25 TEXAS ADMINSTRATIVE CODE (TAC)

§289.255

Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography

Texas Regulations for Control of Radiation

(revisions effective October 23, 2024, are shown as shaded text)

25 TAC §289.255

Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography (Continued)

25 TAC §289.255

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TITLE 25 HEALTH SERVICES
PART 1 DEPARTMENT OF STATE HEALTH SERVICES
CHAPTER 289 RADIATION CONTROL
SUBCHAPTER F LICENSE REGULATIONS

§289.255. Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography.

(a) Purpose.

(1) The requirements in this section establish radiation safety requirements and licensing and registration procedures for using sources of radiation for industrial radiography and for certification of industrial radiographers.

(2) The requirements in this section apply to licensees and registrants who possess sources of radiation for industrial radiography, including radiation machines, accelerators, and sealed radioactive sources.

(3) Each licensee and registrant is responsible for ensuring compliance with this chapter, license and registration conditions, and orders of the department.

(4) Each licensee and registrant is responsible for ensuring radiographic personnel performing activities under a license or registration comply with this chapter, license and registration conditions, and orders of the department.

(b) Scope.

(1) The requirements of this section are in addition to and not in substitution for other applicable requirements of this chapter.

(2) The requirements of the following sections of this chapter apply to all licensed industrial radiographic operations:

(A) §289.201 of this chapter (relating to General Provisions for Radioactive Material);

(B) §289.202 of this chapter (relating to Standards for Protection Against Radiation from Radioactive Materials);

(C) §289.203 of this chapter (relating to Notices, Instructions, and Reports to Workers; Inspections);

(D) §289.204 of this chapter (relating to Fees for Certificates of Registration, Radioactive Material Licenses, Emergency Planning and Implementation, and Other Regulatory Services);

(E) §289.205 of this chapter (relating to Hearing and Enforcement

Procedures);

(F) §289.251 of this subchapter (relating to Exemptions, General Licenses, and General License Acknowledgements);

(G) §289.252 of this subchapter (relating to Licensing of Radioactive Material); and

(H) §289.257 of this subchapter (relating to Packaging and Transportation of Radioactive Material).

(3) The requirements of the following sections of this chapter apply to all registered industrial radiographic operations:

(A) §289.203 of this chapter;

(B) §289.204 of this chapter;

(C) §289.205 of this chapter;

(D) §289.226 of this chapter (relating to Registration of Radiation Machine Use and Services); and

(E) §289.231 of this chapter (relating to General Provisions and Standards for Protection Against Machine-Produced Radiation).

(4) The requirements of §289.228 of this chapter (relating to Radiation Safety Requirements for Industrial Radiation Machines) apply to persons using analytical and other industrial radiation machines subject to this section.

(5) The requirements of §289.229 of this chapter (relating to Radiation Safety Requirements for Accelerators, Therapeutic Radiation Machines, Simulators and Electronic Brachytherapy Devices) apply to persons using accelerators subject to this section.

(c) Definitions. The following words and terms when used in this section have the following meaning unless the context clearly indicates otherwise.

(1) ANSI--American National Standards Institute.

(2) Annual refresher safety training--A review conducted or provided by the licensee or registrant for its employees on radiation safety aspects of industrial radiography. The review may include, as appropriate, the results of internal audits, new procedures or equipment, new or revised regulations, accidents or errors that have been observed, and should also provide opportunities for employees to ask safety questions.

(3) Associated equipment--Equipment, used in conjunction with a radiographic exposure device used to make radiographic exposures, that drives, guides, or comes in contact with the source, (such as, guide tube, control tube, control cable (drive cable), removable source stop, "J" tube, and collimator when it is used as an exposure head).

(4) Cabinet x-ray system--An x-ray system with the x-ray tube installed in an enclosure independent of existing architectural structures except the floor on which it may be placed. An x-ray tube used within a shielded part of a building, or x-ray equipment that may temporarily or occasionally incorporate portable shielding, is not considered a cabinet x-ray system. The cabinet x-ray system is intended to:

(A) contain at least that portion of a material being irradiated;

(B) provide radiation attenuation; and

(C) exclude personnel from its interior during generation of radiation.

(5) Certifiable cabinet x-ray system--An existing uncertified x-ray system modified to meet the certification requirements specified in 21 Code of Federal Regulations (CFR) §1020.40.

(6) Certification identification (ID) card--The document issued by the department to individuals who have completed the requirements stated in subsection (e)(2)(A) of this section.

(7) Certified cabinet x-ray system--An x-ray system that has been certified as specified in 21 CFR §1010.2 as being manufactured and assembled on or after April 10, 1975, as specified in the provisions of 21 CFR §1020.40.

(8) Certifying entity--An entity that is:

(A) an independent certifying organization;

(B) an Agreement State whose industrial radiographer certification program meets the applicable parts of 10 CFR Part 34, Appendix A, Parts II and III for radioactive material; or

(C) a radiation control agency whose x-ray or combination certification requirements are found to be equivalent to criteria established by the Conference of Radiation Control Program Directors, Inc..

(9) Collimator--A radiation shield placed on the end of a guide tube or directly onto a radiographic exposure device to restrict the size of the radiation beam when the sealed source is cranked into position to make a radiographic exposure.

(10) Conference of Radiation Control Program Directors, Inc. (CRCPD)--A 501(c)(3) nonprofit, non-governmental, professional organization dedicated to radiation protection to serve as a common forum for the many governmental radiation protection agencies to communicate with each other and to promote uniform radiation protection regulations and activities.

(11) Control cable (drive cable)--The cable connected to the source assembly and used to drive the source from and return it to the shielded position.

(12) Control mechanism (drive mechanism)--A device enabling the source assembly to be moved from and returned to the shielded position. A drive mechanism is also known as a crank assembly.

(13) Control tube--A protective sheath for guiding the control cable. The control tube connects the control drive mechanism to the radiographic exposure device.

(14) Crank-out device--The control cable, control tube, and drive mechanism used to move the sealed source to and from the shielded position to make an industrial radiographic exposure.

(15) 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.

(16) Field station--A facility where licensed material or radiation machines are stored or used and from which equipment is dispatched to temporary job sites.

(17) Guide tube--A flexible or rigid tube, such as a "J" tube, for guiding the source assembly and the attached control cable from the exposure device to the exposure head. The guide tube may also include the connections necessary for attachment to the exposure device and to the exposure head.

(18) Independent certifying organization--An independent organization meeting the criteria of 10 CFR Part 34, Appendix A, for radioactive material, or comparable standards for x-ray machines.

(19) Industrial radiography (radiography)--A non-destructive testing method using ionizing radiation, such as gamma rays or x-rays, to make radiographic images for the purpose of detecting flaws in objects without destroying them.

(20) Lay-barge radiography--Industrial radiography performed on any water vessel used for laying pipe.

(21) Lock-out survey--A radiation survey performed to determine a sealed source is in its fully shielded position before moving the radiographic exposure device or source changer to a different temporary job site or before securing the

radiographic exposure device or source changer against unauthorized removal.

(22) Offshore--Within the territorial waters of the State of Texas. The territorial waters of Texas extend to the three marine league line or nine nautical miles from the Texas coast.

(23) On-the-job training (hands-on experience)--Experience in all areas considered to be directly involved in the radiography process. The hours of on-the-job training do not include safety meetings, classroom training, travel, darkroom activities, film development and interpretation, or use of a cabinet x-ray unit.

(24) Permanent radiographic installation--An enclosed shielded room, cell, or vault, not located at a temporary job site, in which radiography is performed and meets the criteria of subsection (n) of this section.

(25) Personal supervision--Guidance and instruction provided to a radiographer trainee by a radiographer trainer present at the site, in visual contact with the trainee while the trainee is using sources of radiation, associated equipment, and survey meters, and in such proximity that immediate assistance can be given, if required.

(26) Pipeliners--A directional beam radiographic exposure device.

(27) Platform radiography--Industrial radiography performed on an offshore platform or other structure over a body of water.

(28) Practical examination--A demonstration through practical application of the safety rules and principles in industrial radiography including use of all appropriate equipment and procedures.

(29) Radiation safety officer (RSO)--An individual named by the licensee or registrant and listed on the license or certificate of registration having a knowledge of, responsibility for, and authority to enforce appropriate radiation protection rules, standards, and practices on behalf of the licensee or registrant and who meets the requirements of subsection (e)(4) of this section.

(30) Radiographer--Any individual who has successfully completed the requirements of subsection (e)(2)(A) of this section, performs industrial radiographic operations, or provides visual surveillance of industrial radiographic operations while in attendance during transport or at the site where the sealed source or sources are being used, and is responsible to the licensee or registrant for assuring compliance with the requirements of the department's regulations and conditions of the license or certificate of registration. These individuals may be referred to as certified industrial radiographers or certified radiographers.

(31) Radiographer certification--Written approval received from a certifying entity stating an individual has satisfactorily met certain established radiation

safety, testing, and experience criteria.

(32) Radiographer trainee--Any individual who has successfully completed the training and documentation requirements of subsection (e)(1)(A) of this section and uses sources of radiation and associated equipment or radiation survey instruments under the personal supervision of a radiographer trainer.

(33) Radiographer trainer--A radiographer who instructs and supervises radiographer trainees during on-the-job training and meets the requirements of subsection (e)(3) of this section.

(34) Radiographic exposure device--Any instrument containing a sealed source fastened or contained therein, where the sealed source or shielding may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure (e.g., camera).

(35) Radiographic operations--All activities associated with the presence of x-ray machines or radioactive sources in a radiographic exposure device during the use of the machine or device or transport (except when being transported by a common or contract transport). Radiographic operations include surveys to confirm the adequacy of boundaries, setting up equipment, and any activity inside restricted area boundaries.

(36) Radiographic personnel--Any radiographer, radiographer trainer, or radiographer trainee.

