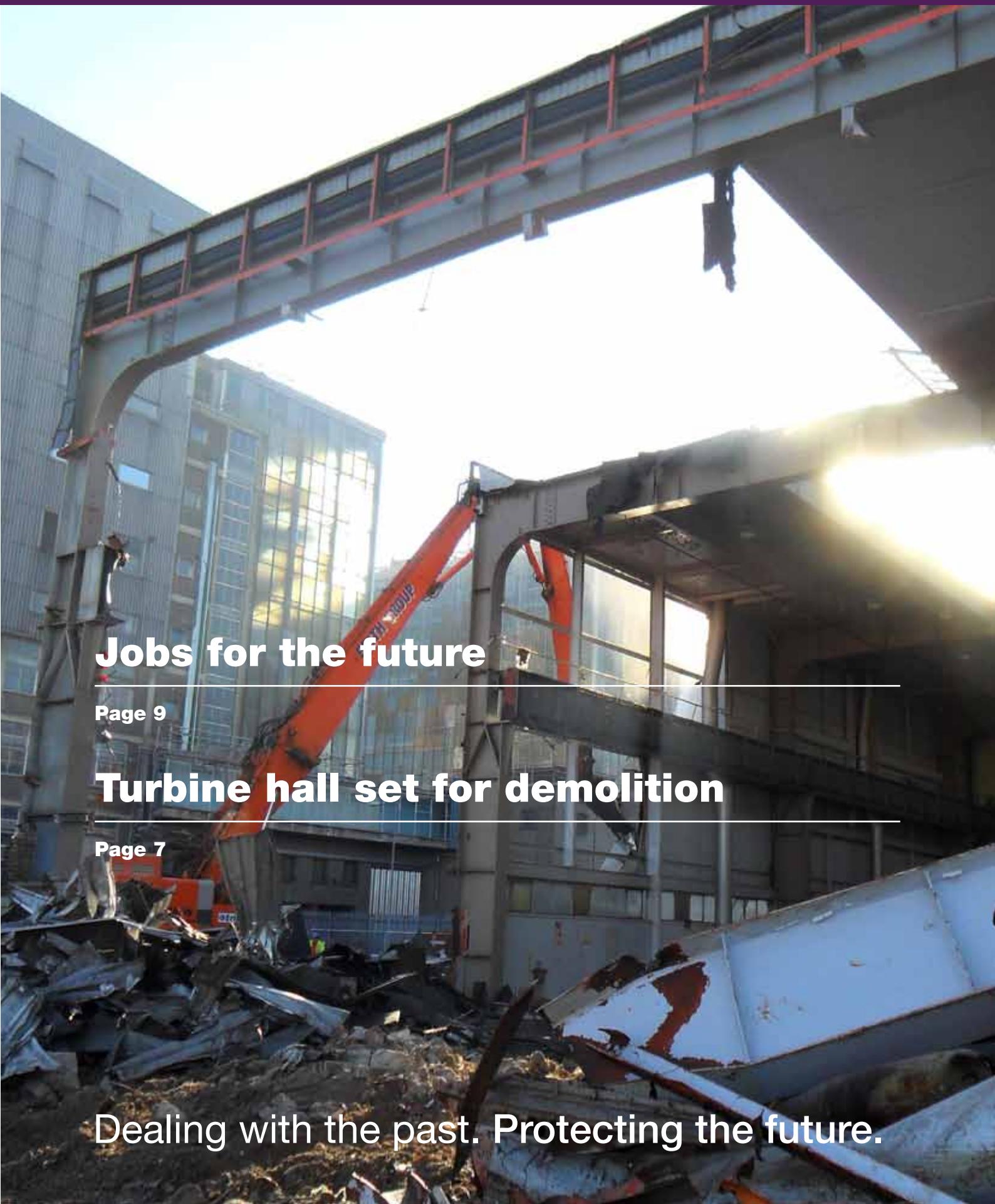


ISSUE 6 2011

# INSIGHT

into nuclear decommissioning

NDA  
Nuclear  
Decommissioning  
Authority



## Jobs for the future

Page 9

## Turbine hall set for demolition

Page 7

Dealing with the past. Protecting the future.

