



UKAEA
Restoring our Environment



Evolution of UKAEA Harwell

Development of Harwell

In the 1930's the RAF established an airfield at Harwell which, in 1946, was taken over by the Ministry of Supply to become the Atomic Energy Research Establishment (AERE) as the UK centre for research and development into civil nuclear power. The site developed rapidly through the 1950's, the old RAF buildings were adapted and new buildings provided a wide range of experimental facilities including research reactors, accelerators, radioactive handling facilities and a wide range of research laboratories. In 1954 the UKAEA (United Kingdom Atomic Energy Authority) was established and assumed ownership of the Harwell site. In the 1960's UKAEA's role diversified into non-nuclear research and development.



Harwell reactor site in 1967

What is now the Rutherford Appleton Laboratory, which grew from an AERE Division, was established adjacent to the UKAEA site in the early 1960's and is a major UK research facility. By the late 1980's nuclear power had become a mature technology and the requirements for nuclear research and development reduced significantly. The last three reactors on the Harwell site closed in 1990 together with a number of other facilities used for nuclear work. For many years much of the work on the Harwell site had been carried out on a commercial basis and in 1996 many of the business activities of UKAEA were privatised as AEA Technology plc.



Harwell 'reactor' site after decommissioning

UKAEA's role at Harwell today



UKAEA at Harwell was a research organisation of international standing. The mission has evolved and UKAEA is now responsible for managing the environmental restoration programmes which consists of:

- Decommissioning of redundant nuclear facilities.
- Management of radioactive wastes from decommissioning and past programmes of work.
- Remediation of contaminated land.
- Management and development of land and property assets.

UKAEA owns the site, part of which is licensed under the Nuclear Installations Act, and holds the Nuclear Site Licence. The UKAEA headquarters is based at Harwell. UKAEA is also responsible for the sites at Culham in Oxfordshire, Winfrith in Dorset, Windscale in Cumbria and Dounreay in Caithness.

◀ UKAEA Headquarters

Decommissioning

When a nuclear facility has finished its operational programme it has to be dismantled safely and any radioactive materials carefully packaged and sent for disposal or long term storage. Most of the radioactive materials are removed at an early stage. Subsequent dismantling of the plant and equipment is carried out in stages.

When all the plant and equipment has been removed the main building structure is checked and any residual radioactivity removed prior to building demolition. Substantial decommissioning work has been carried out at Harwell since 1990. Some examples are briefly described below.

- The LIDO research reactor has been completely removed.
- The DIDO and PLUTO research reactors have been defueled and all the peripheral and support equipment removed. They are now in a state where they can safely be left in care and maintenance for about 40 years. This will allow some of the relatively short lived radioactivity (e.g. ^{60}Co) to decay which will allow the final decommissioning to be carried out using relatively simple equipment.
- A large number of plutonium active glove boxes in B220 have been dismantled. Robotic technology was used for much of this work.
- Lead shielded cells used for examination of irradiated fuel and reactor materials have been dismantled.
- A large seven storey chemical engineering development building has been completely demolished.

Many buildings have already been removed from the Harwell site. In the next few years more facilities will be decommissioned including the GLEEP research reactor, and two large former RAF aircraft hangars which have housed experimental facilities. Work will start on the decommissioning of the B220 active handling building and many buildings used for handling lower levels of radioactivity will be demolished.



Active handling building in operation



Active handling building following decommissioning of shielded cells



Intermediate level waste store

Low level waste for disposal

Radioactive waste management

Different types of radioactive waste are produced on the site. Ventilation of buildings to allow safe working results in the discharge of tiny quantities of radioactivity to the atmosphere. Liquid wastes are treated to reduce the radioactive content to very low levels before discharge. A plant has been built to cement sludge wastes. The decommissioning work generates solid radioactive waste (e.g. redundant plant and equipment) and there are wastes from past research and development work, which have been stored on the site. Over 95% of the solid radioactive wastes are in the low-level waste category, which are sent for disposal at Drigg in Cumbria. The more radioactive intermediate level waste is held in long term storage until a deep underground repository is available. There are no high level radioactive wastes at Harwell.

In recent years there has been considerable investment in new radioactive waste stores and there is an ongoing programme of recovering the waste from the old stores and repacking for long term storage. In the next few years there will be improved waste recovery equipment and new buildings for cementation of the wastes constructed.

Land remediation

A programme of work is underway to survey the land at Harwell for any contamination from chemicals and radioactivity. Like many sites, which have been in industrial use, there are some areas which have been subject to contamination. Through the survey programme suspect areas are identified, investigated and remediated as appropriate. There are some areas of the site, which have been used for disposal of chemicals, beryllium, and low levels of radioactivity. In particular a major remediation of a seven-hectare area, known as the Southern Storage Area, has been completed. Known chemical and beryllium disposal pits have been removed and all the land checked and proven to be clean. During the work munitions arising from the RAF use of the site were also removed.

Further chemical disposal pits in what is known as the Western Storage Area will be removed. These pits were used for the disposal of chemicals including chlorinated hydrocarbons, which have entered the groundwater below the site. A “pump and treat” plant is in operation to recover chlorinated hydrocarbons from the aquifer and prevent any further spread of contamination.

