

DECOMMISSIONING IN THE UNITED KINGDOM

September 2006

Current Status

The United Kingdom is in the process of dealing with the legacy from its first generation of civil nuclear power, together with some earlier facilities, which were wholly or partly associated with the military nuclear programme. Cleaning up the nuclear legacy is a long-term process. In the UK it is a programme that will cost many billions of pounds over a period of many decades. The UK Government has decided that this clean up programme is best achieved by the establishment of a new public body, the Nuclear Decommissioning Authority (NDA). The NDA was established by primary legislation and came into being on 1 April 2005, taking responsibility for liabilities previously held by the two main nuclear site owner-operators, British Nuclear Group and UKAEA. The NDA also took responsibility for assets previously held by British Nuclear Group, whereas assets held by UKAEA were not initially transferred although it is the intention of the NDA to transfer appropriate UKAEA assets to the NDA at a later date. These organisations now operate the nuclear sites under contract to the NDA, who have indicated their intent that site operations will in future be subject to competition. The NDA is responsible for the development and implementation of a UK-wide site restoration and clean-up strategy.

Table 1 provides an overview of the UK industry progress to date on decommissioning.

Policy Objectives of D&D

Any organisation wishing to decommission nuclear power stations and other nuclear facilities must ensure that proposals are consistent with national policy. The national policy on decommissioning is set out in the 1995 Government White Paper Cm 2919. This has recently been updated by a statement of the UK Government and devolved administrations on “The Decommissioning of the UK Nuclear Industry’s Facilities” September 2004. Relevant extracts from the updated statement are as follows:

“The objective of decommissioning is to remove the hazard the facility poses progressively, giving due regard to security considerations, the safety of workers and the general public and protecting the environment, while in the longer term reducing the number of sites and acreage of land which remain under regulatory control. Decommissioning operations should be carried out as soon as reasonable practicable, taking all relevant factors into account as provided for in the relevant operator’s strategy and plan. The Government recognises that decommissioning operations may, however, involve two or more separate stages spanning a number of decades.”

“It may be possible in some cases to complete decommissioning operations to the point where unrestricted use is possible, although an overriding consideration will be whether this represents the Best Practicable Environmental Option (BPEO) for the site.”

“The Government and the regulators are committed to ensuring that the application of the regulatory controls before and during decommissioning, which ensure adequate control of operations, is transparent. The Government expects that the nuclear regulators will continue

to implement its policy on better regulation by ensuring that the level of regulation is proportionate to the level of the risk to safety, the environment or security posed by the site. The Government expects that the amount of regulation will reduce as decommissioning proceeds although there may be periods of intense decommissioning activity when regulatory oversight will need to be temporarily increased.”

“Under improved regulatory arrangements for the conditioning of intermediate level waste (ILW), which came into effect in January 2004, the disposability of waste packages will be one aspect taken into account by the regulatory authorities. In this respect the regulators will examine any advice given to licensees by Nirex under the Letter of Comfort system.”

UK practice varies according to the particular circumstances of a facility. In general, stage 1 decommissioning is carried out promptly following shutdown. The later stages of decommissioning are scheduled in order to reduce the hazards presented by the facility in a progressive and systematic way taking account of:

- the potential hazards posed to the public, workers and the environment;
- the availability of waste routes and of experienced personnel;
- the time required to plan the work and if necessary develop decommissioning techniques and equipment;
- time dependent safety and environmental risks (e.g. recognising the benefits or otherwise from radioactive decay);
- interactions with related projects which may require prioritisation;
- costs and financial provisions;
- availability of expertise;
- sustainable development.

Prior to the establishment of the NDA, the owner-operators of commercial reactors had been seeking to defer the later stages of decommissioning of their redundant reactors. It was proposed that following de-fuelling, appropriate work is performed on and within the reactor buildings, including the boilers, to put them into a passively safe and secure state for the period of quiescent Care and Maintenance that follows. The buildings and their contents are appropriately prepared to ensure containment of radioactivity and to prevent inadvertent human access. The reactors would be allowed to decay for periods notionally around 100 years from cessation of generation before final dismantling and clearance of the site took place. This is known as the “safestore” concept.

The concept would envisage that the contents of the Safestore should be chemically and physically stable, with appropriate containment, and placed in the store in a manner that minimises the need for safety mechanisms, maintenance, monitoring and human intervention, but also in a manner that facilitates retrieval for final disposal.

