

REGULATORY GUIDE B4

**COMPLYING WITH TITLE B - FACILITIES UTILIZING ANALYTICAL OR INDUSTRIAL
X-RAY EQUIPMENT**



SC DEPARTMENT *of*
**ENVIRONMENTAL
SERVICES**

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REGULATORY GUIDE B4
COMPLYING WITH TITLE B - FACILITIES UTILIZING ANALYTICAL OR INDUSTRIAL
X-RAY EQUIPMENT

Each analytical or industrial facility that is registered with the Department is required to comply with Regulations 61-64, X-Rays (Title B), which are the regulations concerning x-ray equipment. This guide is intended to assist facilities using industrial and analytical x-ray equipment in complying with Title B regulations.

GENERAL REQUIREMENTS FOR INDUSTRIAL AND ANALYTICAL EQUIPMENT

A. Analytical Vs. Industrial X-Ray Equipment

The regulations are different for analytical and industrial units. It is important to identify your equipment type. X-ray equipment located at industrial settings usually falls into two types - industrial or analytical. Industrial x-ray equipment is defined as equipment that is used to look at the macroscopic structure of a material, while analytical x-ray equipment is defined as equipment used to look at the microscopic or elemental composition of a material. Examples of industrial x-ray units include cabinet x-ray units, shielded room radiography, field radiography, irradiators, and x-ray gauges. Industrial units are typically used to look for voids in manufactured material, or the presence of metallic items in a material. Examples of analytical x-ray units include diffraction units, x-ray fluorescence units, and electron microscopes. Analytical units are typically used to look for a particular element, such as iron or lead, in a material. Analytical units may be located in an industrial setting, just as industrial units may be located in an academic setting. The designations of industrial and analytical are for the type of analysis the unit does, not the location of the unit. You may contact this Department with any questions in determining a unit type. Throughout this regulatory guide, the regulations are specified as applying to industrial or analytical units.

B. Facility Registration Approval

(See RHB 2.4)

Prior to installing an x-ray machine, a facility must apply to the Department for a Facility Registration Approval (FRA). To receive a Facility Registration Approval, complete and return SCDES Form 0845 "Facility Registration Approval Request" along with the non-refundable application fee of \$62.50. This form may be submitted by email to XRayFRA-ShieldingPlans@des.sc.gov or mailed to 2600 Bull Street, Columbia, SC 29201. Fees may be paid by check, or an invoice will be issued after the application is received. Applications are processed in the order received, with a typical turnaround time of 15 business days (excluding weekends and holidays) once a complete submission and payment are received. As the Department transitions to electronic correspondence, all approval letters and documentation will be delivered electronically. Please maintain digital records, as paper copies will not be mailed.

A FACILITY SHALL NOT INSTALL AN X-RAY PRODUCING MACHINE UNTIL THE DEPARTMENT HAS ISSUED A FACILITY REGISTRATION APPROVAL.

If a facility relocates, SCDES Form 4262 "Report of Change" must be submitted to the Department within

thirty (30) calendar days. This form may be submitted by email to XRayRegistration@des.sc.gov or mailed to 2600 Bull Street, Columbia, SC 29201. Facility Registration Approval is not transferable to a new owner or additional locations. A new Facility Registration Approval and associated fees are required for the acquisition of an existing facility.

Please note that certain types of equipment require a shielding plan prior to installation in accordance with RHB 4.4. See Regulatory Guide B6 or contact the Department for assistance.

C. Registering Equipment

(See RHB 2.5)

All x-ray equipment must be registered with the Department within thirty (30) calendar days of installation by submitting SCDES Form 0819 "Registration and/or Deletion of X-ray Producing Machines." This form may be submitted by email to XRayRegistration@des.sc.gov or mailed to 2600 Bull Street, Columbia, SC 29201. The Department will issue a registration sticker for each control panel. Stickers must be affixed in a clearly visible location to indicate the facility's registration status.

See Regulatory Guide B1 for additional details on registration requirements.

