

NDA

Nuclear
Decommissioning
Authority

ISSUE 17 2015

INSIGHT

into nuclear decommissioning



Delivering progress across the UK

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Front cover: Sizewell A's control room has now closed after being operational for more than 50 years

If you have any comments, please contact the editor Deborah Ward on 01925 832280 or deborah.ward@nda.gov.uk

Business Plan now published

Consultation has now closed on our Draft Business Plan 2015-2018, which sets out key objectives and plans for the next three years.

Following an analysis of the responses, a final version will be published at the end of March 2015. The NDA's total planned expenditure for 2015/16 is £3.31 billion, of which £1.22 billion will be funded by income from commercial operations. Planned expenditure on site programmes will be £2.91 billion, while non-site expenditure is expected to be £0.19 billion.

Non-site expenditure includes R&D, skills development, socio-economic support to communities, insurance and pension costs, fees to SLCs, implementing geological disposal and NDA operating costs.

NDA Chief Executive John Clarke said: "This year sees the 10th anniversary of the NDA. During the past decade we have completed the restructuring of the UK civil decommissioning programme and introduced a decommissioning mindset to much of our estate.

"The challenge for the next decade is to build upon this and deliver a number of our sites into their interim end states having completed bulk decommissioning, along with the removal of the majority of the nuclear waste."

He added that the year ahead would be dominated by work to develop the NDA's third strategy, which is due for public consultation in autumn, followed by publication in March 2016. The NDA is required to update its strategy every five years. The review of current strategy will take place alongside preparation for what is expected to be a very challenging Spending Review in 2015.

- *The NDA has also published an explanation of the Nuclear Provision, which is the best estimate of costs for cleaning up NDA sites across a programme stretching more than 100 years into the future: www.gov.uk*

Public Accounts Committee focus on Sellafield progress

NDA chief executive John Clarke is due to appear before the Public Accounts Committee on 11th March as a follow-up session to the hearings held in Autumn 2013.

The Committee has also invited Stephen Lovegrove, DECC's Permanent Secretary, Tony Price, Sellafield Ltd Chairman, Paul Foster, Sellafield Ltd Managing Director and Tom Bishop, NMP chairman to give evidence to its hearing. The session has been billed as an opportunity to "examine progress made at the site in the last year and expectations for the simplified management arrangements."

The National Audit Office produced a report to inform the Committee which points to improved performance at Sellafield in the last 12 months. The report also sets out performance against 14 of Sellafield's major projects and explains the process the NDA went through in order to reach its decision to change the management arrangements at Sellafield (www.nda.gov.uk).

Speaking before the hearing, John Clarke said: "The NDA has continued to report openly about the challenges faced in tackling the historic legacy at Europe's most complex and hazardous nuclear site. I will be re-iterating to the Committee that the primary reason for increases in costs and schedule is because we now have a better understanding of the technical approach necessary to tackle these unique facilities that date back to the 1940s and 50s."

"I also hope to have the opportunity to explain that we have been through a very thorough process to underpin the decision we have made to change the model at Sellafield, and why we are confident that the new arrangements will help us to deliver further progress and value for money."



Sellafield complexities and uncertainties require new model

In January, the Government approved the NDA's decision to change the management model at Sellafield, following a detailed review.

The changes will see the Site Licence Company (SLC) Sellafield Ltd continue to operate but under the ownership of the NDA rather than under the temporary ownership of a private sector Parent Body Organisation (PBO).

Sellafield Ltd will acquire a 'Strategic Partner' to assist in the delivery of the decommissioning programme. In simple terms, the private sector becomes a supplier to Sellafield Ltd rather than a parent of it.

The decision reflects the NDA's judgement that Sellafield's complexity and technical uncertainties – which are far greater than on any of the NDA's other sites – mean that it is less well suited to the full site-wide transfer of responsibility to the private sector via a PBO structure.

The NDA, Sellafield Ltd and NMP are currently engaged in a 15-month transition programme, during which time the overriding priority is maintaining safety, security and delivery performance on the site.

The objective of the programme is to implement a successful transition and establish appropriate governance arrangements between NDA and Sellafield Ltd. This will ultimately modernise the organisation and develop the enduring capabilities required to deliver the Sellafield mission.