Following the creation of the NDA in April 2005, the overall strategy for site remediation and clean-up of the Magnox power stations no longer resides with the owner-operators British Nuclear Group but with the NDA. The NDA’s strategy for decommissioning Magnox sites will remain the approach currently pursued by British Nuclear Group. However, NDA believes that the case for decommissioning the Magnox reactors to an accelerated timescale warrants serious evaluation and they propose to work with the industry and regulators to do this.

Strategy for decommissioning the Advanced Gas-Cooled Reactors and the Sizewell B PWR remains with British Energy Generation Ltd.

In the UK, the nuclear site licence granted under the Nuclear Installations Act 1965 (as amended) remains in force until the site is finally cleared and the licence revoked. The licensee will have to prepare safety justifications covering all credible faults and ageing. Modifications of systems and structures by licensees, periodic safety reviews and maintenance, care and surveillance, etc, would all be regulated under the standard conditions attached to the nuclear site licence. The environment agencies would expect to see continued adherence to the requirements of authorisations for radioactive waste disposal.

The ultimate aim of decommissioning is to release the site for unrestricted use, although it is recognised this may not be realistic for all sites. Nuclear licensed sites can be delicensed under the Nuclear Installations Act when the HSE is satisfied that there is no danger from ionising radiation on the site. A number of small sites and parts of sites have been delicensed on a case-by-case basis. In May 2005 the HSE published its criteria to be used in the future particularly for some of the larger sites. “No Danger” is essentially defined as a risk of early death due to man made radioactivity of less than 10^{-6} per year.

The September 2004 update of the 1995 Government White Paper Cm 2919 makes reference to improved regulatory arrangements for the conditioning of intermediate level waste. In summary, the revised arrangements require that site operators produce an “ILW Conditioning Proposal” for all wastes on their sites. This proposal should set out the strategy for retrieving, conditioning, storage and ultimate disposal of wastes and should form an essential component of the safety case for the plant and proposed waste products. The ILW Conditioning Proposal is required to justify the selected packaging option based on consideration of BPEO (Best Practicable Environmental Option) and BPM (Best Practicable Means).

In terms of demonstrating disposability, the regulators expect that the operators should engage with UK Nirex Ltd (currently the UK waste management organisation) and seek a disposability assessment under Nirex’s Letter of Compliance (previously referred to as Letter of Comfort) assessment process.

Social and Environmental Impacts

Under the Nuclear Reactors (Environmental Impact Assessments for Decommissioning) Regulations 1999, decommissioning plans require an environmental impact assessment.

These require site licensees to prepare an Environmental Impact Assessment (EIA) and to submit this to HSE for consent before commencing decommissioning. EIAs will be wide ranging, consider possible options for the project and cover aspects such as noise, vibration, air and water quality, ecology, transport, and socio-economic impacts and the likely effects of accidental or untoward events. The environment agencies are statutory consultees for these regulations. The HSE have now granted consent under these regulations for Bradwell, Hinkley Point A, Sizewell A, Dungeness A, Calder Hall and Chapelcross. Consent under these regulations is not required for plant that ceased generation before 1999: Berkeley, Hunterston A and Trawsfynydd are therefore excluded from EIADR requirements.

Decommissioning can also be subject to planning requirements. The National Assembly for Wales and the Department of Trade and Industry have jointly granted planning permission for the Trawsfynydd safestore, the only UK power plant in a National Park.

In addition, planning permissions have been granted for construction of interim operational ILW stores at Trawsfynydd, Hunterston A, Bradwell and Hinkley Point A.

All nuclear licensed sites have Site Stakeholder Groups that include representatives from local government and significant organisations that are affected by the presence of the nuclear facility in their locality. Site Stakeholder Groups are kept informed of the plans for the sites and are briefed on progress, safety data, discharges and other relevant matters. Nuclear power plants in the UK are mainly situated in rural areas which are relatively isolated from major centres of population and industry. Closure of these plants generally presents an employment issue for the locality.

Following closure of facilities, sites can be put to other use. For example UKAEA is working with local planning authorities to develop alternative employment. It has redeveloped some of its R&D sites as business and technology parks, as part of its overall policy to restore the environment of its sites. In the case of Dounreay, it is likely that future development will take place away from the nuclear licensed site. Some research reactor sites have been put to other use.

