

Geographical Information System (GIS)



Background

Land contaminated by radioactivity or chemicals is a legacy of Harwell's use, firstly as a wartime RAF station and then as a nuclear research centre. Part of the site is a licensed nuclear site and before land can be developed for future unrestricted use, it needs to be delicensed. Land quality records are key to this process and are used in the Harwell Site Survey and Delicensing Project set up in 1998.

From establishing the requirements of legislation and reviewing historic records, areas of potentially contaminated land are surveyed and clean-up levels for contaminants determined. Remediation is carried out and improvements to the environment validated. A case for delicensing is prepared, where required, and full records of all the data gathered are managed and stored.



Objectives

To produce a database management system which is integrated with a Geographical Information System (GIS) enabling precise, systematic collection, collation, interpretation and visualisation of data associated with land quality.

Key challenges

- To record the legacies left by the RAF, who occupied the site until 1946.
- To demonstrate accurate measurements of land quality to support site restoration and decommissioning.
- To unite historical documentation with real-time sampling in a meaningful database to prove successful remediation of land.

Solution

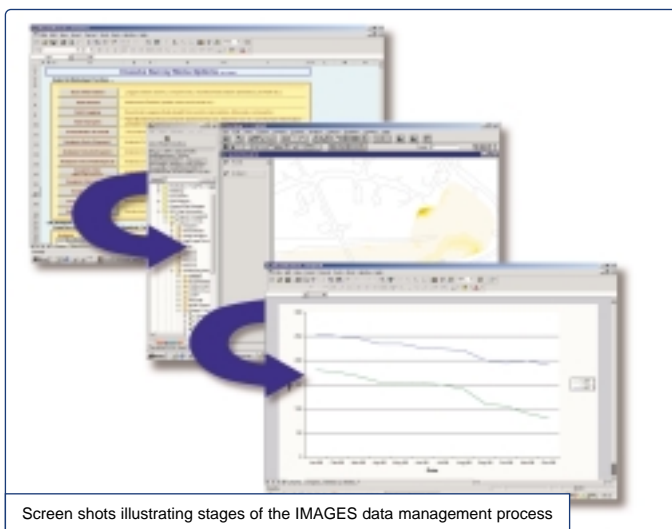
UKAEA commissioned an integrated software tool – IMAGES (Information Management and Geographical Evaluation System). It enables the systematic collection, collation, interpretation and visualisation of data to produce accurate land quality assessments through the use of archived and newly collected data. Archive material includes:

- History of building usage with particular respect to incidents.
- Building surveying results and clearance records.
- Geology and hydrogeology.
- Land monitoring including routine groundwater monitoring.
- Aerial photographs.

New land quality survey data is also collected and uploaded into the IMAGES database system to include that from:

- Radiation measurements taken using a highly sensitive gamma radiation detector and accurately located by a Global Positioning System (GPS). Data is stored electronically and thousands of individual survey measurements are processed to produce colour-coded radiation maps.
- Measurements of radioactivity within buildings.
- Geophysical surveys.
- Logging information from intrusive surveys and analyses of samples.

The resultant IMAGES database gives site managers instant access to the full site data, its past and current uses, and the quality of the land and buildings with respect to contamination. In addition, by displaying the geographically-referenced information, evaluation and interpretation of the land quality data can be carried out.



Outcome

- IMAGES comprises individual database modules, enabling the project team to generate meaningful data without a long lead-time for database evolution and completion. Modifications can be instigated with minimum disruption.
- IMAGES is fully maintained with a programme of support, future developments and improvements, responding to feedback from operators and modifications to the underlying software.
- As the site is gradually decommissioned and parts delicensed, this system will hold the definitive records with respect to land quality status – both the current status and that of the past.
- The Harwell system has since been adopted at all UKAEA sites.

Key facts

Planned areas surveyed/to be surveyed:

- Site survey 370,000m² (37Ha)
- Delicensing 260,000m² (26Ha)
- Property development 310,000m² (31Ha)

- Number of non-intrusive surveys carried out 26*
- Number of intrusive surveys carried out 19*
- Number of samples taken during intrusive surveys 2,256
- Number of buildings surveyed (delicensing only) 14
- Individual documents recorded 2,689
- Public records documents accessed 532
- Building history records established 628

* the area of land surveys varies, eg: one area could be 100m x 100m, another could be 1,000m x 1,000m.

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