

## Case Study

# CANBERRA

## Decommissioning of a Medical Cyclotron using ISOCS™

### Scope:

- RDS-112 Positron Emission Tomography (PET) cyclotron manufactured by CTI Molecular Imaging, Inc., in Knoxville, Tennessee, USA, producing F-18 and C-11 PET radiochemicals.
- Operated for eight years and decommissioned in 2007.
- Components ranging from 0.1 g targets to 10,000 kg concrete shields.
- Activities ranged over nine orders of magnitude.

### Key Drivers:

- Thorough radiological characterization required for shipping and disposal.
- Locate and characterize all activation hotspots.
- Wide range of activation products present in activated metals and concrete, including Fe-55, Mn-54, Zn-65, Sb-124, W-181, Ta-182, Co-57, Co-60 and Cs-137.
- Very limited timeframe available for measurements (2 days) and analyses (1 month).
- Limited characterization budget prohibited sampling and offsite analysis.



Visit our Measurement and Expertise (M&E) page.



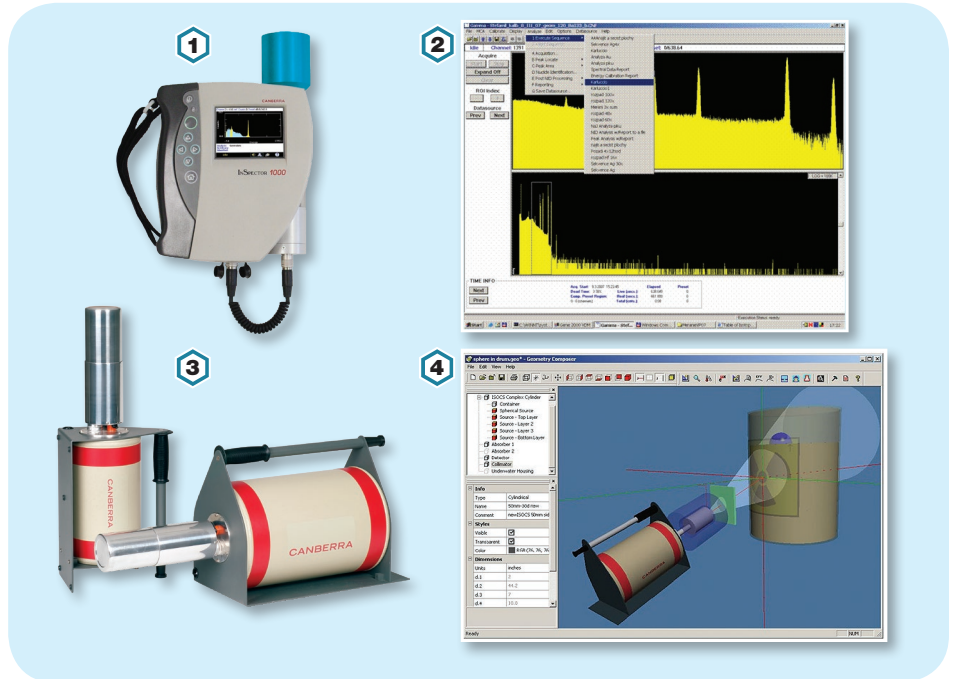
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TECHNOLOGIES

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### Instruments & Techniques Used:

- 1 InSpector™ 1000 Gamma Probe
- 2 Genie™ 2000 Gamma Analysis
- 3 BEGe High Resolution Detector
- 4 ISOCS Efficiency Calibration Software



### CANBERRA™ Solution:

- Locate activation hotspots using handheld NaI probe, perform 100% gamma scan on all items.
- Measure each hotspot with ISOCS-characterized high resolution Broad Energy Germanium (BEGe) detector and ISOCS mathematical efficiency calibration software.
- Develop customized nuclide libraries for each type of activated material.
- Analyze gamma spectra and generate Radioassay Data Sheet for each item.
- Produce comprehensive Radiological Characterization Report to include all items.
- Perform all measurements in low-background area to minimize interferences.

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### ACHIEVEMENTS

- All analytical results were delivered to the customer within thirty days.
- 100% of the cyclotron components were scanned for activation hotspots.
- 45 high-resolution gamma spectroscopy measurements were performed over two days in the field.
- Activated items ranging from simple to very complex were modeled.
- Activities over nine orders of magnitude were measured and reported.