Competent Bodies and Roles

Government

The Department of Trade and Industry (DTI) has the policy responsibility for decommissioning and for nuclear site security.

The Department for Environment, Food and Rural Affairs (DEFRA) has policy responsibility for radioactive waste management.

The Department for Transport (DfT) has responsibility for the regulation of radioactive materials transport.

Nuclear Decommissioning Authority (NDA)

The NDA has been set up by the DTI with the intent of providing the required overall management and direction for legacy clean up. It will develop a coherent clean up strategy while making the best use of available skills and resources. To achieve this it will work in partnership with licensees, who will be responsible for doing the work, and with the nuclear regulators.

The NDA has four guiding principles:

- Focus on getting the job done to high safety, security and environmental standards.
- Best value for money consistent with those standards.
- Openness and transparency
- Development of competitive markets for clean up contracts, to drive innovation and ensure that the best possible use of available skills.

The NDA is not intended to carry out clean up work itself. Instead, it will place contracts with site licensees, currently British Nuclear Group (formerly known as British Nuclear Fuels plc) and UKAEA, who will be responsible for the clean up programme at each site. Site licensees will need to meet relevant regulatory requirements and will be incentivised through contracts to drive forward the clean up work effectively and efficiently. The separation of strategy and planning from implementation will enable the NDA to focus on the strategic management of the clean up programme.

The functions and duties of the NDA are set out in the Energy Bill.

Site Licensees

Current site licensees of the major civil nuclear sites in the UK are UKAEA, British Nuclear Group (part of British Nuclear Fuels Ltd) and British Energy (a private sector company). With the establishment of the Nuclear Decommissioning Authority ownership of the British Nuclear Group sites transferred to the NDA. The transfer of appropriate UKAEA assets to the NDA is planned to take place in 2007.

The Nuclear Installations Act 1965 (as amended) requires certain installations to be licensed. A licence, once granted, applies throughout the lifetime of an installation from manufacture, construction, commissioning, operation and modification, through to eventual decommissioning and demolition.

It is the responsibility of the licensee to prepare programmes for decommissioning. There is a specific requirement for these under Licence Condition 35 attached to each nuclear site licence. This condition also gives NII the power to require the arrangements and programmes to be submitted to it and the power to approve them, or parts of them. Once approved, the licensee cannot deviate from them without NII's prior approval.

There is also a specific requirement under Licence Condition 36 attached to each nuclear site licence requiring the licensee to have and implement arrangements for managing organisational change. This is very relevant to the transition from operation to decommissioning.

Regulators

Licensing and nuclear and waste management aspects of the Nuclear Installations Act are regulated by HSE/NII, see above under site owners. The HSE is also the competent authority for the Nuclear Reactors (Environmental Impact Assessment of Decommissioning) Regulations 1999.

The environment agencies (i.e. the Environment Agency in England and Wales, the Scottish Environment Protection Agency in Scotland) regulate the disposals, under the Radioactive Substances Act (RSA93), of all forms of radioactive wastes (solids, liquids, and gases) from nuclear licensed sites. Prior authorisation must be obtained for the disposal of radioactive waste. An applicant for authorisation must provide a detailed consideration of environmental impacts of disposals. Authorisations issued by the Agency place numerical limits on the quantities of radioactive waste, which can be disposed. They also require that "best

practicable means” are used to minimise the quantities of waste disposed of, and to minimise the radiological effects of disposals on members of the public and the environment.

HSE/NII and the environment agencies work closely together. Their responsibilities and working arrangements on matters of joint interest are described within a “Memorandum of Understanding.” Amongst other things, this has facilitated co-operation during HSE/NII’s quinquennial review of operators’ decommissioning strategies.

The Office of Civil Nuclear Security (OCNS) sets the standards for and regulates the security of sites.

Nirex

In April 2005, UK Nirex Ltd was reconstituted as a Government owned waste management organisation given responsibilities to advise on waste management options for radioactive materials. Nirex is independent of the nuclear waste producers and is funded through the NDA. Nirex sets national waste packaging standards and issues waste package specifications. Nirex provides assessment services to the site operators providing disposability assessments for incorporation into operators’ overall safety cases.

