed individuals have never been qualified by the agency as a radiographer trainer before, submit BRC Form 255-T, "Radiographer Trainer Qualification," for each individual. The list of individuals shall include their full names and titles, such as trainer. If your list is greater than four names, submit the information on a separate sheet, clearly referencing Item 5 of the application. Qualification requirements for radiographer trainers are specified in §289.255(m)(3).

Item 6 - RADIATION SAFETY OFFICER (RSO): The RSO is the individual designated by management to be responsible for supervision of the radiation safety program. This individual should understand the proposed program and be able to answer questions concerning the application. The RSO will be listed on the license. Submit a resume for the RSO detailing applicable training and experience [§289.255(m)(4)(B)] including:

1. a copy of the RSO's high school diploma or certificate of high school equivalency based on the GED test;
2. documentation of successfully completing the training and testing requirements of §289.255(m)(1)(A) and (2)(A)(iii) and (n)(1)(B); and

3. two years of documented experience related to radiation protection, including knowledge of industrial radiographic operations with at least 40 hours of active participation in industrial radiographic operations.

If there is a change in the RSO after the license is issued, the request for an amendment to the license should be made prior to changing the RSO or immediately after the RSO listed on the license is no longer performing the duties of the RSO. A listing of the duties and responsibilities of the RSO is given in §289.255(m)(4)(C).

Item 7 - RADIOACTIVE MATERIALS DATA: All of the information necessary for this item of the application is available from radioactive sealed source and exposure device manufacturers.

1. To complete this item you should:
 - a. List radioactive material to be possessed by radionuclide, such as "iridium-192," "cobalt-60," etc.
 - b. Specify the manufacturer's name and model number for each type of sealed source requested.
 - c. Specify the maximum number of curies (gigabecquerels (GBq)), millicuries (megabecquerels (MBq)), or microcuries (kilobecquerels (kBq)) in each sealed source.
 - d. Specify the intended use of the sealed source and enter the manufacturer's name and model number for each radiographic exposure device, source exchanger, storage container, or other type of device.
2. If you wish to possess sealed sources other than industrial radiographic sources (i.e., any source that will not be used for performing radiography, such as portable moisture/density gauging, hand-held fluoroscopy, or x-ray fluorescence analysis), provide the same information described above for each sealed source and device.

NOTE: The agency maintains other regulatory guides concerning other uses of radioactive material. Please contact the Industrial Licensing Program to obtain the appropriate regulatory guides for uses other than industrial radiography.

3. Make sure that the sealed source/device/source changer combinations are compatible. You may designate multiple sealed sources and source changers when they are compatible with the specific exposure devices. Evaluations of sealed source/device compatibility may be obtained on the Internet.

The United States Nuclear Regulatory Commission (NRC) maintains these evaluations at: <http://www.hsrdr.ornl.gov/nrc/ssdr/ssdrindx.htm>

SUBMIT INFORMATION FOR ITEMS 8 THROUGH 13 ON ADDITIONAL SHEETS

Item 8 - FACILITIES: The agency will not issue a license for industrial radiography use unless a fixed permanent storage facility is established in Texas [§289.252(e)(8)]. Permanent or temporary storage of industrial radiography sources in residences or in residential areas is prohibited [§289.255(v)(3)(B)].

1. Describe the permanent storage facility for radioactive material. This description should include the following.
 - a. Vault - A description of the storage vault including a drawing with dimensions, calculated exposure levels or survey results based on the maximum source activity to be stored in the vault, shielding details, and types of locking devices.
 - b. Building - A description and drawings of the building in which the storage vault is located, the distance to other buildings in the area (especially to occupied office and residential areas), and a description of the building's security to prevent unauthorized entry or removal of radioactive materials (e.g., fencing, alarm system). The drawing should include the following.
 - (i) The scale to which the drawing is made or the distances shown on the drawings.
 - (ii) The type and thickness of shielding materials on all sides, including the floor and roof.
 - (iii) The locations of entries into the facility.
 - (iv) A description of the areas above and below the facility.

- (v) A map of the surrounding area if the location address is not easily identifiable from the information given in Item 2 of the application.
 - (vi) If the proposed storage facility is not owned by your company, please provide a copy of a letter from the owner of the property stating that the individual is aware that you are storing devices containing radioactive material on the property.
 - c. Information detailing the posting of the vault and storage area.
 - 2. Describe the temporary storage of radioactive material in transportation vehicles and facilities including:
 - a. Posting guidelines for temporary storage facilities.
 - b. Precautions taken to prevent unauthorized removal of radioactive material from temporary storage facilities.
 - c. Detailed parameters that should be met prior to allowing devices containing radioactive material to be stored at temporary job sites. These parameters should include, as a minimum, property owner's approval, exclusive access, 24-hour access, construction materials, security/integrity, postings, security, vicinity, etc.
 - 3. When a shielded room or exposure bay is used for industrial radiography, submit a detailed description of the facility that includes the following.
 - a. Drawings or sketches of the shielded room or exposure bay and its surroundings, including the:
 - (i) dimensions of the enclosed area;
 - (ii) type and thickness of shielding material on all sides, including the floor and roof;
 - (iii) location of entries, and
 - (iv) description of the areas adjacent to the shielded room or exposure bay.