D. Report Of Change

(See RHB 2.6)

Registrants are required to notify the Department in writing within thirty (30) calendar days of any change affecting the facility or its registration. Changes that must be reported include, but are not limited to:

- 1) Change in location address or mailing address.
- 2) Name change.
- 3) Change of facility contact information.
- 4) Change of billing contact information.
- 5) Radiation Safety Officer (RSO) change.

Submit changes on SCDES Form 4262 "Report of Change" by email to XRayRegistration@des.sc.gov or by mail to 2600 Bull Street, Columbia, SC 29201.

If the name change is the result of a change of ownership, a new Facility Registration Approval Request (SCDES Form 0845) and applicable fee are required.

E. Personnel Monitoring

(See RHB 3.12)

Personnel monitoring is required in the following situations:

- 1) When an employee is likely to receive greater than 10% of their occupational dose limit for the year.

- 2) When an employee under 18 years of age, or a declared pregnant woman, is likely to receive greater than 10% of their applicable dose limit.
- 3) Finger or wrist dosimetry devices are required of analytical operators using open-beam configuration systems without a safety device, and personnel maintaining analytical equipment if the maintenance procedures require the presence of a primary beam when any component is disassembled or removed. (RHB 7.11)
- 4) Personnel monitoring is required for all operators of industrial x-ray equipment (RHB 8.11). For shielded room radiography, personnel monitoring devices are also required for workers who make "set-ups" and for any maintenance personnel (RHB 8.13.2.1). During field radiography, a pocket dosimeter or pocket chamber must also be worn (RHB 8.13.3.4).
- 5) When an individual enters a high or very high radiation area.
- 6) When the Department deems it necessary.

Personnel monitoring badges must be returned for processing within forty-five (45) days of the end of the monitoring period. All dosimeters must be read at least quarterly, the results from the readings recorded and evaluated for compliance with RHB 3.3.2 and 3.4 and be available for Departmental review. The Registrant must document explanations of any late, absent, or unused badges and maintain these records for Departmental review.

When a protective lead apron is worn by the operator and a personnel monitoring device is used, the monitoring device must be worn at the collar outside of the apron.

The personnel monitoring devices used to determine compliance with occupational dose limits must be processed by a vendor which possesses current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology (NIST). The accreditation must be for the type of radiation for which the individual wearing the device is monitored.

Each registrant must maintain records showing the radiation exposure for each person that is required to be monitored. Adjustments to the dose of permanent record must be determined by the Radiation Safety Officer.

Personnel monitoring records must be retained indefinitely or until this Department authorizes their disposal, even if the service is discontinued.

F. Prior Occupational Exposure

(See RHB 3.20)

Each registrant has the responsibility to determine the occupation radiation dose received within the current year for any new individual who enters the facility's restricted or controlled area. This may be done through signed written statements or previous personnel monitoring reports for the individual. The registrant must maintain these records and/or attempt to obtain records of prior occupation dose for five (5) years after the termination of the registration.

G. Occupational Exposure at Multiple Facilities

(See RHB 3.4.4)

If an employee is likely to receive a dose in excess of 50% of the annual allowable dose, the exposure that an employee receives at any facility must be recorded by each facility at which the employee works. Each facility must ensure that the total dose received by the employee at both locations does not exceed the occupational limits.

H. Overexposures

(See RHB 3.24 and 3.25)

The registrant is required to report to the Department any exposure of an individual in excess of any limit in the regulations. The time frame for reporting overexposure depends on the exposure that an individual receives. Immediate or 24 hours, and/or 30 days written notification may be required. See RHB 3.24 concerning notification of incidents and RHB 3.25-RHB 3.28 requirements for reporting.

I. Radiation Survey Instruments

(See RHB 1.4.4)

All radiation survey instruments used in surveys and tests must be properly calibrated. The calibration must be performed at intervals not to exceed 24 months and after any instrument servicing that may have affected its accuracy. The calibration should be traceable to within 20 percent of the national standard and performed at two or more widely separated points, other than zero. Records of these instrument calibrations must be maintained for inspection. The instrument must have a minimum operation range consistent with the radiation field being measured. Instrument calibration records must be maintained at the facility for review by the Department.

