Harwell Dosimeters Limited

"We congratulate Harwell on surviving fifty years by continuing to evolve in a rapidly-developing environment; and we wish it a successful future as a home to both large and small companies.

When AEA launched us in 1995 from the nest it had provided for so long — almost thirty years for some of us — we were clear that we should retain the name 'Harwell'. 'Harwell' had become a brand name, and in much of the world-wide radiation-processing industry which developed from Harwell's short-lived sister, the Wantage Research Laboratory, our products are known as 'The Harwells'.

To our customers, 'The Harwell' is not an institution or a village: it is a product and every pack bears the word Harwell . . . and our logo!"

Roger Bett, General Manager.

Aldfield Nursery

"Aldfield Nursery shares the anniversary celebrations this year with the Harwell site in hosting its summer Birthday fun day.

The nursery was set up six years ago by Kids Unlimited to meet the parental demand for workplace day care of the highest standard.

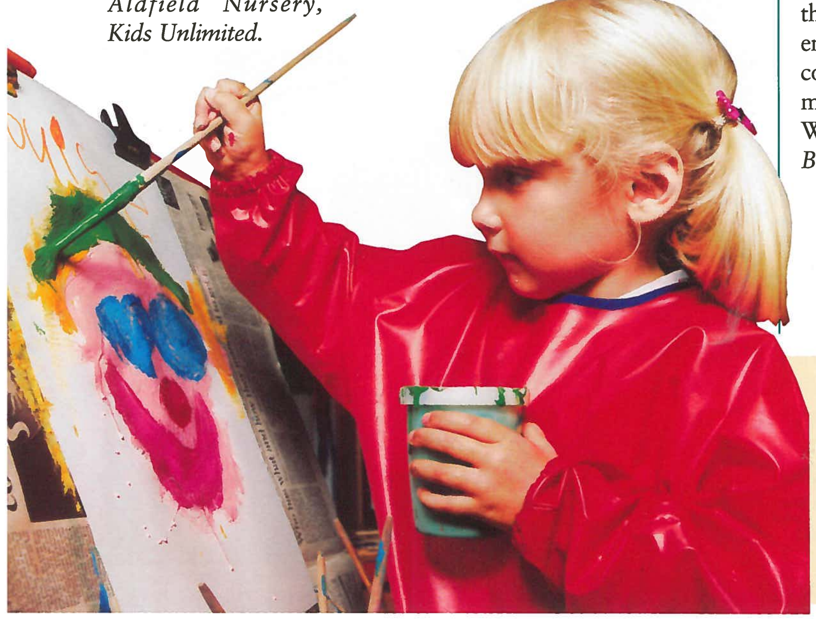
The nursery caters for babies from three months old to pre-school children in their nursery class and has continued to provide an extended homely environment. Not only does the nursery provide flexible child care between the hours of 7.30 am - 5.30 pm, but also offers a baby-sitting service, charity projects and educational visits.

This year Kids Unlimited acquired ISO 9002:1994 Quality standards recognition. We are also committed to training and Investors in people, so double celebrations are justified.

For the past six years I have managed the nursery and worked to build excellent community links with the site including visits from the fire service and Police, singing carols in the Harwell restaurant and project work involving site services.

The nursery has recently been re-decorated, many thanks to the Harwell/training/conference centre for accommodating us in a temporary home. The nursery has recently been given a garden face-lift which enhances the curriculum that we provide."

Liz Ashwin, Manager
Aldfield Nursery,
Kids Unlimited.



A message from Harwell's Head of Site

"Over the 50 years since the Atomic Energy Research Establishment began work at Harwell, I cannot believe that there has ever been a dull moment. The scientists who arrived on 1 January 1946 built GLEEP in less than 18 months and blazed a trail which has left the area with one of the highest densities of technological brainpower in the world.

Having established the scientific basis for the UK's nuclear power programme, Harwell became an engine for technology transfer diversifying into new technologies for new customers and spawning new laboratories and organisations. This has left us today with a thriving community of high technology organisations which include AEA Technology, UKAEA, Nirex, Amersham International, MRC and, our neighbours on the wider Harwell/Chilton Campus, NRPB and the Rutherford Appleton Laboratory. A number of smaller companies now add further diversity to this community.

Stephen White Head of Site, Harwell

For the future, we are committed to developing Harwell as an international centre for high technology business, building upon its reputation for excellence in science and technology. Our programme of infrastructure renewal, the demolition of redundant buildings and the upgrading of roads, footpaths, car parks and landscaping are laying the physical foundations for the next 50 years. Amenities and support services will also be matched to the changing requirements of the companies which work here. The local councils and community are backing us and we have just obtained outline planning permission for the first phase of commercial development.

We can be proud of the achievements of the past 50 years. The next 50 years are going to be just as exciting."

Stephen White

Vale of White Horse District Council

The Vale of White Horse District Council is pleased to join with everyone else in congratulating Harwell on its achievements over the last 50 years. During that time the Vale and Harwell have enjoyed a cordial and fruitful relationship. We look forward to that continuing into a new high-tech partnership which will do much to maintain and enhance prosperity and employment in the Vale of White Horse.

Bob Johnston, Chairman of Council

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ECHO

50TH ANNIVERSARY

Harwell 1946~1996 Special Anniversary Edition

50 years

Including the commemorative lecture given by Sir Alan Cottrell, FRS, F.Eng

pages 13-19

Aerial view of Harwell in 1989.

This special commemorative issue of ECHO takes a look at Harwell as it celebrates its 50th Anniversary year. Harwell has become part of the region's history, from its early RAF days, to today, as an internationally known centre of advanced science and technology.

Harwell lies some three miles south, as the crow flies, of Brunel's Great Western Railway and is situated at the foot of The Ridgeway — at c.2000 BC, Europe's oldest road. The Icknield Way footpath crosses the Harwell site from the East connecting to The Ridgeway.

Part of the 13th century Oxford-Hungerford road runs South-West through the site. Here William of Orange camped when making his way to London in 1688. This so-called 'Golden Mile' is marked with a granite stone and plaque, which is open to public view, situated at the end of Fermi Avenue.

RAF HARWELL

1937, Hawker Hinds of 107(B) Squadron exercising over Oxfordshire. These were exchanged for Bristol Blenheims in 1938. (HR 94374)

Bought by the RAF in 1937 for £11,650, the site — on greensand, chalk and clay strata, soil that produced excellent cherries for which local orchards were famous — was named 'Harwell' by order of the RAF Commanding Officer whose house, at the northern end of the site, happened to lie just inside the Parish of Harwell village.