- b. Area safeguards such as locks, signs, and visible and audible signals. If an alternate system is to be used, provide a description of that system.
- c. The results of radiation level calculations or actual radiation measurements adjacent to and above the facility should be included in your application. Clearly identify the type and position of each source within the facility that was used in your calculations or measurements.

Item 9 - OPERATING, SAFETY, AND EMERGENCY PROCEDURES:

Operating, safety, and emergency procedures must be written and submitted to the agency for approval as part of your application [§289.255(v)(12)]. (See Appendix A - "Items to be Included in an Operating, Safety, and Emergency Procedures Manual.")

The purpose of operating, safety, and emergency procedures is to provide radiographic personnel with clear and specific guidance and instructions for all radiographic operations they will perform. If radiographers perform operations such as source exchange, leak testing, emergency source retrieval, and quarterly inspection and maintenance of equipment, appropriate procedures and instructions for these operations should be included in your operating, safety, and emergency procedures.

Item 10 - RADIATION DETECTION INSTRUMENTS:

Identify survey instruments to be used in industrial radiography by the manufacturer, model, range, and types of radiation detected. You must maintain a sufficient number of calibrated and operable survey meters to make all required physical radiation surveys at each location where radioactive materials are present [§289.202(p)]. Your instruments must have a range sufficient to measure 2 millirem (20 Sv) per hour through 1 rem (10 Sv) per hour [§289.255(f)(1)].

If you want to be authorized to calibrate radiation survey instruments, submit all items listed in Regulatory Guide 5.2, "Guide for the Preparation of Survey Instrument Calibration Applications."

NOTE: For additional detailed information about survey instrument calibration, refer to ANSI N323-1978, "Radiation Protection Instrumentation Test and Calibration."

Item 11 - LEAK TESTING:

1. Options for your leak testing program are:
 - a. If you are using a commercial leak test provider licensed by the agency, the NRC, or any other agreement state to perform leak tests, provide the name of the leak test provider. Also identify who will use the commercial leak test kits to perform leak tests. If radiographic personnel perform leak tests, include specific instructions in the operating, safety, and emergency procedures on how the tests are to be performed.
 - b. If you are requesting authorization from the agency to perform leak test analysis, submit detailed information requested by Regulatory Guide 5.1, "Guide for the Preparation of Leak Test Applications."
2. Include instructions for performing the physical "wipe" test for sealed sources and depleted uranium (DU) shielding. These procedures should specify that when completing the leak test kit, special attention should be paid to accurately identify the radionuclide of interest being tested (e.g., Ir-192, Co-60, DU, etc.).

NOTE: Depleted uranium leak testing need only be conducted at intervals not to exceed 12 months [§289.255(v)(5)(C)(i)].

Item 12 - TRAINING AND EXPERIENCE:

1. For currently certified radiographers, submit specific procedures for verifying and documenting the certification status of radiographers [§289.255(v)(12)(C)]. These procedures should also track expiration dates of certification.
2. You must submit a description of your program for training radiographers and radiographer trainees to meet the qualifications for certification [§289.255(v)(12)(B)(i)]. The requirements for allowing individuals to act as radiographer trainees, radiographers, and radiographer trainers are specified in §289.255(m).
 - a. Provide your procedures for training and qualifying individuals as radiographer trainees and radiographers. The requirements to become qualified as a radiographer trainee are specified in §289.255(m)(1). The requirements to become certified as a radiographer are specified in §289.255(m)(2).

- b. Radiation Safety Training Course. Training for certification of personnel shall be obtained in an agency-accepted radiation safety training course in accordance with §289.255(y)(1). Provide the name of the company that will provide this training for your personnel. If you propose to provide this training, the following information should be provided:
- (i) A detailed outline of each topic required in accordance with §289.255(y)(1). Also, include the amount of time spent on each topic. The safety course required by §289.255(m)(1)(A) shall include at least 40 hours of classroom instruction.
 - (ii) A description of each demonstration to be provided in the course.
 - (iii) A description of any equipment or visual aids to be used. These may include filmstrips, video tapes, movies, dummy sources, survey instruments, and handling equipment.
 - (iv) Copy of any books, training manuals, workbooks, and/or hand-outs used in the course. If these books, training manuals, and/or workbooks are available commercially, you may provide the title, author(s), and publishing company in lieu of the actual document.
 - (v) Copy of a sample test used in the 40-hour safety training course along with the correct answers to the test questions. Indicate the passing grade of the test. Describe the reinstruction to be given to individuals who have failed the test. Indicate the minimum frequency at which the test will be changed. In addition, provide a description of the security measures taken within your organization to protect the tests and answers. The test should contain at least three questions on each topic addressed in §289.255(y)(1) to ensure that the student has demonstrated an understanding of each topic.
 - (vi) A copy of the certificate that will be presented to each individual who successfully completes the training course.

(vii) Instructor Qualifications.

