NDA Nuclear Decommissioning Authority | Magnox | Cavendish Fluor Partnership

Winfrith Timeline

from the early years to the present day

The Beginning

The Winfrith site has been a centre for nuclear reactor research and development for more than 50 years. Officially opened in 1961, Winfrith housed nine experimental reactors at various times, all of them unique, many of them world firsts; from the ground breaking international DRAGON project to the large Steam Generating Heavy Water Reactor (SGHWR) which fed power into the National Grid.

Winfrith site 1957

Pre-eminent during the 1960s, 70s and 80s for its discoveries in the field of reactor design, Winfrith underwent major changes in the 1990s. With the ending of government-funded nuclear research, its remaining operational reactors were shut down and the long work of decommissioning began.

Seven reactors have since been decommissioned and dismantled, as well as other plant. Decomissioning continues on the remaining reactors.

With the skills at Winfrith now firmly fixed on decommissioning, demolition and clean-up, the site is well on the way to achieving another record: becoming the first nuclear licensed site in the UK to be fully restored.

1 Construction of ZEBRA Reactor 1961
2 Steam Generating Heavy Water Reactor (SGHWR) control room 1967
3 Work on the Winfrith site begins 1957
4 DRAGON Reactor reaches full power 1966
5 HRH The Duke of Edinburgh visits site 1969
6 SGHWR in operation 1975

The Early Years
A golden age

The 1950s were the ‘golden age’ of nuclear research, when the UK’s civil nuclear research programme was expanding so fast that an additional site was required for the construction of experimental reactors. After a Public Inquiry, Winfrith in Dorset was chosen for that task.

The site takes shape

Construction began in 1957, under the management of the United Kingdom Atomic Energy Authority (UKAEA). The first building to be completed on site was the Apprentice Training School, underlying the site’s commitment to education and training. The School ran from 1958 until 1992, training more than a thousand apprentices in that time.

The Arish Mell pipeline was another early construction. Built in 1959 to take effluent from Winfrith to the coast, it is still in place today.

By the time Lord Chandos performed the official opening ceremony in 1961, Winfrith’s first reactor – ZENITH, a low energy reactor, was already up and running. Several more experimental reactors of various designs followed, making a total of nine in all.

The building of two of Winfrith’s most well-known reactors, DRAGON and the Steam Generating Heavy Water Reactor (SGHWR), began in the 1960s. DRAGON became operational in 1964 and SGHWR, Winfrith’s most recognisable landmark, was formally switched on by the HRH The Duke of Edinburgh in 1968.

For decades, reactors at Winfrith led the world in providing vital information to the nuclear industry, as well as making significant contributions to fast breeder projects both in the UK at Dounreay and internationally.

Winfrith’s story is a history of world-class research and development into new and exciting areas of science and technology. This is as true today, as the site prepares itself for a new, non-nuclear future, as it was in 1957, when a bulldozer broke the first clod of earth on Winfrith Heath.


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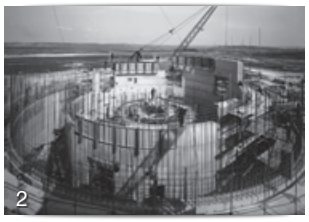
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1 ZENITH Reactor 1961
2 DRAGON Reactor construction 1961
3 Construction of Arish Mell pipeline 1959
4 Apprentice Training Scheme opens 1958
5 DRAGON Reactor inauguration ceremony 1960
6 SGHWR excavation 1963

Winfrith

1950s – 2000s

The Timeline 1950s – 2000s

Work on the Winfrith site begins

Apprentice Training School opens

Construction of Arish Mell pipeline begins

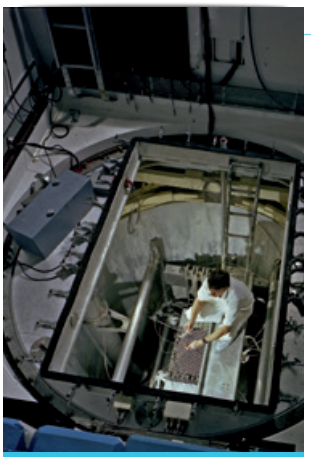
DRAGON Reactor at full power

HRH The Duke of Edinburgh visits site

HM The Queen visits Winfrith

NESTOR Reactor experimentation

Steam Generating Heavy Water Reactor (SGHWR)