RAF Harwell was one of the first of 66 RAF aerodromes to be constructed along similar lines by Sir John Laing's company. The extensive taxi-ways, runways and dispersal areas needed for military airfields led to his pioneering continuous concrete mixing plant technology.

In 1943 Laing organised the building of the Mulberry Harbour system, 16 miles of concrete caissons that were towed across the Channel to form an artificial harbour to help the allied liberation of Europe. He also built the Royal Ordnance Factory at Sellafield, Windscale nuclear plant, Berkeley nuclear power station, the M1 and Coventry cathedral.

Flying in the mid 1930s was in bi-planes with open cockpits and crews wearing flying helmets and goggles. The arrival of 105(B) and 107(B) Squadrons at RAF Harwell in 1937 heralded the introduction of new monoplanes such as the Fairey Battle and the Bristol Blenheim.

RAF Harwell became an Operational Training Unit (15 OTU) in late 1939.

The three air-strips, initially grass, were lit at night by goose-necked flares. These strips required constant mowing and in the winter, the airfield became a quagmire. Concreting the runways was completed by MacAlpine in November 1941, when the station was deemed fit for much heavier planes — even the occasional Lancaster bomber!

On the evening of 5 June 1944, six RAF Albemarles were drawn up on the main runway. Just before midnight, the planes took off carrying 60 paratroopers whose mission was to mark the drop zones behind enemy lines on the Normandy coast. Later, planes took off from Harwell towing Horsa gliders packed with troops. These were the first British forces to land on D-Day.

Later that year, on 17 September, a total of 44 combinations from 38 Group of Stirlings towing Horsas took off from Harwell for Arnhem. For the next seven days Harwell continuously supplied men and equipment, suffering catastrophic losses.

Fifty years later, in June 1994, at the Jubilee Anniversary Dinner of D-Day held at Harwell, a framed extract from the 38 Group's Book of Remembrance was presented to Dr Brian Eyre (UKAEA) by Wing Commander H.E. Angell DFC. It names 1100 men who gave their lives in the D-Day campaign. In the mid-1950s a commemorative stone was erected at the end of the runway to mark this war effort and an open-air service is conducted there annually.

The RAF hauled down its flag at Harwell for the last time at 6 pm on 31 December, 1945.

A Stirling IV towing a Horsa glider westwards along the main runway, destined for Arnhem. (HR 93873)

(below) An early morning take-off by an Airspeed Horsa being towed by a Handley Page Halifax. (HR 15657)

AERE HARWELL

On 1 January 1946, Harwell became Britain's Atomic Energy Research Establishment (AERE), under the control of the Ministry of Supply, to provide the scientific basis for the UK's nuclear development programmes.
The Devizes firm of Chivers and Sons modified and added to John Laing's buildings — some 50 serviceable buildings and sheds, and four large aircraft hangars — at a further cost of some £20m to create the Establishment; the scientists and engineers were able to start working in them by April 1946.

At its peak, Chivers had over 1500 workers on site, requiring labour camps to be set up at the nearby airfields of Grove and Kingston Bagpuize, and a staff camp at Chilton.

The building requirements for nuclear research were new to civil engineering. The "hot lab" in B220 required walls of 10 ft thick concrete loaded with lead and steel. Chivers set up a special materials testing shop on site to test the integrity of the building materials. Research in the early years had to be carried out in the midst of a building site criss-crossed with trenches dug for piping mains services and radioactive waste effluent.

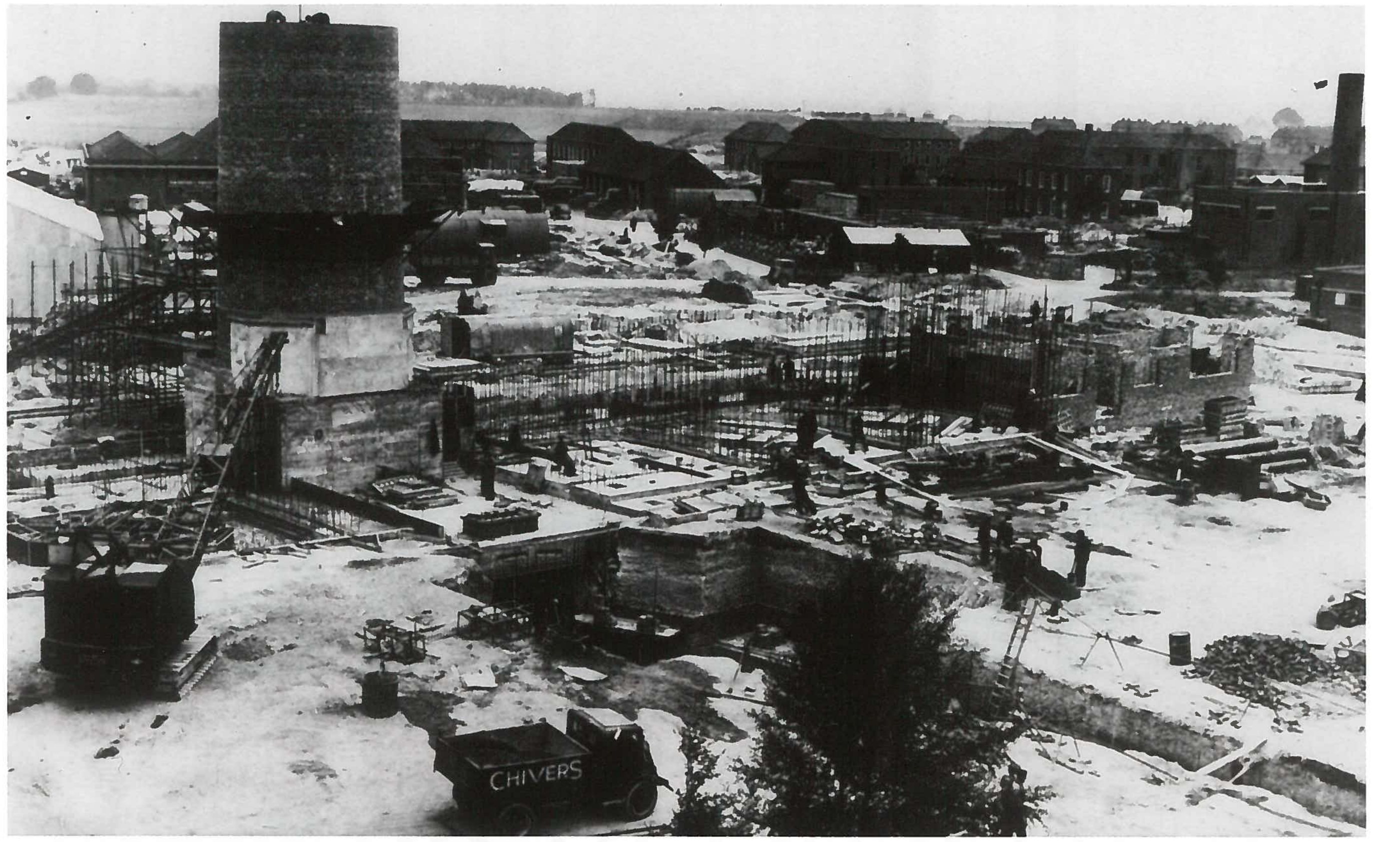
Chivers also constructed the Medical Research Council building, the Atlas Lab, the National Radiological Protection Board's HQ, the Chilton prefab site and the UKAEA housing estates at Abingdon and Wantage.