(I) Identify the individuals who will instruct in the classroom and the topics they will teach.

(II) Submit specific information about the qualifications of these individuals, including where, when, and by whom they were trained in the principles of radiation and radiation safety and in the actual performance of industrial radiography. The person who instructs individuals in the classroom should have knowledge and understanding of the radiation safety principles beyond that obtainable in the course given to prospective radiographers.

c. To qualify as a radiographer trainee, document the successful completion of the 40-hour radiation safety training course and submit to the agency on BRC Form 255-E, "Radiographer Trainee Qualification."

d. On-the-job Training. Ensure that on-the-job training will be for a minimum of 200 hours of active participation in industrial radiographic operations using radioactive materials. Attention should be paid to the definitions of "on-the-job training" and "radiographic operations" found in §289.255(c).

e. To qualify as a radiographer, in addition to successful completion of the agency-administered examination, document the successful completion of the 40 hour safety training course and the on-the-job training and submit to the agency on BRC Form 255-R, "Radiographer Qualification."

3. Training and Testing on Licensee Procedures and Equipment [§289.255(n)(1)]. Clearly indicate that these testing and training requirements will be administered to all radiographic personnel before those individuals can act as a radiographer trainee, radiographer, radiographer trainer, or RSO. All radiographic personnel must successfully complete the oral or written examination required by §289.255(n)(1)(A) and must also successfully complete the practical examination required by §289.255(n)(1)(B). Both of these examinations are administered by the licensee.

- a. Describe the training provided to radiographic personnel in the requirements contained in §289.255(n)(1)(A)(i), the license conditions, and the operating, safety, and emergency procedures. Also, describe the oral or written examination given to verify the understanding of this material.
 - b. Provide a description of the practical examination given to radiographic personnel. The examination should be given in the field and demonstrate the individual's knowledge and competence in using sources of radiation, radiographic exposure devices, associated equipment, handling tools, and radiation survey instruments.
4. Annual Refresher Training [§289.255(v)(7)(F)]. Provide procedures for conducting annual refresher training, including topics to be discussed and who will conduct this training.

Item 13 - WASTE DISPOSAL:

Specify how you will dispose of radioactive material.

Disposal of radioactive material shall satisfy the general requirements in §289.252(p). Waste disposal can usually be accomplished by returning all depleted sources to the manufacturer. The rules also allow radioactive material contained in radiographic devices (the depleted uranium shielding) be disposed of by transfer to an authorized recipient. Authorized recipients are the original supplier, 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 radioactive material. All records of receipt, transfer, and disposal as well as all survey records pertaining to these actions shall be retained for agency inspection. Specific record requirements for receipt, transfer, and disposal are listed in §289.255(e).

Item 14 - CERTIFICATION:

The application shall be dated and signed by a representative of the corporation or legal entity who is authorized to sign official documents and to certify that the application contains information that is true and correct to the best of the applicant's knowledge and belief. All unsigned applications will be returned for proper signature.

B. Submitting a Request for License Amendment or License Termination.

1. Submit an amendment request in letter, rather than on an application form. Always reference your license number when corresponding with the agency. Amendments submitted on an application form may cause a processing delay.
2. Specify exactly what you want changed on the license. Always furnish a justification for the request. The agency will not consider a request for exemption to any part of the rules without meeting at least one of the criteria specified in §289.201(c).
3. Plan ahead whenever possible. For instance, if you have placed a bid on a job and know that an amendment to the license will be required (i.e., new storage/use location, additional radioactive material, addition of radiographer trainers, etc.), forward your request for amendment to the agency immediately. **PLEASE DO NOT WAIT** until after you are awarded the contract to request an amendment.
4. Send your amendment to the Industrial Licensing Program.
5. You will receive the authorization for your license amendment by mail or facsimile. No authorizations are issued via telephone.
6. Always submit the request in duplicate, including attachments. For licensees with more than one permanent use/storage facility listed on the license or for amendment requests, you may be asked to submit more than two copies of your request. If you are asked to submit several additional copies of the request to the agency, it would be advantageous to always submit that requested number of copies with future amendment requests.
7. Send routine amendment requests separately from amendment requests that are more complex. For example, if you are changing RSO and also need to release a permanent storage/use facility for unrestricted use, you should submit each request in separate letters. Many times the agency will perform a confirming close-out survey of your facilities before they are authorized to be released for unrestricted use. This will cause a delay in processing the requested RSO change.

