Radiation Protection and NORM Management in Oil and Gas Operations Training Course

4 – 8 October 2027
London (UK)



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Introduction:

Radiation protection and NORM management in oil and gas operations controls radiological hazards generated by naturally occurring radioactive material accumulating within tubulars, vessels, and waste streams. This one-week course prepares operations and safety personnel to quantify radioactive scale and sludge, implement field containment controls, and produce an operational NORM Management Plan and Radiological Survey Dossier. Delivered at practitioner depth through an inspection walkthrough practical mode, delegates examine assets against IAEA Safety Reports Series No. 34, which establishes handling and waste rules for upstream hydrocarbon extraction. Delegates master asset radiological qualification by attending the Radiation Protection and NORM Management in Oil and Gas Operations Training Course with Blackbird Training Centre.

Course Objectives:

- Distinguish between secular radioactive equilibrium and disrupted decay chains across Uranium-238 and Thorium-232 series present in hydrocarbon production systems.
- Compare surface contamination pancake probe counts per minute vs volume activity concentrations in Becquerels per gram under IAEA GSG-17 clearance criteria.
- Apply Aramco Engineering Standard SAEP-358 protocols to tag, isolate, and decontaminate radioactive tubulars and vessel internals safely.
- Interpret radiation dose limits and constraints under regulatory frameworks to verify that worker exposures remain below one millisievert per year.
- Select appropriate personal protective equipment and containment barriers to prevent internal contamination from Radium-226 and Lead-210 during turnaround maintenance.
- Justify waste segregation routes and interim yard storage configurations in compliance with nuclear and radiological regulatory commission requirements.

Target Audience:

- Upstream production and processing personnel responsible for fluid extraction who must decide when scale accumulation requires radiological containment.
- Facility maintenance and turnaround specialists responsible for vessel entry who must select appropriate respiratory protection against radioactive dust.
- Health, safety, and environmental compliance coordinators responsible for reporting who must judge whether survey readings exceed clearance criteria.
- Pipeline integrity and pigging crew supervisors responsible for line maintenance who must evaluate radioactive sludge contamination in receiver barrels.
- Hazardous waste and yard operations teams responsible for material staging who must choose between interim site storage and authorized repository transfer.



Course Outline:

Day 1: NORM Fundamentals and Upstream Origin Mechanisms

- IAEA Safety Reports Series No. 34: Identifying Natural Radionuclides in Petroleum Fluids
- Radium-226 vs Radium-228 Dynamics: Comparing Geochemical Co-Precipitation in Barium and Strontium Scales
- Lead-210 and Polonium-210 Accumulation: Mapping Gas Processing Thin-Film Deposition Mechanisms
- External Radiation vs Internal Toxicity: Evaluating Inhalation and Ingestion Risks of Particulate NORM
- Radiological Baseline Site Characterisation: Conducting Production Wellhead and Separator Surveys

Day 2: International and National Regulatory Frameworks

- IAEA GSR Part 3 Standards: Establishing Foundational Worker Protection and Clearance Criteria
- NRRC-R-01 Safety Regulations: Defining Licensee Responsibility and Radiation Safety Officer Mandates
- Registration vs Licensing Frameworks: Categorising NORM Facilities Under Regulatory Controls
- Exemption Thresholds: Applying Activity Concentration Formula Summation for Bulk Solids
- Annual Dose Constraints: Verifying Worker Exposure Below One Millisievert Per Year

Day 3: Field Radiometry and Contamination Monitoring Techniques

- Pancake GM Detectors vs Scintillation Probes: Selecting Appropriate Sensors for Alpha-Beta Contamination
- MicroSievert Survey Meters: Measuring Ambient External Dose Rates on Equipment Surfaces
- Instrument Calibration Factors: Converting Field Counts Per Minute to Contamination Activity Units
- Wipe Testing and Smear Sampling: Verifying Removable vs Fixed Radioactive Surface Contamination
- Equipment Clearance Verification: Measuring Ambient Dose Below One MicroSievert per Hour at Distance