Over the course of the 15-month programme, activities will include: the termination of the current PBO contract, the establishment of governance arrangements for Sellafield Ltd as an NDA

subsidiary, revision of arrangements for the management of the supplier/customer interface and an overhaul of the socio-economic programme.

NDA's Sellafield Programme Director Pete Lutwyche said: "We have 13 separate workstreams under way to secure the transition and I am pleased with the progress being made, and with the engagement from current PBO Nuclear Management Partners on the programme."

*Photograph:
Above, Sellafield is the NDA's most
complex site*

spotlight on Sellafield



Radioactivity reduction is a team effort

A project to take radioactive liquid out of one of Sellafield's most hazardous facilities has made important progress.

Completion of the liquor transfer from part of the Magnox Swarf Storage Silo is a step towards emptying the silos, processing the waste and safely decommissioning this legacy plant.

The next stage will be to remove the solid waste from the facility, process it and encapsulate it for long-term storage.

The feat was achieved by workers in MSSS as part of routine operations, which saw 10,000 terabequerels of radioactivity removed, meaning about half of the mobile radioactivity inventory in this area of the building has now been removed.

During the process, liquor is removed from the silo and transferred through a high-level shielded pipe-bridge to a

modern treatment plant on the site, where radioactivity is removed via a filtration and ion exchange process.

After each transfer of liquid, the silo is 'topped up' with clean water. Overall, two million litres of liquid effluent has been removed.

MSSS was a key support facility for the UK's Magnox programme during its operational life. Since its closure, the focus has been on how to decommission it.

Lee Peck, the NDA's programme manager for the MSSS programme, said: "In less than five years, two million litres of liquid effluent has been removed from MSSS which is a fantastic achievement.

"It has been a great team effort which has both reduced the hazard at MSSS and made the job of emptying the silo safer and more straightforward."

Chris Halliwell, Sellafield Ltd's Head of MSSS said: "The silo was not built with decommissioning in mind so safely removing the liquid and solid nuclear wastes requires some ingenious engineering."

*Photograph:
Above, the Magnox Swarf Storage Silos
at Sellafield*

Fact file

- The Magnox Swarf Storage Silo (MSSS) is one Sellafield's highest hazard facilities, along with three others known collectively as the Legacy Ponds and Silos. Clean-up and decommissioning of the MSSS is a priority for the NDA.
- Built in the 1960s, the original six silos were used to store irradiated metallic cladding removed from Magnox fuel before reprocessing.
- Following several extensions, by the 1980s, waste was stored under water in 22 individual compartments and included a range of other Intermediate Level Waste (ILW).
- Although MSSS closed in 1991, the last waste was emptied into the silos in 2000.
- Work to plan, design and construct the facilities needed for decommissioning the MSSS, which is located in a highly congested part of the site, has been under way for many years. Three separate pieces of work are now achieving major progress.

Plants to scoop out waste

The NDA Board recently visited Wolverhampton to see one of the 350-tonne Silo Emptying Plants (SEPs) in action as it enters the final stages of testing.

The machine, along with two others, will eventually be used to scoop out the MSSS contents – arguably the most challenging decommissioning programme in the entire NDA estate.

All three are being built by engineering firm Ansaldo NES. Following construction, the machines are subjected to rigorous testing before being dismantled and sent to Sellafield where they will be reassembled and placed in-situ on the top of the silo.

SEP 2 is the furthest ahead in the process and the NDA board saw it in action on the visit to NES's HQ in the West Midlands. Testing of SEP 2 is nearing completion, with installation due to take place later this year.

Pete Lutwyche, the NDA's Sellafield Programme Director and a member of the NDA Board, was on the visit.

He said: "I've been involved in this project in two stints – at the NDA and in

my previous role at Sellafield Ltd - and to see it on the cusp of actually dismantling and delivering one of the SEP machines to site is a really tremendous achievement.

"I think everyone involved can be very proud of what they've done - it's a once-in-a-lifetime opportunity to do a unique piece of engineering for a unique problem."

Chris Halliwell added: "There's been a big team working on this project for many years and I'm delighted for them that their achievements have been recognised by the NDA Board taking time to come and say thank you and see what they've achieved.

"There's a huge amount of pride amongst the team and I really am delighted for them."

Strengthening the silos

Work is complete on a 15 metre high tower which will help strengthen the MSSS building during its decommissioning.