8. If you have a license and a certificate of registration (an authorization for the use of x-ray machines) or multiples of either, always submit the changes that affect the radioactive material license to the Industrial Licensing Program and changes that affect the certificate of registration to the Industrial Registration Program. Submit changes that affect both documents to each program as separate requests.
9. When requesting the relocation of a permanent storage/use facility, note that the new facility must be authorized on the license before relocation can occur. After the amendment is issued and you have relocated to your new facility it is important that you submit a request to terminate the former facility. This request should be accompanied by a close-out radiation survey [§289.202(ccc)].
10. The agency will accept facsimile transmissions as a formal request for amendment. Please limit facsimiles to no more than ten pages, thus originals need **NOT** be sent by regular mail.
11. To terminate your license, the agency requires the following.
 - a. Request should specify that you want to **terminate** the license.
 - b. Copies of surveys required by §289.202 (p), if applicable.
 - c. All fees shall be paid/current. Not paying your annual fee does **NOT** automatically terminate your license.
 - d. Documentation of radioactive material disposition and radiation surveys required by §289.252(l)(4)(C).
 - e. All Notices of Violation shall be resolved through the Division of Compliance and Inspection.
12. The agency reserves the right to conduct a confirming radiation survey and facility evaluation prior to the release of controlled areas for unrestricted use. It is the licensee's responsibility to decontaminate facilities to levels allowing release for unrestricted use. If residual radiation levels or contamination levels exceed the applicable release limits contained in §289.202, your license will not be terminated until release limits have been met.

13. Always address license amendment or license termination requests to:

Texas Department of Health
Bureau of Radiation Control
Attn: Industrial Licensing Project
1100 West 49th Street
Austin, Texas 78756-3189

V. Inspection Process

- A. The agency will inspect your facility to determine whether you are in compliance with the rules, your approved operating, safety, and emergency procedures, and conditions of your license.
1. In the case of a new license, the initial inspection occurs within six months of the date of license issuance.
 2. In the case of an existing industrial radiography license, an inspection is performed approximately every 12 months.
- B. The inspection is usually performed by an inspector from one of the inspection programs in the state's Public Health Regions or, in certain circumstances, by Austin central office personnel.
- C. It is agency policy that industrial radiography inspections be performed unannounced, if possible.
- D. The inspector will arrive at the inspection site and ask to speak with the individual who is in charge at the site or the individual who is listed on the license as the RSO. If an employee with knowledge of the operations under the license or the radiation safety program is not available to assist the inspector, the inspector has the option of rescheduling the inspection.
- E. The inspector will begin the inspection by explaining the reason for the visit and describing the scope of the inspection. Inspection staff will make sure that the inspection process disrupts your business activities as little as possible. It is beneficial for the licensee to provide the inspector with an area in which to review records and record the inspection findings. This will, in most cases, expedite the inspection process.
- F. In most cases, the inspector will ask to perform a physical inspection of your facilities, including those areas where radioactive materials are used and stored. This portion of the inspection will consist of the following.

1. Observations and visual checks of the posting of storage and use areas.
 2. Security and proper storage of sources of radiation.
 3. A check for proper labeling and radiation surveys to verify radiation areas are in compliance with the rules.
 4. Verification that your use and storage areas remain the same as submitted and approved in the license application.
- G. If a temporary field site use is authorized, transport vehicles will be checked for the required company signs and the United States Department of Transportation (DOT) placards.
- H. The inspection will also include a review of records associated with operations at the main site/records location and temporary field sites. The inspector will need to determine from the available records that rules, operating, safety, and emergency procedures, and procedural and license condition requirements are being met. The inspector will request specific records that need to be reviewed in order to determine compliance. The following should be available for inspection.
1. Current copy of license [§289.203(b)].
 2. Current copy of operating, safety, and emergency procedures [§289.203(b)].
 3. Training records for all users of sources of radiation [§289.255(m) and (n)].
 4. Receipt and transfer records for all sources of radiation, including depleted uranium [§289.255(e)].
 5. Survey instrument, pocket dosimeter, electronic personal dosimeter, and alarming ratemeter calibration records [§289.255(f)(2) and (q)].
 6. Leak test records for sealed radioactive sources and depleted uranium [§289.201(g) and §289.255(v)(5)(D)].
 7. Quarterly inspection and maintenance records [§289.255(i)].
 8. Personnel monitoring records [§289.255(q)].
 9. Quarterly inventory records [§289.255(g)].

10. Daily use records documenting field use requirements.
 11. Storage areas and containers surveys [§289.255(v)(8)].
 12. Field audits of radiographic personnel [§289.255(v)(7)].
 13. Utilization logs [§289.255(h)].
 14. Refresher training [§289.255(v)(7)(F)].
 15. Radiation protection program [(§289.201(e)].
- I. The following records for review apply only to permanent radiographic installations [§289.255(v)(9)(B) and (C)].
1. Entrance control test and alarm.
 2. System repairs.
 3. Annual system evaluation.
- J. Following the inspection, the inspector will conduct a summary with management and the RSO. The inspector will explain what was covered during the inspection, the results, and violations to be cited, if any. During this inspection summary, you will have the opportunity to explain or respond to any discrepancies found during the inspection.
- K. The inspection report will be submitted to the Austin central office where it will be reviewed and the appropriate correspondence sent to the licensee.
- L. Concerning the inspection findings.
1. If you receive a letter stating you were found to be in compliance, no response is required.
 2. If you receive a Notice of Violation, you are required to respond in writing to each alleged violation cited in the notice.
 - a. Respond to each alleged violation separately and include specific steps taken to correct the violation and prevent a recurrence.
 - b. Include in your response the date when full compliance will be achieved.