Day 4: Turnaround Controls, Decontamination, and Asset Tagging

- SAEP-358: Implementing Mandatory Turnaround Equipment Tagging and Control Zones
- Vessel Entry Safety Protocols: Enforcing P3 HEPA Respiratory Protection and Disposable Coveralls
- High-Pressure Water Jetting vs Chemical Dissolution: Evaluating NORM Decontamination Efficacy
- Pigging Waste Handling: Capturing and Drumming Radioactive Sludge from Pipeline Receivers
- Interim Yard Storage Engineering: Establishing Controlled Staging and Yellow Magenta Radiation Labelling



Day 5: Inspection Walkthrough Practical Mode and Dossier Finalisation

- Simulated Plant Walkthrough: Conducting Physical Asset Radiological Screening Along Hydrocarbon Process Lines
- Hydrocarbon Asset Screening vs Laboratory Analysis: Reconciling Field Radiometry with Isotopic Spectroscopy
- Corrective Containment Deployment: Rectifying Simulated Barrier Failures During Heavy Sludge Cleanout
- Waste Consignment Documentation: Preparing Manifests for Transport to Authorized Long-Term Facilities
- Final Deliverable Assembly: Finalising the Operational NORM Management Plan and Radiological Survey Dossier

Skills You Will Gain:

- Radiological Contamination Monitoring
- Pancake Probe Count Conversion
- NORM Scale Hazard Classification
- Turnaround Isolation Zone Staging
- Respiratory Protection Selection
- Radioactive Waste Consignment Auditing
- Regulatory Clearance Calculation
- Radiological Survey Dossier Compilation

Why Attend This Course:

- From uncertain field radiometry to accurately converting detector counts per minute into regulatory clearance units.
- From uncoordinated turnaround vessel entries to enforcing strict containment, personal protective equipment, and dust suppression controls.
- From ad-hoc scrap sorting to systematically isolating and tagging radioactive equipment in compliance with corporate standards.
- From fragmented radiological inspection logs to producing an audit-ready NORM Management Plan and Radiological Survey Dossier.

Conclusion:

Radiation protection and NORM management safeguards petroleum personnel and environmental assets by controlling natural radionuclides accumulated during extraction. This course clarifies distinctions between external gamma radiation exposure and internal contamination risks, as well as surface contamination count rates and mass activity concentration thresholds. Operating at practitioner depth, this course serves field operations teams, asset integrity engineers, and safety specialists who require practical inspection skills, rigorous decontamination workflows, and complete regulatory alignment under recognized international frameworks.



Frequently Asked Questions FAQ:

What is radiation protection and NORM management in oil and gas operations?

Radiation protection and NORM management in oil and gas operations is the identification, monitoring, containment, and disposal of technologically enhanced naturally occurring radioactive material. It prevents external worker radiation exposure and internal radioactive contamination during the extraction, maintenance, cleaning, and decommissioning of hydrocarbon processing equipment.

What is the difference between external radiation exposure and internal contamination in NORM management?

External radiation exposure occurs when penetrating gamma rays irradiate the body from outside an asset without material transfer. Internal contamination happens when alpha- or beta-emitting scale dust or radon progeny are inhaled or ingested, lodging directly inside tissue where localized radiotoxicity causes severe cellular biological damage.

Which international standard governs radiation protection and NORM management in oil and gas operations?

IAEA Safety Reports Series No. 34 provides the primary international technical guidance for managing radioactive waste in petroleum operations. In addition, IAEA GSR Part 3 and IAEA GSG-17 establish foundational criteria for worker radiation protection limits, facility clearance thresholds, and radioactive material exemption levels.

Is this radiation protection and NORM management course suitable for turnaround and maintenance supervisors?

Yes, turnaround and maintenance supervisors benefit directly because this practitioner course teaches hands-on vessel entry isolation, personal protective equipment selection, contamination containment, and equipment tagging. They learn the operational methods required to decontaminate radioactive tubulars and vessels safely without schedule disruptions or regulatory non-compliance.