## Contents

- 3 Fukushima communications challenge
- 4-5 Support for workforces
- 6-7 Accelerated sites update
- 8 Waste firms join ILW programme
- 9 Jobs for the future
- 10 New waste route opens up
- 11 Machine sucks up sludge
- 12 Land restored
- 13 Enabling investment
- 14-15 New options for LLW
- 16 Norwegian dialogue
- 17 Harbour expands
- 18 Vault excavations
- 19 Tanks create atmosphere
- 20 Research forum meets

# Equipment sent to assist Japanese recovery effort

The NDA, along with many other organisations and countries, has sent specialist equipment to Japan after a request for assistance was made through the UK's Department of Energy and Climate Change.

Sellafield Ltd were asked to take the lead in co-ordinating with the rest of the NDA's sites to collect spare radiological measuring and protection equipment that would contribute to Japanese efforts to manage the situation at the damaged Fukushima plant.

Staff from Dounreay drove through the night with a van full of equipment such as respirators, hand-held radiation survey equipment, personal dosimeters, dust masks and protective suits to the collection point in Cumbria. Together with stock from other sites, it was

packaged up as air freight and sent to Japan.

Chief Executive Tony Fountain said: "I would like to thank and congratulate those at Sellafield, Dounreay, Magnox and INS who worked tirelessly to harness their resources and provide assistance to our colleagues in the Japanese nuclear industry at this very challenging time."

The Japanese embassy had made the request to DECC for a range of specialist equipment.



Damage to the Fukushima plant, above, led to the evacuation of residents and the monitoring of radiation levels, below



Welcome to the May 2011 edition of Insight magazine, the NDA's round-up of activities across the estate.

If you would like to receive copies on a regular basis, do send in a request. In the meantime, we would be interested in hearing your views and any suggestions for improving the format.

Comments to the editor Deborah Ward on 01925 802343 or  
**deborah.ward@nda.gov.uk**

Front cover: Demolition work being carried out at Bradwell

John McNamara, Head of Media and PR at the Nuclear Industry Association (NIA), looks at the communications challenges in the wake of the Fukushima tragedy. The NIA is the trade association and representative voice of Britain's civil nuclear industry.

## Facing up to the Fukushima challenge

Now three months on from the worst nuclear accident since Chernobyl, the global nuclear industry is still coming to terms with perhaps its most challenging of communications issues. In fact, although the headlines have long since faded, it's hard to think of a more severe test for the industry's communicators.

The world will remember Fukushima against the backdrop of sheer destruction and sorrow that the worst-ever recorded earthquake and tsunami wreaked on the people of Japan.

They will remember TV replays of nuclear power station explosions and the thousands of people forced to leave their homes and possessions.

They will wonder about the future of nuclear in their own countries and whether the recent renaissance is already doomed.

Nuclear has always been a "tough one" for communicators – but as we have seen in recent years, the public's opinion has improved, and pre-Fukushima there was a strengthening political consensus behind the industry.

The NIA's role as the nuclear industry's trade association has been threefold. Firstly we have taken the lead in keeping member companies and associates informed of the day-to-day implications.

We have also taken the lead in dealing with media enquiries or helping to find the right person to speak to the media. And thirdly, we have taken a lead in dealing with the public's views of nuclear post-Fukushima.

Working closely with the World Nuclear Association, with whom we share our office in London, and the IAEA, we have also relied heavily on daily reports from Tepco, who own the Fukushima plant and just happen to be NIA members. So it has been

easy to keep the flow of real-time information moving.

But where does the industry go now that the situation has stabilised?

The recent report by our Chief Nuclear Inspector Mike Weightman has brought reassurance that the UK's response will be measured. Although Dr Weightman notes that an earthquake of such massive proportions is far beyond anything the UK is ever likely to experience, he recognises that the industry must respond – indeed that it is already responding – and that lessons learned will be applied rigorously.

His initial findings are positive in terms of new nuclear build in the UK, the professional management and safety of our current installations and in the clear and simple message they send to a concerned general public: Nuclear is safe. We look forward to publication of the full report.

On a wider communications level with the media, politicians and general public, we will need to find out where we stand. The NIA will be undertaking some "mid-term" public opinion polling to find out how, if at all, Fukushima has changed people's perception of nuclear.

Other polls suggest that the public still support nuclear at the heart of a future low-carbon economy, confirming that Fukushima has so far not fundamentally changed views.

We also need to start re-engaging with people. Politicians will need to reassure themselves that their previous support for nuclear is well-placed. So we plan to fully engage



**John McNamara**

through this September's party conference season. We will also engage with the media, use speaking opportunities, the website and other social media outlets to help reinforce our key messaging that nuclear should be at the heart of our low-carbon economy going forward.