In 1947 Harwell had 1000 people working on the site; by 1953 numbers had tripled and then doubled to over 6000 by the late 1950s. These included just over 1600 qualified scientists and engineers. The mission and organisation continuously evolved:

• 1951 nuclear weapons work transferred to Aldermaston

• 1952 a committee under Lord Waverley devised plans to transfer atomic energy matters from the Ministry of Supply to a non-departmental body. Churchill's government later published a White Paper (Cmd 8986) that proposed a new public corporation, wholly funded by the Treasury.

Aerial view looking NE of the AERE site in 1947. The former Corporal's Mess, building 150, is in the centre of the picture, opposite the water tower, building 60. In the foreground is the station heating plant, building 58, and the open coal sheds, demolished when building 424 was built. On the former Parade Ground construction has started on the Metallurgy building, building 354 — demolished in 1993. Beyond the Parade Ground is the former NAFFI Stores. (HP 87550)



Work starts on the BEPO stack in November 1947. The Ministry of Works architects originally specified an eight-sided design, but a circular one was built for expediency. In the foreground can be seen the main air-duct for BEPO. The RAF's boiler house (top right) was demolished to make way for building 424. (HR 101572)

The Radiochemistry Laboratory B220, was completed in mid 1949 to a unique specification; air conditioning plant in the windowless upper storey cleans the entire volume of air in the building twice a second. One wing is used for alpha-emitting materials, the other for beta/gamma work.
Internal walls are made with rounded corners to avoid trapping dust particles and coated with strippable rubber paint to aid decontamination. Light fittings were recessed, windows hermetically sealed and the interior finished off to a hospital standard. Doors opened and closed automatically. (HPC 84853)

Radiochemistry on beta/gamma sources in a suite of B220 'caves'. Workers using manipulators are protected by shielding up to two metres thick. (HRC 14403)

The Atomic Energy Bill received the Royal Assent in June 1954 and the UKAEA came into being on 19 July 1954, taking up its duties on 1 August. Sir John Cockcroft was responsible for the UKAEA's Research Group and the Industrial Group was based at Risley, under Sir Christopher Hinton; Sir William Penney was in charge of the Weapons Group based at Aldermaston. The Authority's first Chairman was Sir Edwin Plowden.

• 1957 all fundamental atomic physics research transferred to the newly formed National Institute for Research into Nuclear Science (NIRNS) which became the Rutherford-Appleton Laboratory.

• 1960 Fusion and plasma physics research moved to the nearby Culham site, which ultimately became the host site for the Joint European Torus (JET) project in 1978.

• 1960 the Wantage Radiation Laboratory was created to exploit Harwell's work in radioisotopes and gamma sterilisation of medical instruments. It closed in 1970.

• 1971 the Radiochemical Centre (TRC) became a separate company although it kept a significant presence at Harwell for the next 25 years. In 1981 it became Amersham International and it was privatised in 1982.

• 1971 Staff from Harwell transferred to the National Radiological Protection Board, at Chilton, set up to study the human effects of ionising radiations, and in response to the Radiological Protection Act (1970).

• 1982 The Nuclear Industry Radioactive Waste Executive (NIREX) took over the former 'B' Mess building at Harwell to plan the National Waste Repository for Intermediate Level wastes.

• 1989 AEA Technology was launched as the commercial arm of UKAEA with its HQ at Harwell.

• 1990 The ending of major nuclear research projects and the closing of Harwell's remaining reactors coincided with many staff nearing normal retirement age. By 1996 staff within the security fence at Harwell numbered around 2500.

• 1996 AEA Technology legally separates from UKAEA - both organisations having their HQs at Harwell.

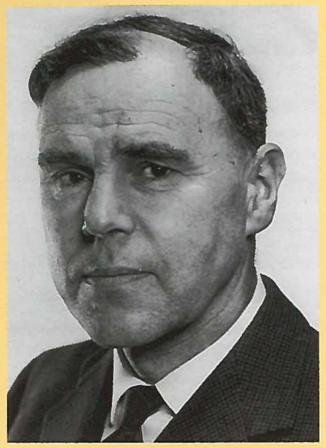
HM The Queen and HRH Prince Philip are taken into building 220 by Harwell's director, Sir John Cockcroft, 1957. (AJ 413)