(37) Residential location--Any area where a structure or structures are located, in which people live, and the grounds on which these structures are located, including houses, apartments, condominiums, and garages.

(38) S-tube--A tube through which the radioactive source travels when inside a radiographic exposure device.

(39) Shielded position--The location within the radiographic exposure device or source changer where the sealed source is secured and restricted from movement.

(40) Shielded-room radiography--Industrial radiography conducted in a room shielded so radiation levels at every location on the exterior meet the limitations specified in §289.202(n) of this chapter or §289.231(o) of this chapter, as applicable. A shielded room is also known as a bay or bunker.

(41) Source assembly (pigtail)--An assembly consisting of the sealed source and a connector that attaches the source to the control cable. The source assembly may also include a ball stop used to secure the source in the shielded position.

(42) Source changer--A device designed and used to replace sealed sources

in radiographic exposure devices, including those used to transport and store sealed sources.

(43) Storage area--Any location, facility, or vehicle used to store and secure a radiation machine, radiographic exposure device, a storage container, or a sealed source when it is not in use. Storage areas are locked or have a physical barrier to prevent accidental exposure, tampering, or unauthorized removal of the machine, device, container, or source.

(44) Storage container--A device in which the sealed source is secured and stored.

(45) Temporary job site--A location where radiographic operations are conducted and where licensed or registered sources of radiation may be stored other than the specific use location or locations listed on a license or certificate of registration.

(46) Trainee status card--The document issued by the department following completion of the requirements of subsection (e)(1)(A) of this section.

(47) Transport container--A package that is designed to provide radiation safety and security when sealed sources are transported and meets all applicable requirements of the United States Department of Transportation (DOT).

(48) Underwater radiography--Industrial radiography performed when the radiographic exposure device or related equipment are beneath the surface of the water.

(d) Exemptions.

(1) Uses of certified and certifiable cabinet x-ray systems are exempt from the requirements of this section except for the requirements of subsections (a), (b)(3), (c), and (t)(8) of this section.

(2) Industrial uses of hand-held light intensified imaging devices are exempt from the requirements in this section if the exposure rate 18 inches from the source of radiation to any individual does not exceed 2 millirem per hour (mrem/hr) (0.02 millisievert per hour (mSv/hr)). Devices with exposure rates that exceed the 2 mrem/hr (0.02 mSv/hr) level must meet the applicable requirements of this section and §289.252 of this subchapter or §289.226 of this chapter, as applicable. This exemption will apply only to those radiation machines that do not allow a person or body part to be exposed to the radiation beam.

(3) Radiation machines determined by the department to constitute a minimal threat to human health and safety as specified in §289.231(ll)(3) of this chapter are exempt from the requirements in this section except for the requirements of paragraph (1) of this subsection.

(4) Facilities that utilize radiation machines for industrial radiography only at permanent radiographic installations are exempt from the requirements of this section except for the requirements of subsections (a), (b)(1), (b)(3) - (5), (c), (e), (j), (k), (n), (o), (t)(1), (t)(2), (t)(5), and (t)(7).

(e) Requirements for qualifications of radiographic personnel.

(1) Radiographer trainee. Licensees or registrants must not permit any individual to act as a radiographer trainee until the individual possesses the original or a copy of a department-issued trainee status card or certification ID card.

(A) To obtain a department-issued trainee status card, the licensee, registrant, or the individual must document to the department on RC Form 255-E, or equivalent, that such individual has successfully completed a course of at least 40 hours on the applicable subjects outlined in subsection (x)(1) of this section.

(B) The trainee must carry a copy of the completed RC Form 255-E in the interim period after submitting documentation to the department and before receiving a trainee status card. The copy of the completed RC Form 255-E submitted to the department may be used in lieu of the trainee status card for a period of 30 days from the date recorded by the trainee on the documentation.

(C) The individual must notify the department, in writing, of the need for a replacement trainee status card. The individual must carry a copy of documentation of the request while performing industrial radiographic operations until a replacement trainee status card is received from the department.

(D) Records required by subparagraph (A) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section.

(E) Each licensee and registrant must maintain, for inspection by the department, clear and legible records demonstrating all the applicable requirements of this paragraph are met. A copy of the trainee status card will satisfy the documentation requirements of this paragraph.

(2) Radiographer. Licensees or registrants must not permit any individual to act as a radiographer until the individual possesses a valid radiographer certification.

(A) To obtain a radiographer certification, an individual must submit the fee as prescribed in subsection (h)(1) of this section and:

(i) complete the requirements of paragraph (1)(A) of this subsection;

(ii) document to the department on RC Form 255-R completion of on-the-job training as a radiographer trainee supervised by a radiographer

trainer who meets the requirements of subsection (e)(3) of this section;

(I) The radiographer trainee must carry a legible trainee status card as specified in paragraph (1) of this subsection while obtaining the on-the-job training specified in subclauses (II) - (VII) of this clause.

(II) The on-the-job training must include at least 200 hours of active participation in radioactive materials industrial radiographic operations or 120 hours of active participation in x-ray industrial radiographic operations, as applicable.

(III) Individuals performing industrial radiography utilizing radioactive materials and x-ray machines must complete both segments (320 hours) of on-the-job training.

(IV) The hours of on-the-job training do not include safety meetings, classroom training, travel, darkroom activities, film development and interpretation, or use of a cabinet x-ray unit.

(V) One year of documented experience of on-the-job training as authorized by another agreement state or the United States Nuclear Regulatory Commission (NRC) may be substituted for the requirements of subclauses (II) or (III) of this clause. The documentation must be submitted to the department on RC Form 255-OS or equivalent.

(VI) The trainee must be under the personal supervision of a radiographer trainer whenever a radiographer trainee:

(-a-) uses radiation machines, radiographic exposure devices, or associated equipment; or

(-b-) performs radiation surveys required by:

(-1-) subsection (t)(6) of this section to determine the radiation machine has stopped producing radiation; or

(-2-) subsection (u)(9) of this section to determine the sealed source has returned to the shielded position after an exposure.

(VII) The personal supervision must include:

(-a-) the radiographer trainer's physical presence at the site where the sources of radiation are being used;

(-b-) the availability of the radiographer trainer to give immediate assistance if required; and

(-c-) the radiographer trainer's direct observation of the trainee's performance of the operations referred to in this section.

(iii) successfully complete within the last five years the appropriate department-administered examination prescribed in subsection (g)(2) of this section or the appropriate examination of another certifying entity that affords the same or comparable certification standards as those afforded by this clause and clauses (i) and (ii) of this subparagraph; and

(iv) possesses a current certification ID card issued as specified in subsection (h)(2) of this section or by another certifying entity affording the same or comparable certification standards as those afforded by this clause or clauses (i) - (iii) of this subparagraph.

(B) Reciprocal recognition by the department of an individual radiographer certification may be granted as specified in subsection (h)(5)(A) and (B) of this section.

(C) Once an individual has completed the requirements of paragraph (2)(A)(iv) of this subsection, the licensee or registrant is not required to submit the documentation referenced in paragraph (2)(A)(i) and (ii) of this subsection for renewal of a radiographer certification.

(D) Records required by subparagraph (A) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section.

(E) Each licensee and registrant must maintain for inspection by the department, clear and legible records demonstrating the applicable requirements of this paragraph are met for all industrial radiographic personnel. A copy of the certification ID card will satisfy the documentation requirements of this paragraph.

(3) Radiographer trainer.

(A) Licensees or registrants must not permit any individual to act as a radiographer trainer until:

(i) it has been documented to the department on RC Form 255-T or equivalent the individual has:

(I) met the radiographer certification requirements of paragraph (2)(A) of this subsection; and

(II) documented 2000 hours of direct experience as a certified radiographer.

(ii) the individual is in receipt of a valid trainer certification ID card issued by the department and under which the individual is acting as a

radiographer trainer; and

(iii) determination is made by the department the individual is not currently under order from the department prohibiting the individual from acting as a radiographer trainer.

(B) The specific duties of the radiographer trainer include:

(i) providing personal supervision to any radiographer trainee at the site where the sources of radiation are being used; and

(ii) preventing any unauthorized use of a source of radiation by a radiographer trainee.

(4) RSO for industrial radiography. An RSO must be designated on every industrial radiography license and certificate of registration issued by the department. The RSO's qualifications must be submitted to the department. A single individual may be designated as RSO for more than one license or certificate of registration if authorized by the department.

(A) The minimum qualifications for industrial radiography RSOs are:

(i) completion of requirements for a radiographer trainer of subsection (e)(3)(A) of this section; and

(ii) formal training in the establishment and maintenance of a radiation protection program.

(B) The department considers alternatives when the RSO has appropriate training and experience in the field of ionizing radiation and has adequate formal training with respect to the establishment and maintenance of a radiation safety protection program.

(C) The specific duties of the RSO include:

(i) establishing and overseeing operating, safety, emergency, and as low as reasonably achievable (ALARA) procedures, and to review them regularly to ensure that the procedures are current and conform with the requirements of this chapter;

(ii) overseeing and approving all phases of the training program for radiographic personnel so that appropriate and effective radiation protection practices are taught;

(iii) ensuring required radiation surveys and leak tests are performed and documented as specified in this chapter, including any corrective measures when levels of radiation exceed established limits;

(iv) ensuring personnel monitoring devices are calibrated and used properly by occupationally exposed personnel;

(v) ensuring timely notifications to employees are made as specified in §289.203 of this chapter;

(vi) ensuring timely notifications to the department are made as specified in this section and §289.202 of this chapter or §289.231 of this chapter, as applicable;

(vii) ensuring any required interlock switches and warning signals are functioning and radiation signs, ropes, and barriers are properly posted and positioned;

(viii) investigating, determining the cause, taking steps to prevent the recurrence, and reporting to the department each:

(I) known or suspected case of radiation exposure to an individual or radiation level detected over the limits established by this chapter; and

(II) theft or loss of sources of radiation;

(ix) having a thorough knowledge of management policies and administrative procedures of the licensee or registrant;

(x) assuming control and having the authority to institute corrective actions, including shutdown of operations, when necessary, in emergency situations or unsafe conditions;

(xi) maintaining records as specified in subsection (v)(1) of this section;

(xii) ensuring the proper storing, labeling, transport, and use of exposure devices and sources of radiation;

(xiii) ensuring inventory and inspection and maintenance programs are performed as specified in subsections (k) and (m) of this section;

(xiv) ensuring personnel are complying with the requirements of this chapter and the conditions of the license or the certificate of registration; and

(xv) ensuring the operating, safety, and emergency procedures of the licensee or registrant are met as specified in subsections (t)(5)(A) - (C) and (G) and (u)(8)(A) - (C) and (I) of this section.