3. Included with each Notice of Violation is a “Notice of Violation--Explanation and Guide for Response.” (See Appendix B.) Appendix B explains the significance of each of the five severity levels, how and what should be in your response, and the address where your response should be sent. A more detailed description of the severity levels appears in §289.205(k).
4. Always reference your license number when corresponding with the agency.
5. When correspondence concerns a specific inspection, also reference the Compliance Number shown on the notice.

APPENDIX A

ITEMS TO BE INCLUDED IN THE OPERATING, SAFETY, AND EMERGENCY PROCEDURES MANUAL

1. Submit a description of the organization of the industrial radiographic program including delegations of authority and responsibility for operation of the radiation safety program. Identify the management structure and the RSO's position within that structure.
2. The following provides a more detailed explanation of the items required to be included in your operating, safety, and emergency procedures manual [§289.255(v)(12)(B) and (y)(4)].

- a. Handling and Using Sealed Sources and Radiography Exposure Devices

- (i) Provide step-by-step instructions for using each type of radiographic exposure device. Manufacturers' manuals and similar documents should not be incorporated into the procedures; rather, information should be extracted from them. Particular emphasis should be placed on conducting daily equipment inspections, including the use of go-no-go gauges, radiation surveys, and area surveillance. Include in these procedures the use of a utilization log [§289.255(h)]. BRC Form 255-U, "Utilization Log," may be used for this purpose or you may develop your own. Plainly indicate in your instructions to personnel how the utilization log will be maintained.

- (ii) Procedures should also describe the step-by-step use of each model of source changers.

- b. Method and Occasions for Conducting Radiation Surveys

Identify when surveys are to be made, the items that are surveyed, and the radiation levels that are acceptable. The following are examples of surveys you should make during industrial radiography and associated operations.

- (i) A survey of the perimeter of the restricted area to determine the exposure levels. NOTE: It is not necessary to perform a physical survey of the perimeter of the high radiation area. Exposure levels may be determined by calculation, in keeping with the as low as reasonably achievable (ALARA) concept [§289.255(v)(8)(C)].

- (ii) A survey of the entire circumference of the radiographic exposure device, guide tube, and collimator, if applicable, after each radiographic exposure to determine that the source has returned to the safe storage position [§289.255(v)(8)(B)].
- (iii) Lock out surveys [§289.255(v)(8)(F)].
- (iv) A survey of the radiation levels at external surfaces of storage containers (vault), including the levels at external surfaces of vehicles used for storage [§289.255(v)(8)(G)].
- (v) A survey of the radiation levels in the cabs of transportation vehicles and the external surfaces of vehicles used for transporting sources and devices.
- (vi) A survey of the containers prepared for shipment according to DOT regulations.
- (vii) A survey of radiographic exposure devices and source exchange devices to ensure that sources are in a safe storage position following source exchange.

c. Methods for Controlling Access to Industrial Radiography Areas

Provide separate instructions for permanent radiographic facilities and temporary job site operations.

- (i) Permanent radiographic facilities.

Include instructions in the use of control devices and warning devices that are incorporated into the facility. Provide instructions for posting entrances to the facility with "Caution (or Danger) High Radiation Area" signs and provide procedures to ensure that the system is operable [§289.255(r)].

- (ii) Temporary job site operations.

Provide specific instructions regarding the access control to radiation areas. A perimeter or boundary should be established. In addition to the ropes, signs, tapes, and barriers, radiographic personnel shall keep the perimeter of the restricted area under continuous surveillance [§289.255(r)(1)]. It is acceptable to post the perimeter of the restricted area rather than the perimeter of the radiation area [§289.255(s)(5)]. If an unauthorized individual enters the radiation area, the source shall be returned to the fully shielded position [§289.255(r)(1)].

- (iii) Instructions required in all operations.

Specify procedures to be implemented that prevent unauthorized personnel from entering the restricted area. Instruct personnel to post "Caution (or Danger) Radiation Area" signs at the calculated 5 mR in one hour radiation level and to make a confirming survey after the source has been exposed. Do not include instructions for a confirming survey of the high radiation area perimeter, since such a survey could lead to unnecessary exposure of personnel.

d. Methods and Occasions for Locking and Securing Sources of Radiation

Provide instructions for the locking and securing of sources and devices, including storage containers and source changers, at both permanent and temporary job sites. Situations requiring the physical locking or securing of a source of radiation include the following:

- (i) prior to being transported;
- (ii) storage at any given location; and
- (iii) when the radioactive source is returned to the shielded position within the radiographic exposure device.

e. Use of Individual Monitoring Devices

- (i) Provide a procedure that ensures each radiographer trainer, radiographer, or radiographer trainee must wear the following in accordance with §289.255(q)(2)(A), during all radiographic operations:
 - (I) a direct-reading pocket dosimeter or electronic personal dosimeter;
 - (II) either a film badge, thermoluminescence dosimeter (TLD), or optically stimulated luminescence dosimeter (OSL); and
 - (III) an alarming rate meter.
- (ii) Individual monitoring devices shall meet the requirements of §289.202(p)(3).

