Remediation of a Radium-Contaminated Facility with High Radon Levels

1 Introduction

Legacy contamination, radium luminising works. Excavation, decontamination, disposal of arisings (characterisation, size reduction, waste packaging). High radon levels

2 Objectives

AMEC were contracted to remediate a facility which had legacy Ra-226 contamination resulting from the site's previous use as a luminising works. The work involved monitoring of the facility to establish the extent of the contamination, decontamination of the building fabric, excavation works, characterisation of waste materials and preparation for disposal of arisings.

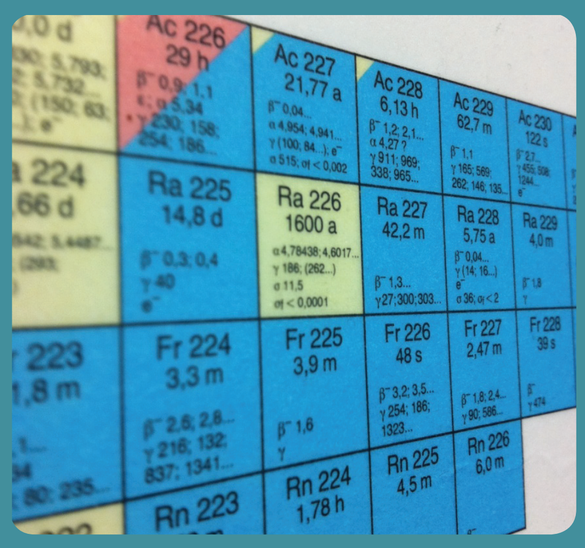

Fig 1: The contaminant

Radon levels in some areas of the facility were found to be extremely elevated, requiring the use of ventilation systems and RPE.

3 Work Activities

The decontamination activities included:

Fig 2: Remediation of wooden flooring

- Excavation work
- Remediation of roof and loft voids
- Remediation and/or removal of wooden wall boards
- Remediation and/or removal of staircases
- Remediation of floors including wooden floorboards and quarry tiles
- Remediation of wooden beams and joists
- Scabbling of walls
- Brick removal from walls
- Investigation works

Various decontamination techniques were employed throughout the works, including novel innovative techniques developed specifically for challenges encountered during the works. These techniques included the routing of tongue and groove joints between floorboards, and the scabbling of difficult to access joists and beams using a reciprocating saw and blade.

4 Waste Management

All clean wastes were subject to clearance monitoring before their removal from the controlled areas 'as soon as reasonably practicable' to minimise the risk of contamination. All contaminated waste arisings were packaged at the workface and placed in segregated lay-down areas, again to minimise the risk of cross-contamination.

Fig 3: Bagged waste

All wastes were double-bagged, characterised and assigned to the agreed disposal route for removal from site.

A comprehensive Waste Stream Characterisation list was produced to identify all items that were consigned as either clean or contaminated waste as part of the decommissioning activities.

5 Radon Environment

Ra-226 decays to Rn-222 (radon gas). Working in areas with a high radon concentration requires special precautions such as wearing appropriate respiratory protective equipment (RPE) and also the use of air ventilation systems. Radon levels were continuously logged in one of the work areas, and the dramatic variation in radon concentrations over a 24 hour period can clearly be seen in Fig 4 – the levels quickly begin to increase at the end of each working day when the air moving unit was switched off, then can be seen to drop sharply the following morning when ventilation is switched back on.

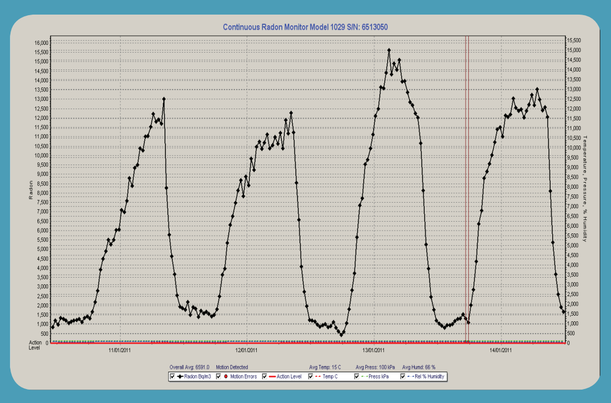

Fig 4: Daily variation in radon levels

6 Further Information

Bob Major – bob.major@amec.com
Jen Barnes – jen.barnes@amec.com
Mark Pledger – mark.pledger@amec.com

Bob Major, Jen Barnes, Mark Pledger,
Stephanie Bloomer, Richard Wilkins
AMEC Birchwood,
Warrington,
UK