The project was executed in two stages. Construction of the tower finished in 2013 and work to attach it to the 1960s building earlier this year.

Project manager Andy Bell explained: "This is a totally unique project which has had its challenges. The tower was built in a highly secure area, with severe space restrictions and radiation levels that required a mobile shield in place to protect the workforce.

"We've now completed the final part of the job to tie-in the 15 metre high tower with the building using 26 tonnes of steel. Literally breaking into the

side of the building was no mean feat and we encountered a few technical problems but these are all behind us now and I'm delighted with the professionalism shown by all members of the project team to get the job done."

Construction of the seismic restraint tower began in 2012 and started with the excavation of some 300-400 tonnes of earth and spoil. The tower was built out of 100 tonnes of reinforcing steel and 500 cubic metres of concrete, and weighs more than 1200 tonnes.

Sir Robert MacAlpine safely carried out both phases with almost 85,000 manhours of physical site work carried out without a single lost-time accident.



Photograph: Above, staff celebrate the completion of work

Site Licence Companies to merge

Magnox Ltd and RSRL are being merged into a single Site Licence Company (SLC) as part of the changes being introduced by the new Parent Body Organisation, the Cavendish Fluor Partnership (CFP).

The merger is expected to be complete later this Spring and will unite the 12 sites under a single leadership team, with a simplified structure and a range of shared management systems.

Meanwhile, work continues on the 'consolidation' phase of the new contract, which is expected to take around 12 months and meet a number of important requirements under the terms of the contract.

The proposals submitted by CFP were based on information collated early in 2013, reflecting the situation at Magnox/RSRL sites at the time but, as with any major programme of work, project and technological developments have since taken place. The consolidation phase of approximately 12 months enables CFP to understand these developments and revise its proposals appropriately, working closely with the SLCs and NDA to reach agreement.

NDA Chief Financial Officer David Batters said: "As part of the contract won by CFP, a period of consolidation and reconciliation was built into the process for the winning bidder to consider the financial bid they made in 2013 and to test that against the situation they actually inherited in September 2014. The new plan emerging from that process is not due to



be presented to the NDA until later this year, but we remain confident that the final plan agreed with CFP at that time will see substantial savings and represent excellent value for money to the taxpayer."

The consolidation process is a key principle of the contract and was fully anticipated to take account of major developments. For example, the decision to extend generation at Wylfa into 2015 brings additional operating costs as well as significant extra income for the NDA, while at Bradwell and Trawsfynydd the ambitious programmes to accelerate interim closure dates have encountered some delays but remain on course to reduce original forecasts by more than 10 years.

A further activity is the introduction of CFP's technical innovations and efficiencies, which include restructuring the organisation, and understanding the detail of how all changes can be implemented at each site.

Revisions to all site programmes will be incorporated before a final budget is agreed toward the end of this calendar year. An overall assessment of levels of change across the full 14-year contract period is still to be determined.

Photograph:

Above, an aerial shot of one of the Magnox sites, Wylfa

4th November is the date to remember

Following the resounding success of last year's event, the date for the 2015 NDA Estate Supply Chain Event has now been confirmed as Wednesday, 4 November.

The one-day event for businesses supplying the decommissioning sector, now believed to be the largest of its kind in Europe, will once again be held at EventCity in Manchester. As with previous years, entry to the event will be free of charge to both visitors and exhibitors.

Around 1,500 delegates from across the country attended the 2014 event, including existing supply chain businesses and those new to decommissioning.

Launched five years ago, the annual event is organised jointly by the NDA and its Site Licence Companies (SLCs) to promote greater visibility of contract opportunities for businesses interested in the UK's decommissioning market and to provide an informal networking forum, with particular focus on Small and Medium Enterprises (SMEs).

Last year, the event also featured the Government Department UK Trade and Investment (UKTI), who promote British



**Supply Chain
Charter for Nuclear
Decommissioning
Sites**

businesses to overseas markets, and the MOD's Defence Equipment and Support and Submarines Operating Centre.

The event will also include a presentation ceremony for the winners of the prestigious 2015 NDA Estate Supply Chain Awards.

For the latest updates please sign up to our e-bulletin via the NDA website homepage or follow us on twitter @ndagovuk.



Empty bunker marks beginning of the end

The first of Hunterston's five solid waste bunkers has been successfully emptied of more than 120 tonnes of hazardous material.

