

ISSUE 1 2009

INSIGHT

into nuclear decommissioning

NDA

Nuclear
Decommissioning
Authority

Meet our new man at the helm

Page 3

Decommissioning in action

Page 8 - 9



Dealing with the past. Protecting the future.

Contents

- 3 Efficiency will be the key
- 4 Keeping costs down
- 5 Europe's most complex site
- 6 Nuclear gems in the making
- 7 Cutting-edge lasers
- 8 ILW store opens its door
- 9 Sizewell defuels
- 9 Chapelcross savings
- 10 Support for communities
- 11 Archive owes debt to Eric
- 12 Competition for key Scottish site
- 13 Managing radioactive waste safely
- 14 A look at Low Level Waste
- 16 Greener future for nuclear industry

Welcome to the first edition of Insight, a new magazine about the NDA's work in dealing with the legacy of the UK's old nuclear facilities.

Our aim is to give a brief taste of ongoing activities around our 19 sites as well as an insight into how we operate. Much of the information is also available on our website, but we believe our mission is vitally important and should be shared with as many individuals and organisations as possible. We would be pleased to hear your views on Insight and to take on board any suggestions for improving the content or format.

Please send your comments to **deborah.ward@nda.gov.uk**

A snapshot of what we do

The Nuclear Decommissioning Authority (NDA) is a non-departmental public body established in 2005.



Demolition of the cooling towers at Chapelcross Power Station

We are responsible for 19 sites built in the post-war days of the UK's early nuclear programme, which now need to be cleaned up and restored for public use.

Put simply, our job is to decommission these nuclear facilities and ensure that all the waste products, both radioactive and non-radioactive, are safely managed. This will reduce the risks for our own generation and for the future.

It is the largest, most important environmental clean-up programme in Europe, a mission that is immensely technical and challenging.

Our top priorities are safety, security, environmental responsibility and providing value for taxpayers' money.

The UK was one of the forerunners in developing nuclear energy after the Second World War, but most of the research was expended on cutting-edge experimental facilities designed to generate electricity. Decommissioning never came to mind.

One of our first, but crucial, tasks has been to establish the real scale of the nuclear legacy and develop, for the first time, a strategy for dealing with it.

Our plans, by necessity, look 120 years ahead to take account of the slow decay in radioactivity. But in reality we focus on the short to medium term, maintaining operations, reducing the highest hazards and moving forward on decommissioning.

The NDA's expertise in delivering its programme is also seen as increasingly vital to the success of the UK's nuclear new build programme.

Large parts of our estate are still operational, such as the reprocessing

plants at Sellafield, the low-level waste repository, the five Magnox sites that are being defuelled and the two remaining generating stations at Oldbury and Wylfa. Others are at various stages of the decommissioning and clean-up process.

We do not have a hands-on role in cleaning up our facilities. Under the criteria laid down by Parliament, these functions are contracted out to our Site Licence Companies (SLCs) at each site. Our SLCs are responsible for developing individual site plans and are in turn managed by Parent Body Organisations (PBOs), appointed through our competition process.

PBOs provide world-class management expertise to each SLC for the specified length of the contract we have negotiated with them. The site workforces remain unchanged, but the leadership team will be guided by the PBO.

The NDA provides expert nuclear advice to Government and strategic direction for the sites, sets targets and manages the contracts to achieve efficiency, value for money and delivery. We also manage the inevitable fluctuations in expenditure and income.

Our budget is set by the Department for Energy and Climate Change and HM Treasury. It is a combination of government funding and income from our commercial assets.

Our HQ is in West Cumbria and we employ 350 full-time equivalent people, while there are 18,500 people employed directly across the sites and many more employed by sub-contractors.



Efficiency will be the key

Tony Fountain's NDA looks set to be a more streamlined operation, with time and energy freed up to concentrate on the fundamental priority of dealing with the nuclear legacy.

Describing his approach as "simplified wiring", the new Chief Executive wants to reduce bureaucracy and address the financial squeeze that faces the entire public sector.

"My desire is to put our work in the context of the extreme pressure on funding – the most extreme in many, many years. At this early stage, I think the key priorities must be to ensure we increase the proportion of spend on the core mission, and reduce the amount spent on support activities and overheads," he said.

"We need to ensure our planning is closely related to the Government's Public Value Programme, to create a set of options that would be implemented if we were required to make cuts in

expenditure. Against this backdrop, my overall thrust is to focus on ensuring the whole estate improves its levels of efficiency and execution."

The NDA's clean-up mission, he believes, is very clear. "I'm impressed by just how clear it is." Important secondary aims are to secure the best return from existing assets and make a positive difference in the communities that host the nuclear facilities.

Tony has many years of experience in the oil and gas industry and will be bringing an outsider's objectivity to nuclear decommissioning. As a student, his strengths lay in mathematics and science, and he chose economics because of its slant towards the commercial and international political world. He moved to BP

after completing post-graduate studies at Oxford, and remained there until his recent move to the NDA.

His induction into the nuclear sector began with a taste of the clean-up challenges at Chapelcross power station in the Scottish borders.

After a guided tour of the heat exchanger asbestos-removal project and a look at defuelling in action, he voiced approval for the culture of safety and the professionalism of the site's workforce. He was also struck by the sheer scale of the decommissioning challenge and the painstaking attention to detail at every stage.

A few weeks into the post, he is full of praise for the NDA's personnel as being highly motivated, talented and well qualified but notes that bureaucratic procedures can hamper efficiency.

"It's a cliché, I suppose, to say it's rather bureaucratic, perhaps because the organisation is highly regulated, perhaps because it's a public sector body, perhaps also because it's full of engineers - and engineers just love process. I do believe it can be freed up a bit ... what I call simplified wiring."

"I would like to see the good people we have do their jobs, and for decisions to be made at an individual level rather than layers of committee decision-making."

The Chapelcross tour was followed by a visit to Sellafield, acknowledged to be one of Europe's most hazardous sites and "an extraordinary challenge".

