Radiation Safety Course Outline (40hr)

Basic Math review

Radioactive Materials

a. Production
   (1) Neutron activation
   (2) Nuclear fission
b. Stable vs. unstable (radioactive) atoms c. Curie - the unit of activity
d. Half-life of radioactive materials
e. Plotting of radioactive decay
f. Specific activity - curies/gram

Types of Radiation

a. Particulate radiation - properties: alpha, beta, neutron
b. Electromagnetic radiation - X-ray, gamma- ray
c. X-ray production
d. Gamma-ray production
e. Gamma-ray energy
f Energy characteristics of common radioisotope sources
g. Energy characteristics of X-ray machines

Fundamental Properties of Matter

a. Elements and Atoms
b. Radiation Protection – Why?
c. Atomic particles properties
d. Atomic Structure
e. Atomic Number and Mass Number
f. Isotopes vs Radioisotopes

Personnel Monitoring

a. Wearing of monitoring badges
b. Reading of pocket dosimeters
c. Recording of daily dosimeter readings
d. "Off-scale" dosimeter-action required
e. Permissible exposure limits

Survey Instruments

a. Types of radiation instruments
b. Reading and interpreting meter indications
c. Calibration frequency
d. Calibration expiration-action
e. Battery check-importance

Storage and Shipment of Exposure Devices

a. Vehicle storage
b. Storage vault - permanent
c. Shipping instructions - sources
d. Receiving instructions - radioactive material

Leak Testing of Sealed Radioactive Sources

a. Requirements for leak testing

b. Purpose of leak testing
c. Performance of leak testing

State and Federal Regulations

a. Nuclear Regulatory Commission (NRC) and agreement states – authority
b. License reciprocity
c. Radioactive materials license requirements for industrial radiography
d. Qualification requirements for radiographic personnel
e. Regulations for the control of radiation (state or NRC as applicable)
f. Department of Transportation regulations for radiographic-source shipment
g. Regulatory requirements for X-ray machines (state and federal as applicable)

Radiation Survey Reports

a. Description of report format
b. Requirements for completion

Radiographic Work Practices

a. Establishment of restricted areas
b. Posting and surveillance of restricted areas
c. Use of time, distance, and shielding to reduce personnel radiation exposure
d. Applicable regulatory requirements for surveys, posting, and control of radiation and high- radiation areas

Emergency Procedures

a. Vehicle accidents with radioactive sources
b. Fire involving sealed sources
c. "Source out" - failure to return to safe shielded conditions
d. Emergency call list

Exposure Devices

a. Daily inspection and maintenance
b. Radiation exposure limits for gamma-ray exposure devices
c. Labeling
d. Use
e. Use of collimators to reduce personnel exposure

TEST NDT does not have any pre-requisites for attending any of our courses, it is entirely up to the attendee to determine whether the course is suitable for their needs and whether they are capable of achieving the standards. Please study the applicable course outline and decide if the course is suitable for your needs before enrolling, if in doubt, please contact us to discuss. For employer funded attendees, please discuss the suitability of any of the courses with your employers responsible NDT level 3 before enrolling.