Retrieval of the highly radioactive graphite and metallic waste has posed a technical challenge for many years and the recent success is a major milestone for the site.

Hunterston's two reactors were, unusually, constructed in an elevated position at a height of more than 10 metres, which enabled access from underneath. Gravity assisted the removal of used fuel, while refuelling could be carried out without the need for lifting machinery above the active core.

Similarly, the fuel elements were also unique to the plant, incorporating a graphite sleeve which was stripped from the irradiated uranium during discharge from the reactors, along with associated metallic components.

This Intermediate Level Waste (ILW) was transported via underground tunnels into one of the five above-ground bunkers made of reinforced concrete.

The Solid Active Waste Bunker Recovery (SAWBR) project will recover all contents from the bunkers, and process it into a passively safe state for storage in the site's ILW Store.

Following removal of the 62 packages from Bunker 5, work will start on breaking through into the next bunker,

No 4, with a scheduled completion date for late in 2016. Emptying the solid waste from all bunkers is expected to fill more than 1,200 packages and take a further three to four years.

The NDA's Brian Burnett, Head of Programme Delivery for Magnox and RSRL, said: "This has been an extremely challenging programme with many technical problems to overcome. The journey to this achievement has been long and difficult, but is a major step in reducing hazards at the site."

Martin Grafton, Site Director, added: "This is a key milestone for the site and work is already under way to access Bunker 4 using remote equipment. The team have worked hard to improve productivity rates in the waste retrieval process and a number of lessons learned and successes achieved during the Bunker 5 clearance will now be applied to the recovery of waste from the four remaining bunkers."

Specially engineered stainless steel packages containing the waste have been transferred to the ILW store. Eventually, the contents will be encapsulated in grout and then returned to the store for the decades-long Care and Maintenance phase before the site is fully cleared.



*Photographs:
From the top, the breakthrough is made
into the bunker and its contents emptied.*



Pioneering centre to train future engineers

Decommissioned land adjacent to the Berkeley site is set to be transformed into a pioneering further education campus focused on science and engineering.

A range of historic nuclear facilities, some of which were once destined for demolition, will be refurbished and brought back to life as the centrepiece of the new development by South Gloucestershire and Stroud College.

The land forms part of the old Berkeley Centre research complex that once carried out work for the UK's entire nuclear industry. In 2006, following a comprehensive clean-up programme over many years, it became the first plot of land owned by the newly created NDA to secure de-licensing.

The 28-acre site was subsequently de-designated by the Government in 2010, enabling the site to be released for further use.

Its development as a science and technology park will mark successful completion of the full decommissioning cycle: a restored site given a new lease of life - and one that both reflects its industrial heritage and meets the aspirations of the local community for a technology-related sustainable future.

The NDA's Property Manager Tony Smithers said: "This is, essentially, a site restored and mission accomplished.

"We are delighted that the vision of stakeholders, as expressed during consultations about site end states some years ago, will be realised.

"The potential for using these redundant facilities for educational purposes was not always obvious, however, and we did once draw up plans to demolish the buildings.

"The college's plans are exciting and ambitious, supporting the UK's drive to excel in science and engineering, while also building on Berkeley's nuclear history. We look forward to seeing the first students welcomed onto the campus and enjoying their studies."

The NDA has agreed a long-term lease for half of the 28-acre site after marketing the land for business use from 2006. Other premises on the site are already occupied by a range of businesses.

Vocational courses for the first intake of post-16-year-olds are expected to start on site in 2016, when the major phase of refurbishment will be complete.

The plans will see the cavernous old engineering rig hall as a focal point of the campus, with some internal equipment, such as the overhead crane, brought back to life for practical student training. Solar panels will be installed on the façade while other facilities, including a suite of welding workshops, will also be given a facelift in order to be re-used.

For the college, the opportunity to train future engineers and technicians in a realistic workplace environment is a major benefit - recreating such facilities from scratch would have been prohibitively expensive.

The campus will provide a wide-ranging curriculum up to post-doctoral level, including construction, mechanical and electrical engineering. Many of the courses will be designed to meet the specific needs of employers in the region which will be a hub for the UK's nuclear renaissance as the construction of nearby Hinkley C gains momentum. A further focus will be on sustainable skills and renewable technologies.