The survey instrument manufacturer's instructions must be available to operators. Operators must adhere to and demonstrate competency in these instructions. Documentation must be maintained that the operators have read and agree to adhere to these instructions. (RHB 7.5.8.2 and RHB 8.8.2.4)

The operator shall check each survey instrument for proper operation with a dedicated check source each day of use to ensure the instrument is operating properly.

J. Records

The registrant is required to maintain all records required to comply with or show compliance with Title B. These records include:

- Records showing receipt, transfer, use, storage, and disposal of all sources of radiation. (RHB 1.10.1)
- Records showing model and serial numbers of all tubes and controls. (RHB 1.10.2.1)
- Records of surveys, calibrations, maintenance, and modifications performed on the x-ray system(s), with the names of persons who performed such services. (RHB 1.10.2.4)
- Copies of all correspondence with the Department. (RHB 1.10.2.5)
- Records of prior occupational dose for employees. (RHB 3.20)

- Records of personnel monitoring results. (RHB 3.22)
- Records of alterations of safety devices - analytical. (RHB 7.4.5.1.4)
- Records of testing of safety devices - analytical. (RHB 7.7.4)
- Records of surveys, tests, and inspections. (RHB 7.7.2 or 8.10.1)
- Calibration records for survey instruments. (RHB 1.4.4)
- Records of personnel instruction and competency testing. (RHB 7.9.3 or 8.8.2.3)
- Utilization logs for field radiography. (RHB 8.13.3.1)
- Records from pocket dosimeters for field radiographers. (RHB 8.13.3.4.4)

ANALYTICAL X-RAY EQUIPMENT REQUIREMENTS

A. Training Requirements

Each facility is required to ensure that all Radiation Safety Officers and x-ray operators are adequately instructed in the facility's written operating procedures, basic radiation concepts, and competent in the safe use of the equipment. The Department will assess RSO and operator training during onsite visits. Therefore, each facility must be able to present the inspector with the written training resources and the documented competence for each RSO and operator.

- 1) All operators must be trained in the following (See RHB 7.9):
 - a) Identification of radiation hazards associated with the use of the equipment;
 - b) Significance of the various radiation warning and safety devices incorporated into the equipment, or the reasons they have not been installed on certain pieces of equipment and the extra precautions required in such cases;
 - c) Proper operation of the equipment per manufacturer's guidelines and registrant's written operating procedures;
 - d) Characteristics of ionizing radiation;
 - e) Personnel and/or area monitoring and the use of personnel and/or area monitoring devices if applicable;
- 2) Additional training requirements for Open Beam Configuration (See RHB 7.5.8):
 - a) The operation, calibration, and limitations of radiation survey instruments and proper survey techniques, if applicable;
 - b) Methods of controlling radiation dose, such as time, distance and shielding;
 - c) Units of radiation dose;
 - d) Symptoms of acute localized exposures;

- e) Proper procedures for reporting an actual or suspected overexposure;
- f) Applicable State regulations contained in Part VII and Part III.

3) All RSOs must be trained as an operator **in addition to** the following (See RHB 7.9.1):

- a) The regulations contained in Part VII, Part XI, and the applicable sections of Part III;
- b) The use of related handling tools and survey instruments that will be used by the RSO.

These topics are the minimum required subjects that must be covered in operator and RSO training for analytical units. Each facility must assess the type of equipment at their facility, and tailor their training program appropriately.

B. Requirements for Operating Procedures

(See RHB 7.10 and RHB 7.5.7)

Facilities using analytical x-ray units are required to have written operating procedures. The operating procedures must be available to all workers using the unit. The equipment must be operated in accordance to the operating procedures. The procedures must include but not be limited to:

- 1) Personnel and/or area monitoring;
- 2) Pregnant employees;
- 3) Training new employees;
- 4) Methods and occasions for conducting radiation surveys, tests, and inspections;
- 5) Methods for controlling access to restricted and radiation areas;
- 6) Methods for locking and securing the x-ray unit, when not in use or in storage;
- 7) Maintenance of records.