- (iii) Provide directions on the exchange of individual monitoring devices, charging or resetting of pocket dosimeters, the frequency of reading pocket dosimeters, and instructions on how and where to store dosimetry devices when not in use.
 - (iv) Provide instructions for checking pocket dosimeters for exposure and energy response [§289.255(q)(2)(E) and (F) and (q)(3)].
 - (v) Provide step-by-step instructions for what radiographic personnel must do if a pocket dosimeter goes off-scale or if an electronic personal dosimeter reads greater than 200 mrem (2 mSv) [§289.255(q)(2)(G)]. The procedure shall include the following instructions.
 - (I) Stop work immediately and return the source to the fully shielded position.
 - (II) Notify the appropriate individuals.
 - (III) Submit to the RSO the film badge, TLD, or OSL for immediate processing.
- f. Transportation of Radioactive Material.
- (i) Provide procedures for transporting to field locations, including packaging of radioactive material in the vehicles, placarding of vehicles, and controlling radioactive material during transportation. The transportation of radioactive material over public highways is subject to §289.257 and DOT regulations.
 - (ii) Provide instructions on how exposure devices and storage containers will be secured within a transporting vehicle to prevent movement and possible damage to, or loss of, the exposure device or storage container. Your personnel should be instructed in the following items.
 - (I) How to determine which label (Radioactive White I, Radioactive Yellow II, or Radioactive Yellow III) shall be used [49 Code of Federal Regulations (CFR) 172.403].
 - (II) The method by which the exposure device or storage container is to be secured in the vehicle so that it cannot move during transport.
 - (III) When to placard both sides, the front, and the back of the vehicle.

(IV) The proper completion of all required shipping manifests.

g. Minimizing Exposure of Individuals in the Event of an Accident - Emergency Procedures.

(i) Provide procedures for radiographic personnel that contain clear and specific guidelines covering emergency situations. An emergency situation is considered to exist whenever an unusual radiation event occurs that is or may become a radiation hazard. Since it is not possible to list or describe all possible situations that constitute an emergency, include general instruction for the most common emergency situations including, as a minimum, procedures for a disconnect accident, a transportation accident, and loss of a sealed source of radiation.

(ii) Provide procedures for emergency source retrieval. The agency understands that no two emergency source retrievals situations are identical; therefore, there is no defined set of procedures. However, certain operations, activities, and actions will remain the same, regardless of the situation. The purpose of emergency source retrieval procedures is to provide quick, reliable guidance.

(I) If a source is to be retrieved by a person other than the licensee, confirm that the individual will be authorized by the agency to retrieve sources. A list of persons authorized by the agency to perform emergency source retrieval can be accessed at:
www.tdh.state.tx.us/ech/rad/pages/page17.htm

(II) Performing emergency source retrieval must be authorized by a condition on your license [§289.255(v)(11)(B)] if you intend to perform emergency source retrieval.

(-a-) In order to be authorized for emergency source retrieval, detailed procedures should be submitted. As a minimum, these procedures should include the following.

(-1-) A list of equipment to be used for source retrieval operations.

(-2-) Step-by-step guidelines for the retrieval of sources involving different scenarios (e.g. source stuck in guide tube, source disconnected from drive cable, source will not go to fully shielded position, etc.).

(-3-) Use of survey meters, dosimetry, time, distance, and available shielding throughout the step-by-step instructions.

(-b-) Radiographic personnel shall not attempt to perform operations involving retrieval of a source in an unshielded position unless they have specific training, instruction, and/or actual practice in retrieval operations. For radiographic personnel who will be performing source retrievals, furnish their resumes detailing their experience with source retrievals (give specific examples, including place, licensee, date, and situation) or evidence of training obtained that was specific to source retrievals (furnish syllabus from course and certificate of successful completion).

(III) Regardless of who performs source retrieval, the procedures should include:

(-a-) instructions for notification of the agency, including content of reports; and

(-b-) description of the ultimate disposition of damaged equipment/sources (e.g., crimped guide tubes, failed source assemblies, etc.).

h. Notifying Proper Personnel in the Event of an Accident.

Clearly identify the names and telephone numbers of management or supervisory personnel to be notified in the event of an accident. Such persons may also include police and fire department contacts, depending on the emergency [§289.255(k)].

i. Posting and Labeling Requirements.

(i) Outline the procedures and requirements for the posting and labeling of radiographic areas, equipment, and vehicles.

(ii) Give the procedures for labeling of sources, exposure devices, source changers, and transport containers.

(iii) Describe the posting of storage areas.

(iv) Discuss in your procedures instructions for the routine inspection of all required postings and labels, including provisions for identification and location of each label and posting, condition of each, replacement, and the date and identification of the person conducting the inspection.

j. Recordkeeping.

Your procedures should include instructions to radiographic personnel by outlining what records they must complete and how the records should be completed. Specific records generated by radiographic personnel while performing industrial radiography must include at least those records specified in §289.255(w).

If you conduct industrial radiography at a temporary job site, you must have the records required by §289.255(w)(10) available at that site for agency inspection. Further, §289.255(w)(9) requires that certain records be kept at all additional authorized use/storage sites.