The College has secured £12 million of Government funding for the first phase of the anticipated £40 million development. This includes funds for two specific projects: a small-scale renewable energy research centre, plus a facility for the delivery of cyber security education and training, both run in collaboration with the University of Gloucestershire.

At least £5 million is also being invested by the College, which is currently awaiting a decision on its application to develop a £14 million University Technical College specialising in training 14-19 year-olds in advanced manufacturing and cyber security skills. Much of the development work has been supported by Gloucestershire's Local Enterprise Partnership, Gfirst.

Photographs:

Top, an artist's impression of the converted engineering hall, shown, right, in its current condition during an event for local employers

Background

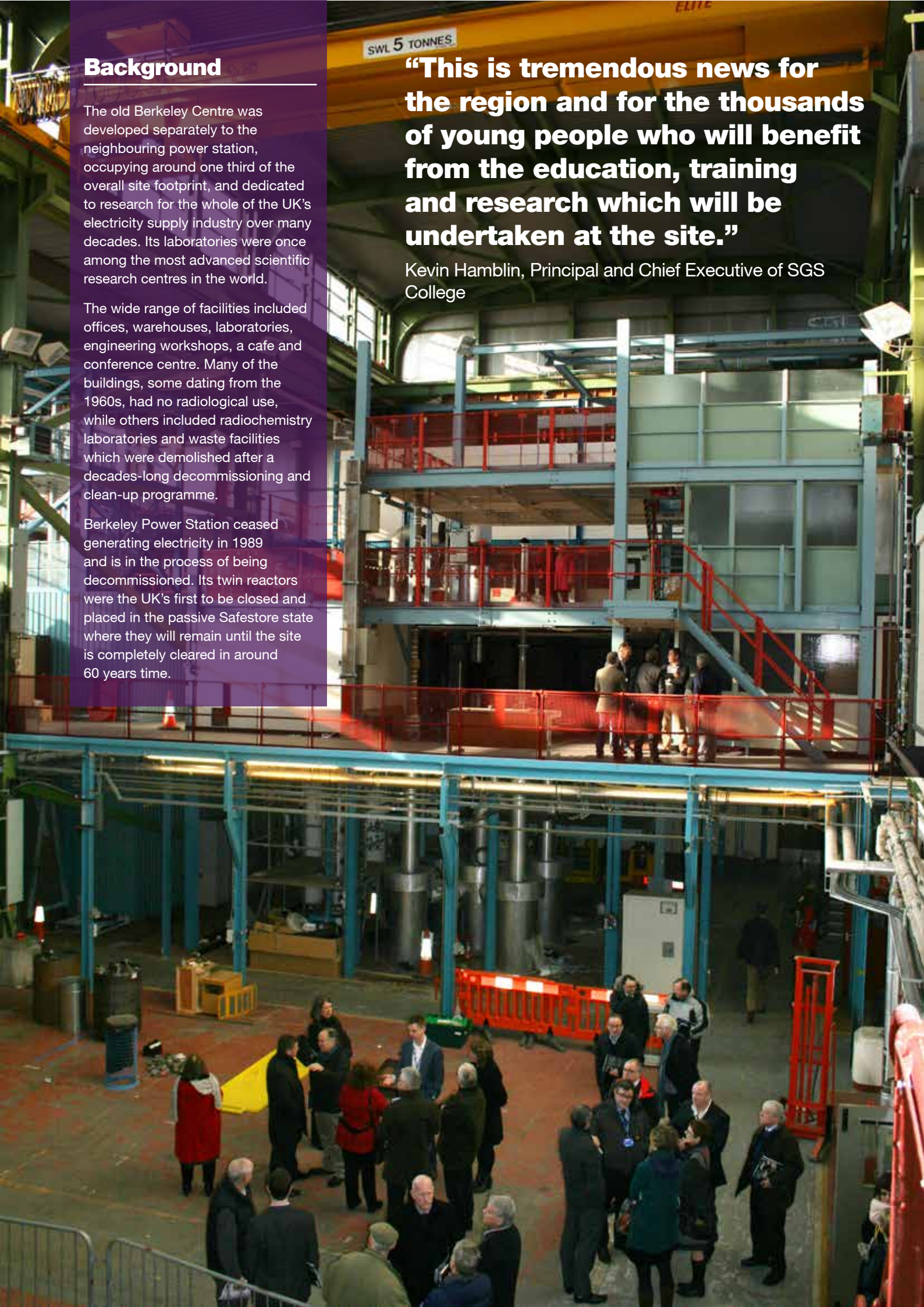
The old Berkeley Centre was developed separately to the neighbouring power station, occupying around one third of the overall site footprint, and dedicated to research for the whole of the UK's electricity supply industry over many decades. Its laboratories were once among the most advanced scientific research centres in the world.