DIRECTORS OF HARWELL

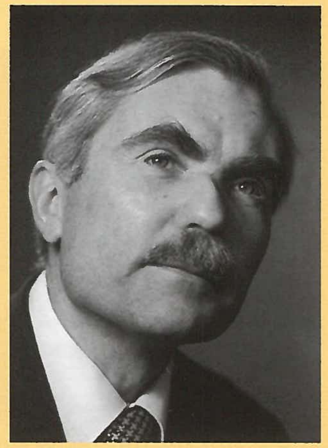

Sir John Cockcroft 1946 - 58

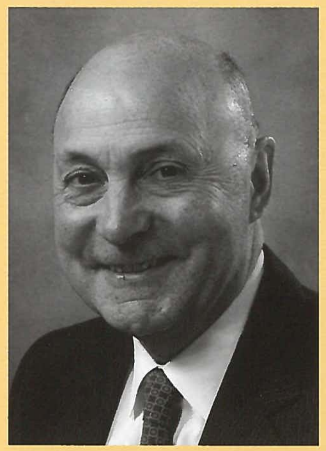

Sir Basil Schonland 1958 - 60

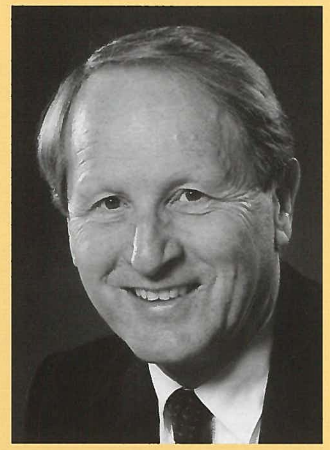

Dr Arthur Vick 1960 - 64


Dr Robert Spence 1964 - 68

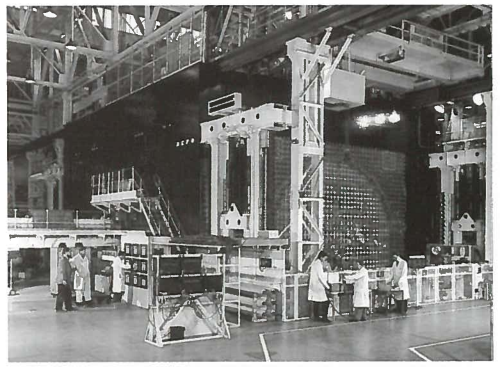

Dr Walter Marshall 1968 - 75


Dr Lewis Roberts 1975 - 86


Dr Graeme Low 1986 - 87


Dr Peter Iredale 1987 -90

RESEARCH FACILITIES AT HARWELL


The BEPO reactor in H10 showing, on the right, the aircraft carrier 12 ton hydraulic hoist which provided precision access to any part of the pile face for refuelling. (AJ 3980)


The "topping out" of BEPO's 200ft stack in 1948. BEPO required five tons of air every hour to limit the uranium fuel temperature to below 200 degrees Centigrade. The air exhausting from the stack pierced the densest fog. (HR 59797)

BEPO

The basic design of British Experimental Pile O (BEPO) was started by UK staff in Montreal during the war, and completed at the UK's Risley site. Construction started in H10 in June 1946 and criticality was achieved on 5 July 1948. BEPO provided valuable experience for the advent of Calder Hall and Britain's Magnox nuclear power stations. BEPO was the UK's major producer of radioisotopes in the 1950s. It shut down in 1968.

BEPO was a graphite-moderated, air-cooled pile that achieved 5.4 MW (Thermal) from a full load of 40 tons of natural or low-enriched uranium. Some 17,600 fuel elements were inserted into channels in 25,000 machined graphite blocks that weighed a total of 850 tons. Each graphite block was fabricated at Harwell to an accuracy of 0.0025in, and the resultant 26 foot high pile was built to within 0.03in of the designed figure.

Reactivity was controlled by four horizontal boron-carbide 2in diameter rods and emergency shutdown achieved in less than one second by vertical rods fired by compressed air.

GLEEP

Built in Hangar 8, the Graphite Low Energy Experimental Pile (GLEEP), designed by Watson-Monro, was the world's longest running reactor. From a bare hangar floor to an operating 'pile' took only 15 months, and the basic structure of the reactor was not altered until it shut down 43 years later in 1990.


The GLEEP control desk remained largely unchanged throughout its 43 year lifetime. (HP 33965)

John Baxter, head of Research Reactors Division, is interviewed by the media on the occasion of GLEEP's 40th Anniversary. (HRC 37430)

It consisted of a 'pile' of chamfered graphite blocks in the shape of a 21ft cube surrounded by a large air gap and then a wall of barytes concrete 5 feet thick. Its fuel consisted of 30 tons of natural uranium dispersed among 660 channels formed into the core.

For most of its life GLEEP operated at a thermal power of 3kW — the same as a domestic kettle; but for isotope production in the late 1940's it frequently operated at 100 kW. Once, as part of a controlled experiment, it achieved 700 kW.

The consistency of its neutron flux, around 1000 million neutrons per square centimetre per second, over years of operation without deviation, made it the ideal neutron source for the calibration of ionisation chambers in the 1980's.

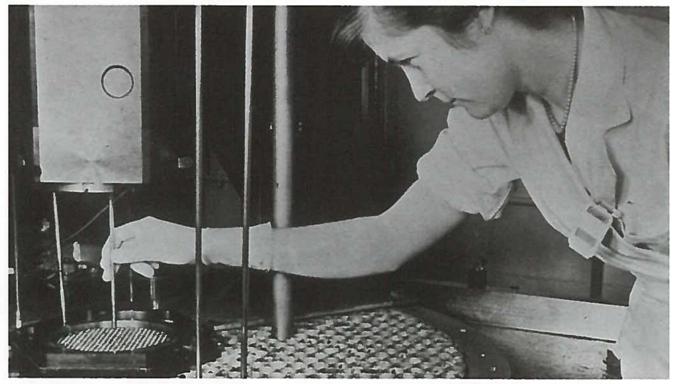
Fast Reactor research

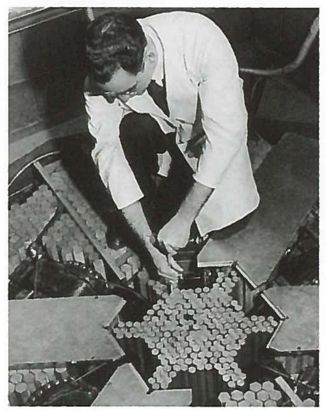
As early as 1946, fast 'breeder' reactors dominated thinking on the future of nuclear power for electricity generation because of limited uranium resources. Fast reactors can convert non-fissile U238 to the fissile isotope of Pu239 faster than it is used up allowing such reactors to utilise 50% of the uranium fuel, compared to less than 0.5% for 'slow' moderated reactors.

Research at Harwell on heat and mass transfer in sodium, on the chemistry and metallurgy of liquid sodium and on reactor fuels contributed to the fast reactors to be built at Dounreay. Sodium boiling and sodium fire studies were done at Harwell in the early 1970s. And fuel studies resulted in a novel 'gel' process for making spheres of mixed oxides of uranium and plutonium.