C. Requirements for Conducting Radiation Surveys

(See RHB 7.7.2)

Analytical x-ray units must have the surveys performed in the following situations:

- 1) Upon installation of the equipment and at least every twelve months after that;
- 2) Following any change in the initial arrangement, number, or type of local components in the system;

- 3) Following any change in operating parameters;
- 4) Following any maintenance requiring the disassembly or removal of a local component in the system;
- 5) During the performance of maintenance and alignment procedures if the procedures required the presence of a primary x-ray beam, when any local component in the system is disassembled or removed;
- 6) Any time a visual inspection of the unit reveals an abnormal condition;
- 7) Whenever monitoring devices show a significant increase over the previous monitoring period or the readings are approaching the radiation dose limits.

Records of these surveys must be maintained for review by this Department.

For enclosed beam analytical x-ray equipment, an area monitor or monitors may be used in place of an annual radiation survey. The area monitor shall be placed on the unit and replaced on at least quarterly basis. The results must be documented and available for Departmental review. If an area monitor show a substantial increase over previous results, a documented investigation must be performed to include a radiation area survey. (See RHB 7.7.3)

D. Tests of Safety Devices

(See RHB 7.7.4 and RHB 7.7.5)

Tests of safety devices such as interlocks, shutters, and warning lights are required to be conducted at least yearly to ensure their proper operation. All surveys, tests, and inspections must be documented, and records shall be maintained for Departmental review.

E. General Requirements for All Analytical X-ray Equipment

All facilities must post a "Notice to Employees" in a location where it can be reviewed by all workers. A copy of this form is available on the SCDES website. (See RHB 11.2.3)

All analytical units must meet the following posting and labeling requirements:

- 1) Each area or room containing an analytical x-ray unit must be conspicuously posted with a sign or signs bearing the standard radiation symbol and the words "CAUTION - X-RAY EQUIPMENT," or words having similar intent. (See RHB 7.4.2)
- 2) A label bearing the words "Caution - Radiation - This equipment produces radiation when energized" or words having a similar intent must be placed near any switch which energizes a tube. (See RHB 7.4.3.1)

- 3) A sign bearing the words "Caution - High Intensity X-ray Beam," or words having a similar intent must be placed in the area immediately adjacent to each tube head or on the x-ray tube housing. The sign must be placed so that it is clearly visible to any person operating, aligning, or adjusting the unit, or handling or changing a sample. (See RHB 7.4.3.2)

Warning lights labeled with the words "X-RAY ON," or words having similar intent, are required for all analytical units. They must be located near any switch that energizes an x-ray tube. They must also be illuminated only when the tube is energized and be fail-safe. (See RHB 7.4.4)

F. Additional Analytical Equipment Requirements

- 1) **Electron microscopes:** Electron microscopes are required to be registered with the Department. The only requirement for electron microscopes is that they be installed, shielded, and operated in such a manner that radiation dose limits are not exceeded. They are exempt from all other requirements of Part VII. (See RHB 7.2)

- 2) **Hand-held analytical x-ray equipment:** All operators must have documented training that includes the items listed under Training Requirements (see RHB 7.9) starting on page 6 of this guide to include the facility's written operating procedures (see RHB 7.10). Hand-held analytical x-ray units must be interlocked so they cannot be used unless they are touching or in close proximity to the sample being irradiated. The equipment must be operated according to manufacturer's specifications. Hand-held analytical x-ray units are exempt from all other requirements of Part VII. (See RHB 7.3)

- 3) **Open-beam configuration x-ray equipment:** All open-beam configuration units must have a safety device to prevent entry, of any part of the body, into the primary beam path or a safety device that causes the beam to shut off upon entry into the primary beam. A registrant may apply for an exemption of the safety device requirement. The exemption request must include:

- a. A description of the various safety devices that have been evaluated;
- b. The reason each of these devices cannot be used;
- c. A description of the alternative methods that will be used to minimize the possibility of accidental exposure, including procedures to assure that operators and other in the are will be informed of the absence of the safety devices; and
- d. The procedure for notifying proper persons in the event of an accident. A list of the persons to be notified is required and must include names, addresses, and telephone numbers.