The wide range of facilities included offices, warehouses, laboratories, engineering workshops, a cafe and conference centre. Many of the buildings, some dating from the 1960s, had no radiological use, while others included radiochemistry laboratories and waste facilities which were demolished after a decades-long decommissioning and clean-up programme.

Berkeley Power Station ceased generating electricity in 1989 and is in the process of being decommissioned. Its twin reactors were the UK's first to be closed and placed in the passive Safestore state where they will remain until the site is completely cleared in around 60 years time.

“This is tremendous news for the region and for the thousands of young people who will benefit from the education, training and research which will be undertaken at the site.”

Kevin Hamblin, Principal and Chief Executive of SGS College





Barry ponders life after the ponds

Barry Reynold's 41-year career has been centred around the fuel storage ponds at Harwell's historic DIDO and PLUTO reactors.

And when the decommissioned facilities finally closed, it seemed fitting for Barry to bid an emotional farewell and head off into retirement.

"My first job when I joined in 1974 as a 19-year-old industrial worker was on the maintenance and cleaning of the ponds, and the 'cropping' of the fuel elements," Barry remembers. "And my work has been associated with them in one way or another ever since."

Built in 1957, the two tank-like constructions together contained some 937 cubic metres of demineralised water, which provided shielding and cooling for the spent fuel elements that had been removed from reactors. The ponds became non-operational in 1990 when the reactors closed and the fuel was removed.

During the 1990s, the larger of the ponds was used by a commercial tenant to store cobalt and caesium sources,

for the medical field and for industrial sterilisation.

Decommissioning began in 2011 with the removal of equipment and 'furniture', resulting in metal packages of low level waste (LLW) which will eventually be smelted down and reused.

The draining of both ponds began in 2012 and was completed in March 2014, with the liquid waste discharged to a tank, before being dispatched to the site's Liquid Effluent Treatment Plant.

Barry worked shifts on the DIDO and PLUTO reactors for 10 years and then, in the mid-1980s, found himself back at of the ponds, now as building manager. After a spell at another Harwell reactor, GLEEP, he returned to the ponds and, in one of his last roles before retirement, was responsible for their clean-up, draining and re-categorisation.

"Looking back, I can truly say I have enjoyed every single moment of my time



at Harwell," Barry said. "I had many wonderful experiences, met some great people and for that reason, when I think about it, I can honestly say that Harwell has made me the person I am today. Thank you."

Photographs:

Top, DIDO and PLUTO were, for many years, the key focus for Barry, above

Less waste equals more space

‘Less’ has proved to be ‘more’ for the Low Level Waste Repository site in west Cumbria.



Just over 200 ISO-freight containers were sent to the Repository for disposal in 2013/14 – down from more than 300 the previous year.

It's a far cry from the days when 700 containers per annum were arriving on the site, near Drigg.

Achieved during a period of increased waste generation, the steep downward trajectory of disposals is a mark of success for LLW Repository Ltd, the Site Licence Company.

The site has transformed from a waste disposal facility just seven years ago, receiving waste at an unsustainable rate and causing a capacity shortage for the national nuclear industry, to a fully integrated waste management facility today.

“LLW Repository Ltd has changed dramatically the way low level waste is managed in the UK,” said Dennis Thompson, Managing Director.

“The business has almost doubled in size and the nuclear industry now has a full range of viable and cost-effective options to reduce and recycle its nuclear wastes.”

Customers are encouraged to apply the Waste Management Hierarchy – Avoid, Reduce, Reuse, Recycle or Treat – and dispose of the waste at the Repository as a last resort.

Waste diversion saved the nuclear estate more than £67 million in 2013/14.

LLW Repository's Waste Service Delivery team works directly with customers and suppliers to provide a suite of re-use and recycling services.

The company is now mid-way through its second five-year term of a 17-year contract, and its objectives focus on implementation of the National LLW Strategy.