Although impressed by the progress being made on cleaning up the ponds and silos, he felt there was room for greater efficiency. "The tough challenge is about priority spending – you don't necessarily get 100p in the £ at Sellafield," he mused.

Tony is based at Herdus House in Cumbria and is aiming to buy a property in Cockermouth, but will retain his home in Sussex, where his 15-year old daughter is based.

Cumbria is a region he knows and loves, having spent many a leisure break walking the fells or sailing the lakes. A passionate horse-rider, it looks like he will have precious little time in the months ahead to indulge any interest other than nuclear.



Surplus land around Wylfa Power Station has been sold

Keeping costs down

Decommissioning old nuclear facilities is an expensive operation, as the headlines often proclaim, and although the NDA receives Government funding for its core mission, it is also required to seek maximum value from existing assets.

Business optimisation is therefore a key activity, generating income that can help to underpin the costs of clean-up while offsetting the demands on the taxpayer.

The NDA focused on its decommissioning strategy and major stock-take in the early years of its existence, but has now also turned its attention to the process of selling surplus pockets of land, as well as increasing the revenue from the property portfolio inherited from BNFL.

Much of this unused land surrounds existing nuclear sites and was once tentatively earmarked, back in the mists of time, for nuclear expansion proposals that did not materialise, or simply as buffer space with potential for other uses.

Following the Government's renewed commitment to nuclear power, however, the surplus land acquired the potential to attract greater levels of interest.

In March 2008, the NDA launched a market-testing exercise to assess the level of interest in a range of assets which included land adjacent to its sites, uranium-derived materials and its fuel manufacturing plant near Preston.

Six months later, following a series of meetings with organisations that had expressed interest - from both nuclear

and non-nuclear sectors - the NDA was able to announce an initial sale of land around three sites. Given the difficulty of putting an accurate valuation on the land, it was decided to use an online auction which would ensure a transparent and competitive process for the bidders.

The auction began in March 2009, concluding successfully at the end of April. A consortium of EON UK Plc and RWE Npower bought land at Wylfa and Oldbury, while EDF bought land at Bradwell. The Wylfa sale was conducted jointly with EDF who also owned land around the Anglesey site.

The process raised up to £387 million for NDA which will be helpful in the current economic climate.

Project Manager Sam Hounslow said: "It was difficult to gauge the potential level of interest in the land, and the value that might be realised, so the auction proved to be an excellent way to proceed. We were delighted with the response."

Now, also sold is a tranche of surplus land around Sellafield. Following expressions of interest the land was sold to a consortium of Iberdrola SA, GdF, Suez SA and Scottish & Southern Energy plc. This sale will ultimately result in proceeds of up to £70 million for the taxpayer.

The four sites are among 10 UK locations nominated for new nuclear power stations.

Meanwhile, the NDA is in advanced discussions with Westinghouse over a deal for the Springfields fuel manufacturing plant near Preston. This would provide excellent value for money for the taxpayer while also providing Westinghouse and the Springfields' workforce with the opportunity to develop future business opportunities.

At the heart of these discussions is the proposal to transfer responsibility for the commercial business and staff from NDA to Westinghouse, together with a long lease. This will provide NDA with an income stream and Westinghouse with the freedom to invest in the site.

NDA Commercial Director John Clarke added: "The NDA has enjoyed a successful five-year relationship with Westinghouse as the Management & Operations contractor for Springfields. Their long-term understanding of the site, together with their experience as a nuclear fuel vendor, makes Westinghouse a good partner to exploit the potential of the site. The NDA will work hard to ensure this great commercial opportunity that could provide continued employment and a long-term platform for increased investment is a success."

NDA also owns a diverse range of properties that lie outside the nuclear licensed sites and include office space, housing, sports fields, a quarry and nature reserves. NDA Properties Ltd was transferred to NDA from BNFL and has assets worth around £15 million together with a rental income of £2.5 million.

Sites announcement

The Government has recently announced the final list of potential new build sites this autumn after assessing each location against a list of criteria that range from environmental considerations to flooding issues and access to cooling water.

Once the site list is finalised, the land-owners will be wholly responsible for drawing up plans for new nuclear power stations and taking them through the planning process, both at local authority and Government level.

Sellafield – the most complex nuclear site in Europe

The Sellafield site in West Cumbria is widely acknowledged as having the most significant challenges for the UK nuclear clean-up mission.

In the first of a series of articles, we provide an overview of current activities, while future articles will look in detail at specific operations and projects to build a full picture of the most complex nuclear site in Europe.

Sellafield is the NDA's largest site, occupying 262 hectares, and incorporates the former separate sites of Windscale and Calder Hall. Packed within this area are a large number of diverse plants that share services and infrastructure. This presents logistical challenges for the operators, Sellafield Ltd, as they tackle the decommissioning agenda.

The main activities focus on high hazard reduction, the management of high and intermediate level waste and spent fuel, decommissioning and clean-up and land remediation.

Reducing the risk from the highest hazards, many of which go back to the early days of the UK nuclear industry, is a priority.

These historic facilities were not built with decommissioning in mind, and can require novel uses of existing technology or the development of new technologies.

Decommissioning the Legacy Ponds and Silos is one such area, constructed in the 1950s-60s to store waste material from early reactor and reprocessing plant operations. These ageing facilities need to be appropriately maintained so that waste material can be safely retrieved. New facilities are being constructed to allow retrieval, treatment and packaging of this waste material which will then be placed in interim storage prior to final disposal.



In addition to the legacy ponds and silos, the Sellafield team is decommissioning the Windscale Pile reactors. Pile one was damaged by fire in 1957 and presents a unique challenge. Meanwhile decommissioning of the iconic Windscale Advanced Gas Cooled Reactor is well advanced.

