

## **Minimum Requirements for Limited Scope Operators:**

**Part 2 of the Colorado Rules and Regulations Pertaining to Radiation Control, RH 2.6.1.4 states:**

2.6.1.4 For any radiographic x-ray system used on a living human (not inconsistent with 2.6.1.2, 2.6.1.3, and 2.6.1.5 through 2.6.1.14), “adequately trained” shall mean that the individual meets the requirements of Appendix 2D.

- (1) Limited-scope x-ray machine operator approval is limited to imaging procedures for x-ray examination of the skull, chest, hip/pelvis and spine/sacrum, upper extremities and lower extremities.
- (2) A limited-scope x-ray machine operator shall not perform radiologic procedures involving the administration or utilization of contrast media, bone density or fluoroscopic equipment, mammography, computed tomography, or radiation therapy procedures.

## **PART 2, APPENDIX 2D:**

### **X-RAY SYSTEM OPERATOR ADEQUATE RADIATION SAFETY TRAINING AND EXPERIENCE, INCLUDING LIMITED-SCOPE X-RAY MACHINE OPERATOR (LSO)**

The registrant shall require each x-ray system operator to be an individual at least 18 years of age who:

2D.1 Is certified or registered by:

2D.1.1 The American Registry of Radiologic Technologists; or

2D.1.2 A specialty board that has been recognized by the Department, including or in combination with documentation accepted by the Department of the training required by 2D.2A through 2D.2F;

2D.2 Or, is accepted by the Department as a State of Colorado-registered limited scope x-ray machine operator to conduct specified radiographic examinations of the chest, extremities, skull, hip/pelvis and spine/sacrum, having satisfactorily completed:

[Elements of the following are from the 2009 *Content Specifications for the Examination for the Limited Scope of Practice in Radiology* and used with ARRT permission.]

2D.2.1 At least 80 hours of didactic training providing the minimum hours of instruction in the specific subjects listed in 2D.2A through 2D.2F:

RADIATION SAFETY (passing score on written test of 75% or higher on the radiation safety module)

2D.2A Basic X-Ray Physics—20 hours

- (1) Structure of matter and the atom
- (2) General description of production of x-rays
- (3) X-ray emission, quantity and quality
- (4) Function of filtration and effects it has on x-ray beam collimation
- (5) Types of function of beam limiting devices
- (6) Design, features and functions of x-ray tubes
- (7) Circuitry of the x-ray machine

2D.2B Radiobiology—3 hours

- (1) Effects of ionizing radiation on the human body
- (2) Molecular and cellular radiobiology
- (3) Factors that cause somatic and genetic damage

2D.2C Radiation Protection—6 hours

- (1) ALARA
- (2) Shielding materials
- (3) Radiation quantity and units of measurement
- (4) Basic interactions of x-rays with matter
- (5) Primary and secondary scatter
- (6) Importance of time, distance, shielding
- (7) Maximum permissible doses: occupational and public
- (8) Patient protection

RADIOGRAPHIC PROCEDURES (passing score on written test of 75% or higher on radiographic procedures module)

2D.2D. Principles of Exposure—15 hours

- (1) Factors that control and influence radiographic quality
- (2) Properties of x-rays
- (3) Size distortion
- (4) Shape distortion
- (5) kVp, mAs, time
- (6) AEC and manual
- (7) Grids
- (8) Collimation
- (9) Intensifying screens
- (10) X-ray films and holders
- (11) Artifacts
- (12) Inverse square law

2D.2E Procedures and Processing—4 hours

- (1) Film storage and handling
- (2) Manual, automatic processing film processing and troubleshooting
- (3) Computed Radiography (CR)
- (4) Digital Radiography (DR)
- (5) PACs
- (6) Quality assurance / quality control

2D.2F Anatomy and Positioning—32 hours

- (1) Chest—4 hours
- (2) Extremity—12 hours
- (3) Spine—8 hours
- (4) Skull—8 hours; and

2D.2.2 At least 480 hours of clinical training during which time the individual may perform x-ray examinations only under personal (in attendance during the procedure) supervision of a qualified trainer, including:

2D.2.2.1 At least 320 hours experiential training at a clinic; and

2D.2.2.2 No more than 160 hours of laboratory training (exclusive of the didactic hours required by 2D.2A through 2D.2F); and

2D.2.3 Performance of the following imaging procedures (at least 80 examinations in total, with record of each examination kept on file):

- 2D.2.3.1 Ribs—4 examinations;
- 2D.2.3.2 Hand—4 examinations;
- 2D.2.3.3 Wrist—4 examinations;
- 2D.2.3.4 Forearm—4 examinations;
- 2D.2.3.5 Elbow—4 examinations;
- 2D.2.3.6 Humerus—4 examinations;
- 2D.2.3.7 Shoulder—4 examinations;
- 2D.2.3.8 Clavicle—4 examinations;
- 2D.2.3.9 Femur—4 examinations;
- 2D.2.3.10 Tibia – Fibula—4 examinations;
- 2D.2.3.11 Ankle—4 examinations;
- 2D.2.3.12 Foot—4 examinations;
- 2D.2.3.13 Sinuses—4 examinations;
- 2D.2.3.14 Skull—4 examinations;
- 2D.2.3.15 Facial Bones—4 examinations;
- 2D.2.3.16 C-Spine—4 examinations;
- 2D.2.3.17 Thoracic Spine—4 examinations;
- 2D.2.3.18 Lumbar Spine—4 examinations;
- 2D.2.3.19 Chest—4 examinations;
- 2D.2.3.20 Hip / Pelvis—4 examinations; and

2D.2.4 Approval by the Department as having passed the ARRT Limited Scope Operator Examination required by 2.4.5.1.

2D.2.4.1 The application to be registered in the State of Colorado as a Limited Scope Operator shall be submitted on the appropriate Department form(s) and shall contain all information required by the Department as indicated on the form(s) and all accompanying instructions.

- (1) The applicant shall complete Form R-70, “Application for Registration – Limited Scope Operator” and shall attach form R-71.
- (2) The applicant shall verify didactic training and clinical experience on Form R-71, “Clinical Supervisory and Competency Statement – Limited Scope Operator.”

2D.2.4.2 The application shall be accompanied by the required fee(s).

2D.2.4.3 Application to take the ARRT LSO examination shall be made within one year upon completion of the requirements of 2D.2.1 and within ninety (90) calendar days upon completion of the requirements of 2D.2.2 and/or 2.D.2.3.

2D.2.4.4 Upon being contacted by ARRT to schedule the LSO examination, the applicant shall complete the Core Module and at least the Radiographic Procedure Modules for Chest, Extremities, Skull/Sinuses and Spine within ninety (90) calendar days.

2D.2.4.5 The Department will notify the applicant of the ARRT LSO examination result upon receipt by the Department.

2D.3 Has maintained a minimum of twenty-four (24) hours of continuing education every two years in the areas of radiology, radiation safety, radiography and similar fields. This education shall:

2D.3.1 Conform to guidelines equivalent to the August 1, 2008 ARRT *Continuing Education Requirements for Renewal of Registration*; and

2D.3.2 Be documented by certificate(s) or other attestation(s) of satisfactory completion, submitted with an updated form R-90, "Application For Renewal – Limited Scope Operator".