ZEPHYR

Britain's first fast reactor, ZEPHYR, was assembled at Harwell in 1954. This zero energy device had a 15cm diameter core of clad plutonium rods surrounded by a blanket of natural uranium. Reactor control was by withdrawing some of the uranium rods to alter the number of reflected neutrons into the core.


ZEPHYR, the first fast reactor, had a breeding factor of x2. (HP 84900)


ZEUS, a larger zero energy fast reactor, whose enriched U235 fuel was ultimately used in the Dounreay Fast Reactor. (HP 84901)

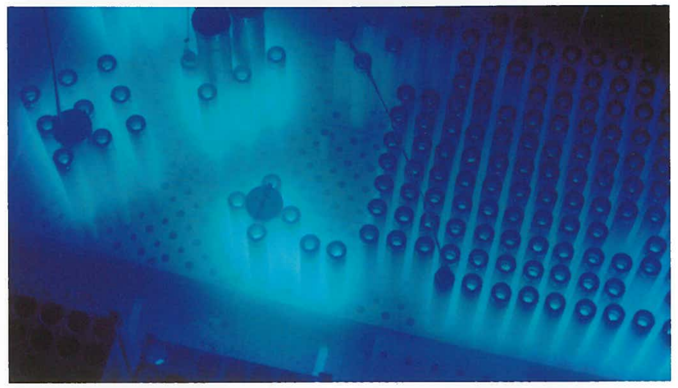
ZEUS

Measuring 60 cm across, ZEUS, built in 1955, was used to study the design of the core for the Dounreay Fast Reactor. From 1958 most of Harwell's reactor physics work was moved to the new Atomic Energy Establishment at Winfrith in Dorset.

DIDO, PLUTO *and* LIDO

The DIDO reactor was the first of Harwell's two high-flux materials testing reactors, and it went critical in November 1956. PLUTO was commissioned in 1957. They were moderated and cooled with heavy water and fuelled with uranium-aluminium alloy enriched to 80% U235. Their original design power of 15MW was progressively uprated to 30MW by the time they were shut down in 1990.

DIDO (HPC 31253)

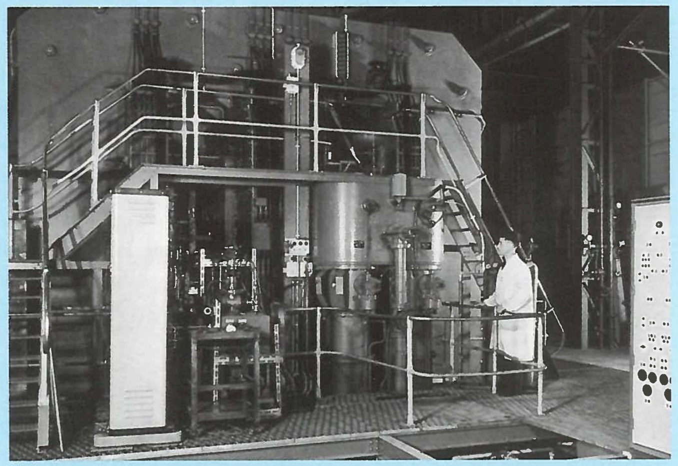


Spent fuel rods from DIDO and PLUTO 'cooling off' under 20ft of water before despatch to Dounreay for reprocessing. Gamma radiation travelling faster than the speed of light (in water) causes the glow of Cerenkov radiation. The pond also provided gamma sterilisation of hospital instruments. (HPC 83704)

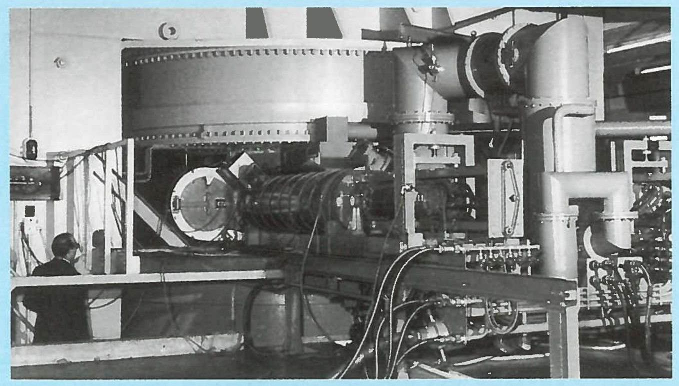
DIDO and PLUTO were designed for irradiation experiments, testing experimental loops for the design of other reactor systems and for isotope production. A substantial neutron beam programme grew in the 1970s and 80s for solid state physics research and neutron radiography.

Harwell's reactors as the main tools for neutron cross-section analyses were supplemented by the Tandem Van de Graaff in 1960 and the Helios 136MeV linear accelerator in 1979. Harwell's research programme also required accelerators, chemical engineering buildings, and radiochemistry 'hot labs'. These were constructed in the 1940's and '50's. The success of the programme depended on the best support facilities possible. They included engineering workshops and design offices, metallurgy, electronics, specialist R&D laboratories and other support services.

Tandem Van der Graaff Accelerator. (HRC 59950)



ElectroMagnetic Separator. (AJ 1894)

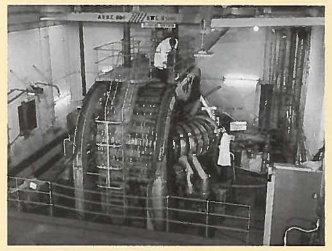


110" Synchrocyclotron. (HP 84879)

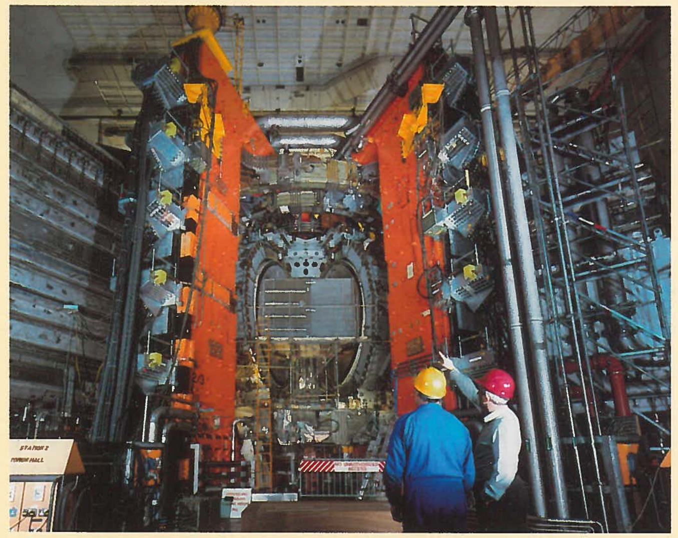
ZETA to JET - *Fusion Research*

On the 12 August 1957, a large experimental apparatus for studying the controlled release of energy from thermonuclear reactions was started up in Hangar 7 at Harwell. Scientists, led by Dr P C Thonemann, R Carruthers and 'Bas' Pease, heated deuterium gas to five million degrees centigrade inside the one metre diameter torus of ZETA (Zero Energy Thermonuclear Assembly).