Funding Arrangements

The majority of nuclear legacy sites are owned directly or indirectly by the UK Government. The NDA is funded directly by the UK Government. The Energy Bill contains provisions to establish a Statutory Segregated Account, to be known as the Nuclear Decommissioning Funding Account (NDFA), to fund the NDA’s clean up activities.

In the case of privatised nuclear power stations, segregated funds have been established by the licensee for meeting their costs of decommissioning and associated waste management. In the reorganisation of responsibilities for decommissioning (see Policy Objectives of D&D), there is debate about the merits of a fund for public sector nuclear liabilities.

Decommissioning Techniques and Inspection

Techniques

Decommissioning is now regarded as a mature technology. A wide range of techniques for decontamination and dismantling is commercially available. This includes sophisticated remotely operated equipment.

Decontamination techniques include:

- Non-abrasive methods of simple cleaning such as swabbing, sweeping and vacuuming, which leave the substrate surface essentially unchanged;
- Chemical (and electrochemical) treatment to remove a layer of the substrate surface, along with radioactivity. The depth of treatment depends on how far the radioactivity has penetrated beneath the surface;
- Physical attrition to remove a surface layer, such as the scabbling of concrete or milling the surface of lead bricks.

Dismantling methods include:

- physical cutting using a variety of reciprocating and circular saws, drills and hydraulic shearing tools
- flame cutting (oxy-acetylene, plasma-arc)
- crushing
- conventional and explosive demolition.

The nature of the dismantling work depends on the nature and extent of contamination. In some cases, it is possible to decontaminate a facility completely so that conventional demolition methods can be used. In other cases, a high degree of containment and remote handling methods may be necessary.

Specific projects, such as dismantling the fire-damaged Pile 1 at Windscale or recovery of wastes from the ILW disposal shaft at Dounreay present significant technical challenges which require bespoke solutions.

Inspection

HSE/NII inspects all operations on licensed nuclear sites throughout all stages of the life of the plant. Particular attention is paid to any major change of plant status. The style of inspection during the transition from operation to decommissioning and the decommissioning phase generally is the same as that used during the operational phase. However, the amount of inspection resource applied by HSE/NII may be reduced as the risks to people from the plant reduce during the decommissioning process.

The environment agencies also have a programme of inspection on nuclear licensed sites which relates to their regulatory responsibilities. There is close liaison between the agencies and HSE/NII.

During any safe enclosure phase, the regulatory system will ensure that the licensee is aware of the current condition of residual plant structure, systems and components and, to the extent that is necessary, the material held in a safe store. This information, together with relevant records from the operational phase which the licensee has to keep, will inform decisions about future decommissioning activities which will usually start with a radiological survey.

Radioactive Waste Management

Radioactive waste in the UK is classified as follows:

CATEGORIES OF RADIOACTIVE WASTE	
Very low level wastes (VLLW)	Wastes that can be disposed of with ordinary refuse, each 0.1 cubic metre (m ³) of material containing less than 400 kBq (kilobecquerels) of beta/gamma activity or single items containing less than 40 kBq
Low level wastes (LLW)	Containing radioactive materials other than those suitable for disposal with ordinary refuse, but not exceeding 4 GBq/te (gigabecquerels) of alpha or 12 GBq/te of beta/gamma activity – most such wastes can be accepted for authorised disposal at Drigg.
Intermediate level wastes (ILW)	Wastes with radioactivity levels exceeding the upper boundaries for LLW, but which do not need heating to be taken into account in the design of storage or disposal facilities
High level wastes (HLW)	Wastes in which the temperature may rise significantly as a result of their radioactivity, so this factor has to be taken into account in designing storage or disposal facilities

Usually, waste is strictly segregated to enable material which is inactive to be monitored and cleared for free release in accordance with an Exemption Order made under the Radioactive Substances Act. Re-use of materials on site is based on a safety justification prepared by the licensee and where appropriate accepted by NII.

The UK has disposal facilities for LLW and for VLLW wastes. The only national repository is the LLW disposal facility at Drigg in Cumbria operated by British Nuclear Group. UK industry practice is to dispose of LLW to the Drigg facility as and when it arises. ILW is treated and stored on site pending provision of national facilities.

The UK does not at present have a disposal route for ILW. In the 1990s Nirex investigated the suitability of a site adjacent to the Sellafield works for a deep geological repository. In March 1997 the Secretary of State for the Environment decided to refuse permission for the next stage of the investigation, construction of an underground rock characterisation laboratory. This decision has inevitably led to a review of the future direction of radioactive waste management policy in the UK.