An operator must be in immediate attendance at all times when the equipment is in operation. However, the equipment must be secured to prevent unauthorized operation when not in use. The x-ray tube status (ON-OFF located near the radiation source housing) and shutter status (OPEN-CLOSED located near each port on the radiation source housing) must be indicated. Warning devices must be labeled and must be fail-safe. (See RHB 7.5)

INDUSTRIAL X-RAY EQUIPMENT REQUIREMENTS

A. Training Requirements

Each facility is required to ensure that all Radiation Safety Officers and x-ray operators are adequately instructed in the facility's written operating procedures, basic radiation concepts, and competent in the safe use of the equipment. The Department will assess RSO and operator training during onsite visits. Therefore, each facility must be able to present the inspector with the written training resources and the documented competence for each RSO and operator.

- 1) All operators must be trained in the following (RHB 8.8.2):
 - a) Fundamentals of radiation safety including (RHB 8.12.1):
 - i. Characteristics of ionizing radiation;
 - ii. Units of radiation dose; (rem or sievert)
 - iii. Hazards of exposure to radiation;
 - iv. Levels of radiation from sources of radiation;
 - v. Methods of controlling radiation dose – time, distance, and shielding;
 - b) Radiation detection instrumentation to be used including (RHB 8.12.2):
 - i. Use of radiation survey instruments including – operation, calibration and limitations;
 - ii. Survey techniques;
 - iii. Use of personnel monitoring equipment – film badges or other approved dosimeters; and pocket dosimeter or pocked chambers, if applicable.
 - c) Operation and control of x-ray machines. (RHB 8.12.3)
 - d) The requirements of pertinent state regulations. (RHB 8.12.4)
 - e) The registrant's written operating and emergency procedures. (RHB 8.12.5)
- 2) All RSOs must be trained as an operator **in addition to** the following (See RHB 8.8.1):
 - a) The regulations contained in Part VIII, Part XI, and the applicable sections of Part III;
 - b) The use of related handling tools and survey instruments that will be used by the RSO.

These topics are the minimum required subjects that must be covered in operator and RSO training for industrial units. Each facility must assess the type of equipment at their facility, and tailor their training program appropriately.

B. Requirements for Operating and Emergency Procedures

(See RHB 8.9)

Facilities using industrial x-ray units are required to have written operating and emergency procedures. The operating procedures must be available to all workers using the unit. The equipment must be operated in accordance to the operating procedures. The procedures shall include but not be limited to:

- 1) The handling and use of the x-ray machine;
- 2) Methods and occasions for conducting radiation surveys;
- 3) Methods for controlling access to radiographic areas;
- 4) Methods for locking and securing the x-ray unit when not in use or in storage;
- 5) Personnel monitoring and the use of personnel monitoring equipment, including steps that must be taken by radiography personnel in the event a pocket dosimeter is found to be off-scale;
- 6) The proper handling of exposed personnel;
- 7) Minimizing exposure of individuals in the event of an accident;
- 8) The procedure for notifying proper persons in the event of an accident. A list of the persons to be notified is required and must include names, addresses, and telephone numbers;
- 6) Maintenance of records.