(f) Additional requirements.

(1) Licensees or registrants must not permit any individual to act as a radiographer trainee, radiographer, radiographer trainer, or RSO until the individual has met the certification requirements as specified in subsection (e) of this section, as applicable, and has:

(A) received copies of and demonstrated an understanding of the following by successful completion of a written or oral examination administered by the licensee or registrant covering this material:

(i) the requirements contained in this section and the applicable requirements of §289.201 of this chapter, §289.202 of this chapter, §289.203 of this chapter, §289.231 of this chapter, and §289.257 of this subchapter;

(ii) the appropriate license and certificate of registration conditions;

(iii) the licensee's or registrant's operating, safety, and emergency procedures; and

(B) demonstrated competence in the use of sources of radiation, radiographic exposure devices, associated equipment, related handling tools, and radiation survey instruments that may be employed in industrial radiographic assignments by successful completion of a practical examination administered by the licensee or registrant covering such use.

(2) A radiographer and radiographer trainer must ensure radiographic operations to which the individual is assigned are conducted as specified in the requirements of this section.

(3) Records of the administration of and the examinations required by paragraph (1) of this subsection must be made and maintained as specified in subsection (v)(1) of this section. Records must include:

(A) copies of written tests administered by the licensee or registrant;

(B) dates of oral and practical examinations and names of individuals conducting and receiving the oral and practical examinations; and

(C) a list of items tested and the results of the oral and practical examinations.

(g) Application and fee for radiographer certification examinations.

(1) Application.

(A) An application for taking the examination must be on forms prescribed and furnished by the department.

(B) The non-refundable and non-transferable application fee for examination is $120.

(C) The appropriate fee must be submitted with the application for examination.

(D) The application and the non-refundable and non-transferable fee must be submitted to the department on or before the dates specified by the department.

(E) Applicants who fail to appear at a scheduled exam and do not reschedule 48 hours before their assigned exam session must apply for a future exam session and submit the appropriate fee, as specified in subparagraphs (A) - (D) of this paragraph.

(2) Examination. The examination must be given for the purpose of determining the qualifications of applicants.

(A) The scope of the examination and the methods of procedure, including determination of the passing score, are prescribed by the department. The examination assesses the applicant's knowledge to safely use sources of radiation and related equipment and the applicant's knowledge of this section, and the applicable requirements of §289.201 of this chapter, §289.202 of this chapter, and §289.231 of this chapter.

(B) The examination is administered by the department or persons authorized by the department.

(C) A candidate failing an examination may apply for re-examination as specified in paragraph (1) of this subsection. A candidate may not retake the same version of the department-administered examination.

(D) The examination is normally offered once each month. Times, dates, and locations of the examination are furnished by the department.

(E) The examination is in the English language.

(F) To take the examination, an individual must present a government-issued photo identification card, such as a driver's license, at the time of the examination.

(G) Calculators will be permitted during the examination. Calculators or computers with preprogrammed data or formulas, including exposure calculators, are not permitted during the examination.

(H) The examination is a "closed-book" examination.

(I) Any individual observed by a department proctor compromising the integrity of the examination will be required to surrender the examination, the answer sheet, and all scratch paper. The individual is not allowed to complete the examination, forfeits the examination fee, and leaves the examination site to avoid disturbing other examinees. The individual must wait 90 days before taking a new examination and must resubmit a new application and a $120 non-refundable and non-transferable examination fee.

(J) Examination material must be returned to the department at the end of the examination. No photographic or other copying of examination questions or materials is permitted. Disclosure by any individual of the contents of any examination before its administration is prohibited.

(K) The names and scores of individuals taking the examination are a public record.

(h) Radiographer certification.

(1) An application for radiographer certification must be on RC Form 255-R, RC Form 255-OS, or equivalent.

(A) The non-refundable fee for radiographer certification is $110.

(B) The appropriate fee must be submitted with the application for radiographer certification when filing with the department.

(2) A certification ID card will be issued to each individual successfully completing the requirements of subsection (e)(2)(A)(i) - (iii) of this section.

(A) Each individual's certification ID card contains the individual's photograph. The department takes the photograph at the time the examination is administered.

(B) The certification ID card remains the property of the department and may be revoked or suspended under the provisions of paragraph (4) of this subsection.

(C) Any individual who needs to replace a certification ID card must submit to the department a written request for a replacement certification ID card, stating the reason a replacement certification ID card is needed. A non-refundable fee of $35 must be paid to the department for each replacement of a certification ID card. The prescribed fee must be submitted with the written request for a replacement certification ID card. The individual must carry a copy of the request while performing industrial radiographic operations until a replacement certification ID card is received from the department.

(D) Each certification ID card is valid for a period of five years, unless

revoked or suspended as specified in paragraph (4) of this subsection. Each certification ID card expires at the end of the calendar day, in the month and year stated on the certification ID card.

(3) Renewal of a radiographer certification.

(A) Applications for examination to renew a radiographer certification must be filed as specified in subsection (g)(1) of this section.

(B) The examination for renewal of a radiographer certification must be administered as specified in subsection (g)(2) of this section.

(C) A renewal certification ID card will be issued as specified in paragraph (2) of this subsection.

(4) Suspension or revocation of a radiographer certification.

(A) Any radiographer violating the requirements of this chapter, or providing any material false statement in the application or any statement of fact required by this chapter, may be required to show cause at a formal hearing why the radiographer certification should not be suspended or revoked as specified in §289.205 of this chapter.

(B) When a department order has been issued for an industrial radiographer to cease and desist from the use of sources of radiation or the department suspends or revokes the individual's radiographer certification, the radiographer must surrender the certification ID card to the department until the order is changed or the suspension expires.

(C) An individual whose radiographer certification has been suspended or revoked by the department or another certifying entity must comply with the process and conditions of the suspension or revocation orders before certification is reinstated or the individual is permitted to apply for a new certification.

(5) Reciprocity of a radiographer certification.

(A) Reciprocal recognition by the department of an individual radiographer certification is granted if:

(i) the individual holds a valid certification in the appropriate category and class issued by a certifying entity, as defined in subsection (c) of this section;

(ii) the requirements and procedures of the certifying entity issuing the certification afford the same or comparable certification standards as those afforded by subsection (e)(2)(A)(i) - (iii) of this section; and

(iii) the individual submits a legible copy of the certification to the department before conducting radiographic operations in Texas.

(B) Enforcement actions with the department, another agreement state, or the NRC or sanctions by an independent certifying entity are considered when reviewing a request for reciprocal recognition from a licensee, registrant, or certified radiographer.

(C) Certified radiographers granted reciprocity by the department must maintain the certification upon which the reciprocal recognition was granted, or before the expiration of such certification, must meet the requirements of paragraph (3) of this subsection.

(i) Receipt, transfer, and disposal of industrial radiography sealed sources and radiography exposure devices using depleted uranium (DU) for shielding.

(1) Each licensee and registrant must make and maintain records as specified in subsection (v)(1) of this section, showing the receipt, transfer, and disposal of industrial radiography sealed sources and radiography exposure devices using DU for shielding.

(2) These records must include, as appropriate:

(A) date of receipt, transfer, or disposal;

(B) name of the individual making the record;

(C) radionuclide;

(D) number of curies (becquerels) or mass (for DU);

(E) manufacturer, model, and serial number of each source of radiation or device;

(F) for the person transferring the source of radiation, the name of the transferee, the number of the transferee's radioactive material license authorizing possession of the material, and the regulatory agency issuing the license to the transferee; and

(G) for the person receiving the source of radiation, the name of the transferor, the number of the transferor's radioactive material license authorizing possession of the material, and the regulatory agency issuing the license to the transferor.

(j) Radiation survey instruments.

(1) Each licensee and registrant must have a sufficient number of calibrated,

appropriate, and operable radiation survey instruments at each location where sources of radiation are present to perform the radiation surveys required by this section and §289.202(p)(1) and (3) of this chapter and §289.231(s)(1) and (2) of this chapter, as applicable. These radiation survey instruments must be capable of measuring a range from 2 mrem/hr (0.002 mSv/hr) through 1 rem per hour (rem/hr) (0.01 sievert per hour (Sv/hr)).

(2) Each radiation survey instrument must be calibrated:

(A) by a person licensed or registered by the department, another agreement state, or the NRC to perform such service;

(B) at energies appropriate for the licensee's or registrant's use;

(C) at intervals not to exceed six months and after each instrument servicing other than battery replacement;

(D) at two points located approximately one-third and two-thirds of full-scale on each scale for linear scale instruments; for logarithmic scale instruments, at mid-range of each decade, and at two points of at least one decade; and for digital instruments, at three points between 2 and 1,000 mrem/hr (0.02 and 10 mSv/hr); and

(E) to demonstrate an accuracy within plus or minus 20 percent of the true radiation level at each point checked.

(3) Each radiation survey instrument must be checked with a radiation source at the beginning of each day of use and at the beginning of each work shift to ensure it is operating properly.

(4) Records of the calibrations required by paragraph (2) of this subsection must be maintained as specified in subsection (v)(1) of this section.

