CANBERRA

D&D Capabilities and Solutions

Depth Profiling of Contamination Distribution: Non Invasive Solutions

Key Drivers:

- Map the in depth contamination distribution in walls and floors when a non-invasive method is required.
- Ensure worker safety in efficiently applying ALARA principles and mitigating risks.
- Optimize financial cost with an upstream assessment of waste volumes and subsequent disposal costs prior to any dismantling field work.
- Collect all relevant data, before and during field work, allowing optimization of:
  - The choice of the most efficient dismantling tools, techniques, methods
  - Field work duration
  - Waste sentencing

KEY BENEFITS

- Field Work Time Reduction
- Dose Exposure Reduction
- Cost Reduction of total project

Objectives:

- Accurate characterization of in-depth contamination distribution in homogeneous and non-homogeneous mediums (walls, slabs, concrete…)
- 3D mapping of contamination allowing waste volume calculation per category
- Gamma activity measurement
- Provide customers with versatile solutions to perform:
  - Accurate upstream mapping of contamination
  - Fast in-situ measurements during D&D operations
  - Rigorous final verification measurements

Measurement with a shielded integrated, compact CZT detector that includes MCA (also available without MCA)

A CANBERRA™ solution can be customized based on the unique requirements of the situation. *All the solutions offered in this flyer can be thoroughly performed by our Measurements & Expertise (M&E) team, without any purchase of products or systems.*

MIRION TECHNOLOGIES

Depth Profiling of Contamination Distribution: Non Invasive Solutions

D&D Capabilities and Solutions

Concrete wall measurements with CZT or HPGe detectors

Technical description

- Surface measurement of concrete can be carried out by a simple ISOCS™ instrument measurement. For depth profiling measurement, three non-invasive methods are available:

1 Outside Wall using the ISOCS system, take one measurement if using multi-energy line nuclides

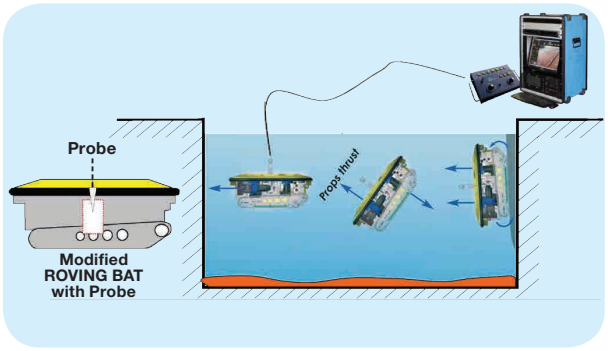
- Non-invasive.
- HPGe ISOCS based.
- Needs multi-energy nuclide e.g. ^{152}Eu, ^{238}U, ^{235}U, Ra+d, Th+d, even ^{137}Cs (surface) or ^{60}Co (in depth) as reference, most of them were well calibrated, to determine the contaminated isotope and activity on depth profile.
- ISOCS system efficiency calibrations.
- Advanced In-situ Gamma Spectrometry (AIGS) Services.

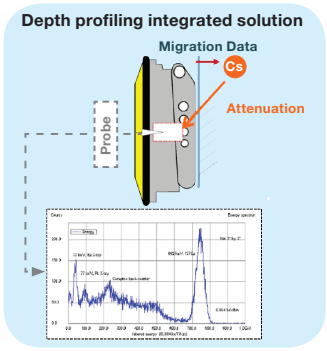
2 Outside Wall using the ISOCS system, take three measurements if using single energy line nuclides

- Multiple measurements at different angles.
- ISOCS based collimated detector.
- Can use simpler nuclides or with single energy line nuclides to determine the depth profile of contaminated sources.
- Best result is when all spectra have the same activity at all energies.
- Advanced In-situ Gamma Spectrometry (AIGS) Services.

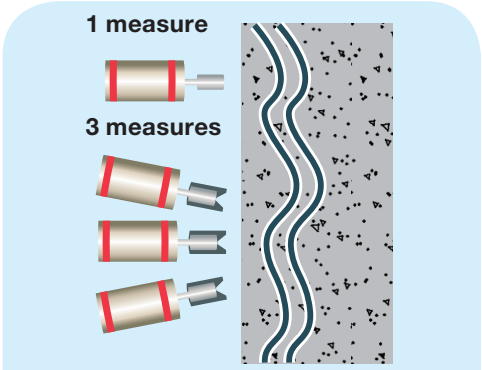
3 Outside Wall using the ISOCS system in-situ and spectrum shape data

- Based on increased Compton down-scatter for activity at deeper locations.
- Calibration based on Peak-to-Compton ratio as a function of depth.
- Sophisticated algorithms implemented in software.

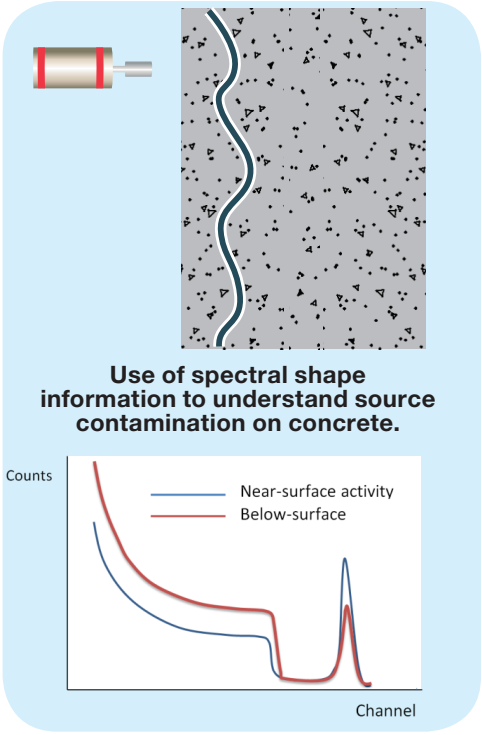




Non-invasive measurements using a ROVING-BAT underwater in Sellafield (UK)



Non-invasive in-situ measurement using an ISOCS system, also using several positions.



Use of spectral shape information to understand source contamination on concrete.

For more information, review the complete case study on our website:
www.canberra.com/measurements-expertise