

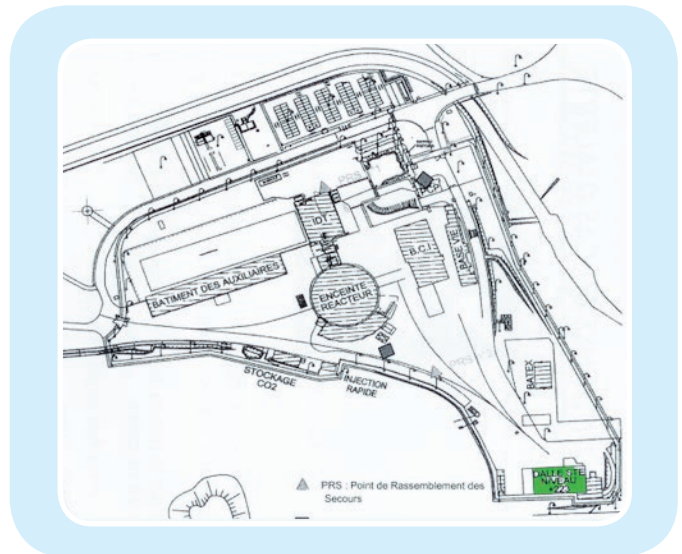
Activity Depth Profiling of Building at Brennilis NPP, France

Scope:

- Decommissioning the STE (Service de Traitement des Effluents) building, mapping of the walls, ground and floor without releasing any dust.
- Brennilis NPP is the first French utility being decommissioned since 1985, and this campaign took place in 2008.
- *TruPro*[®] method has been selected by EDF to avoid cross-contamination as drilling is less invasive and contaminating than current coring method.
- The goal of this project for EDF was to perform the facility characterization using the *TruPro* method from NMNT, to assess the levels of contamination while still maintaining the integrity of the building.

Key Drivers:

- To mitigate risk and maintain ALARA principles, the building had to be characterized and mapped in order to understand levels of contamination and to identify hot spots and contamination profiles at depths prior to dismantling.
- The SET building had to be mapped several months before dismantling it, and its integrity had to be maintained during this project.
- To prevent the removal of dust from the site, samples were to remain within the STE building.
- Find a new less expensive, less invasive and faster method than standard coring.
- Bringing calibration sources on site was forbidden.
- Specific Radionuclide Activities of interest were, Co-60, Cs-137, Eu-152, Eu-154, Eu-155, Pu-239, Am-241 and Pu-241.
- Working space for measurements was very limited within the STE building with a provisional roof in bad shape.
- High radon background in the environment, due to local geology and other factors.



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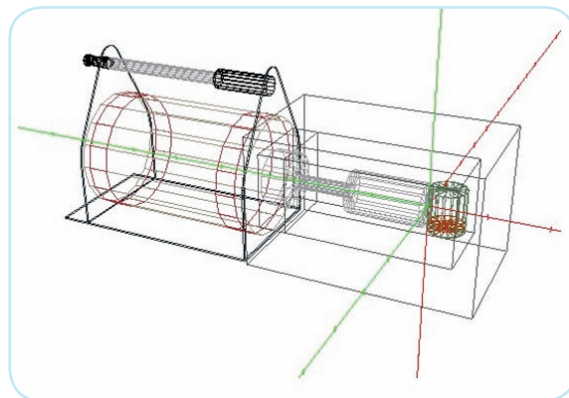
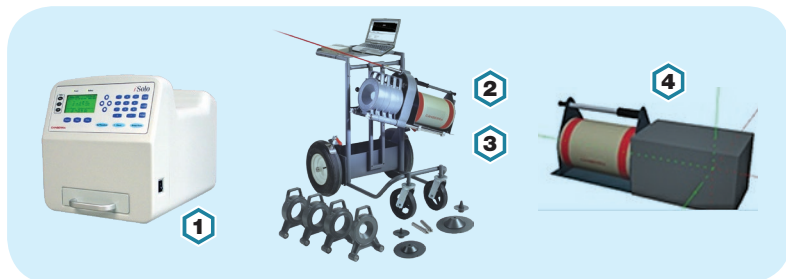
MIRION
TECHNOLOGIES

Activity Depth Profiling of Building at Brennilis NPP, France

Case Study

Instruments & Techniques Used:

- 1 iSolo® for alpha/beta smears
- 2 ISOCS™ cart with GC4020 HPGe, big MAC, InInspector™ 2000 DSP
- 3 ISOCS characterization Software
- 4 Customized collimator



CANBERRA™ Solution:

- *TruPro* powdered granite and concrete samples were collected in 250 ml vials.
- These vials were measured in-situ by using a portable calibrated radiometric instrument.
- The *TruPro* method provided the ability to penetrate “hot” contaminated concrete with very dense subsurface rebar through layers of materials to depths of 10 cm to 2.5 meters.
- The CANBERRA ISOCS/ LabSOCS™ system was the appropriate choice for gamma measurements as no calibration sources were allowed.
- The complete system included a rugged ISOCS cart, outfitted with ISOCS calibrated HPGe detectors, special lead shielding, digital electronics, and ISOCS and LabSOCS analysis software.
- Using Genie™ 2000 background subtraction, the system was able to distinguish the radon background from non-environmental factors.
- ISOCS geometries were created for 1.5 to 145 grams to compensate for the uniformity of the powder in the vials.
- Smear measurements with iSolo for alpha/beta contamination.

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ACHIEVEMENTS

- Combination of ISOCS measurement of depth-tagged samples with *TruPro* vacuum drilling allowed activity depth profiles to be determined, while minimizing cross-contamination, limiting volumes of waste generated, and reducing project timescales and costs.
- Reduced time to sample and map the activity distribution in the building, compared to conventional approach based on core sampling.
- Potential hot spots were swiftly identified and further examined within the building.
- 280 measurements were taken from the *TruPro* samples over approximately 21 working days.
- As a result of their work at Brennilis, NMNT International received an “A rating” from EDF, the highest rating offered to a vendor.
- The successful joint effort demonstrated that the CANBERRA solutions are well suited for analysis of *TruPro* samples.
- Similar measurement collaboration projects with *TruPro*/NMNT were carried out in Vandellos NPP (Spain), Chinon NPP (France), and other countries.