(k) Inventory.

(1) Each licensee and registrant must perform a physical inventory at intervals not to exceed three months to account for all sources of radiation and for devices containing DU received or possessed except for radiation machines utilized for industrial radiography at permanent radiographic installations. Each registrant utilizing radiation machines for industrial radiography at permanent radiographic installations must perform physical inventories and maintain inventory records as required by §289.226(m)(9) of this chapter.

(2) Records of the quarterly inventories required by paragraph (1) of this subsection must be made and maintained as specified in subsection (v)(1) of this section.

(3) The record must include, for each source of radiation, as appropriate:

(A) manufacturer, model, and serial number;

(B) radionuclide;

(C) number of curies (except for DU);

(D) location of each source of radiation;

(E) date of the inventory; and

(F) name of the individual making the inventory.

(l) Utilization logs.

(1) Each licensee and registrant must make and maintain current logs of the use, removal, and return to storage of each source of radiation. The information must be recorded in the log when the source is removed from and returned to storage. The logs must include:

(A) a unique identification, for example, make, model, and serial number, of:

(i) each radiation machine;

(ii) each radiographic exposure device containing a sealed source or transport and storage container in which the sealed source is located; and

(iii) each sealed source;

(B) the name and signature of the radiographer using the source of radiation;

(C) the locations and dates where each source of radiation is used; and

(D) the dates each source of radiation is removed from storage and returned to storage.

(2) Utilization logs must be kept on clear legible records containing all the information required by paragraph (1) of this subsection.

(3) Records of utilization logs must be made and maintained as specified in subsection (v)(1) of this section.

(m) Inspection and maintenance of radiation machines, radiographic exposure

devices, transport and storage containers, associated equipment, source changers, and survey instruments.

(1) Each day before using equipment, the radiographer must:

(A) perform visual and operational checks on radiation machines, survey instruments, radiographic exposure devices, transport and storage containers, associated equipment, and source changers to ensure:

(i) the equipment is in good working condition;

(ii) the sources are adequately shielded in radiographic exposure devices; and

(iii) required labeling is present and legible;

(B) determine the survey instrument is responding using check sources or other appropriate means; and

(C) remove the equipment from service until repaired if equipment problems are found.

(2) Each licensee and registrant must perform and must have written procedures for the following:

(A) inspection and routine maintenance of radiation machines, radiographic exposure devices, source changers, associated equipment, transport and storage containers, and survey instruments at intervals not to exceed three months to ensure the proper functioning of components important to safety. All appropriate components must be maintained as specified in manufacturers' specifications. Radiation machines, radiographic exposure devices, transport containers, and source changers being stored are exempted from this requirement provided each radiation machine, radiographic exposure device, transport container, or source changer is inspected and repaired before being returned to service. This inspection and maintenance program must cover, at a minimum, the items listed in subsection (x)(2) of this section; and

(B) inspection and maintenance necessary to maintain the Type B packaging used to transport radioactive material. The inspection and maintenance program must include procedures to assure Type B packages are shipped and maintained as specified in the certificate of compliance or other approval.

(3) Records of daily checks of equipment, equipment problems found in daily checks and quarterly inspections, and of any maintenance performed as specified in paragraph (1) of this subsection must be made and maintained as specified in subsection (v)(1) of this section.

(4) The record must include:

(A) date of check or inspection;

(B) name of inspector;

(C) equipment involved;

(D) any problems found; and

(E) what repairs or maintenance, if any, were done.

(n) Permanent radiographic installations.

(1) Permanent radiographic installations must have high radiation area entrance controls (for example, a control device that energizes a conspicuous visible and audible alarm signal or continuous direct or electronic surveillance) as described in §289.202(s)(1) - (4) of this chapter or §289.231(t)(1) - (4) of this chapter, or, if applicable, §289.229 of this chapter.

(2) The entrance controls must be tested for proper operation at the beginning of each day of equipment use.

(3) The alarm system must be tested for proper operation with a source of radiation each day before the installation is used for radiographic operations. The test must include a check for the visible and audible signals.

(4) Entrance control devices reducing the radiation level upon entry (designated in paragraph (1) of this subsection) must be tested monthly.

(5) If an entrance control device or alarm is operating improperly, it must be immediately labeled as defective and repaired within seven calendar days. The facility may continue to be used during this seven-day period, provided the licensee or registrant implements the continuous surveillance requirements of subsection (q) of this section, ensures radiographic personnel use an alarming ratemeter, and complies with the requirements of subsection (u)(8)(G) of this section.

(6) Records of alarm systems and entrance control tests and repairs required by this subsection must be made and maintained as specified in subsection (v)(1) of this section.

(o) Notifications.

(1) The department must be notified of the loss or theft of sources of radiation, overexposures, and excessive levels as specified in §289.202(ww) - (yy) and (bbb) of this chapter or §289.231(gg) - (jj) of this chapter, as applicable.

(2) In addition, whenever one of the following events occurs, each licensee or registrant must make the initial notification report by telephone to the department within 24 hours and submit a written report to the department within 30 days:

(A) a source assembly cannot be returned to the fully shielded position and properly secured;

(B) the source assembly becomes unintentionally disconnected from the control cable;

(C) any component critical to safe operation of the radiographic exposure device fails to properly perform its intended function;

(D) an indicator on a radiation machine fails to show that radiation is being produced;

(E) an exposure switch on a radiation machine fails to terminate production of radiation when turned to the off position; or

(F) a safety interlock fails to terminate x-ray production.

(3) As specified in paragraph (2) of this subsection, the licensee or registrant must include in each report submitted:

(A) a description of the equipment problem;

(B) the cause of each incident, if known;

(C) the manufacturer and model and serial number of equipment involved in the incident;

(D) the location, time, and date of the incident;

(E) the action taken to establish normal operations;

(F) the corrective action taken or planned to prevent recurrence; and

(G) the names of personnel involved in the incident.

(4) Any licensee conducting radiographic operations or storing radioactive material at any location not listed on the license for a period more than 180 days in a calendar year must notify the department before exceeding the 180 days.

(5) Any registrant conducting radiographic operations or storing radiation machines at any location not listed on the certificate of registration for a period more than 90 days in a calendar year must notify the department before exceeding

the 90 days.

(p) Individual monitoring.

(1) The individual monitoring program must meet the applicable requirements of §289.202 of this chapter or §289.231 of this chapter.

(2) During industrial radiographic operations, the following applies:

(A) Licensees or registrants must not permit an individual to act as a radiographer, radiographer trainer, or radiographer trainee unless each individual wears, on the trunk of the body at all times during radiographic operations:

(i) an individual monitoring device meeting the applicable requirements of §289.202(p)(4) and (5), (q), and (r) of this chapter or §289.231(s)(3) of this chapter;

(ii) a direct-reading pocket dosimeter or an electronic personal dosimeter; and

(iii) an operable alarming ratemeter.

(B) For permanent radiographic installations where other appropriate alarming or warning devices are in routine use, the wearing of an alarming ratemeter is not required.

(C) Pocket dosimeters must meet the criteria in ANSI 13.5-1972 at the time of manufacture and must have a range of zero to 200 mrem (2 mSv). Electronic personal dosimeters may only be used in place of ion-chamber pocket dosimeters.

(D) Pocket dosimeters must be recharged at the start of each work shift.

(E) As a minimum, direct-reading pocket dosimeters must be recharged and electronic personal dosimeters reset, and "start" readings recorded:

(i) immediately before checking out any source of radiation from an authorized use or storage site for the purposes of conducting industrial radiographic operations; and

(ii) before beginning radiographic operations on any subsequent calendar day (if the source of radiation has not been checked back into an authorized use or storage site).

(F) Whenever radiographic operations are concluded for the day, the "end" readings on pocket dosimeters or electronic personal dosimeters must be

recorded and the accumulated occupational doses for that day determined and recorded.

(G) If an individual's pocket dosimeter is discharged beyond its range (for example, goes "off-scale"), or if an individual's electronic personal dosimeter reads greater than 200 mrem (2 mSv) and the possibility of radiation exposure cannot be ruled out as the cause, industrial radiographic operations by that individual must cease and the individual's monitoring device requiring processing must be sent for processing immediately. The individual's monitoring device not requiring processing must be evaluated immediately. The individual must not return to work with sources of radiation until a determination of the radiation exposure has been made. This determination must be made by the RSO or the RSO's designee. The results of this determination must be included in the records maintained as specified in paragraphs (5) and (6) of this subsection and subsection (v)(1) of this section.

(H) Each individual monitoring device must be assigned to and worn by only one individual.

(I) Film badges must be replaced at periods not to exceed one month and all other individual monitoring devices requiring replacement must be replaced at least quarterly. After replacement, each individual monitoring device requiring processing must be returned to the supplier for processing within 14 calendar days of the exchange date specified by the supplier or as soon as practicable. All individual monitoring devices must be evaluated at least quarterly or promptly after replacement, whichever is more frequent. Circumstances preventing meeting these time limits must be documented, and those records must be available for review by the department.

(J) If an individual monitoring device is lost or damaged, the worker must cease work immediately until a replacement individual monitoring device is provided and the exposure is calculated for the time period from issuance to loss or damage of the individual monitoring device. The results of the calculated exposure and the time period for which the individual monitoring device was lost or damaged must be included in the records maintained as specified in paragraph (6) of this subsection and subsection (v)(1) of this section.

(3) Pocket dosimeters or electronic personal dosimeters must be checked for correct response to radiation at periods not to exceed one year. Acceptable dosimeters must read within plus or minus 20 percent of the true radiation exposure.

(4) Each alarming ratemeter must:

(A) be checked without being exposed to radiation before use at the start of each work shift, to ensure the audible alarm is functioning properly;

(B) be set to give an alarm signal at a preset dose rate of 500

mrem/hr (5 mSv/hr) or lower with an accuracy of plus or minus 20 percent of the true radiation dose rate;

(C) require special means to change the preset alarm function;

(D) be calibrated for correct response to radiation at intervals not to exceed one year; and

(E) have an audible alarm sufficient to be heard by the individual wearing the alarming ratemeter in a work environment or have other visual or physical notification of alarming conditions.

