



Radiation Safety and Protection for Industrial Radioactive Sources and NORM



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Introduction:

Radiation safety failures around industrial radioactive sources rarely come from the source itself; they come from unclear local rules, unmonitored doses, poor source accountability and crews who are unsure what to do when a source sticks or goes missing. This Core Concept course gives practitioners the radiation protection methods set out in IAEA safety standards and applies them to industrial radiography, nuclear gauges, well logging and NORM-affected operations. Participants inspect realistic source-use sites and produce a Radiation Safety Inspection Report and Local Rules Pack for their own operation.

Course Objectives:

- Apply the principles of justification, optimisation and dose limitation to source-use tasks as IAEA GSR Part 3 and GSG-7 set them out
- Plan radiography, gauging and logging work using time, distance and shielding to keep occupational exposure as low as reasonably achievable
- Operate survey meters and personal dosimeters, interpret readings and keep dose and monitoring records that stand up to review
- Designate controlled and supervised areas and write local rules, work instructions and source accountability checks for a site
- Respond to a stuck, lost or damaged source and to NORM contamination using a prepared radiation emergency plan
- Produce a Radiation Safety Inspection Report and Local Rules Pack for a source-use site

Target Audience:

- Industrial radiography crews and site technicians who operate exposure devices in the field or in shielded enclosures
 - Staff who install, operate or maintain fixed and portable nuclear gauges on process plant
 - Well logging and wireline crews who handle sealed sources at the wellsite
 - Appointed radiation protection officers and radiation safety officers who supervise day-to-day source use
 - HSE practitioners who audit contractors using radioactive sources or manage NORM-affected equipment
 - Storekeepers and logistics staff responsible for source storage, inventory and consignment
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Course Outline:

Day 1: Ionising Radiation and Industrial Source Use

- Alpha, Beta, Gamma, X-Ray and Neutron Radiation Properties and Penetration
- Activity, Half-Life and Dose Quantities: Becquerel, Gray and Sievert
- Deterministic and Stochastic Effects of Occupational Exposure
- Industrial Source Applications Map: Radiography, Nuclear Gauges and Well Logging
- Site Source Register and Current-State Radiation Safety Checklist

Day 2: IAEA Radiation Protection Standards and Roles

- IAEA GSR Part 3 Basic Safety Standards: Planned, Emergency and Existing Exposure Situations
- Justification, Optimisation and Dose Limitation Principles Applied to Source Tasks
- Occupational Radiation Protection Programme Elements in IAEA GSG-7
- Radiation Protection Officer Duties, Qualified Expert Support and Management Responsibilities
- Controlled and Supervised Area Designation Criteria and Signage

Day 3: Exposure Control, Dosimetry and Monitoring

- Time, Distance and Shielding Calculations Using the Inverse Square Law and Half-Value Layers
- Survey Meter Selection, Function Checks and Calibration Records
- Personal Dosimetry: Passive Badges, Electronic Personal Dosimeters and Dose Record Keeping
- Radiography Barrier Setting and Boundary Dose Rate Surveys Following IAEA SSG-11
- Local Rules, Work Instructions and Pre-Job Radiation Safety Briefing Sheet

Day 4: Source Security, Transport, Emergencies and NORM

- Source Inventory, Leak Testing and Security Measures in IAEA NSS 11-G
- Source Store Design Checks, Key Control and Disused Source Handling
- Transport Package Types, Labels and Transport Index Under IAEA SSR-6
- Radiation Emergency Plan: Stuck, Lost, Stolen or Damaged Source Response Drill
- NORM in Scale, Sludge and Produced Water: Survey, Decontamination and Waste Segregation

Day 5: Inspection Walkthroughs and the Radiation Safety Inspection Report

- Radiography Site Walkthrough: Barrier, Signage and Boundary Survey Audit
 - Fixed Gauge Installation Walkthrough: Shutter, Labelling and Access Control Check
 - Wellsite and Source Store Walkthrough: Inventory Reconciliation and Security Review
 - Radiation Safety Inspection Report and Local Rules Pack Drafting
 - Peer Review of Findings and Corrective Action Prioritisation
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Skills You Will Gain:

- Ionising Radiation Hazard Recognition
- Occupational Dose Optimisation
- Radiation Survey Instrumentation
- Personal Dose Record Management
- Radiation Area Classification
- Radioactive Source Accountability
- Radiological Emergency Preparedness
- NORM Contamination Control

Why Attend This Course:

- Return with a Radiation Safety Inspection Report and Local Rules Pack for a source-use site in your own operation
- Read a survey meter, set a radiography barrier and explain a dose record to a crew with confidence
- Know the first actions to take when a source sticks, goes missing or a NORM-contaminated item is opened
- Compare source-use practice with radiographers, gauge users and logging crews from oil and gas, construction, mining and manufacturing

Conclusion:

Industrial radioactive sources stay safe when every crew member understands the hazard, the site has clear local rules and each source is accounted for from store to job and back. This course moves from radiation physics and dose quantities, through the IAEA radiation protection standards and the roles they assign, to exposure control, dosimetry, source security, transport, emergencies and NORM. The final day applies that material in site inspection walkthroughs and produces a Radiation Safety Inspection Report and Local Rules Pack that participants take back to their operation.