DIMPLE Reactor in operation

1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979

1950s

Planning permission for the development of the Winfrith site is granted. Construction work begins in September 1957, soon hampered by freezing weather. In 1959, the first reactor, Zenith, becomes operational and an agreement to build DRAGON is signed. The Apprentice School welcomes its first students.

1960s

Lord Chandos performs the official opening ceremony in 1961. A second reactor, NERO, becomes operational, followed by DIMPLE (from Harwell) and ZEBRA. DRAGON reaches full power in 1966 and HRH The Duke of Edinburgh formally switches on SGHWR in February 1968. HM The Queen visits in 1969.

1970s

Winfrith becomes a centre for reactor safety and oil exploration research. Throughout the 70s, SGHWR supplies electricity to the national grid. In 1976, DRAGON is shut down. NESTOR and DIMPLE low power reactors contribute safety and performance data.

1980

ZEBRA Reactor is shut down

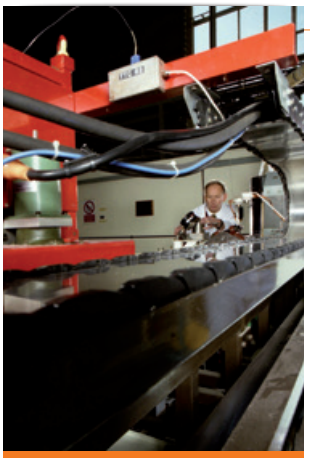
1981

1982

1983

Winfrith heathland

1984



1985

1986

1987

1988

1989

Petroleum Technology Research

1990

SGHWR closes down

1991

1992

1993

1994

1995

1996

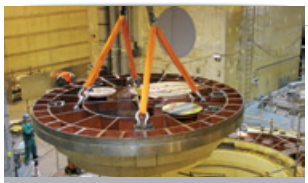
Winfrith Technology Centre is launched

1997

1998

1999

Alpha Materials Laboratory land is returned to greenfield



2000

2001

2002

SGHWR decommissioning

2003

2004

2005

2006

2007

2008

Active handling building demolished

2009

2010

2011

Demolition of WETP

1980s

After 20 years of safe operation, ZEBRA is shut down in 1983. Winfrith diversifies into new areas, including the impact testing of transport flasks and petroleum technology research. In 1985, Winfrith Heath becomes an SSSI. AEA Technology is launched in 1989.

1990s

SGHWR closes down after 23 years. Decommissioning programme begins. Winfrith Apprentice School closes. NESTOR and DIMPLE cease operation. Winfrith Technology Centre is launched in 1996. Following demolition, the Alpha Materials Lab land is returned to greenfield.

2000s

Winfrith is a contractor to the NDA and RSRL was formed. Reactor halls and a category 1 active handling building are demolished. SGHWR and DRAGON are in care and maintenance. Decommissioning of the Waste Encapsulation Plant and active sludge tanks is underway.

The Middle Years
An experimental test bed

During the 1960s, 70s and 80s, the Winfrith site was a test bed for a range of pioneering research and experimental reactors, ranging from zero energy reactors to a large power reactor. With the coming of the 1990s, all that changed.

Reactor research

The prototype gas-cooled DRAGON reactor was operational from 1964 until 1976. The aim of this outstandingly successful international project was to test the feasibility of a new type of high temperature helium-cooled reactor design.

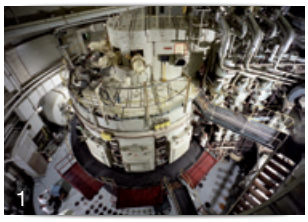
SGHWR, which in its heyday produced enough electricity to power a small town, operated from 1968 until 1990.