The requirements for record retention are given in §289.255(y)(3).

k. Daily Inspection and Maintenance.

Include specific instructions about performing daily inspections of radiographic equipment, including survey instruments, associated equipment, and source changers. These inspections are not intended to be as detailed as the quarterly inspection. In most cases, manufacturers of the equipment will provide a list of items for daily inspections. You shall provide the radiographer with a unique checklist of the items to be checked in the daily inspection. If the manufacturer's equipment list is to be followed, include it as a part of your procedures. Radiographic equipment should be checked each day prior to use. Specify in the procedures the steps to be taken if any equipment is found to be defective. Your instructions shall at least meet the requirements of §289.255(i)(1) and be tailored to your specific program and uses.

The minimum requirements for quarterly equipment inspections [§289.255(y)(2)] should be formalized as part of your procedures in the form of a checklist. Procedures should be submitted detailing how these inspections will be completed.

A formalized procedure should be submitted for the inspection and maintenance of Type B packages [§289.255(i)(2)(B)]. This procedure should specify inspection intervals, items checked during inspection, comparison to Type B certificate of compliance, results, and actions taken to resolve items of non-compliance.

1. Internal Audit Program.

- (i) An internal audit program that ensures that regulations, license conditions, and operating, safety, and emergency procedures are followed by radiographers and radiographer trainees is required [§289.255(v)(7)(A)]. Submit a description of your internal audit program, including specific items covered in an audit, and the procedures for recording and reporting deficiencies to appropriate management personnel. Audits shall be made at intervals not to exceed six months and, if possible, should be unannounced.
- (ii) Specify the name, training, and experience of each individual conducting the internal audits. Individuals who conduct internal audits should have experience as a radiographer trainer or as an RSO.
- (iii) The internal audit program should include the educational follow-up program to be used in correcting deficiencies noted during the internal audit.
- (iv) The following internal audit checklist provides an example of an acceptable internal audit. However, your internal audit checklist should be tailored to your specific program.

Sample - Checklist for Internal Audit of Radiographic Personnel Performance

Radiographic Location _____ Date _____ Time _____

—

Personnel _____ Auditor _____

—

Personnel _____ Personnel _____

—

(Include status for all personnel: trainee, radiographer, trainer, RSO)

Survey Meter Model No. _____ Serial No. _____ Calibration
Due Date _____

—

ISOTOPE

Radioisotope _____ Curies (GBq) _____ Serial No. _____

—

Camera Serial No. _____ Camera Model No. _____

-

1. Were the radiographic personnel wearing film badges, TLDs, or OSLs?

2. Were the radiographic personnel wearing alarming ratemeters?
3. Were the radiographic personnel wearing pocket dosimeters or electronic personal dosimeters?
4. Was the restricted area posted with "CAUTION (or DANGER) HIGH RADIATION AREA" signs?
5. Was the radiation area posted with "CAUTION (or DANGER) RADIATION AREA" signs?
6. Was the radiation area properly controlled to prevent unauthorized entry?
7. Was the high radiation area posted with "CAUTION (or DANGER) HIGH RADIATION AREA" signs?
8. Did the radiographic personnel have a calibrated and properly operating survey instrument?
9. Was the utilization log properly filled out?
10. Were the radiographic personnel working with defective or damaged equipment?
11. Did the radiographic personnel perform an area radiation survey during the first radiographic exposure?
12. Did the radiographic personnel properly survey the radiographic exposure device following each exposure?
13. Did the radiographic personnel properly survey the source tube and collimator, if applicable, following each exposure?
14. Were radioactive sources stored properly?
15. Were radioactive sources locked to prevent unauthorized removal?
16. Was the storage area posted with "CAUTION (or DANGER) RADIOACTIVE MATERIAL" signs?
17. Did the radiographic personnel possess a copy of the applicant's operating, safety, and emergency procedures?
18. Did the radiographic personnel possess a copy of applicable state or NRC rules?

- 19. Did the radiographic personnel possess a current copy of the license?
- 20. Did the radiographic personnel have a certification ID card or valid trainee status card?
- 21. If applicable, did the radiographic personnel have and use proper ropes and barriers?
- 22. Was the collimator properly used?
- 23. Were there any items of noncompliance other than those listed on this form? (If any, explain in remarks.)

Remarks _____

Auditor's signature _____ Date _____

Personnel's signature _____ Date _____

Personnel's signature _____ Date _____

Personnel's signature _____ Date _____

- m. Underwater Radiography (if applicable). Underwater radiography is defined as radiography conducted when the exposure device and/or any related equipment are beneath the surface of water. Offshore radiography is radiography conducted within nine nautical miles of the Texas coast. Lay-barge radiography is radiography performed on any vessel used for laying pipe.
 - (i) Underwater radiography is prohibited unless authorized by license condition [§289.255(v)(10)].