# Support for communities facing job losses

The NDA is investing millions of pounds to support the retraining of site workforces in regions that are particularly vulnerable to the impact of future closures.

Working in partnership with other local authority, business and training organisations, a range of initiatives are being implemented to assist staff seeking to acquire new skills, alternative career opportunities or setting up businesses.

Priority support is being targeted at regions where NDA sites dominate the local economy and there are few obvious alternatives for the displaced workers who will be affected in the years ahead. The funding is tailored to reflect the characteristics and needs of each region.

In Caithness, a £2.2 million programme has just been agreed to assist Dounreay staff and supply chain businesses in adjusting to the site's eventual closure. The NDA has

contributed a sum of £808,875 while Dounreay Site Restoration Ltd will provide £100,000 per year over the three-year programme.

An estimated 2,000 jobs will disappear over the coming years both from the site itself and associated businesses as clean-up and demolition of the former research site nears completion.

Caithness Chamber of Commerce is leading the *Make the Right Connections* initiative to harness workforce expertise in the area, initially carrying out an audit of existing skills and business capabilities and then matching these with opportunities in new industry through retraining, business growth and marketing.

Cleaning up the Dounreay site accounts for more than 10% of the current GDP of the North Highlands, while many more businesses benefit indirectly from consumer spending.

Dounreay has reduced its workforce by approximately 300 in the last five years, to the current level of 900, and will continue to shrink as more of the site is cleaned up and demolished.

At Chapelcross in the Borders, meanwhile, the 300-strong workforce is set to drop by 80% over the next six years as the site approaches a phase of less intensive on-site activity before final site clearance.

The *Beyond Chapelcross* initiative, supported by £1.2 million from the NDA, is designed to strengthen and diversify the local business base

## Clean-up bodies in jobs pledge

Representatives of the Caithness nuclear industry have signed a “socio-economics partnering charter” to improve employment prospects for workers whose jobs currently depend on Dounreay.

The NDA, contractor Babcock and the Site Licence Company Dounreay Site Restoration Ltd will work together to contribute to regeneration of the North Highlands as the nuclear site is decommissioned and jobs disappear.

The NDA spends about £150 million a year on work to clean up and close down Dounreay. About £80 million of this goes into the local economy in salaries, contracts and purchases.

“The work being carried out in this area is groundbreaking for the NDA,” said NDA Chief Executive Tony Fountain. “This approach, which will be a contractual requirement in the new PBO contract, ensures we make best use of our combined resources to focus on delivering socio-economic initiatives quickly and effectively.”



Tony is pictured signing the charter, along with (from the left) Babcock Non-Executive Director Martin Austick, Ken Nicol, DSRL Socio Economic Manager, NDA

Socio-Economic and Stakeholder Relations Manager Anna MacConnell and DSRL Managing Director Simon Middlemas.

and help members of the workforce to find alternative employment in the region. It will be delivered by Magnox Ltd, in partnership with Dumfries and Galloway Council.

The initiative complements the existing Chapelcross Industry Park project – to which the NDA has committed £2.5 million – which will provide much-needed space for business start-ups.

NDA funding will add significant value to existing schemes, including the Prince's Scottish Youth Trust Board (PSYBT) and Financial Assistance to Small Businesses (FSAB), and unlock the delivery of more than £1 million worth of local regeneration projects for the towns of Gretna, Annan and Lockerbie.

The scheme has the full support of local stakeholders, including MP David Mundell, who chairs the Corridor Regeneration Strategy (CoReS) Steering Group, and Scottish Enterprise.

And in North Wales, the £4 million *Shaping the Future* initiative is already under way, helping many of the 1,200 staff of Trawsfynydd and Wylfa to prepare for life once the sites begin to wind down activities. Both sites are significant contributors to the regional economy of North West Wales.

With a £1.2 million NDA contribution and backed by the European Social Fund through the Welsh Assembly Government, the scheme will be delivered by project delivery organisation Menter Môn.

The aim is to harness skills mixes from both workforces and the local supply chain in order to retain experience, boost employment and generate new enterprise in the region.

*Shaping the Future* will offer one-to-one mentoring and the development of individual action plans to address skills gaps and regional need.

In addition, it will offer a programme to retrain and re-skill the workforce as well as help individuals into jobs or to start up their own ventures.



