

Nevada Technical Associates, Inc.
Radiation Safety Officer
Course Outline

Starting time: 8:30 each day. The course will end at about noon on Friday. The topics below will be more or less evenly distributed over the duration of the course. Attendees will receive a manual of several hundred pages and a course certificate.

1. Introduction
 - a. Course objectives and schedule
 - b. Origins of nuclear science
 - c. Atomic structure, isotopes, nuclear stability
 - d. Equations of radioactive decay

2. Radioactive Decay Processes
 - a. Alpha emission
 - b. Beta emission
 - c. Gamma emission
 - d. Other decay processes
 - e. Statistics of radioactive decay

3. Radiation Detection and Measurement
 - a. Gas-filled chambers
 - b. Scintillation detectors
 - c. Semi-conductors
 - d. Photographic emulsions

4. Interaction of Radiation with Matter
 - a. Modes of interaction
 - b. Heavy charged particle interactions
 - c. Beta particle interaction
 - d. Gamma ray interaction
 - e. Neutron interaction

5. Biological Effects of Radiation

- a. Radiation quantities and units
- b. Quality factors
- c. Biological effects
- d. Mechanisms of biological damage
- e. Acute, whole-body gamma radiation
- f. Risk of stochastic effects
- g. Fatality rates in various industries
- h. Radiation dose from natural and man-made sources

6. Shielding

- a. Charged particle shielding
- b. Photon shielding
- c. Neutron shielding
- d. Facility shielding

7. Personnel Radiation Dosimetry Devices and Methods

- a. External monitoring
- b. External dose evaluation
- c. Internal monitoring
- d. Internal dose assessment

8. Federal and State Regulations

- a. Chronology of standards
- b. Sources of standards, recommendations and requirements
- c. Basis of Standards
- d. Current regulations
- e. Licensing procedure

9. Radiological Safety Surveys, Records and Documentation

- a. Surveys and inspections
- b. Radiological Controls and ALARA
- c. Records and documents
- d. Operating and emergency procedures and document control

10. Radioactive Material Transportation and Disposal Regulations

- a. Applicable regulations
- b. Categories, packaging and limits
- c. Manifests, records, markings, and labels
- d. Radwaste disposal methods, sites, records and regulations

11. Radiological Emergencies

- a. Definitions, classifications and phases
- b. Notifications and assistance
- c. Response: isolation, radiation and medical evaluations
- d. Review of accident causes and recent accidents

12. Drafting a Radiological Safety Plan (student exercise)

- a. Attendees prepare program
- b. Exercise review