(5) The following records required by this subsection must be made and maintained by the licensee or registrant for inspection by the department as specified in the following time requirements and subsection (v)(1) of this section.

(A) Records of pocket dosimeter or electronic personal dosimeter readings and yearly operational response checks must be maintained for three years. If the dosimeter readings were used to determine external radiation dose (for example, no individual monitoring device exposure records exist), the records must be maintained for department inspection until disposal is authorized by the department.

(B) Records of pocket dosimeter and electronic personal dosimeter readings of personnel exposures must be maintained for three years.

(C) Records of estimates of exposures resulting from off-scale personal direct-reading dosimeters or lost or damaged individual monitoring devices must be maintained until disposal is authorized by the department.

(6) The following records required by this subsection must be maintained as specified in the following time requirements and subsection (v)(1) of this section.

(A) Records of alarming ratemeter calibrations must be maintained for three years.

(B) Records of individual monitoring device results must be maintained until disposal is authorized by the department.

(q) Access control.

(1) During each industrial radiographic operation, radiographic personnel must maintain continuous visual surveillance of the operation to protect against unauthorized entry into a radiation area or high radiation area, except at permanent radiographic installations where all entryways are locked and the requirements of subsection (n) of this section are met.

(2) Radiographic exposure devices must not be left unattended except when in storage or physically secured against unauthorized removal or tampering.

(r) Posting. All areas where industrial radiography is being performed must be posted conspicuously as specified in §289.202 of this chapter or §289.231 of this chapter, as applicable, including the following.

(1) Radiation areas. Each radiation area must be posted conspicuously with a sign or signs displaying the radiation caution symbol and the words "CAUTION, RADIATION AREA" or "DANGER, RADIATION AREA."

(2) High radiation area. Each high radiation area must be posted conspicuously with a sign or signs displaying the radiation caution symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA."

(3) Whenever practicable, ropes or barriers must be used in addition to appropriate signs to designate areas as specified in §289.202(n)(1) of this chapter or §289.231(o)(1) of this chapter, as applicable, and to help prevent unauthorized entry.

(4) During pipeline industrial radiographic operations, sufficient radiation signs and other barriers must be posted to prevent unmonitored individuals from entering the area as specified in §289.202(n)(1) of this chapter or §289.231(o)(1) of this chapter, as applicable.

(5) In lieu of the requirements of subsection (r)(1) and (2) of this section, a restricted area may be established as specified in §289.202(n)(1) of this chapter or §289.231(o)(1) of this chapter, as applicable, and be posted as specified in subsection (r)(1) and (2) of this section; for example, both signs may be posted at the same location at the boundary of the restricted area.

(6) Exceptions listed in §289.202(bb) of this chapter or §289.231(y) of this chapter, as applicable, do not apply to industrial radiographic operations.

(s) Specific requirements for radiographic personnel performing industrial radiography.

(1) At a job site, the following must be supplied by the licensee or registrant:

(A) at least one operable, calibrated survey instrument for each exposure device or radiation machine in use;

(B) an individual monitoring device that meets the requirements of §289.202(p)(4) and (5), (q), and (r) of this chapter or §289.231(s)(3) of this chapter, as applicable, for each worker;

(C) an operable, calibrated pocket dosimeter or electronic personal

dosimeter with a range of zero to 200 mrem (2 mSv) for each worker;

(D) an operable, calibrated, alarming ratemeter for each worker; and

(E) the appropriate barrier ropes and signs.

(2) Each radiographer at a job site must carry a valid certification ID card issued by the department or another certifying entity whose certification offers the same or comparable certification standards.

(3) Each radiographer trainee at a job site must carry a trainee status card issued by the department or equivalent documentation as specified in subsection (e)(1) of this section.

(4) Radiographic personnel must not perform radiographic operations if any of the items in paragraphs (1) - (3) of this subsection are not available at the job site or are inoperable. Radiographic personnel must ensure the items listed in paragraph (1) of this subsection, radiographic exposure devices, and radiation machines are used as specified in the requirements of this section.

(5) During an inspection by the department, a department inspector may terminate an operation if any of the items in paragraphs (1) - (3) of this subsection are not available and operable or if the required number of radiographic personnel are not present. Operations must not resume until all required conditions are met.

(t) Radiation safety and registration requirements for the use of radiation machines.

(1) Registration requirements for industrial radiographic operations.

(A) Radiation machines used in industrial radiographic operations must be registered as specified in §289.226 of this chapter.

(B) In addition to the registration requirements in §289.226(e) and (i) of this chapter, an application for a certificate of registration must include:

(i) a schedule or description of the program for training radiographic personnel that specifies:

(I) initial training;

(II) annual refresher training;

(III) on-the-job training;

(IV) procedures for administering the oral and written examination to determine the knowledge, understanding, and ability of radiographic personnel to comply with the requirements of this chapter, the conditions of the

certificate of registration, and the registrant's operating, safety, and emergency procedures; and

(V) procedures for administering the practical examination to demonstrate competence in the use of sources of radiation and radiation survey instruments employed in industrial radiographic assignments.

(ii) written operating, safety, and emergency procedures available to each individual operating a radiation machine, including any restrictions of the operating technique required for the safe operation of the particular x-ray system;

(I) The registrant must document that each individual operating a radiation machine has read the operating and safety procedures and must maintain this documentation for inspection by the department. The documentation must include:

(-a-) name and signature of the individual;

(-b-) date the individual read the operating and safety procedures; and

(-c-) initials of the RSO;

(II) The operating and safety procedures must include the items listed in subsection (x)(3) of this section;

(iii) a description of the internal audit program to ensure radiographic personnel follow the requirements of this chapter, the conditions of the certificate of registration, and the registrant's operating, safety, and emergency procedures at intervals not to exceed six months;

(iv) a list and description of all field stations and permanent radiographic installations

(v) a description of the organization of the industrial radiographic program, including delegations of authority and responsibility for operation of the radiation safety program; and

(vi) procedures for verifying and documenting the certification status of radiographers and for ensuring that the certification of individuals acting as radiographers remains valid.

(C) A certificate of registration is issued if the requirements of this paragraph of this subsection and §289.226(e) and (i) of this chapter are met.

(2) Locking of radiation machines. The control panel of each radiation

machine must be equipped with a locking device preventing the unauthorized use of an x-ray system or the accidental production of radiation. The radiation machine must be kept locked and the key removed except when under the direct visual surveillance of a radiographer.

(3) Permanent storage precautions for the use of radiation machines. Radiation machines must be secured while in storage to prevent tampering or removal by unauthorized individuals.

(4) Requirements for radiation machines used in industrial radiographic operations.

(A) Equipment used in industrial radiographic operations involving radiation machines manufactured after October 1, 1987 must be certified at the time of manufacture to meet the criteria set forth by ANSI N43.5 (relating to Radiological Safety Standards for the Design of Radiographic and Industrial X-Ray Equipment), except accelerators used in industrial radiography.

(B) The registrant's name and city or town of an authorized use site listed on the certificate of registration must be prominently displayed with a durable, legible, clearly visible label on both sides of all vehicles used to transport radiation machines for temporary job site use.

(5) Operating and internal audit requirements for the use of radiation machines.

(A) Each registrant must conduct an internal audit program to ensure the requirements of this chapter, the conditions of the certificate of registration, and the registrant's operating, safety, and emergency procedures are followed by radiographic personnel.

(B) Each radiographer's and radiographer trainee's performance during an actual radiographic operation must be audited and documented at intervals not to exceed six months.

(C) If a radiographer or a radiographer trainee has not participated in a radiographic operation during the six months since the last audit, the radiographer or the radiographer trainee must demonstrate knowledge of the training requirements of subsection (f)(1) of this section by an oral or written and practical examination administered by the registrant before the individual can next participate in a radiographic operation.

(D) The department may consider alternatives in those situations where the individual serves as both radiographer and RSO.

(E) In those operations where a single individual serves as both radiographer and RSO and performs all radiography operations, an audit program is

not required.

(F) The registrant must provide annual refresher safety training, as defined in subsection (c) of this section, for each radiographer trainee, radiographer, or radiographer trainer at intervals not to exceed 12 months.

(G) Individuals, other than a radiographer or a radiographer trainee, under the personal supervision of a radiographer trainer, must not manipulate controls or operate radiation machines used in industrial radiographic operations. Only one radiographer is required to operate radiation machines during industrial radiography.

(H) Radiographic operations must not be conducted at storage sites unless specifically authorized by the certificate of registration.

(I) Records of annual refresher training and audits of job performance specified in this subsection must be made and maintained as specified in subsection (v)(1) of this section.

(J) Records of annual refresher safety training and audits of job performance made as specified in this subsection must include:

(i) list of the topics discussed during the refresher safety training;

(ii) dates the annual refresher safety training was conducted;

(iii) names of the instructors and attendees; and

(iv) for audits of job performance, records must include a list showing the items checked and any non-compliance observed by the RSO or designee.

(6) Radiation surveys for the use of radiation machines.

(A) Industrial radiographic operations must not be conducted unless at least one calibrated and operable radiation survey instrument, as described in subsection (j) of this section, is used for each radiation machine energized.

(B) A physical radiation survey must be made after each radiographic exposure using radiation machines to determine the machine is "off."

(C) All potential radiation areas where industrial radiographic operations are performed must be posted as specified in subsection (r) of this section, based on estimated dose rates, before industrial radiographic operations begin. An area survey must be performed during the first radiographic exposure to confirm the requirements of subsection (r) of this section have been met and

unrestricted areas do not have radiation levels over the limits specified in §289.231(o)(1)(B) of this chapter.