Spent fuel management is an important part of the site's operations. A number of plants carry out reprocessing and fuel manufacturing, with interim waste stores supporting waste management activities. The Site's Thermal Oxide Reprocessing Plant (THORP), operational since 1994, separates spent nuclear fuel which has been used in reactors. The majority of spent fuel, 97%, can be recycled to produce new fuel which means waste is minimised. The MOX, or Sellafield Mixed Oxide Plant, and Magnox reprocessing operations are also part of the spent fuel management portfolio.

Dealing with the site's waste inventory is key to successful management of the nuclear legacy. The Sellafield Vitrification

plant takes evaporated highly active liquor from reprocessing operations and converts it into a solid glass form which is then stored on site. An effluent and encapsulation plant treats and packages intermediate level solid and liquid wastes. This waste is then placed in interim storage on the site, awaiting long-term deep geological disposal.

With the commitment of a skilled and multi-disciplined workforce, the challenging programme of work is progressing and the impact of the new Executive Team is beginning to show. With a new Lifetime Plan being put together and a real focus on high hazard reduction and efficient operations, expectations are high on delivering significant progress over the next few years.



Stored waste containers

Nuclear gems in the making

The first DIAMOND conference has been a resounding success, according to the NDA's Dr Melanie Brownridge.

Melanie, Head of Research and Development, made the opening speech at the inaugural two-day event in the National Railway Museum, York, which was attended by around 120 delegates, including postgraduate students, academic supervisors, industry representatives and regulators.

The aim was to allow the academics to share aspects of their highly specialised research with industry leaders, while providing an industrial and commercial context for the students.

DIAMOND (Decommissioning, Immobilisation And Management Of Nuclear Waste For Disposal) is a consortium of six universities led by Professor Simon Biggs at the University of Leeds. The consortium includes representatives from the University of Manchester, University College London, Imperial College London, Loughborough University and University of Sheffield, and was formed in response to a call for proposals in the field of nuclear waste management by the Engineering and Physical Sciences Research Council.

DIAMOND's unique approach is to begin the dialogue at a much earlier stage of the doctoral projects, which

last several years, and to operate on a multi-disciplinary basis, rather than focusing on a narrow range of nuclear-related subjects.

Melanie said: "The benefit for the students was to begin to see the context of their work which is very specialised, and to allow them to understand how important their work is to the industry."

The event was funded by the Engineering and Physical Sciences Research Council, with sponsors including the NDA, Sellafield Ltd, National Nuclear Lab, Amec, Tessella, UKAEA, ParticlesCIC and Nuclear Technologies plc.

Melanie and NDA Research Manager Darrell Morris joined Bruce Hanson (NNL) and David Lever (Serco) on the judging panels for the Best Oral Presentation and Best Poster Presentation from the students.

Sunny Phuah from Imperial College and Claire Thorpe from the University of Leeds each received a £250 prize from the NDA, presented by Melanie.

One final point of interest for Dr Brownridge (nee Gresley) was the

opportunity to see at first hand the designs of her distant relative and engineering genius Sir Nigel Gresley, designer of the Flying Scotsman and the Mallard.

Further information:
www.diamondconsortium.org



Claire is congratulated by Melanie

Lasers ready for trial

Cutting-edge lasers are now ready for demonstration in the nuclear decommissioning process.

Cambridge-based materials engineering specialist TWI Ltd won a £1 million contract to demonstrate the effectiveness of lasers in removing contaminated concrete surfaces and cutting up metal pipework.

The company has now procured and commissioned a single laser system that can address both these applications. The first six months of the project were spent in design and build of the system, which includes the concrete scabbling head equipped with an on-line debris collection system and the integrated vision system which can automatically track the concrete surface.

The equipment was developed in response to an NDA project to encourage innovative technologies from the supply chain in support of the decommissioning mission.

TWI Project Manager Paul Hilton said: "After quite an intense period of specifying, sourcing, designing, and manufacturing, the system has now come together and the eagerly awaited process trials have begun on tube cutting."



Cutting head



Laser in action

To aid TWI with the process trials, Sellafield Ltd have supplied an assortment of steel tubes, and some concrete samples, while other aged pre-cast concrete samples have been provided by Manchester University.

Interest in the project from the SLCs is already high, while National Geographic's video division has made contact with TWI about a possible TV programme on the techniques being developed.

The NDA's Head of Research and Development, Dr Melanie Brownridge said:

"We are committed to investing in innovation and the development of a vibrant supply chain. The application of laser technologies from other industries offers the opportunity to secure and develop good practice for NDA's mission and beyond – and we are delighted with the developments so far."

Contaminated concrete and pipework represent major decommissioning challenges in terms of the large volumes of material to be treated, radiation levels and the number of facilities affected.

This project will demonstrate the capabilities of lasers for surface removal of contaminated concrete and size-reduction of vessels and pipework. If successful, lasers could be effectively deployed in situations that are too hazardous or inaccessible for standard people-led teams.

The project has its own public website, www.twi.co.uk/laserdemo, and, beginning in 2010, will feature demonstration workshops, training sessions, company visits and one-to-one expert assistance, in order to maximise the full potential of this innovative project.

The Trawsfynydd ILW store



Protection for fuel in transit

Spent nuclear fuel has been transported by rail since the 1960s, travelling more than seven million miles without any incident involving the release of radioactivity.

The fuel is transported in a heavily shielded purpose-built flask. Constructed from forged steel more than 30cm thick, each flask weighs more than 50 tonnes and holds no more than 2.5 tonnes of fuel.

The flasks must undergo a series of demanding tests to demonstrate they would withstand a very severe transport accident.

ILW store opens its door

Trawsfynydd recently celebrated a decommissioning milestone when its new Intermediate Level Waste (ILW) Store was officially opened.

The £20 million store, the first to be completed on a Magnox site, was delivered on time and without a single lost-time accident. Construction started in 2006 and was completed in 2008.

Guest of honour Lord Dafydd Elis-Thomas, the Welsh Assembly's Presiding Officer, cut the ribbon while guests watched. The first packages are now in place after being transferred from their interim storage location.

