

Measurement infrastructure for nuclear decommissioning – an update

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Aims:

1. To provide overview of metrology in the field
 2. To identify needs in:
 - Bulk monitoring
 - Surface monitoring
 - Radiochemical analysis
- One priority RM for current NMS programme
- Other specific needs to support research proposals

Priorities for reference materials/sources

	Bulk monitoring	Surface monitoring	Radiochemical analyses
Matrices/ Substrates	Concrete, soft waste, brick	Steel, concrete, Formica	Concrete, steel, soil
Radionuclides	^{241}Am , ^{60}Co , ^{137}Cs	^{238}U , ^{137}Cs , Am nuclides	^3H , ^{14}C , actinides
Sample size	200 litre drum	-	500 g
Activity concentration	$< 0.4 \text{ Bq g}^{-1}$	-	$< 0.4 \text{ Bq g}^{-1}$ (concrete), 1 – 10 Bq g^{-1} (steel)

Which matrix first?

- **Most votes for γ -emitters in concrete or soft waste**
- **Have decided to develop **soft-waste** standard first to develop methodology**
- **Which material and density?**

Which material?

- Canvassed users on possible ‘surrogate’ material and suitable overall density:
- **Materials:** Paper, cellulose, plastics, cotton, vermiculite, ion-exchange resins
- **Densities:** Typically in range 150 – 700 kg m⁻³ depending on composition and compaction
- 300 kg m⁻³ (or similar) often cited

Plan

- Ion-exchange resins sound the best option, but densities rather high (around $700 - 800 \text{ kg m}^{-3}$)
- \therefore will partially load 240 x 500ml LDPE bottles with spiked resin
- Stack bottles into 200 L drum to give overall density of 300 kg m^{-3}

Plan

- **Initially, will prepare one drum @ 0.1 Bq g⁻¹ each of ²⁴¹Am, ⁶⁰Co and ¹³⁷Cs for circulation to UK labs**
- **Currently testing commercial resin (drying conditions and radionuclide uptake)**
- **Provisionally, drum prepared by end September 2006**