(D) Records of the surveys required by subparagraph (C) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section. If a survey was used to determine an individual's exposure due to loss of personnel monitoring data, the records of the survey must be maintained for inspection by the department until disposal is authorized by the department.

(7) Requirements for radiation machines in shielded rooms.

(A) Radiation machines in shielded rooms must comply with all applicable requirements of this section.

(B) Radiation machines in shielded rooms must be evaluated at intervals not to exceed one year to ensure compliance with the applicable requirements of this section and §289.231(o)(1) - (3) of this chapter.

(C) Records of the annual evaluation of radiation machines in shielded rooms required by subparagraph (B) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section.

(8) Requirements for certified and certifiable cabinet x-ray systems.

(A) Certified and certifiable cabinet x-ray systems, including those designed to allow admittance of individuals, are exempt from the requirements of this section except:

(i) Registrants must not permit any individual to operate a cabinet x-ray system until the individual has received a copy of and instruction in the operating procedures for the unit.

(ii) Tests for proper operation of interlocks must be conducted and recorded at intervals not to exceed 12 months.

(iii) The registrant must perform an evaluation to determine compliance with §289.231(o)(1) - (3) of this chapter and 21 CFR §1020.40 at intervals not to exceed one year.

(B) Records of operating instructions in cabinet x-ray systems required by subparagraph (A)(i) of this paragraph and interlock tests required by subparagraph (A)(ii) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section.

(C) Records of the evaluation of certified cabinet x-ray systems required by subparagraph (A)(iii) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section.

(9) All reciprocal recognition of certificates of registration by the department are granted as specified in §289.226(s) of this chapter.

(u) Radiation safety and licensing requirements for the use of sealed sources.

(1) Licensing requirements for industrial radiographic operations.

(A) Sealed sources used in industrial radiographic operations must be licensed as specified in §289.252 of this subchapter.

(B) In addition to the licensing requirements in §289.252 of this subchapter, an application for a license must include.

(i) A schedule or description of the program for training radiographic personnel specifying:

(I) initial training;

(II) annual refresher training;

(III) on-the-job training;

(IV) procedures for administering the oral and written examinations to determine the knowledge, understanding, and ability of radiographic personnel to comply with the requirements of this chapter, the conditions of the license, and the licensee's operating, safety, and emergency procedures; and

(V) procedures for administering the practical examination to demonstrate competence in the use of sources of radiation, radiographic exposure devices, related handling tools, and radiation survey instruments employed in industrial radiographic assignments.

(ii) Written operating, safety, and emergency procedures are made available to each individual operating a sealed source in radiographic operations, including any restrictions of the operating technique required for the safe operation of the particular sealed source.

(I) The licensee must document each individual operating a sealed source in radiographic operations has read the operating and safety procedures and must maintain this documentation for inspection by the department. The documentation must include:

(-a-) name and signature of the individual;

(-b-) date the individual read the operating and safety procedures; and

(-c-) initials of the RSO.

(II) The operating and safety procedures must include the items listed in subsection (x)(3) of this section.

(iii) A description of the internal audit program to ensure radiographic personnel follow the requirements of this chapter, the conditions of the license, and the licensee's operating, safety, and emergency procedures at intervals not to exceed six months.

(iv) A list and description of all field stations and permanent radiographic installations.

(v) A description of the organization of the industrial radiographic program, including delegations of authority and responsibility for operation of the radiation safety program.

(vi) A description of the program for inspection and maintenance of radiographic exposure devices and transport and storage containers, including items in subsection (x)(2) of this section and the applicable items in subsection (m) of this section.

(vii) If a license application includes underwater radiography, as a minimum, a description of:

(I) radiation safety procedures and radiographer responsibilities unique to the performance of underwater radiography;

(II) radiographic equipment and radiation safety equipment unique to underwater radiography; and

(III) methods for gas-tight encapsulation of equipment.

(viii) If a license application includes offshore platform or lay-barge radiography, as a minimum, a description of:

(I) transport procedures for radioactive material to be used in industrial radiographic operations;

(II) storage areas for radioactive material; and

(III) methods for restricting access to radiation areas.

(ix) Procedures verifying and documenting the certification status of radiographers and ensuring that the certification of individuals acting as radiographers remains valid.

(x) If the applicant intends to perform leak testing of sealed sources or exposure devices containing DU shielding, the applicant must describe the procedures for performing the leak test and the qualifications of the person authorized to do the leak test.

(xi) If the applicant intends to analyze its own wipe samples, the application must include a description of the procedures to be followed. The description must include:

(I) instruments to be used;

(II) methods of performing the analysis; and

(III) pertinent experience of the individual or individuals analyzing the wipe samples.

(xii) If the applicant intends to perform "in-house" calibrations of survey instruments, the applicant must describe methods to be used and the relevant experience of the individual or individuals performing the calibrations. All calibrations must be performed as specified in subsection (j) of this section.

(C) A license is issued if the requirements of this paragraph and §289.252 of this subchapter are met.

(2) Limits on external radiation levels from storage containers and source changers. The maximum exposure rate limits for storage containers and source changers are 200 mrem/hr (2 mSv/hr) at any exterior surface, and 10 mrem/hr (0.1 mSv/hr) at 1 meter from any exterior surface with the sealed source in the shielded position.

(3) Locking of radiographic exposure devices, storage containers, and source changers.

(A) Each radiographic exposure device, storage container, and source changer must have a lock or outer locked container designed to prevent unauthorized or accidental removal or exposure of a sealed source. Each exposure device and source changer must be kept locked and, if a keyed lock, the key removed except when under the direct visual surveillance of a radiographer or an individual specifically authorized by the department, except at a permanent radiographic installation.

(B) Each radiographic exposure device, storage container, and source changer must be locked and the key removed from any keyed lock before being transported from one location to another and before being stored at a given location.

(4) Permanent storage precautions for the use of sealed sources.

(A) Radiographic exposure devices, source changers, and transport containers containing sealed sources must be secured while in storage to prevent tampering or removal by unauthorized individuals.

(B) Radiographic exposure devices, source changers, or transport containers containing radioactive material must not be stored in residential locations unless specifically authorized by the department.

(5) Performance requirements for industrial radiography equipment. Equipment used in industrial radiographic operations must meet the following minimum criteria.

(A) Each radiographic exposure device, source assembly, sealed source, and associated equipment must meet the criteria set forth by ANSI N432-1980. This publication is available online at http://pbadupws.nrc.gov/docs/ML0508/ML050840139.pdf and may be purchased from the American National Standards Institute, Inc., 25 West 43rd Street, New York, New York 10036; Telephone (212) 642-4900.

(i) All newly manufactured radiographic exposure devices and associated equipment acquired by licensees after September 1, 1993, must comply with the requirements of this section.

(ii) All radiographic exposure devices and associated equipment in use after January 1, 1996, must comply with the requirements of this section.

(iii) In lieu of subparagraph (A) of this paragraph, equipment used in industrial radiographic operations need not comply with §8.9.2(c) of the Endurance Test in ANSI N432-1980, if the prototype equipment has been tested using a torque value representative of the torque an individual using the radiography equipment can realistically exert on the lever or crankshaft of the drive mechanism.

(B) Engineering analysis may be submitted by a licensee to demonstrate the applicability of previously performed testing on similar individual radiography equipment components. Upon review, the department may find this an acceptable alternative to actual testing of the component as specified in subparagraph (A) of this paragraph.

(C) In addition to the requirements specified in subparagraph (A) of this paragraph the following requirements apply to radiographic exposure devices, source changers, source assemblies, and sealed sources.

(i) Radiographic exposure devices intended for use as Type B transport containers must meet the applicable requirements of §289.257 of this subchapter.

(ii) Modification of radiographic exposure devices, source changers, source assemblies, and associated equipment is prohibited, unless the design of any replacement component, including source holder, source assembly, controls, or guide tubes does not compromise the design safety features of the system.

(D) In addition to the requirements specified in subparagraphs (A) - (C) of this paragraph, radiographic exposure devices, source assemblies, and associated equipment allowing the source to move outside the device must meet the following criteria.

(i) The source assembly must be designed so the source does not become disconnected if cranked outside the guide tube. The source assembly cannot be unintentionally disconnected under normal and reasonably foreseeable abnormal conditions.

(ii) The control cable must be positively connected to the source assembly before the source assembly can be driven out of the fully shielded position in a radiographic exposure device or source changer.

(iii) The radiographic exposure device must automatically secure the source assembly when it is cranked back into the fully shielded position within the radiographic exposure device. This securing system may only be released by means of a deliberate operation on the radiographic exposure device.

(iv) The outlet nipple, lock box, and control cable fittings of each radiographic exposure device must be equipped with safety plugs or covers installed during storage and transportation to protect the source assembly from damage and from other foreign matter, such as water, mud, or sand.

(v) 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 may not interfere with the safe operation of the exposure device or associated equipment.

(vi) Guide tubes must be used when moving the source out of the radiographic exposure device.

(vii) Guide tubes must be able to withstand a crushing test closely approximating the crushing forces likely to be encountered during use, and be able to withstand a kinking resistance test closely approximating the kinking forces likely to be encountered during use.

(viii) An exposure head, endcap, or similar device designed to prevent the source assembly from extending beyond the end of the guide tube must be attached to the outermost end of the guide tube during radiographic operations.

(ix) The guide tube exposure head connection must be able to withstand the tensile test for control units as specified in ANSI N432-1980.

(x) Source changers must provide a system for ensuring the source is not accidentally withdrawn from the changer when connecting or disconnecting the control cable to or from a source assembly.

(6) Leak testing, repair, opening, and replacement of sealed sources and devices. Leak testing, repair, opening, and replacement of sealed sources and devices must be performed according to the following criteria.

(A) Leak testing of sealed sources must be done as specified in §289.201(g) of this chapter, except records of leak tests must be maintained as specified in subsection (v)(1) of this section.