This was developed by the NDA, in conjunction with LLW Repository Ltd, and approved by the UK Government in 2010.

The company's National Programme Office team works with all the players in the industry, including regulators, consignors, waste generators and the supply chain, to implement the UK Strategy.

And LLW Repository Ltd shows no sign of losing momentum.

It is looking to embed the use of the new waste treatment routes it pioneered in its first term.

Additional vaults are also planned and ambitious goals have been set to clean up the legacy Plutonium Contaminated Materials on site.

It also wants to move quickly toward long-term closure of the seven trenches on site, where historically low level waste was tumble-tipped, as well as the specially engineered Vault 8, which is close to capacity.

"I am proud of what the LLWR has accomplished in a relatively short period of time," Dennis said.

"Today it is a very different company, capable of much more than anyone could have imagined just five years ago. We are now busy transforming ourselves again; we must ensure that we are ready to run tomorrow's Repository."

Photograph:

Above, a container of waste arrives at the Port of Workington, to be taken by rail to the Repository

* The Department of Energy and Climate Change (DECC) recently launched its consultation on an update of the UK Strategy for the Management of Solid Low Level Waste from the Nuclear Industry. The consultation, which closes on 21 April, is intended to ensure that the strategy remains fit for purpose, reflecting changes in the industry. See the Government website www.gov.uk for details.

Control room finally switched off

The main control room at Sizewell A has fallen silent for the first time in more than half a century.

Home to an array of buttons, switches and dials controlling the former power station, the control room kept the site's heart beating 24 hours a day after generation began in 1966. Electricity production stopped in 2006.

Steve Pybus, who has worked in the facility for more than 20 years, said: "A significant period of my life, and that of my colleagues, has been spent operating the station from here. People often say it resembles something like the starship Enterprise, and coincidentally Star Trek was first broadcast in the same year that generation at Sizewell began. It is a sad

and historic moment to see it empty, but a lot of work has been undertaken to prepare for this moment."

Closure of the control room will eventually lead to the area being dismantled and is part of the programme to prepare for decommissioning, following regulatory agreement that the site is now fuel free.

Confirmation that the 52,000 fuel elements have left the site means that 99% of the radioactive hazard has been removed. The final flask was despatched to Sellafield last summer and was followed by a rigorous verification process to enable the confirmation of fuel-free status.

Site Director Tim Watkins added: "While this is the end of an era, it is very much a sign that decommissioning is starting to take shape. Magnox is leading the way at cleaning up this first generation of reactors in the UK and we will be applying all of the lessons we have learned at other sites to safely move Sizewell A to its closure point while delivering best value for the taxpayer."

Photograph: Below, Sizewell's control room has reached the end of its life





Watch as turbine hall tumbles

The gradual demolition of the turbine hall at Dungeness A is being broadcast live on the Magnox website.

Work to dismantle the 26-metre high structure began in January and, subject to weather conditions, is due to be complete at the end of March.

Site Director Paul Wilkinson said: "This is a very visible sign of our progress. Thousands of people have either worked in the turbine hall or lived alongside it in our local community over the years, so we wanted to give them the opportunity to witness the final part of the journey for this part of the site. I hope lots of people take the opportunity to see the work as it takes place."

The turbine hall housed four turbo-generators running at 1,500 revs per minute to turn steam into electricity for

40 years until the site ended generation in 2006.

This final demolition marks the culmination of a three-year programme of work, which was originally scheduled to take 12 years but was accelerated thanks to an additional £12.8 million of funding from the NDA. The additional funds were made available through estate-wide efficiency savings and re-prioritisation of other work.

David Batters, NDA Chief Finance Officer, added: "This is an excellent example of what the NDA was set up to deliver: accelerated decommissioning progress that alters the local skyline and saves money for the taxpayer. My thanks

and congratulations go to the Magnox team at Dungeness A for their hard work in making it happen."

The demolition is being captured by webcam, with an update to the image every few minutes. Watch at: www.magnoxsites.co.uk

Photograph:

Above, the turbine hall is taken to pieces

Contractor:
Erith



Simplicity of low-cost technology can inspire the smoothest finish

A multi-million pound suite of bespoke gloveboxes is being assembled in Bristol to support the transfer of historic nuclear material from Dounreay to Sellafield.

Part of the high-tech £10 million installation includes a household can opener, costing just £15, that is able to cut the lids off old fuel containers without leaving jagged edges.