Banks of capacitors delivered half a million joules of electrical energy every 10 seconds to the primary windings of a large pulse transformer encircling part of the three meter diameter torus. The deuterium gas ionised as it became the short-circuited secondary for the transformer. Peak currents of 200,000 amperes flowed in the resultant 'plasma' for several milliseconds and further 'pinched' the gas.



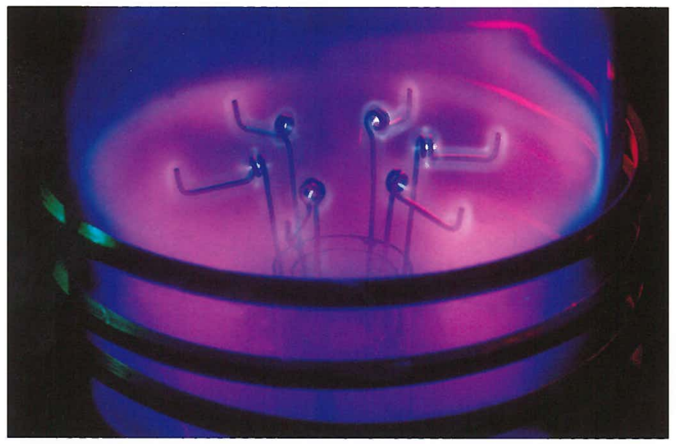
A net gain of energy required temperatures in the order of 100 million degrees centigrade. This was not achieved until research at Culham Laboratory, established in 1961 as UKAEA's fusion laboratory, culminated in the European JET project's success in the 1990s.



(above) The JET machine at Culham undergoing maintenance in 1990. (J90-66C)

(left) The ZETA device in Hangar 7. (AJ 1293)

Materials research



Plasma Activated Vapour Deposition (PAVD) of nitrides onto nylon thread guides used in a spinning mill. The threads travel at 750 mph causing rapid wear problems. PAVD treated guides last 100 times longer. (HPC 29101)

Materials developed for use in or near the core of a nuclear reactor had to function with consistent reliability under conditions of high temperature, high pressure and intense neutron and gamma fluxes. Harwell's materials technology research created hitherto unknown materials with exciting possibilities.

Examples of these included non-metallic materials for high temperature heat exchangers, electrodes in advanced batteries and porous heating elements in chemical processing plant. A range of composite materials were developed as substitutes for asbestos items; and gel processed powders with closely controlled particle size were introduced for ceramic spraying into intricately engineered shapes.

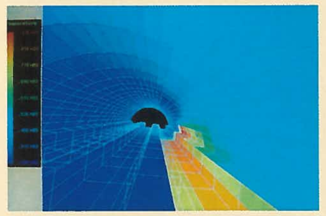
Coating technology and ion implantation techniques, developed from nuclear research, made it possible to reduce the wear rates of precision tools and machinery, from reducing the wear in car and lorry engines to strengthening the blades used to slice bread!

Metallurgical research investigated fabrication techniques and corrosion and fracture problems. Electrochemical studies led to novel battery fuel cell prototypes. Underlying research investigated superconductivity and microelectronic materials.

(right) A range of engineering items made from Harwell-developed metal matrix composites. They have increased stiffness, high temperature resistance and are lightweight. (HRC 13226)

Computing and electronics

Harwell's site-wide computing service started as part of Theoretical Physics Division, under Klaus Fuchs, in 1948. Research demanded considerable numerical calculation, and data processing was initially done using hand cranked machines. In 1953 a Punched Card machine section was set up in B328 followed by a Ferranti "Mercury" computer in 1958, containing a room-sized one kilobyte 'fast' store of 1000 electronic valves. Mercury cost £80,000.



Computational Fluid Dynamics (CFD) was used to investigate the Kings Cross fire disaster and the resultant 'Harwell Trench Effect' changed the outcome of the Public Enquiry. The fireball that killed 31 people was proved to be due to chimney draught up the escalator and not to explosive combustion of paint. (HRC 46468)

Harwell's Electronics Division built KADET, the world's first all transistor computer in the late 1950s; but in 1961, a much larger Ferranti "Atlas" computer was purchased for £4 million, and shared with Rutherford Laboratory. Ion implantation, a nuclear physics technique developed and refined over many years, led to Harwell-designed implanters being used in the silicon chip industry world-wide.

Jim Stevens circuit testing the world's first transistorised computer, built by Electronics Division in 1958. (A 3733)

The demand for computer power in the 70s and 80s was met by IBM main-frame computers, culminating in the CRAY 2 super-computer in 1987. This performed 1,700 million calculations per second in a two billion byte random access memory, and cost £12 million.

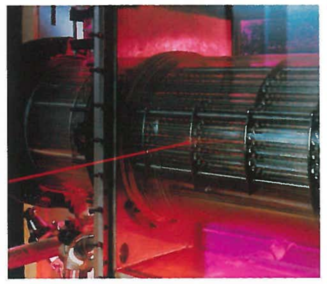
Technology transfer

By 1960 the concentration of talent and investment had established Harwell as a laboratory among world leaders in the development of nuclear power. With the end in sight of the pioneering stage in nuclear technology, it faced a dramatic reduction in size.

Fecralloy steel coated with platinum-based catalyst for car exhaust systems. (H 4817/180c)

The Science & Technology Act (1965) allowed Harwell to undertake non-nuclear work in response to ministerial requirement and so its objectives widened from being a single mission laboratory to include a wide range of work for Government and industrial customers prepared to pay for it.