The store, which can hold up to 368 concrete 'overpacks' and 2,444 drums containing ILW, provides a controlled and secure environment for the waste, which will be held until the long-term Geological Disposal Facility becomes available.

Located in the Snowdonia National Park, the store is architect-designed and clad in local slate, as well as meeting all the requirements for storing radioactive waste.

Packages will be received and inspected before being dispatched to an appropriate storage area using a series of cranes and remote handling devices.

99% of the radioactive hazard was removed from site in 1995 when the last of the spent fuel was despatched to Sellafield for reprocessing. 43% of Trawsfynydd's radioactive waste volume – which accounts for 67% of the radioactivity remaining on site - has already been packaged and is ready to be transferred into the store.

Fuel and waste disposal

Used fuel and waste from nuclear power stations has varying levels of radioactivity.

The Magnox fuel used to generate electricity is highly radioactive and is sent to Sellafield for reprocessing into its component parts, namely uranium, plutonium and a small amount of concentrated high level waste.

However, before being transferred off site, the used fuel is usually moved into a pond containing chemically modified water where it is left to cool, for a minimum of 180 days. Defuelling is usually the first step in the process of decommissioning a power station

and removes 99% of radioactive material from a plant. Sellafield is the only site that stores the high level waste reprocessing product.

Components surrounding the fuels, such as casings, springs and other pieces of debris, are less radioactive. These are generally characterised as Intermediate Level Waste (ILW) and form much larger storage volumes than the fuel (due to their low packing density) but are less radioactive. ILW is highly varied in form, from large solid waste items to wet sludges.

All the UK's ILW will be stored above ground on an interim basis, in safe containers and specially constructed

buildings, until a Geological Disposal Facility becomes available.

Low Level Waste (LLW) is produced by the nuclear sector but also by non-nuclear sources such as hospitals, universities and the pharmaceutical industries. Made up of a wide range of materials including plastic, sludge, paper, tissue, clothing, metal and building rubble, it is disposed of at the UK's Low Level Waste Repository near the village of Drigg in Cumbria.

Waste with an extremely low level of radioactivity, known as Very Low Level Waste (VLLW), can be segregated and safely accepted in conventional landfill sites with the relevant regulatory approvals and environmental permits.



Removal of fuel from one of the reactors

Sizewell

Defuelling has now started at Sizewell A, with four flasks so far dispatched to Sellafield.

The programme will continue for the next three years until all the fuel, which is currently stored safely in Sizewell's twin reactors, has been transported up to Cumbria for processing.

Reactor One is now 6.89% defuelled, with 24,646 elements remaining, while Reactor Two is 1.75% defuelled, with 26,012 elements remaining. The flasks despatched contained 564 elements in total, weighing 17.07 tonnes unpackaged.

The start of defuelling is a key phase in the decommissioning plan, and its eventual completion, planned for 2012, will represent a huge milestone for the site.

Defuelling was expected to start following the end of generation in December 2006, however, challenges at the Sellafield processing plant led to fewer flasks being available. Generating sites are given priority and therefore Sizewell's defuelling has been delayed.

During its 40-year operational lifetime, more than 3,000 fuel flasks were dispatched to Sellafield from Sizewell A. It will take approximately 310 flasks to clear the inventory of fuel present on the site.

Asbestos: millions saved

Work to reduce a major asbestos hazard at the Chapelcross site is ahead of schedule, while an innovative approach to analysing the material could save up to £49 million.

Once electricity generation stopped in 2004 and the site's 16 heat exchangers cooled down, the asbestos cladding began to absorb water, becoming heavy. When chunks were dislodged, it became essential to strip the cladding off entirely.

The project, launched 18 months ago, is believed to be the largest asbestos removal in Europe. Asbestos lagging is also being removed from the turbine hall, in all around 3,300 tonnes.

Based on known site conditions, it was calculated that most of the asbestos would be contaminated with low levels of radioactivity, requiring treatment and disposal at the UK's Low Level Waste Repository near Drigg in Cumbria. Waste disposal costs were initially estimated to be around £50 million.

The first step was to put in place some protection from the weather, creating a safe working environment for the team, and to analyse the asbestos. The weather-proof structure required 1,600 tonnes of scaffolding and is designed to withstand strong winds.

In consultation with Sellafield Site and the Low Level Waste Repository, the team came up with the option of

safely storing all the asbestos waste at Chapelcross until it was feasible to undertake a single 'supercompaction' campaign at Sellafield before transferral for final disposal at the LLW Repository.

The NDA's Site Programme Manager at Chapelcross, Keith Riding, said: "I applaud the team's constant drive for improvement, which has produced enormous benefit in terms of hazard reduction, and I welcome the cost savings."

Following completion of the protective weather-proof structure six weeks ahead of schedule, teams at Chapelcross saw an opportunity to carry out a further radiological characterisation exercise, challenging conventional practice.

This assessment confirmed that a significant amount of the asbestos was far less contaminated than originally calculated, which could be 'free-released' and disposed of as special waste in licensed landfill sites.

Three heat exchangers are now completely free of asbestos and the work is one month ahead of schedule.

This innovative approach has resulted in a significant hazard reduction and minimisation of the amount of waste sent to the LLWR, whilst waste disposal costs could be reduced to around £1 million as the project continues for the remaining four years.



The marina at Wick Harbour

Support offsets the impact of nuclear decline

When the NDA was formed, a key concern raised by communities was the potential economic impact from the eventual closure of nuclear facilities that once employed thousands of people, often in remote parts of the UK.

Learning lessons from the unplanned 1980s coal industry restructuring, which had left behind a range of social and economic problems, the Government's 2004 Energy Act charged the NDA with playing a full role in helping to address the local impacts of decommissioning.

With the benefit of time to plan, the NDA has drawn up a policy that sets out the priorities and criteria that guide its decision-making.