C. Requirements for Conducting Area Surveys

- 1) Cabinet x-ray units cannot be operated until a radiation survey of the unit and areas adjacent to the unit has been performed. The unit and the area adjacent to the unit must be surveyed at least annually after the unit has been put into use. Surveys must also be performed after any repair, modification, or maintenance on the system. (See RHB 8.13.1)
- 2) Industrial units used in shielded room radiography and field radiography must be surveyed prior to each entry into the radiation exposure area to ensure that the unit is off. The survey must be performed with an instrument capable of measuring radiation of the energies and dose rates to be encountered. (See RHB 8.13.2.2 and RHB 8.13.3.3)

D. Tests of Safety Devices

(See RHB 8.10)

All industrial x-ray units must be checked for obvious defects at the beginning of each day of equipment use. At least yearly, components associated with radiation safety, such as interlocks, shutters, or alarm systems, must be inspected for proper functioning. If any component is determined to be damaged, the unit shall not be used until it is repaired. Records of inspections and maintenance are required to be maintained for Departmental inspection.

E. General Requirements for All Industrial Equipment

All facilities must post a "Notice to Employees" in a location where it can be reviewed by all workers. A copy of this form is available on the SCDES website. (See RHB 11.2.3)

Industrial units must meet the following posting and labeling requirements:

- 1) Areas in which radiography is being performed must be conspicuously posted with (See RHB 8.7):
 - a. Posting of Radiation Areas – Posting must include the radiation symbol and the words "CAUTION, RADIATION AREA."
 - b. Posting of High Radiation Areas – Posting must include radiation symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA."
 - c. Posting of Very High Radiation Areas – Posting must include radiation symbol and the words "GRAVE DANGER, VERY HIGH RADIATION AREA."
- 2) A label which reads, "CAUTION - RADIATION - THIS EQUIPMENT PRODUCES RADIATION WHEN ENERGIZED," shall be located near or adjacent to each switch that controls the production of x-rays. (See RHB 8.6)

Warning devices must be labeled so that their purpose is easily identified. Warning lights labeled with the words "X-RAY ON," or words having similar intent, are required for all industrial units. They must be located near any switch that energizes the x-ray tube. They must also only be illuminated when the tube is energized and be fail-safe. (See RHB 8.5)

Each x-ray unit must have a locking device designed to prevent unauthorized or accidental production or radiation. The x-ray unit must be kept locked at all times except when under the direct supervision of a radiographer, a Radiation Safety Officer, or an operator. (See RHB 8.2)

F. Requirements for Certain Industrial Radiographic Techniques

- 1) **Cabinet x-ray units:** Cabinet x-ray units must have a permanent floor or be permanently attached to a support system. It must not be possible to insert any body part into the primary beam. The

door of the cabinet must have at least two safety interlocks. (See RHB 8.13.1.4, RHB 8.13.1.5, and RHB 8.13.1.6)

Cabinet x-ray units also require indicators of x-ray production to be legibly labeled "X-RAY ON." Each port of entry into a cabinet x-ray system must have a clearly legible and visible label bearing the statement: "CAUTION – DO NOT INSERT ANY PART OF THE BODY WHEN SYSTEM IS ENERGIZED – X-RAY HAZARD." (See RHB 8.13.1.8.3 and RHB 8.13.1.10)

- 2) **Baggage checkers:** Baggage checkers must ensure operator presence at the control area in a position which allows surveillance of the ports and doors during x-ray generation. (See RHB 8.13.1.11)

- 4) **Shielded room radiography:** Shielding plans must be submitted and approved by the Department prior to use of the equipment. A radiation area survey must be performed by a qualified vendor, registered with the Department, within 30 days of installation. This survey must be submitted to this Department for review. See regulatory guide B6 for assistance. (See RHB 8.13.2.4)

The shielded room must also include entrance interlocks, audible warning device, visible warning signal, signs indicating the meaning of the warning signals, an emergency shut-off, and a separate electrical system. X-ray generation must not be possible from within the shielding room. (See RHB 8.13.2.5, RHB 8.13.2.6, RHB 8.13.2.7, RHB 8.13.2.8, RHB 8.13.2.9, RHB 8.13.2.10, and RHB 8.13.2.11)