Harwell's Nondestructive Testing Centre was set up in 1967 and eventually acquired 'National' status. Developed from the need to test nuclear plant, it sold industry a range of crack-sizing, defect location and materials characterisation services. It was awarded the Queen's Award to Industry for its work on improving the efficiency of Rolls Royce jet engines. Other centres included the Ceramics Centre and the Chemical Emergency Centre.



Laser beam investigation of a glass heat exchanger. (HPC 4924)

New materials such as FECRALLOY steels and REFEL silicon carbide, originally developed for the reactor materials programme, were patented and sold under licence.

By 1985, Harwell was earning over £50 million p.a. from over 1200 separate R&D contracts.

In the 1970s Harwell pioneered the concept of Research & Development 'Clubs' in which member companies paid annual fees for joint research. The longest running 'club', known as HTFS (Heat Transfer and Fluid Fow Service), has over 200 member firms worldwide financing work into advanced heat transfer problems. Other long term clubs included the Separation Processes Service and Bioseparations R&D Clubs.

Most clubs were set up to run for a fixed time but others were specialist units separately funded by Government. Examples of these were the Marine Technology Support Unit (1968) and the Energy Technology Support Unit (1974).

This diversification into non-nuclear, commercially driven activities led to the formation of AEA Technology plc, the world-wide science and engineering business, which as a separate organisation is now carrying forward this work in the private sector.

Redevelopment

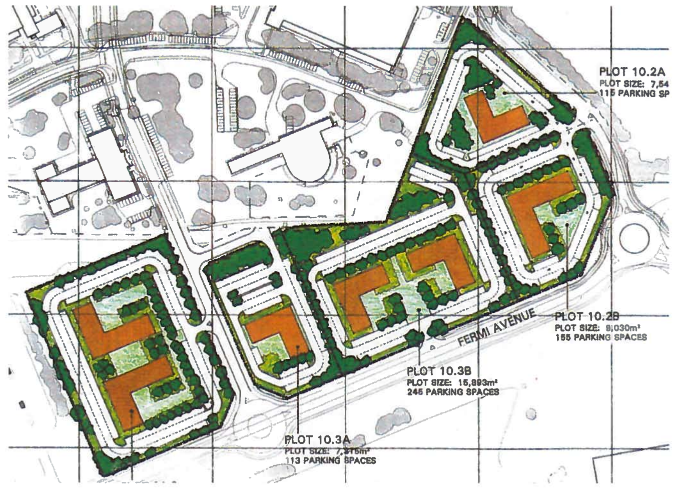
Harwell is now a multi-organisational centre for high technology business. It remains in the ownership of the UKAEA which is responsible for decommissioning its redundant nuclear facilities; while AEA Technology, now in the private sector having separated from the UKAEA, is its largest tenant. It is part of a larger Harwell/Chilton campus for science and technology which also includes the Rutherford Appleton Laboratory, the NRPB and the MRC.

In 1994, building 354 was demolished and the former RAF Parade Ground was made into a car park. Four veteran cars paraded at the opening ceremony. In the background, right, can be seen the former RAF NAAFI which is now a Social Club. (HRC 97476)

The UKAEA is determined to maintain the site's reputation for excellence in science and technology and is preparing for the next 50 years by regenerating its infrastructure, by planning for new development, by giving first class support to present business occupants and by attracting new high technology business.

During the 1990s about £25 million is being spent to improve the infrastructure. In scenes reminiscent of the 'Chivers' 1946-50 era, the site has on occasion once again become home to hundreds of contractors and their machines.

RAF buildings of the 1930s, such as Hangar 9, and many 'temporary' buildings put up in the 1950s, have been demolished



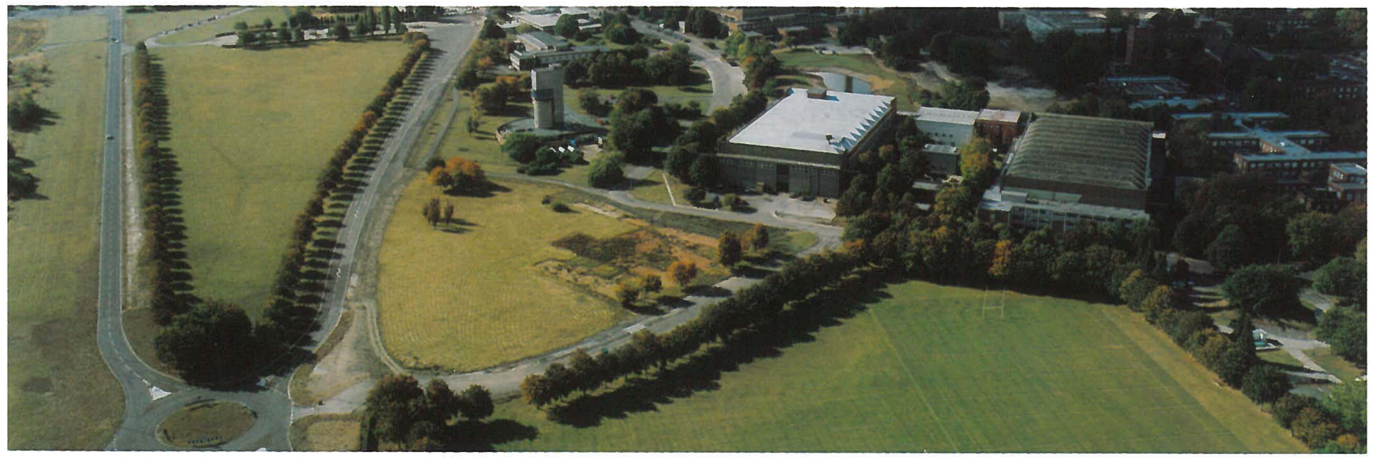
Phase One planning application for Harwell, illustrative site layout

to create new open green spaces. Electricity, water, gas and heating supplies have been renewed and ownership transferred to public utility companies. The site's shortage of car parking spaces is being met by the creation of new car-parks — notably on the former RAF Parade Ground behind B150. Longer term plans to improve site access and traffic management schemes were started in 1996, by creating a new roundabout at the end of Fermi Avenue.

Two new lagoons have been dug, one on the old Hangar 9 site, and the other at the Reactor site. These are designed to manage surface water drainage problems, and provide emergency fire fighting water supplies as well as creating an environmentally attractive location for staff and wildlife.