ZENITH was the first of six low energy reactors, designed not to produce energy but purely for research into areas such as core design and refuelling. NERO followed in 1960 and in 1964 was modified to become JUNO. HECTOR started operating in 1963.

NESTOR and DIMPLE, low power reactors, were used during the 1970s and 80s to provide data on reactor safety and performance. They were among the world's longest running and most successful reactors of their kind. ZEBRA, the last zero energy reactor to be built at Winfrith, provided data for Dounreay's fast breeder programme. It closed down in 1983, after 20 years of service. All remaining early low power reactors were shut down by the 1990s.

Winfrith has always been acutely aware of its environmental responsibilities. The site is, after all, located on Winfrith Heath, Thomas Hardy's Egdon Heath. In 1985 the unique nature of the heathland was recognised when it was designated a Site of Special Scientific Interest (SSSI).

Today, the Heath, home to a huge variety of flora and fauna – from all six native British reptiles to rare orchids and Dartford warblers – is carefully managed on behalf of Magnox, in close collaboration with English Nature and the Dorset Wildlife Trust, to ensure its rich wildlife is both respected and protected.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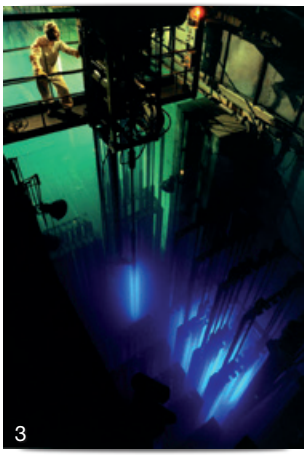
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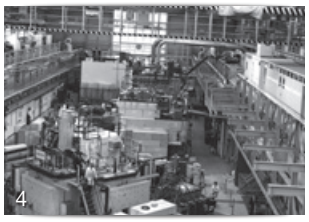
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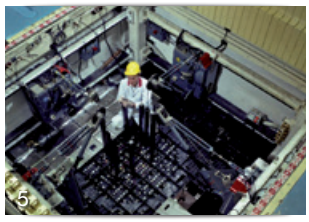
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1 Internal shot of DRAGON Reactor 1959
2 ZENITH Reactor 1960
3 SGHWR fuel pond 1974
4 NESTOR Reactor physics hall 1962
5 ZEBRA Reactor development 1981
6 Winfrith heathland 1988

The Later Years
Era of decommissioning

Winfrith has undergone many changes since those early days. With the 1990s Government decision to end the UK's civil nuclear research programme, the skills and energies of its scientists and engineers were redirected towards new goals: decommissioning existing plant and conducting research in a number of commercial fields. Winfrith became a major centre for research into oil exploration and reactor safety testing.

Decommissioning and diversification

The Alpha Materials Laboratory was one of Winfrith's first major decommissioning projects. Used for the manufacture of mixed oxide fuel for reactor physics experiments, it ceased commercial operations in the early 1990s. The laboratory was then decontaminated and decommissioned – the first time a major plutonium facility of this kind had been decommissioned. The area has now been returned to a greenfield state.

In 1991, an extensive programme to decommission SGHWR began, culminating in 2006/7 with the removal of redundant ancillary systems and external facilities. The SGHWR building is currently being assessed, prior to the facility going into a period of care and maintenance.

In 1995, as part of a diversification process, the eastern end of the site became Winfrith Technology Centre. This Centre was home to science and technology-based companies, as well as giving tangible proof of how a nuclear site could be successfully restored. In 2004, the Centre was transferred to English Partnerships.

In 2005, the site began operating as a contractor to the newly created Nuclear Decommissioning Authority (NDA).