(B) The replacement, leak testing analysis, repair, opening, or any modification of a sealed source must be performed only by persons specifically authorized to do so by the department, the NRC, or another agreement state.

(C) Each exposure device using DU shielding and an "S" tube configuration must be tested for DU contamination.

(i) Tests for DU contamination must be performed at intervals not to exceed 12 months.

(ii) The analysis must be capable of detecting the presence of 0.005 microcuries (185 becquerels (Bq)) of radioactive material on the test sample and must be performed by a person specifically authorized by the department, the NRC, or an agreement state to perform the analysis.

(iii) Should such testing reveal the presence of DU contamination, the exposure device must be removed from use until an evaluation of the wear of the S-tube has been made.

(iv) Should the evaluation reveal the S-tube is worn through, the device may not be used again.

(v) DU-shielded devices do not have to be tested for DU contamination while in storage and not in use.

(vi) The device must be tested for DU contamination before using or transferring the device, if the interval of storage exceeds 12 months.

(D) A record of the DU leak test must be made and maintained as specified in subsection (v)(1) of this section.

(7) Labeling and storage.

(A) Each transport container must have permanently attached to it a durable, legible, clearly visible label having, at a minimum, the standard trefoil radiation caution symbol conventional colors (for example, magenta, purple, or black on a yellow background), having a minimum diameter of 25 millimeters, and the following wording: "CAUTION. RADIOACTIVE MATERIAL. NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY)" or "DANGER. RADIOACTIVE MATERIAL. NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY)." In addition, transport containers must meet applicable requirements of the DOT.

(B) Radiographic exposure devices, source changers, and storage containers must be physically secured to prevent tampering or removal by unauthorized personnel. The licensee must store radioactive material in a manner that will minimize danger from explosion or fire.

(C) The licensee must lock and physically secure the transport package containing radioactive material in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal.

(D) The licensee's name and city or town of an authorized use site listed on the license must be prominently displayed with a durable, legible, and clearly visible label on both sides of all vehicles used to transport radioactive material for temporary job site use.

(E) The licensee must ensure each radiographic exposure device has attached to it a durable, legible, and clearly visible label bearing:

(i) the chemical symbol and mass number of the radionuclide in the device;

(ii) the activity and the date on which this activity was last measured;

(iii) the manufacturer, model, and serial number of the sealed source;

(iv) the licensee's name, address, and telephone number; and

(v) at a minimum, the standard radiation caution symbol as defined in §289.202 of this chapter, and the following wording: "CAUTION. RADIOACTIVE MATERIAL--DO NOT HANDLE. NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY)" or "DANGER. RADIOACTIVE MATERIAL--DO NOT HANDLE. NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY)."

(F) Each radiographic exposure device must have a permanently stamped, legible, and clearly visible unique serial number.

(8) Operating and internal audit requirements for the use of sealed sources

of radiation.

(A) Each licensee must conduct an internal audit program to ensure the requirements of this chapter, the conditions of the license, and the licensee's operating, safety, and emergency procedures are followed by radiographic personnel.

(B) Each radiographer's and radiographer trainee's performance during an actual radiographic operation must be audited and documented at intervals not to exceed six months.

(C) If a radiographer or a radiographer trainee has not participated in a radiographic operation during the six months since the last audit, the radiographer or the radiographer trainee must demonstrate knowledge of the training requirements of subsection (f)(1) of this section by an oral or written and practical examination administered by the licensee before these individuals can next participate in a radiographic operation.

(D) The department may consider alternatives in those situations where the individual serves as both radiographer and RSO.

(E) In those operations where a single individual serves as both radiographer and RSO, and performs all radiography operations, an audit program is not required.

(F) Each licensee must provide annual refresher safety training, as defined in subsection (c) of this section, for each radiographer and radiographer trainee at intervals not to exceed 12 months.

(G) Whenever radiographic operations are performed at a location other than a permanent radiographic installation, the radiographer must be accompanied by at least one other qualified radiographer or an individual who has, at minimum, met the requirements of subsection (e)(1) of this section. The additional qualified individual must observe the operations and be capable of providing immediate assistance to prevent unauthorized entry. Radiographic operations must not be performed if only one qualified individual is present.

(H) Collimators must be used in industrial radiographic operations using crank-out devices except when physically impossible.

(I) Individuals other than a radiographer or a radiographer trainee, under the personal supervision of a radiographer trainer, must not manipulate controls or operate radiographic exposure devices and associated equipment used in industrial radiographic operations.

(J) All radiographic operations conducted at locations of use authorized on the license must be conducted in a permanent radiographic installation, unless

specifically authorized by the department.

(K) Records of annual refresher training and audits of job performance specified in this subsection must be made and maintained as specified in subsection (v)(1) of this section.

(L) Records of annual refresher safety training and audits of job performance made as specified in this subsection must include:

(i) list of the topics discussed during the refresher safety training;

(ii) dates the annual refresher safety training was conducted;

(iii) names of the instructors and attendees; and

(iv) for audits of job performance, the records must also include a list showing the items checked and any non-compliance observed by the RSO or designee.

(9) Radiation surveys for the use of sealed sources of radiation.

(A) Industrial radiographic operations must not be conducted unless at least one calibrated and operable radiation survey instrument, as described in subsection (j) of this section, is used at each site where radiographic exposures are made.

(B) A survey with a radiation survey instrument meeting the requirements of subsection (j)(1) - (3) of this section must be made after each radiographic exposure to determine the sealed source has been returned to its fully shielded position, and before exchanging films, repositioning the exposure head, or dismantling equipment. The entire circumference of the radiographic exposure device must be surveyed. If the radiographic exposure device has a source guide tube, the survey must also include the source guide tube and any collimator.

(C) All potential radiation areas where industrial radiographic operations are performed must be posted as specified in subsection (r) of this section, based on calculated dose rates, before industrial radiographic operations begin. An area survey must be performed during the first radiographic exposure (for example, with the sealed source in the exposed position) to confirm the requirements of subsection (r) of this section have been met.

(D) Each time re-establishment of the restricted area is required, the requirements of subparagraph (C) of this paragraph must be met.

(E) The requirements of subparagraph (D) of this paragraph do not apply to pipeline industrial radiographic operations when the conditions of

exposure, including the radiographic exposure device, duration of exposure, source strength, pipe size, and pipe thickness, remain constant.

(F) A lock-out survey, in which all accessible surfaces of the radiographic exposure device or source changer are surveyed, must be performed.

(G) Surveys must be performed in the storage area to ensure radiation levels do not exceed the limits specified in §289.202(n)(1) of this chapter. These surveys must be performed initially with the maximum amount of radioactive material present in the storage area and thereafter at the time of the quarterly inventory and whenever storage conditions change.

(H) A survey meeting the requirements of subparagraph (B) of this paragraph must be performed on the radiographic exposure device and the source changer after every sealed source exchange.

(I) Records of the surveys required by subparagraphs (C), (D), and (F) - (H) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section. If a survey was used to determine an individual's exposure due to loss of personnel monitoring data, the records of the survey must be maintained for inspection by the department until disposal is authorized by the department.

(10) Requirements for shielded rooms containing sealed sources.

(A) Shielded rooms containing sealed sources must comply with all applicable requirements of this section.

(B) Shielded rooms containing sealed sources must be evaluated at intervals not to exceed one year to ensure compliance with the applicable requirements of this section and §289.202(n)(1) - (3) of this chapter.

(C) Tests for proper operation of interlocks must be conducted and recorded as specified in subsection (n) of this section.

(D) Records of evaluations required by subparagraph (B) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section.

(E) Records of interlock tests required by subparagraph (C) of this paragraph must be made and maintained as specified in subsection (v)(1) of this section.

(11) Underwater, offshore platform, and lay-barge radiography.

(A) Underwater, offshore platform, and lay-barge radiography must not be performed unless specifically authorized in a license issued by the

department as specified in paragraph (1) of this subsection.

(B) In addition to the other requirements of this section, the following requirements apply to the performance of offshore platform or lay-barge radiography.

(i) Cobalt-60 sources with activities more than 20 curies (Ci) (nominal) (740 gigabecquerels) and iridium-192 sources with activities more than 100 Ci (nominal) (3.7 terabecquerels) must not be used in the performance of offshore platform or lay-barge radiography.

(ii) Collimators must be used for all industrial radiographic operations performed on offshore platforms or lay-barges.

(12) Prohibitions.

(A) Industrial radiography performed with a sealed source not fastened to or contained in a radiographic exposure device (fishpole technique) is prohibited unless specifically authorized in a license issued by the department.

(B) Retrieval of disconnected sources or sources that cannot be returned by normal means to a fully shielded position or automatically secured in the radiographic exposure device must not be performed unless specifically authorized by a license condition.

(13) All reciprocal recognition of licenses by the department are granted as specified in §289.252(ee) of this subchapter.

(v) Record/document requirements. Each licensee and registrant must maintain the following records/documents at each site at the time intervals specified and make them available to the department for inspection.

(1) Time requirements for record keeping. The following are time requirements for record keeping.

Figure: 25 TAC §289.255(v)(1)

(2) Records and documents required at field stations.