The NDA currently has provision in its budget to spend up to £10 million a year on projects that support the economic regeneration of areas affected by decommissioning activities.

Funded by efficiency savings, support has been provided to a range of projects targeting four priority areas where the closure of NDA facilities is likely to have the greatest impact: Caithness and North Sutherland, West Cumbria, Anglesey and Meirionnydd and the Gretna-Lockerbie-Annan corridor in Dumfries and Galloway.

The NDA works with a range of partner organisations to ensure projects are able to attract match funding, meet its criteria and will deliver economic benefits.

One of the major projects completed so far is the installation of a marina facility at Wick Harbour, which was opened by the Princess Royal in September and has generated £45,000 of revenue since opening in late summer. The NDA provided funds for a feasibility study and further funds for the project itself, totalling more than £400,000.

Wick Harbour's long-term development plan includes a breakwater that will create a deep water port to attract the oil and gas businesses working in the North Sea.

The project has the potential to create up to 200 jobs in an isolated part of Scotland that will be affected by the decommissioning of the NDA's Dounreay facility. The NDA is also working with Scrabster Harbour Trust to support their

plans to provide infrastructure for the emerging marine energy industry and bring a further 300 jobs to the area over the next 10 years.

The NDA has also provided £5 million of funding towards the £20 million skills, training and education facility at Lillyhall in West Cumbria, another priority area. ENERGUS, recently opened by Ed Miliband, Secretary of State for Energy and Climate Change, will be a flagship academy for the National Skills Academy for Nuclear.

Other schemes receiving funding include: tourism initiatives in Caithness, a prospective business park near Annan, maritime festival in Whitehaven, regeneration and business start-ups in South Copeland and entrepreneurship support in Wales.

Details of a range of programmes in North Wales, as well as other areas, will be announced over the coming months.

Pictorial archive owes debt to Eric

A fascinating collection of old images is being painstakingly preserved thanks to the dedication of long-serving Harwell photographer Eric Jenkins.

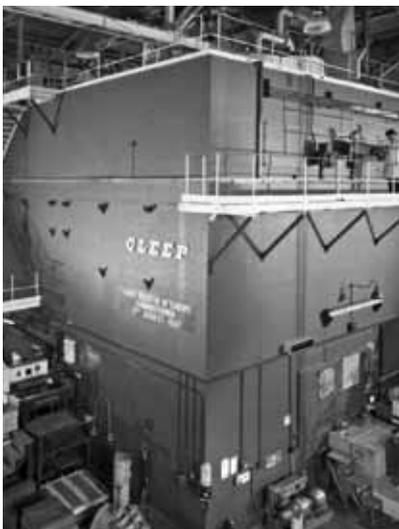
The moving films and grainy photos, dating from the end of World War II when the UK first began research into developing nuclear power, tell the story of how scientists tested prototype reactors and pushed the boundaries of knowledge. The more up-to-date images, now in full colour, show how those same reactors are being decommissioned and buildings demolished.

One unique visual story includes the installation of graphite into Europe's first reactor GLEEP (Graphite Low Energy Experimental Pile), built in 1946, and its final moments 60 years later. GLEEP was used for initial investigations into how to make a reactor work and later as an international standard for materials testing and calibration.

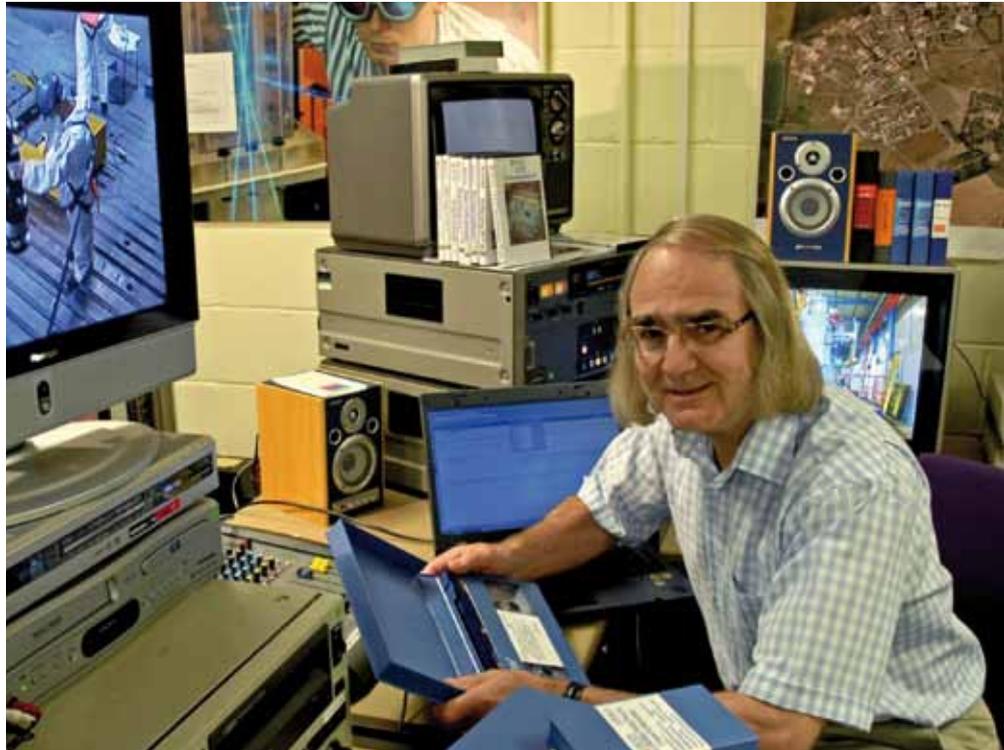
Eric started work as a 16-year-old lab technician at the Harwell research site in 1959, but his passion for photography gradually nudged him in a different direction.

Now a full-time professional photographer with 50 years experience, he has an extensive knowledge of the nuclear story and many of the images in the collection are his own work.