The former Chilton and Aldfield prefab sites have been cleared and agreement reached with the local planning authority to allocate up to 275 dwellings on the Chilton site in the District local plan. In September 1996 the UKAEA obtained outline planning approval for 28,000 square metres of business development at the south-east side of the main site along Fermi Avenue and on the site of the former RAF A-Mess, Ridgeway House.

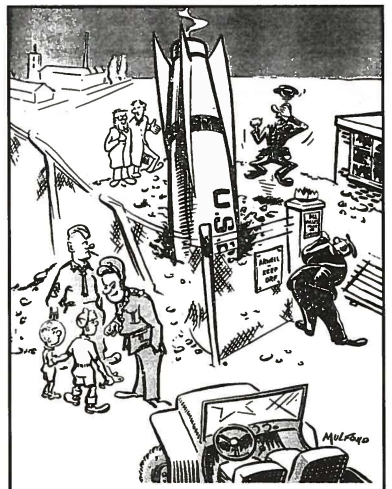
In the 50th anniversary year of Harwell, the redevelopment plans aim to create a pre-eminent high technology centre for the next 50 years.



Aerial view of Harwell showing redevelopment area at the left. (UKAEA 1700)

Distractions
serious and humorous

On 22 April 1957, a T33 Starfire jet of the USAF, lost on a flight from Kent to Dorset, mistook Harwell for RAF Abingdon and landed safely on Fermi Avenue, coming to a halt outside the Rutherford Appleton Laboratory's building R12.



During lunch time the next day, and watched by hundreds of staff, it attempted to take off in an easterly direction assisted by temporary rocket pods fastened to its wings. As it rapidly approached the A34, the pilot attempted a steep climbing turn at the moment when one of the rockets malfunctioned. The jet slewed to the left and its wing touched the ground. It headed along the ground in a plume of smoke and sparks, its undercarriage collapsed, and it ploughed through the perimeter fence heading for Hangar 8 and the GLEEP reactor.

It came to a halt at the edge of the pit being dug for the Tandem Van de Graaff building. The pilot escaped unharmed but the jet was later cut up into sections and taken away by a low-loader transporter. As a consequence of this incident, Harwell's former runways were covered in top soil and many trees were planted.

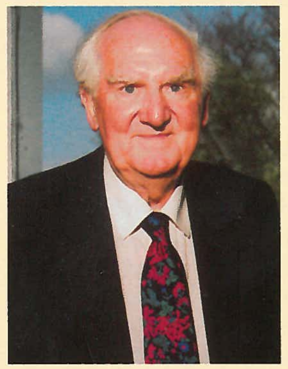
The T33 jet, minus its undercarriage, rests among Chivers sheds near the former Control Tower B6. (HP 84827)

HARWELL - THE FIRST FIFTY YEARS
50th Anniversary Lecture

given on 10 May, 1996 in Harwell's Cockcroft Hall by
Sir ALAN COTTRELL, FRS, F.Eng
Department of Materials Science and Metallurgy, University of Cambridge

In The Beginning

We are here to celebrate a jewel in Britain's crown, the Atomic Energy Research Establishment, Harwell, on the attainment of its 50th birthday. What has made it such a brilliant jewel are its outstanding scientists and engineers, from the early heroes of the United Kingdom's atomic energy project through to today's resourceful entrepreneurs. Harwell is a powerhouse of advanced science which has driven many of Britain's postwar developments in physical science and engineering technology.



Sir Alan Cottrell

It began at a chance meeting between Cockcroft, Chadwick and Oliphant, in a Washington hotel in November 1943, when Cockcroft agreed to take charge of the Montreal Laboratory of the Anglo-Canadian Atomic Energy Project. A year later, the same line of thought led to the idea of founding an atomic energy research establishment in Britain, with of course Cockcroft as its founding father and grand designer. It would have general responsibility for providing the scientific basis of Britain's intended atomic energy projects. Mr. Attlee, the Prime Minister, announced in the House of Commons on 29 October, 1945, that the Government had decided to set up a research and experimental establishment covering all aspects of atomic energy. From the outset Cockcroft's concepts of what was needed were clear and firm. As regards choice of site, he insisted that the proposed laboratory had to be near a major university and within easy reach of London. This seemed to narrow the choice down to somewhere near Oxford or Cambridge. But there were other conditions to be satisfied. It should be sited in fairly remote, empty, countryside — and Cockcroft insisted here that it should also be in pleasant country — and should be near to a good supply of cooling water. All of this pointed to the R.A.F. airfield, with its large hangars and good roads, on the Berkshire downs near the village of Harwell. It was an ideal choice. To quote what an American visiting scientist wrote about Harwell, a few years later: Harwell was "two hours by car to London, the south coast and Wales. Possibilities for exploration, entertainment and intellectual stimulation are endless: theatre in Oxford, Stratford-on-Avon, London: abundant archaeological sites from all periods: cathedrals, churches and Oxford colleges."

Cockcroft was appointed Director in July 1945 by Sir John Anderson who said that "the Director should have the utmost measure of freedom in the control of the Establishment." What wisdom was shown in that directive! And how strange those far-sighted words sound, today. The airfield was handed over 50 years ago, in the Spring of 1946, and so it all began. The conversion of a wartime RAF establishment into a huge laboratory of the most advanced kind, with great nuclear facilities, took a strenuous ten years in which everyone waded through mud and stumbled on builders' debris. But there was a great enthusiasm, a young staff mostly imported from the British team at Chalk River, Canada, and a real pioneering spirit which swept everyone along. Accommodation was a severe problem, partly solved by the urgent construction of a large village of prefabricated bungalows nearby. These were intended to last only ten years, but of course remained in use until quite recently, 43 years later. Later, several estates of good houses were built in Abingdon and nearby villages for the rapidly growing Harwell staffs and their even more rapidly growing families.

Cockcroft had an equally clear concept of what the character and style of Harwell was to be. Above all, it was to be a great research establishment in all aspects of nuclear science, a kind of post-graduate University, able to attract outstanding people and provide them with excellent and unique facilities for their research. But, of course, it had as its primary duty the requirement to provide the basic scientific data and understanding needed to launch and underpin Britain's atomic energy projects. The most urgent needs were for nuclear data, to design reactors, and for chemical processing techniques for the extraction and purification of uranium and other nuclear materials; and for separating the constituents of irradiated fuel. Hence there was a strong early concentration on