(A) Each licensee or registrant maintaining field stations where industrial radiography operations are performed must maintain copies of the following records and documents specific to that site available at each site for inspection by the department for a period of three years:

(i) a copy of the appropriate license or certificate of registration authorizing the use of licensed or registered sources of radiation;

(ii) operating, safety, and emergency procedures as specified in subsection (x)(3) of this section;

(iii) applicable sections of this chapter as listed in the license or certificate of registration;

(iv) records of receipt, transfer, and disposal of sources of radiation and devices using DU for shielding at the additional site as specified in subsection (i) of this section;

(v) records of the latest survey instrument calibrations in use at the site as specified in subsection (j) of this section;

(vi) records of the latest calibrations of alarming ratemeters and operational checks of pocket dosimeters and electronic personal dosimeters as specified in subsection (p) of this section;

(vii) inventories as specified in subsection (k) of this section;

(viii) utilization records for each radiographic exposure device and radiation machine dispatched from that location as specified in subsection (l) of this section;

(ix) records of equipment problems identified in daily checks of equipment as specified in subsection (m) of this section, if applicable;

(x) records of alarm systems and entrance control checks as specified in subsection (n) of this section;

(xi) training records as specified in subsection (f) of this section;

(xii) records of direct-reading dosimeter readings as specified in subsection (p) of this section;

(xiii) audits as specified in subsections (t)(5)(A) - (C) and (u)(8)(A) - (C) of this section;

(xiv) latest radiation survey records as specified in subsections (t)(6)(D) and (u)(9)(I) of this section;

(xv) records of interlock testing as specified in subsections (t)(8)(A)(ii) and (u)(10)(C) of this section;

(xvi) records of annual evaluation of cabinet x-ray systems as specified in subsection (t)(7)(C) of this section;

(xvii) records of leak tests for specific devices and sources at

the additional site as specified in subsection (u)(6) of this section;

(xviii) shipping papers for the transportation of sources of radiation as specified in §289.257 of this subchapter;

(xix) a copy of the NRC license, agreement state license, or state certificate of registration authorizing the use of sources of radiation, when operating under reciprocity as specified in §289.226 of this chapter and §289.252 of this subchapter; and

(xx) individual monitoring records as specified in subsection (p) of this section.

(B) The following records required for each field station as specified in this subsection must also be maintained at the main authorized site:

(i) records of receipt, transfer, and disposal of sources of radiation and devices using DU for shielding at the additional site as specified in subsection (i) of this section;

(ii) inventories as specified in subsection (k) of this section; and

(iii) individual monitoring records as specified in subsection (p) of this section.

(3) Records required at temporary job sites. Each licensee and registrant conducting industrial radiography at a temporary job site must have the following records available at that site for inspection by the department:

(A) a copy of the appropriate license or certificate of registration or equivalent document authorizing the use of sources of radiation;

(B) operating, safety, and emergency procedures as specified in subsection (x)(3) of this section;

(C) applicable sections of this chapter as listed in the license or certificate of registration;

(D) latest radiation survey records required as specified in subsections (t)(6)(D) and (u)(9)(I) of this section for the period of operation at the site;

(E) the daily pocket dosimeter records for the period of operation at the site;

(F) utilization records for each radiographic exposure device or radiation machine used at that location as specified in subsection (l) of this section;

(G) the latest instrument calibration and leak test records for devices at the site. Acceptable records include tags or labels attached to the devices or survey instruments and decay charts for sources manufactured within the last six months; and

(H) a copy of the NRC license, agreement state license, or state certificate of registration authorizing the use of sources of radiation, when operating under reciprocity as specified in §289.226 of this chapter or §289.252 of this subchapter.

(w) Form of records. Each record required by this chapter must include all pertinent information and be stored in a legible and reproducible format throughout the specified retention period. The licensee or registrant must maintain adequate safeguards against tampering with and loss of records.

(x) Appendices.

(1) Subjects to be included in training courses for radiographer trainees. Training provided to qualify individuals as radiographer trainees in compliance with subsection (e)(1)(A) of this section must be presented on a formal basis. The training must include the following subjects.

(A) Fundamentals of radiation safety, including:

(i) characteristics of radiation;

(ii) units of radiation dose in rem (sieverts) and quantity of radioactivity in curies (becquerels);

(iii) significance of radiation dose, including:

(I) radiation protection standards;

(II) biological effects of radiation dose;

(III) hazards of exposure to radiation; and

(IV) case histories of radiography accidents;

(iv) levels of radiation from sources of radiation; and

(v) methods of controlling radiation dose, including:

(I) working time;

(II) working distances; and

(III) shielding.

(B) Radiation detection instrumentation, including:

(i) use, operation, calibration, and limitations of radiation survey instruments;

(ii) survey techniques; and

(iii) use of individual monitoring devices.

(C) Radiographic equipment to be used, including:

(i) remote handling equipment;

(ii) operation and control of radiographic exposure devices and sealed sources, including pictures or models of source assemblies (pigtails);

(iii) storage and transport containers, source changers;

(iv) operation and control of x-ray equipment;

(v) collimators;

(vi) storage, control, and disposal of radioactive material; and

(vii) inspection and maintenance of equipment.

(D) Requirements of pertinent federal and state regulations.

(E) Generic written operating, safety, and emergency procedures (see subsection (x)(3) of this section).

(2) General requirements for inspection of industrial radiographic equipment.

(A) Radiographic exposure devices must be inspected for:

(i) abnormal surface radiation levels anywhere on camera, collimator, or guide tube;

(ii) condition of safety plugs;

(iii) proper operation of locking mechanism;

(iv) condition of pigtail connector;

(v) condition of carrying device (straps, handle, etc.); and

(vi) proper and legible labeling.

(B) Guide tubes must be inspected for:

(i) rust, dirt, or sludge buildup inside the guide tube;

(ii) condition of guide tube connector;

(iii) condition of source stop; and

(iv) kinks or damage that could prevent proper operation.

(C) Control cables and drive mechanisms must be inspected for:

(i) proper drive mechanism with camera, as appropriate;

(ii) changes in general operating characteristics;

(iii) condition of connector on control cable;

(iv) control cable flexibility, wear, and rust;

(v) excessive wear or damage to crank-out devices;

(vi) damage to control cable conduit that could prevent the cable from moving freely;

(vii) proper connector mating between the control cable and the pigtail; and

(viii) proper operation of source position indicator, if applicable.

(D) Pipeliners must be inspected for:

(i) abnormal surface radiation;

(ii) changes in the general operating characteristics of the unit;

(iii) proper operation of shutter mechanism;

(iv) chafing or binding of shutter mechanism;

(v) damage to the device that might impair its operation;

(vi) proper operation of locking mechanism;

(vii) proper drive mechanism with camera, as appropriate;

(viii) condition of carrying device (strap, handle, etc.); and

(ix) proper and legible labeling.

(E) X-ray equipment must be inspected for:

(i) change in the general operating characteristics of the unit;

(ii) wear of electrical cables and connectors;

(iii) proper and legible labeling of console;

(iv) proper console with machine, as appropriate;

(v) proper operation of locking mechanism;

(vi) proper operation of timer run-down cutoff; and

(vii) damage to tube head housing that might result in excessive radiation levels.

(3) Operating, safety, and emergency procedures. The licensee's or registrant's operating, safety, and emergency procedures must include instructions in:

(A) handling and use of sources of radiation for industrial radiography so no individual is likely to be exposed to radiation doses more than the limits established in §289.202 of this chapter;

(B) methods and occasions for conducting radiation surveys, including lock-out survey requirements;

(C) methods for controlling access to industrial radiography areas;

(D) methods and occasions for locking and securing sources of radiation;

(E) personnel monitoring and the use of personnel monitoring equipment, including steps to be taken immediately, by industrial radiographic personnel, in the event a pocket dosimeter is found to be off-scale (see subsection (p)(2)(G) of this section);

(F) methods of transporting equipment to field locations, including packing of sources of radiation in the vehicles, placarding of vehicles, and controlling of sources of radiation during transportation, including applicable DOT requirements;

(G) methods for minimizing exposure of individuals in the event of an accident, including procedures for a disconnect accident, a transportation accident, and loss of a sealed source;

(H) notifying proper personnel in the event of an accident;

(I) specific posting requirements;

(J) maintenance of records (see subsection (v)(1) of this section);

(K) inspection, maintenance, and operational checks of radiographic exposure devices, source changers, storage containers, transport containers, source guide tubes, crank-out devices, and radiation machines;

(L) method of testing and training as specified in subsections (e) and (f) of this section; and

(M) source recovery if the licensee is authorized to perform source recovery.

Figure: 25 TAC §289.255(v)(1)

Specific Subsection	Name of Record	Time Interval Required for Record Keeping
(e)(1)(A) and (2)(A) and (f)(1)	Training and Certification Records	5 years
(i)	Receipt and Transfer	3 years
(i)	Disposal	Until license termination
(j)(2)	Survey Instrument Calibrations	3 years
(k)	Quarterly Inventory	3 years
(l)	Utilization Logs	3 years
(m)	Inspection and Maintenance	3 years
(n)	Permanent Radiographic Installation Tests	3 years
(p)	Individual Monitoring Devices	Until disposal is authorized by the department
(p)	Estimates of Exposure	Until disposal is authorized by the department
(p)	Direct-Reading Pocket or Electronic Personal Dosimeter Readings	3 years or until disposal is authorized by the department if dosimeters were used to determine external radiation dose
(p)	Pocket Dosimeter Calibrations and Yearly Response Checks	3 years
(p)	Alarming Ratemeter Calibrations	3 years
(t)(5) and (u)(8)	Internal Audit Program	3 years
(t)(5)(F) and (u)(8)(F)	Annual Refresher Training	3 years
(t)(6) and (u)(9)	Radiation Surveys	3 years or until disposal is authorized by the department if a survey was used to determine an individual's exposure
(t)(7)(C)	Annual Evaluation of Radiation Machines in Shielded Rooms	3 years
(t)(8)(A)(i)	Operating Instructions in Cabinet X-Ray Systems	3 years

(t)(8)(A)(ii)	Tests of X-Ray Interlocks	3 years
(t)(8)(A)(iii)	Evaluation of Certified Cabinet X-Ray Systems	3 years
(u)(6)	Leak Tests	3 years
(u)(10)(D)	Annual Evaluation of Shielded Rooms Containing Sealed Sources	3 years
(u)(10)(E)	Test of Sealed Source Interlocks	3 years
(v)(3)	Records at Temporary Job Sites	During temporary job site operations