As facilities were taken out of service, or moved from one site to another, Eric was often a lone voice in trying to ensure the visual records didn't end up in a skip along with the rest of the office waste.



The GLEEP reactor



Eric's archive is now a valuable national asset

"It effectively started because I didn't like to see photographs or film being thrown away. I always felt they should be kept as a record," he said.

He has worked tirelessly to transfer roll after roll of old film into more modern formats and ensure old photographs are scanned and electronically archived. Computer and recording equipment from down the decades are dotted around his office, allowing him to ensure even the most antiquated material is accessible to modern technology.

Much work remains to be done – Eric's memory is sometimes the only catalogue of half-remembered events or long-gone facilities, but he aims to ensure that everything is gradually transferred to an electronic equivalent.

His solitary crusade has evolved into a systematic project to archive the material and maintain comprehensive records, working with Sue Connell and Chris Holmes.

It has been a labour of love over many years but the collection is now an important national archive that contains more than one million still images and unique footage of the UK's nuclear heritage. Without Eric, much of it could have been lost forever.

Plans are currently being developed for the creation of the UK's first national nuclear archive at Wick in the far north of Scotland.

Subject to funding, this would involve moving Eric's image library to Wick. It is envisaged that the archive would bring together material from across the UK and be available for researchers, academics, businesses and other interested parties or individuals.

Eric aims to stay on long enough to ensure a smooth transition for all the visual material kept at Harwell, where it is managed for the NDA by UKAEA. The team, meanwhile, is still seeking items for conservation, so if you know of any material that might be of interest, please get in touch on: 01235 434499.



Dounreay

Competition for key Scottish site

An open competition to find a new Parent Body Organisation for the Dounreay site is now officially under way.

The NDA's ownership of Dounreay remains unchanged, while day-to-day operations will continue to be the responsibility of the Site Licence Company, Dounreay Site Restoration Ltd (DSRL). The existing skilled workforce will also remain in place.

The competition relates solely to the Parent Body Organisation that owns the shares in the Site Licence Company (SLC).

Competition is central to the NDA's strategy. As part of a statutory duty to secure value for money, and promote competition and best practice, the NDA competes the Parent Body role to own shares in each SLC. For Dounreay, the current Parent Body Organisation is UKAEA, which has recently been acquired by Babcock International Group PLC (Babcock).

The official Dounreay competition launch was marked by the publication of a Prior Information Notice in the Official Journal of the European Union (OJEU).

Graeme Rankin, the competition project manager, said: "Since the publication of the Prior Information Notice, which marked the much-awaited official start of the competition, the team has been talking to potential bidders.

"This has been extremely useful in understanding bidders' views, and these will inform the development of contract and procurement strategies going forward. The NDA remains committed to securing the best possible PBO for the Dounreay site."

The competition will be administered openly and transparently, in accordance with European Union procurement guidelines.

The new PBO will take ownership (via share transfer) of the DSRL SLC for the duration of the contract.

Its goal will be to provide the vision for achieving the site's mission. Key personnel will be seconded to form the SLC's senior leadership team, driving to attain best value for money while maintaining mandatory standards of safety, security and environmental performance.

Once the contract and procurement strategies have been finalised, a two-part industry event will be held in Caithness and then Glasgow or Edinburgh in the first half of 2010.

The event will inform all of those interested about the overall aim and scope of the contract, the more detailed timetable and the process to be followed.

Last year, the Sellafield PBO was subject to competition and the contract awarded to Nuclear Management Partners, a specially created consortium of URS' Washington Division, AMEC and AREVA NC.

The process, involving one of the UK's largest and most complex public procurement programmes, took two years to complete.

The Sellafield agreement is initially for a period of five years with the potential of further extensions, subject to performance, to a total of 17 years. The Management & Operations Contract offers business initially to the value of around £1.3 billion per annum with associated fee of approximately £50 million per annum, subject to the specified level of improved performance and efficiency of Sellafield Ltd being met.

Cillit Bang will do the trick

Nuclear sites across Britain are showing interest in the discovery by Dounreay workers that plutonium stains can be removed by a £1.99 household cleaning product.

A decommissioning team found the usual industrial cleaning fluid was slowing down work to dismantle an experimental chemical plant used in the 1980s to recycle plutonium liquor – and that Cillit Bang appeared to be more effective.

One of the team suggested Cillit Bang after watching a TV advert where it was shown to strip grime from a 2p coin.

Managers ordered tests and the product is now playing a key role in keeping on the track the clean-out and demolition of the plant, a test-bed for the giant THORP reprocessing plant at Sellafield.

The nuclear site in Cumbria is among those who have been in touch with Dounreay to learn more about the discovery.

David Manson, project manager with Dounreay Site Restoration Ltd, says it is a good example of innovation driving down the £2.6 billion cost of demolishing the site.

The experimental chemical plant was one of many built at Dounreay during the 20th century to research more efficient ways of generating electricity from plutonium.

A £9 million project to clean out and dismantle the laboratory is now well underway.

"We need to decontaminate as much of the surfaces as possible before we can cut them up," explained David Manson.