In 2009 Research Sites Restoration Limited (RSRL), a subsidiary of UKAEA Ltd, was founded and became the site licence company responsible for the closure programmes at Winfrith and its sister site, Harwell, under contract to the NDA. In October 2009 UKAEA Ltd was sold by the UK Atomic Energy Authority to Babcock International Group. Competition to appoint a new parent body organisation for RSRL and Magnox began in 2012. Cavendish Fluor Partnership was announced, the preferred bidder and share transfer happened on 1 September 2014. RSRL became known as Magnox in Spring 2015.


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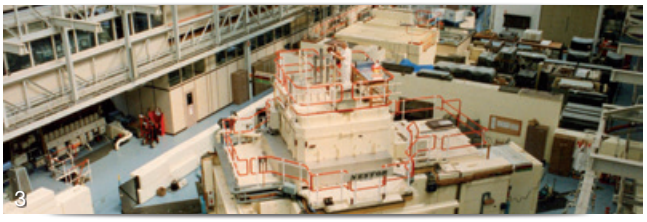
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1 Alpha materials laboratory decommissioning 1999
2 SGHWR round house demolition 1998
3 Internal shot of NESTOR Reactor which ceased operation in 1995
4 SGHWR cooling towers demolition 1991
5 Winfrith Technology Centre established 1993
6 Aerial shot of Winfrith 2002

The Present Day
Environmental restoration

The new millennium brought a time of intense decommissioning activity to Winfrith, along with a renewed focus on land remediation and site restoration.

End of an era

A Waste Encapsulation Plant, designed and built to manage the historic sludges arising from SGHWR operations, ran from 2005 until 2011. In that time the plant processed more than 1,000 drums of sludge. Demolition work began in 2011.

Decommissioning of DRAGON began in 2005 with the removal of ancillary equipment and the decontamination of areas within the reactor building. Work to prepare the facility for care and maintenance is proceeding, including the decommissioning of fission chambers and reactor tanks. Once size-reduced, the tanks will be processed through the Winfrith Abrasive Cleaning Machine (WACM).

NESTOR and DIMPLE were the last of Winfrith's reactors to be shut down, ceasing operations in 1995. Following decommissioning and removal of the reactors, in 2006 the reactor hall which housed both facilities was demolished. The area is now grassed and awaiting delicensing.

ZEBRA was demolished in 2006 and decommissioning completed in 2010, with the clearance of its office block.

Winfrith's Active Handling and Decontamination building was one of the first category 1 nuclear facilities of its kind in the UK to be successfully decommissioned. Operational during the 1960s, it contained high activity cave lines, a pressurised suit operations area, general workshops and operations areas, as well as a 30m-high ventilation stack. Decommissioning began in 2001 and was completed in 2008. The land has now been remediated and fully restored.

Since the beginning of decommissioning in the 1990s, major progress has been made in restoring the Winfrith site. Where many of Winfrith's significant facilities once stood there are now landscaped green spaces. No high hazard nuclear facilities remain on site. With a third of its clean-up programme now completed, Winfrith can look forward to the next phase in its lifecycle: achieving the goal of full site decommissioning.


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1 Demolition of Waste Encapsulation Plant (WETP) 2011
2 DRAGON Reactor decommissioning 2011
3 Demolition of reactor halls that housed NESTOR and DIMPLE 2006
4 Winfrith Abrasive Cleaning Machine (WACM) 2009
5 ZEBRA Reactor demolition 2005
6 Demolition of active handling and decontamination facility (A59) 2007

For further information

Visit us at www.magnoxsites.com
Telephone us at 01235 820220

We have gone to considerable trouble to ensure that the facts presented in this brochure are correct. We recognise that the achievements we have outlined are simply a snapshot of some of the events at the Winfrith site. They are not intended to be a comprehensive report of work carried out over the decades.

Magnox is owned and operated by Cavendish Fluor Partnership (CFP) on behalf of the Nuclear Decommissioning Authority (NDA).

The NDA works with CFP, the Magnox management team and other stakeholders to oversee the delivery of programmes, building confidence amongst Government and others that the nuclear legacy is being tackled effectively, safely and responsibly.

Magnox

Winfrith Site

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