Principles of Servicing
Nuclear Medicine Systems

RSTI

RADIOLOGICAL SERVICE TRAINING INSTITUTE

Introduction

The Principles of Servicing Nuclear Medicine Systems course is a hands-on course for service professionals new to the Nuclear Medicine modality. It is designed to teach the skills necessary to service to the subsystem level. Heavy emphasis is placed on basic Nuclear Medicine principles, image analysis, operation, safe laboratory practices, system troubleshooting, and preventive maintenance. The lectures, hands-on lab procedures, and documentation are designed to provide the student with the knowledge necessary to service Nuclear Medicine system.

Prerequisites

Attendees must possess an associate degree in electronics or equivalent experience. A background in imaging, although not a requirement, will be helpful.

Objectives

At the conclusion of this course, participants will be able to:

- Demonstrate their understanding of Nuclear Medicine principles.
- Verify system operation.
- Verify system specifications.
- Troubleshoot system problems.
- Perform first and second level preventive maintenance procedures.

Course Outline

Day 1

- Introduction to Nuclear Medicine
  - Common Nuclear Medicine studies
    - Study Terminology
  - Radiation safety
    - Licensing
    - RAM & ICCAL
  - System basic operation
    - Front panel controls

- System specifications
- Lab Activities
  - System operation
  - Component Location

Day 2

- Nuclear Medicine physics
  - Atomic structure
  - Radioactive isotopes
  - Types of radiation
- Radioactive measurements
  - Energy levels
  - Roentgen, Rad, Rem
  - Half life
- Quality assurance
  - Spatial resolution
    - FWHM
  - Uniformity
    - Integral
    - Differential
  - Linearity
  - Energy resolution
    - FWHM
  - Phantoms
- Lab Activities
  - Spatial resolution evaluation
  - Uniformity evaluation
  - Linearity evaluation
  - Statistical measurements

Day 3

- Collimators
  - Energy levels
  - Resolution/sensitivity
  - Slant hole
  - Pinhole
- Crystals
  - Shapes and sizes
  - Handling and care
- PMTs
  - Light coupling
  - Construction and purpose

- Gain
- Power supplies
  - Low voltage
  - High voltage
- X,Y signal processing
  - Detector
  - X,Y summing
  - Z division
  - Sample and hold
- Lab Activities
  - PMT coupling
  - Power supply measurements

Day 4

- Z signal processing
  - Detector
  - PHA window
- Quality assurance checks
- Uniformity correction methods
- PM Basics
  - Cleaning
  - Filters
  - Lubrication
  - Tuning
  - Backups/Cloning/Ghosting
- Lab Activities
  - Z PHA calibration
  - Quality assurance checks

Day 5

- Troubleshooting
  - Common Failures
  - System diagnostics
- Final exam
- Final exam review
- Course evaluation

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Hands-On Training Course
Course Length: 2 Weeks
CEU's Awarded: 8 CEU's
State of Ohio Registration No. 93-09-1377T