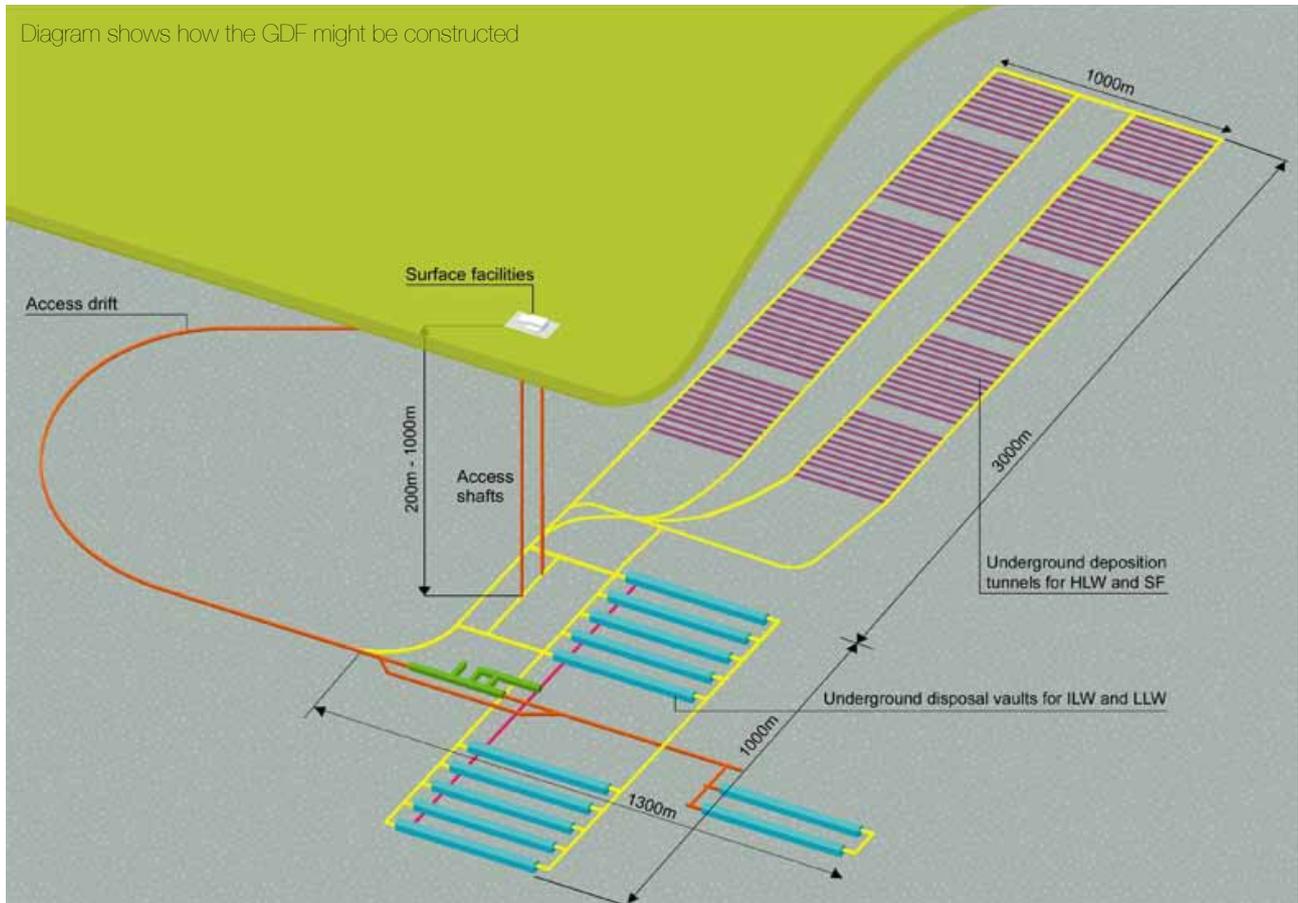
"The normal decontamination agents we'd use on steel and glass need time to dry and this slowed us down. The acids that had been used years ago also created problems. It meant we had to think carefully about the most effective way to wipe the plutonium from the steelwork before we could cut it up."

Members of the 15-strong clean-up team wear whole-body plastic suits with their own oxygen supply and often need 4 or 5 layers of gloves to protect them from radiation.

They are now using Cillit Bang to clean out the ancillary plant, such as ventilation ducts.

Long search for a more permanent solution

The Government has launched a search for the final home of our higher activity radioactive wastes. They are asking communities across the country to talk to them about potentially hosting what will be called the ‘Geological Disposal Facility’.



This is the start of a long process, anticipated to take several decades. Around 70% of the radioactive waste is already stored at Sellafield in West Cumbria. The three Councils from Allerdale, Copeland and Cumbria County have therefore started the early stages of this conversation with Government.

The Councils are keen to have their discussions informed by a wide range of community interests, so they have set up a Partnership to advise them: the West Cumbria Managing Radioactive Waste Safely Partnership.

The Partnership is an advisory body aiming to ‘make recommendations to the Councils on whether they should participate or not in the geological disposal facility siting process, without commitment to eventually host a facility’.

Effectively the Partnership is considering whether West Cumbria should proceed

to the next stage with Government, during which a range of geological and engineering research would be carried out to see if West Cumbria is suitable.

As well as organising communications to all households in West Cumbria, the Partnership holds its meetings in public, and will be organising additional open meetings. Find out more at www.westcumbriamrws.org.uk

Elizabeth Atherton, Head of Stakeholder & Community Engagement at NDA’s Radioactive Waste Management Directorate, said: “Together with Government we act as an observing member of the West Cumbria MRWS Partnership. We attend the partnership meetings to provide information and support. This includes ensuring that questions and concerns about the geological disposal facility siting process, construction, operation, closure and post-closure are addressed

and resolved as far as reasonably practicable.”

Elizabeth said both Government and NDA would welcome the opportunity to talk to any groups who are interested in the Managing Radioactive Waste Safety process.

By Rhuari Bennett of 3KQ

Working towards the best solutions

The NDA's work on decommissioning and environmental restoration inevitably generates waste, but until 2007, the Government Radioactive Waste Policy did not fully address large volume waste arisings.

As a result, the Government and devolved administrations consulted on and published a revised policy for Solid Low Level Waste (LLW) in 2007.

One of the policy requirements was to give the NDA responsibility for producing a UK Nuclear Industry LLW strategy – the first of its kind. The NDA produced the draft strategy in June this year, which went out for consultation in summer.

At present, most of the UK's solid low level radioactive waste from the nuclear industry is disposed of at the national Low Level Waste Repository (LLWR) near Drigg, Cumbria.

The continued availability of a disposal route for LLW is considered vital by both the nuclear industry and non-nuclear industry LLW producers. The Repository has been in use since 1959 and the existing vaults are now close to capacity.