The UK Government and the devolved administrations for Scotland and Wales are currently considering the options for a UK policy for all forms of radioactive wastes. In September 2001 the UK government published a consultation paper, 'Managing Radioactive Waste Safely – Proposals for developing a policy for managing solid radioactive waste in the UK'. A period of public consultation followed until March 2002. In July 2002 the government announced that, following these consultations, it intended to set up a new body, the Committee on Radioactive Waste Management (CoRWM). This Committee had the remit to assess the options for managing solid radioactive waste and recommend to UK ministers the

best solution that will achieve long-term protection for people and the environment. CoRWM made recommendations regarding a preferred option to Government in June 2006.

CoRWM's recommendations are that geological disposal represents the best available option for long-term management of radioactive waste and that this should be progressed as soon as practicable. However, recognising the timescales and uncertainties associated with geological disposal, CoRWM also recommends a robust programme of interim storage, particularly to protect against terrorist attack. Much of CoRWM's work was based in social, ethical and intergenerational equity issues. The Committee further recommends that siting of the geological disposal facility should be based on the principle of host community volunteerism.

The September 2004 update of the 1995 Government White Paper Cm 2919, recognises uncertainties in ultimate waste disposal facilities, and their conditions for acceptance, but confirms that operators should continue to process their decommissioning wastes in accordance with Nirex Letter of Compliance arrangements. In practice this means that operators utilise Nirex packaging standards and seek Nirex assessment of the disposability of proposed waste packages.

Radioactive discharges associated with decommissioning should be minimised. Anticipated discharges must meet relevant radionuclide limits and constraints. Prospective critical group doses should also be as low as reasonably practicable, having taken economic and social factors into account.

The environment agencies will be seeking to ensure that discharges are consistent with the UK Strategy for Radioactive Discharges 2001-2020, a draft of which was issued for consultation in June 2000. This proposes that there should be a progressive reduction in the contribution future discharges from the site as a whole make to critical group doses and to collective doses to the general public. Any proposed increases should only be considered in exceptional circumstances, for example, if they are the inevitable result of measures required to reduce significant risks associated with decommissioning redundant plant, provided such increases in discharges are time-limited and necessary to achieve the required reduction in risks. A specific detailed justification will need to be made for such increases.

The regulators of nuclear decommissioning and waste management (including disposal) in the UK are HSE/NII and the environment agencies – as detailed above in “Competent Bodies and Roles - Regulators”.

Public Information

Organisations involved in decommissioning are encouraged to operate openly, with as much information as possible being made available to the general public and interest groups as part of the development of their proposals. Those organisations are also encouraged to share information on decommissioning techniques which may be more broadly applicable as good practice. Licensees and Nirex are actively discussing options with interested groups.

The regulators have published guidance to their inspectors relevant to decommissioning, for example: HSE/NII's Safety Assessment Principles for Nuclear Plant; guidance produced by HSE/NII on the management of nuclear materials and radioactive waste, and on

decommissioning; and Environment Agency guidance on the conditioning of intermediate level waste. In March 2005, HSE/NII, Environment Agency and Scottish Environment Protection Agency issued Guidance to Industry *Conditioning of Intermediate Level Radioactive Waste on Nuclear Licensed Sites*.

In handling authorisations for radioactive waste disposal related to decommissioning, the environment agencies consult widely and publicly. This is likely to involve local public meetings and surgeries.

A wide range of local organisations must be consulted under the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999.

List of Websites for nuclear operators, government departments, and regulators:

British Energy	www.british-energy.com
British Nuclear Energy Society	www.bnes.com
British Nuclear Group	www.britishnucleargroup.com
Department of Environment, Food and Rural Affairs	www.defra.gov.uk
Department of Trade and Industry	www.dti.gov.uk
Department for Transport	www.dft.gov.uk
Environment Agency	www.environment-agency.gov.uk
HSE/NII	www.hse.gov.uk
Nuclear Decommissioning Authority	www.nda.gov.uk
Safeguards project	www.safeguards.com
SEPA	www.sepa.org.uk
UKAEA	www.ukaea.org.uk
Nirex	www.nirex.co.uk