Retraining will assist the workforce in finding new careers

## Nuclear partners agree on staff transfers

An agreement has been signed to enable staff transfers between the Magnox sites and EDF Energy, which operates the UK's existing fleet of nuclear power stations and is developing plans for the next generation.

A key part of the Magnox mission is to reduce staff numbers as decommissioning sites progress to the Care and Maintenance phase when the spent fuel is removed and the reactors are sealed up.

The agreement between Magnox Ltd and EDF Energy will formalise the options available for some Magnox staff who wish to transfer to nearby generating stations owned by EDF Energy. Careful management of staff releases will enable Magnox to retain essential skills for as long as they are needed while still providing career opportunities for its employees.

Neil Baldwin, Managing Director of Magnox Ltd, said: "The managed transfer of staff is a key part of our plans as we move through the transition from generation into decommissioning and through to Care and Maintenance."

"While it is clear that the future of Magnox - beyond the next five years – is all about decommissioning, this type of agreement provides options for our employees who see their

future in nuclear power and electricity generation."

Dr Andy Spurr, Managing Director of EDF Energy's existing nuclear business, said: "The agreement recognises our mutual interests in maintaining the pool of suitably qualified and experienced people within the UK nuclear businesses and will enable us to recruit high-calibre employees to meet skill requirements of both organisations and, importantly, retain key skills and experience within the nuclear industry."

"EDF Energy's plans for new nuclear will create thousands of jobs over the next few years. We also need to continue to run our existing fleet of nuclear power stations around the UK."

"We are doing a lot with schools and colleges to encourage young people to study STEM subjects and join the industry as apprentices and graduate trainees. But the addition of staff who are already experienced in the nuclear industry is an opportunity not to be missed."

# Dealing with waste at Trawsfynydd

At Trawsfynydd, there are seven key projects to achieving the 'Accelerated Plan', and all are so far, on or ahead of schedule.

As Site Director Dave Wilson says: "It's a real challenge to progress work towards Care and Maintenance at the Trawsfynydd site on an accelerated timescale. A huge amount of decommissioning work has already been undertaken and we remain committed to working safely and efficiently towards this important milestone for the NDA and the UK taxpayer."

Some of the achievements to date include the transfer, ahead of schedule, of 53 packages to the Intermediate Level Waste (ILW) store, the only such operational store in the Magnox fleet. It is estimated that there are around 288 packages to be loaded in total.

In terms of waste, the site team is investigating innovative methods

of destroying radioactive waste oil and the potential recycling of ILW Fuel Element Debris. Most wet waste has already been retrieved and encapsulated, however, the remaining material requires remotely controlled retrieval, and the focus is on developing the right equipment to complete this.

Major work is also under way on the reactor buildings, where internal capping roofs are being completed to enable the building height to be reduced, structural repairs are ongoing while asbestos and plant are being removed.

Other vital work includes the ongoing ponds project, where scabbling of the contaminated concrete surface is under way and will lead to eventual demolition of the complex. The ponds team also designed an award-winning, innovative piece of equipment for lifting plant out of the pond lanes – collecting Idea of the Year in the Health and Safety Category at Ideas UK.



Work is being completed on the internal capping roofs



A waste package is transferred into the ILW store

Two Magnox sites are pushing ahead with work to accelerate decommissioning and reach the ‘Care and Maintenance’ milestone years ahead of schedule.

Trawsfynydd and Bradwell are clearing hazards, removing redundant plant in preparation for demolition and testing innovative practices in order to set a benchmark for the remaining Magnox sites.

‘Care and Maintenance’ (C&M) marks the phase when all major decommissioning work is complete, leaving only a waste store and the sealed reactors which will be monitored until final dismantling starts in around 60 years time, when the deep Geological Disposal Facility (GDF) is expected to be operational. Trawsfynydd is due to enter C&M in 2016, five years earlier than originally planned, while Bradwell will save 12 years by reaching C&M in 2015. The timeframe for both sites is challenging – but achievable – and the workforces are seizing the opportunity to lead the way for the rest of the fleet.

## Bringing the hall down at Bradwell



Pond clean-out is a priority, and significant progress has been achieved

### Preparations for demolition of the turbine hall are forging ahead at Bradwell.

The project team has been busy stripping metal, removing asbestos, knocking down ancillary buildings and ensuring all projects are on track to deliver the tight milestones.