More space is being constructed right now and there are plans for expansion. But even with all this extra capacity (potentially to extend the site to 700,000 cubic metres subject to planning and regulatory approvals), there will still be a significant shortfall compared with the amount of waste forecast to be generated over the long term (3,000,000 cubic metres over 120 years).

This means that the remaining capacity must be carefully managed. Waste generation must be minimised overall and unavoidable waste dealt with in the most appropriate manner.

The strategy looks at ways of reducing the amount of waste generated and needing disposal through the principles (known as the waste hierarchy) of prevention, reduction, reuse, recycling and waste treatment. This will preserve this important national asset and reduce or defer the need for an additional national facility in the future.

The proposed strategy comprises three strategic themes:

- application of the waste management hierarchy to avoid and minimise waste generation, and ensure waste is managed in a risk-based, fit-for-purpose manner



Handover of a new concrete slab that will be used to store containers

- best use of existing assets which will help to extend the life of the LLWR
- new fit-for-purpose waste management routes

The NDA is looking to the waste management supply chain to take a role in implementing the strategy. Given its maturity and expert capabilities, it is in a position to take up this role as the majority of waste management solutions that are required to implement this strategy are or will be available. Close working between the supply chain and the nuclear estate will ensure a successful strategy.

The best use of existing assets focuses on the role of the UK LLW Repository, setting approaches to ensure the optimised use of the facility for those wastes where disposal cannot be avoided.

In practice, this will mean ensuring that the repository is only used for waste that requires the level of safety, security and environmental protection offered by vaulted disposal at LLWR - for example making sure that the site capacity is not used for Very Low Level Waste (VLLW). There are also opportunities to improve the packaging of LLW for disposal and also how waste is transported to and from sites.

A key action in the strategy includes widening the service provision at the LLWR to include waste treatment as well as disposal.

The services will be provided through the supply chain, however, using the LLWR as a hub has the potential for generating efficiencies of scale and as an expansion of an existing route should prove easier for waste managers to start using as soon as they are available.

Consultation

The consultation on the draft strategy, which opened in June 2009, is continuing and gives members of the public a chance to comment on the proposals.

The responses received so far have already highlighted some key points for consideration regarding alternative waste treatment and disposal sites. These will now be reviewed in detail and used to further refine the strategy.

Michael Calloway, the NDA's Head of Low Level Waste, said: "The comments will help us to produce the best possible solution for effectively managing the UK's solid low level radioactive waste now and for the future."

Aerial view of the Repository



High in volume but low in radioactivity

Solid LLW has been produced by both the nuclear (power generation, decommissioning of nuclear sites and maintenance of the UK nuclear deterrent) and non-nuclear (universities, hospitals, pharmaceutical industry, etc) sectors since the 1920s. LLW is made up of a wide range of materials, including plastic, paper, tissue, clothing, wood, metal and building rubble.

It makes up approximately 90% of the total volume of the UK's radioactive waste – but contains less than 0.0003% of the radioactivity. Predicted volumes of LLW average at approximately 25,000 cubic metres per year. To put this into some context, 335 million tonnes of conventional (non-radioactive) waste are

generated in England and Wales each year. With a tonne of waste roughly the same as one cubic metre of waste, LLW is equivalent to just 0.0075% of conventional waste arisings.

The Government's 2007 policy included a revised approach for disposal options, allowing some material with lower levels of radioactivity to be sent to landfill. In the case of small volumes of very low level waste, this can be disposed of at ordinary landfill sites or incinerated. Such waste, likely to include material from hospitals or universities, contains little total radioactivity and can be safely treated alongside household, commercial and industrial waste.

Bulk volumes are more likely to be in the form of contaminated demolition waste and soil from the nuclear industry, along with other general wastes, and must

be sent to landfill sites with the relevant authorisations.

Other forms of low level waste can also be sent to special landfill sites subject to a detailed assessment of the radiological impact and authorisation from regulators.

All waste disposal sites must secure planning permission via local regulatory procedures which are subject to consultation with interested parties, including members of the public.

The policy sets out a new framework for more flexible management of solid low level radioactive waste taking account of the diverse physical, chemical and radiological nature of LLW and the increasing volumes arising from large-scale decommissioning and nuclear site restoration in the UK.

Greener future for nuclear industry

The Nuclear Decommissioning Authority (NDA) and the Environment Agency are encouraging senior executives through the nuclear industry to become ‘Environmental Leaders’.

The two organisations jointly hosted the Environmental Leadership conference in Manchester with the aim of sharing best practice for environmental issues throughout the nuclear industry.

A range of senior executives from the nuclear industry attended the conference, including representatives from SLCs throughout the NDA estate.

During the day, delegates considered the attributes of environmental leadership, and what a company needs to do to lead the environmental agenda.

They also looked at how to incorporate environmental best practice into business processes and sustainable design, as well as the NDA and Environment Agency expectations of the nuclear industry.

The NDA’s Environment Manager, Andrew Craze, said: “Decommissioning is about restoring and improving the environment, so it makes sense that environmental leadership is an essential part of the process.

“As an industry we need to make sure we are achieving the best possible result for the environment, as well as

minimising the impact we have on it as a result of our day-to-day operations.

“Sharing experiences across the industry is an excellent way to learn from one another – achieving better results in a shorter space of time.

“This event showed how we can all demonstrate our commitment to the environment through our actions, as well as how much can be achieved by leaders who have a clear vision for what their organisations can do to safeguard the environment and take bold action to make this a reality.”

Decommissioning is about environmental restoration



© Nuclear Decommissioning Authority 2009.
All images remain the copyright of NDA, some images supplied as courtesy of British Nuclear Group, United Kingdom Atomic Energy Authority and Magnox. Every effort is taken to ensure the accuracy of material or images produced or used by the NDA. However, the NDA cannot guarantee that the images shown will always be current, accurate or complete and does not warrant or endorse the accuracy or completeness of the images.