Radiation Protection Training for TENORM

4-Hour

SYLLABUS

PRESENTED BY:
Applied Environmental Consulting, Inc.

INTRODUCTION

- What you will Learn
- History of Radiation
- The Beginning
- Discovery of Radiation
  - Wilhelm Roentgen
  - Madame Curie
  - Albert Einstein

RADIATION BASICS

- Energy Spectrum
  - Non-ionizing
  - Ionizing
- Atomic Structure
- Atom
  - Proton
  - Neutron
  - Electron
  - Atomic Number
  - Atomic Weight
- Emissions from Radioactive Materials or other atomic structures
  - Alpha
  - Beta
  - Gamma
  - X-rays
  - Neutron

SOURCES OF RADIATION

- Natural
- Man-Made
- External
- Internal
- Contamination

CHARACTERISTICS OF RADIOACTIVE MATERIALS

- Unstable
- Detectable
- Spontaneous Emission

RADIOACTIVITY

- Disintegrations
- Disintegration per Unit Time
- Curie/Becquerel
- Activity Concentration
- Half-Life

INTERACTIONS OF RADISTION WITH MATTER

- Interactions
  - Non-ionizing
  - Ionizing
- Units
  - Roentgen
  - RAD
  - Weighing Factors
  - REM
- Rates of Exposure and Dose

RADIATION BIOLOGY

- Sources of Dose
  - External

- Internal
- Types of Dose
  - Acute
  - Fractionated
  - Chronic
- Types of Effects
  - Somatic
  - Genetic

RADIATION PROTECTION

- Principles of Exposure Control
  - Time
  - Distance (Inverse Square Law)
  - Shielding
- As Low As Reasonably Achievable (ALARA)
- Sealed Source vs Contamination
- Signs & Labels
- Personnel Monitoring

INSTRUMENTATION

- Concepts
  - GM Counter
  - Scintillators
  - Efficiency
  - Scales
  - Radiation Levels
- Control Zones “Bone Yard”
- NORM & TENORM
  - Decay schemes
  - How is it generated in industry
  - How is it monitored and managed?
  - Personnel protection methods
  - Regulatory release levels
  - Site specific requirements, PPE, Control zones
  - Disposition pathways
  - Metal recycling
  - Landfill
  - USDOT Exemption Vs. Release levels

TRANSPORTATION

TENORM Exempt
Radioactive materials, Limited Quantity
Radioactive LSA
Bill of Lading