- 5) **Field radiography:** Field operations require the use of a utilization log that includes a description (or make and model number) of the x-ray unit, the identity of the radiographer, the plant or site where it is used, and the dates each radiation machine is used and the number of exposures made. Field radiography also requires the use of pocket dosimeters. Doses must be read daily and recharged daily or at the start of each shift. (See RHB 8.13.3)

- 2) **X-ray gauges:** A yellow or amber warning light labeled with "High Voltage On" must be located on the control panel or adjacent to the source housing. This light will only illuminate when power is applied to the x-ray tube. (See RHB 8.13.4.2)

INSPECTIONS

The Department conducts routine **unannounced** inspections of x-ray facilities. The Department will also conduct inspections if a complaint is received or if a facility requests an inspection. If violations are found on an inspection, a follow-up inspection may be conducted if the Department deems necessary. Inspections by the Department are mandatory but every attempt will be made to accommodate patient schedules.

The inspection consists of checking/verifying the operation of the x-ray equipment as well as reviewing records as outlined in the attached checklist. The facility can greatly assist the Department inspector by using the attached inspection checklist to ensure that all records are available for review. At the conclusion of the inspection, the inspector will conduct an exit interview to discuss items of non-compliance as well as

any other items the inspector deems relevant.

The inspector may leave an inspection report at the conclusion of the inspection or send a written report to the facility within approximately two weeks of the inspection. Any violations will be included in this report.

All corrections must be made within sixty (60) days of receipt of the inspection report. The facility must notify the Department, in writing, by this date that corrections have been made. Corrective action must be described for each violation. Each violation must be addressed individually. It will not suffice to simply state that all violations have been corrected. After the Department has received the sixty (60) day notification and accepted the corrective action, a compliance letter will be sent to the facility.

QUESTIONS

If you have questions, please feel free to call, email, or write:

SC Department of Environmental Services
Radiation Protection Program
2600 Bull Street
Columbia, SC 29201
PHONE: (803) 545-4400
FAX: (803) 545-4412

EMAIL –

REGISTRATIONS: XRayRegistration@des.sc.gov

FACILITY REGISTRATION APPROVALS AND SHIELDING PLANS: XRayFRA-ShieldingPlans@des.sc.gov

COMPLIANCE: XRayCompliance@des.sc.gov

REGULATORY GUIDES

- B1 - Registration of X-ray Facilities and Equipment
- B2 - Complying with Title B - Medical Facilities
- B3 - Complying with Title B - Dental Facilities
- B4 - Complying with Title B - Facilities Utilizing Analytical or Industrial X-ray Equipment
- B5 – Complying with Title B - Vendors
- B6 – X-Ray Facility Shielding Plans
- B7 - Complying with Title B - Mammography
- B8 - Complying with Title B - Personnel Security Screening Systems
- B9 - Complying with Title B - Veterinary Facilities
- B10 - Complying with Title B - Hospitals
- B11 - Complying with Title B - Therapy Facilities

Visit our web site at: <https://des.sc.gov/programs/bureau-land-waste-management/radiation-protection-program/x-ray-regulations>

CHECKLIST FOR SCDES INSPECTION

Analytical/Industrial Facility

Please have available the following records for the SCDES inspector:

- ___ Personnel monitoring reports.
- ___ Records of previous occupational dose for employees.
- ___ Training plan (including material used for training).
- ___ Documentation of operator training.
- ___ Records from testing x-ray system performance, including calibration and service records, as well as in-house testing. Records from radiation area surveys, tests, and inspections.
- ___ A list of all operators of the x-ray equipment including routine operators as well as back-up/part time operators. This list should include the title of each operator (e.g., quality control tech, engineer, metallurgist, chemist, etc.).
- ___ Operating and emergency procedures.
- ___ Utilization logs (Field Radiography).
- ___ Survey instrument calibration records.

Please be familiar with, and be prepared to show the SCDES inspector the following items:

- ___ Posted radiation area signs.
- ___ Posted "Notice to Employees"
- ___ Survey instrument
- ___ Survey instrument check source