- (ii) Provide procedures for the following topics:
 - (I) Individual Monitoring Devices, including location to be worn.
 - (-a-) Film badges - Sealed capsule;
 - (-b-) TLDs;

- (-c) OSLs; and
- (-d) Pocket dosimeter or electronic personal dosimeter.
 - (-1) Sealed capsule
 - (-2) Charging or resetting procedures
 - (-3) Recording of readings
- (II) Survey Meters.
 - (-a) Sealed capsule
 - (-b) Presetting meter
 - (-c) Care, calibration, and maintenance
- (III) Specific Posting and Area Restrictions for Underwater Use.
- (IV) Exposure Procedures.
 - (-a) Two person crews
 - (-b) Procedures for actual exposure
 - (-c) Survey after exposures
 - (-d) Return of source to surface
- (V) Underwater Transport.
 - (-a) Procedures for transportation of the sources underwater
 - (-b) Methods for servicing the source for underwater transport
- (VI) Inspection and Maintenance.
 - (-a) Checklist of all equipment for underwater use
 - (-b) Abnormal surface radiation
 - (-c) Deviation from normal operating characteristics

- (-d-) Daily check of shutter mechanism
 - (-e-) Binding or scraping of shutter mechanism
 - (-f-) Notation of any damage to device
 - (-g-) Proper operation of locking mechanism
 - (-h-) Device and controls treatment with water displacement lubricant prior to submersion and after each submersion
 - (-i-) Return of exposure devices to the manufacturer periodically for repair and maintenance
 - (-j-) Maintenance and repair records
- (VII) Radiation safety training of divers who are assisting radiographic personnel (if they are not already trained radiographers).
- (VIII) Prohibition of divers carrying exposure devices while ascending or descending. Exposure devices should be carried in a basket.
- (IX) Prohibition of use of cobalt-60 sources with activities in excess of 20 curies (740 GBq) and iridium-192 sources with activities greater than 100 curies (3.7×10^{-3} GBq).
- n. Lay-Barge and Offshore Platform Radiography (if applicable).

Procedures for lay barges and offshore platform radiography should address the following.

- (i) Protection of personnel in berthing spaces.
- (ii) Scatter radiation from the radioactive source.
- (iii) The use of collimators for all sources.
- (iv) Establishment of restricted areas by radiographic personnel.
- (v) Storage parameters, precautions, and procedures.

- (vi) Prohibition of use of cobalt-60 sources with activities in excess of 20 curies (740 GBq) and iridium-192 sources with activities greater than 100 curies (3.7×10^{-3} GBq).
- (vii) Unique transport procedures.

APPENDIX B

NOTICE OF VIOLATION -- EXPLANATION AND GUIDE FOR RESPONSE

1. AGENCY INSPECTION. An inspection was performed to determine compliance with Title 25, Texas Administrative Code, Chapter 289 (25 TAC §289) [also known as the *Texas Regulations for Control of Radiation*] and your license. The inspection consisted of selective examinations of radiation safety and operating procedures, radiation use/storage facilities, the presence/adequacy of required records, interviews, radiation surveys, and (in some cases) facility and/or environmental samples. During this compliance inspection, the agency inspector identified one or more items that appear to be violations, reviewed each alleged violation at the conclusion of the inspection with the person indicated on the Notice of Violation (Notice), and detailed the alleged items of noncompliance to the agency's central office in a written report. That report has been reviewed, health physics staff agree with the inspector's findings, and each alleged violation is listed in the accompanying Notice.

2. SEVERITY LEVELS. Each alleged violation has been assigned a Severity Level. The Severity Level indicates the significance of the noncompliance; and it may be elevated if the item is a repeat violation, etc.

Severity I -- Most Significant Violation
Severity II -- Very Significant Violation
Severity III -- Significant Violation
Severity IV -- Violation
Severity V -- Minor Violation

3. LICENSEE RESPONSE. You are required to take immediate corrective action and submit a written reply to the agency within thirty (30) days after receiving a Notice. **For each individual alleged violation, the reply must either:**
 - a. **describe the specific steps taken to correct the alleged violation, the steps taken to prevent its recurrence, and indicate the date when full compliance was (or will be) achieved; OR,**
 - b. **explain and/or document why the alleged violation is not valid.**

In your written response, please reference the **Compliance Number** (located at the top left of the Notice) and your **License Number**. Also, please direct your response to the attention of the individual who reviewed the inspection report at the following address:

TEXAS DEPARTMENT OF HEALTH
BUREAU OF RADIATION CONTROL
DIVISION OF COMPLIANCE AND INSPECTION
1100 WEST 49TH STREET
AUSTIN, TEXAS 78756-3189

Alternatively, responses to a Notice may be faxed to the agency reviewer at: (512) 834-6654.

4. LICENSE AMENDMENT. If an amendment to your license is required to correct any violation, please submit your amendment request under separate cover from your response to this Notice and **direct it to the Industrial Licensing Program** at the same mailing address. Amendment requests may also be faxed to (512) 834-6690.
5. QUESTIONS? Call the individual who reviewed and signed the Notice at (512) 834-6688.

NOTE: If you have Internet access, the agency has an indexed site where current and proposed regulations, agency regulatory guides, and compliance inspection forms can be viewed and downloaded.

<http://www.tdh.state.tx.us/ech/rad/pages/brc.htm>