**TABLE 1
UKAEA DECOMMISSIONING PROGRESS**

FACILITY	DESCRIPTION	STATUS
PFR	Prototype Fast Reactor	Undergoing Stage 1 decommissioning. Defuelling complete. Over 1000 tonnes of Sodium destroyed Secondary Sodium Circuits cleaned by water vapour nitrogen treatment. Prepared the Reactor for final sodium removal through Jacking Major Reactor Components project and through-drilling/piercing specific components to allow the sodium to drain down, ready for removal and final destruction later in 06/07 FY.
DFR	Experimental Fast Reactor	Undergoing Stage 1. NaK coolant destruction plant has operated successfully with clean eutectic NaK. Commissioning continues. The enabling works for the balance of DFR decommissioning are now complete and construction of Breeder material removal facilities and equipment is 25% complete.
D1204	MTR reprocessing plant	Stage 1 Decommissioning ongoing with preparations for Stage 2 In-Cell decommissioning commenced.
D1200	Laboratory Complex	Stage 2 Decommissioning in progress with 25% of the laboratory complex now complete.
D1202	MTR Fuel Fabrication Facility	Stage 2 Decommissioning nearing completion to allow completion of Stage 3 in 2007.
D1217	PIE Facility	Stage 1 Decommissioning complete. Stage 2 in progress with completion of one shielded cell removal and strip out of the main cell suite.
D1251	DMTR PIE Cave and Fuel Storage Pond	POCO in progress.
D8550	Pu Handling Building	Stage 3 Decommissioning in progress.
DIDO, BEPO & PLUTO	Experimental reactors	Stage 2 decommissioning completed 1996.
GLEEP	Experimental Reactor	Stage 3 decommissioning completed 2004
LIDO	Swimming pool reactor	Stage 3 decommissioning completed 1995
B220	Radiochemistry laboratories and radioactive handling facilities.	Redundant laboratory areas and shielded cells cleared. Over 150 standard glove boxes decommissioned. Large installed glove boxes and pressurised suit areas decommissioned. Limited parts of the building remain in use for waste handling and storage.
B351	Chemical engineering facility	Stage 3 decommissioning completed 1998
WAGR	Prototype for Advanced Gas-Cooled Reactor	Stage 1 complete. Stage 2/3 decommissioning in progress
Piles 1 & 2	Air-cooled graphite moderated pile reactor	Stage 1 complete. Piles 1& 2 undergoing partial Stage 2 decommissioning.
SGHWR	Prototype heavy-water moderated and light water cooled reactor	Decommissioned to Stage 1 1997. Stage 2/3 decommissioning in progress
DRAGON	Experimental reactor	Stage 1 completed – Stage 2/3 decommissioning in progress.
ZEBRA	Experimental fast reactor	Stage 3 decommissioning completed 2005
NESTOR and DIMPLE	Low power experimental reactors	Stage 3 decommissioning completed 2000
A52	Alpha materials laboratory	Stage 3 decommissioning completed 1999

BRITISH NUCLEAR GROUP DECOMMISSIONING PROGRESS

FACILITY	DESCRIPTION	STATUS
B29	Fuel Storage Pond	Undergoing POCO
B30	Magnox Storage Pond & Decanning Facility	Undergoing POCO
B31	Settling Tanks	Undergoing POCO
B38 Wet Silos	Stores mixture of fuel cladding and miscellaneous beta gamma wastes	Stored wastes being retrieved.
B203	Pu Recovery Plant	Undergoing dismantling
B204	Head End Plant	Undergoing POCO/Initial decommissioning
B209	Various Pu Treatment & Finishing Plant	Several lines fully decommissioned. Various parts undergoing dismantling
B212	Caesium Extraction Plant	Undergoing dismantling
B277	PFR Fuel Element Plant	Undergoing dismantling
Berkeley	Magnox Reactor x 2	Undergoing Stage 2 decommissioning
Hinkley Point A	Magnox Reactor x 2	Undergoing Stage 2 decommissioning
Hunterston A	Magnox Reactor x 2	Undergoing Stage 2 decommissioning
Trawsfynydd	Magnox Reactor x 2	Undergoing Stage 2 decommissioning
Bradwell	Magnox Reactor x 2	Undergoing Stage 2 decommissioning
Calder Hall	Magnox Reactor x 4	Pre-defuelling modifications in progress
Chapelcross	Magnox Reactor x 4	Pre-defuelling modifications in progress