The low-cost innovation is part of an approach at Dounreay that focuses on adapting existing off-the-shelf technology, where possible, as a more cost-effective alternative to designing a concept from scratch. Engineers from the site's project team found the solution at an ironmongers' in Thurso.

Nigel Lowe, NDA's Head of Programme at Dounreay, said: "Use of standard technology such as a simple can opener is a great example of applying innovative, creative thought processes to nuclear clean-up work, securing savings on the requirement to develop a purpose-built tool."

Following assembly and comprehensive testing at the premises of Redhall Engineering, near Bristol, the shielded gloveboxes will be transported north and re-assembled at Dounreay. They will be used to unpack, characterise, treat and repack unirradiated fuels currently

stored, in welded containers, at locations around the site.

The high-tech fuel facility will enable operators to manipulate the fuel through a series of processes while avoiding direct contact with it.

Unirradiated fuel forms part of the legacy from early research at Dounreay into more efficient ways of generating electricity from fast breeder reactors. Much of the material has been in storage for more than 30 years, since the Government halted the fast breeder programme.



The contract for the gloveboxes, designed by AECOM, also brings together suppliers from across the UK with the engineering skills to meet the exacting standards of the nuclear industry.

Commissioning of the gloveboxes is expected to take six months and, subject to regulatory agreement from the Office for Nuclear Regulation, operations are expected to last for three years.

Nigel added: "The site is being dismantled and is heading towards closure over the coming decades, and

the Dounreay workforce is skilled in managing extremely complex projects: the Unirradiated Fuels Characterisation Facility is testament to this."

The nuclear material began to leave the site in 2012 following the Government decision to consolidate the fuel inventory at Sellafield.

Contractors:

AECOM, Redhall Engineering, JGC Engineering, Gows Lybster, John Gunn & Sons, MM Miller, Nuvia, Jacobs and Arch Henderson & Partners.

Photographs:

At a tour of the Bristol premises, Dounreay apprentice Caitlin Harvey shows the can opener to Site Stakeholder Group Chair David Flear and Richard Westlake, from the Department of Energy and Climate Change. Far left, the gloveboxes will be dismantled and re-assembled at Dounreay.

"NDA's programme to consolidate the historic nuclear material is an important one and we are pleased to see innovative and low-cost approaches being used."

Richard Westlake, Director, Nuclear Resilience and Assurance, Department of Energy and Climate Change



Final shipment completes historic contract

The final shipment of foreign waste from Dounreay to Belgium marks the completion of a historic fuel contract.

The 1990s contract between the UK Atomic Energy Authority, Dounreay's former operator, and SCK/CEN of Belgium in the 1990s committed the Scottish site to reprocessing spent test reactor fuel from abroad, following the closure of the fast reactor research programme.

The operators of Belgium's BR2, which carries out materials research and produces isotopes for nuclear medicine, sent a total of 240 spent fuel elements to Dounreay.

The fuel was dissolved, with re-usable uranium separated from the waste "fission products" and turned into new fuel. The higher activity liquid waste was conditioned and solidified in cement inside 500-litre stainless steel drums at the Dounreay Cementation Plant (DCP) in 2009.

Part of the Dounreay site closure programme involves closing the historic contracts and returning the waste to customers, where feasible, under the terms of the reprocessing contracts.

Preparations to return the waste started in 1995, requiring significant work from 2008 until the first shipment in August 2012.

The Dounreay team of fuel and waste specialists, radioactive materials transport officers, engineers and the DCP management worked hand in hand with SCK-CEN, the Belgian Authorities and transport company Transnubel to establish the arrangements and authorisations, and demonstrate compliance with the stringent Belgian conditions of acceptance for the waste.

For each of the 21 shipments, the drums were retrieved from the shielded DCP

waste stores and inspected remotely by the Belgian authorities in the Import Export Facility (IEF).

Two shielded flasks were purchased by SCK-CEN, designed specifically for the task, while DCP engineers ensured the flask loading/export process was able to automatically position the drums in the flasks with pin-point accuracy.

Specialist drivers were sub-contracted by the Belgians to transport the flasks to the ship.

The 21st shipment in December completed the repatriation of the 123 drums of waste.

Photograph:

Above, Dounreay staff celebrate the final shipment from site