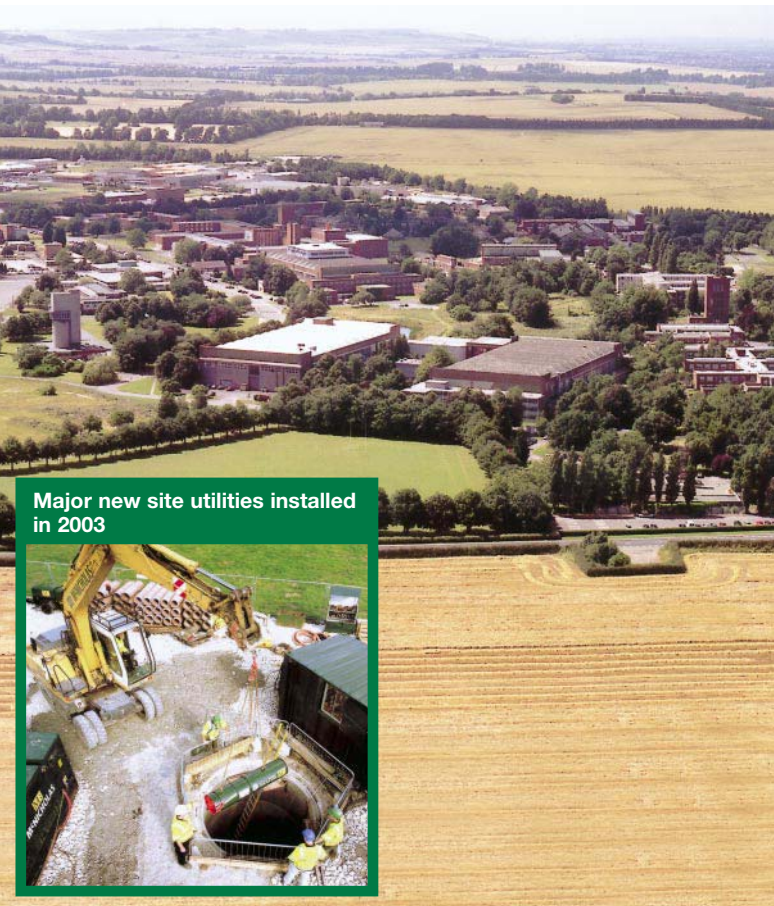
As the decommissioning work on the nuclear licensed site progresses the land and buildings are being thoroughly surveyed to ensure that there is no residual radioactivity. This will allow a substantial part of the eastern end of the site to be delicensed (i.e removed from the controls of the nuclear site licence) and the land made available for other uses.



Plant for removal of chlorinated hydrocarbons from groundwater



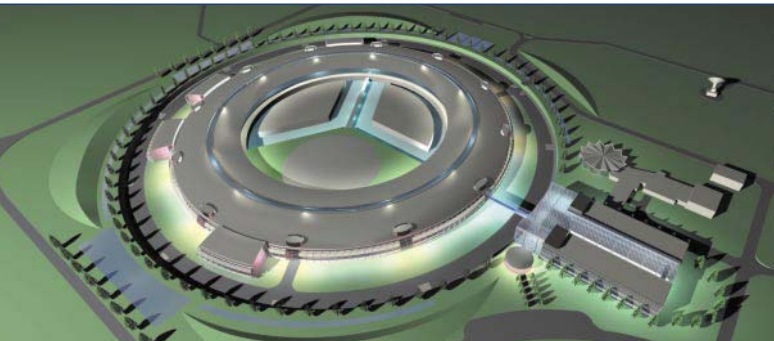
Beryllium disposal pit after removal of waste showing clay liner



Property management

The land and buildings owned by UKAEA form part of the Harwell Chilton Campus. Together with the separate freeholds of Rutherford Appleton Laboratory and National Radiological Protection Board the campus is a major centre for employment with around 4000 people working here. Many of the existing buildings on the site are made available by UKAEA to tenant organisations. A number of these organisations were spun off from UKAEA and new businesses are being attracted to the site. There is an Innovation Centre designed for start-up businesses and a range of other businesses have moved to Harwell. The Medical Research Council is expanding and building the Mary Lyon Centre to support the Genome project. A major new facility called the Diamond Light Source is being built adjacent to the Rutherford Appleton Laboratory, funded by Government and the Wellcome Trust.

The Diamond Light Source will have many applications but will be particularly suitable for the examination of the structure of biological materials. In the past Harwell has been associated with nuclear research and development but the new developments around the campus will place it at the forefront of bioscience research. The scale and reputation of the campus means it is well placed for further new development.



Artist's impression of Diamond light source facility
Courtesy of JacobsGIBB Ltd/Crispin Wride Architectural Design Studio

Mary Lyon Centre under construction 2002



The future

Substantial progress has been made on the environmental restoration programme at Harwell. A smaller nuclear site will remain for some years until all the decommissioning is complete and it is possible to dispose of the remaining radioactive wastes. The reduction of the nuclear site is allowing new development around the Harwell campus, which will ensure that it continues to grow as a major centre for science and technology. What was AERE is now known as Harwell International Business Centre.

New software engineering building completed in 2000



Stages in site restoration