The latest success is the demolition of the auxiliary turbine hall, following on from the completion of other key facilities including the main control room, water treatment plant and the battery room.

Graham Cotton, Project Manager, said: “The project has been

through, and will go through, some testing times due to the nature of the works to be undertaken.

“However, with determination, drive and expertise, both our contractor and staff working together as one team have the ability to deliver the

objectives of this project safely and successfully.”

On the reactors, work is under way to remove redundant pipework, while the ponds project is steaming ahead with the use of new equipment to remove furniture and sludge.

### As for what's left ....

A few interesting facts about the waste:

- More than 200 shipments of waste taken from the site.
- 2,429 tonnes of mixed metal recycled.
- 62 tonnes of waste, comprising spoil and rubble, disposed of.
- 31 tonnes of asbestos removed since deplant and demolition started in the construction, design and maintenance area of the turbine hall.

# Waste firms join ILW programme

Six specialist firms have signed up to support the Magnox Intermediate Level Waste (ILW) programme.

Framework contracts worth more than £350 million have been awarded to retrieve waste from vaults at eight sites, process it and fill Gesellschaft für Nuklear-Service (GNS) Yellow Boxes for interim storage and potentially final disposal.

Babcock International, Nuvia, EnergySolutions, NSG Environmental, Spencer Atkins and TSIF ILW are the companies selected following a competition process. Steve Templar, ILW Programme Director, said: "We've searched the market for existing solutions to reduce expensive development costs and deliver increased value."

The contracts were finalised as the first ILW was retrieved from



A container is unloaded prior to being filled

the Berkeley vaults since the start of decommissioning, meeting a target set by the NDA. Fuel Element Debris (FED) was retrieved from vault two using a remotely controlled manipulator. Each grab load of FED was loaded into a box liner that was suspended in the vaults and filled in five stages. After each stage, the liner and contents were withdrawn for radiological assessment to confirm dose rate limits were as expected. Once full, the liner was lowered into the GNS container and the lid bolted in position.

Chris Barnes, Project Manager, said: "This is a fantastic achievement for Magnox. It was a challenging target that was achieved through the application of simple techniques combined with great teamwork."

The Berkeley vaults and chute silo contain approximately 1,515 cubic metres of ILW generated from the operational years of the power station and laboratories. The majority of the waste is removed from the Magnox fuel casing prior to its shipment to Sellafield for reprocessing.

However, given the nature of the research work undertaken within the laboratories, there are other waste streams unique to Berkeley, which will eventually need to be segregated and stored. The chute silo also contains Miscellaneous Active Components (MAC) such as the charge chutes and control rods removed from both reactors.

The results of the recent project will inform future plans for bulk retrieval at Berkeley and elsewhere in Magnox.

Meanwhile at Bradwell, three burst detection probes were packaged into a GNS Yellow Box, as work continues to demonstrate the viability of the containers with a range of different waste types.

## Technical strategy published

The NDA's Radioactive Waste Management Directorate (RWMD) has published its Geological Disposal: Technical Strategy to support the preparatory stages of geological disposal programme for higher activity radioactive wastes in the UK.

The strategy is complementary to the Geological Disposal: Steps towards implementation report published in 2010 which set out an overview of RWMD's programme. Both documents are available on the NDA website: <http://www.nda.gov.uk/stakeholders/newsletter/technical-strategy.cfm>

Bruce McKirdy, RWMD's Managing Director, said: "The strategy document focuses on the technical work that we will undertake in the preparatory studies phase of the programme. It sets out how these activities will be managed and considers what we need to do in the future. We do not have a site yet, so we concentrate on developing a disposal system using generic geological environments. The selection of a site will come from the UK Government led Managing Radioactive Waste Safely programme which is based on voluntarism and partnership with potential host communities."

A number of strategic activities have been developed that represent the key components of the RWMD programme. These are directly linked to the RWMD mission and programme objectives ensuring complete integration of activities. We will work with waste producers to identify and deliver optimal solutions to the management of higher activity waste. We welcome feedback on the strategy and if you have any comments or observations please let us know. Contact details are given at the front of the report or can be emailed to [rwmfdfeedback@nda.gov.uk](mailto:rwmfdfeedback@nda.gov.uk)

## Geological disposal



An artist's impression of how the surface facilities might look

## Underground disposal will sustain hundreds of jobs

Disposal of the UK's higher activity radioactive waste in an underground engineered facility will generate an average of 550 jobs over its 140-year lifespan, according to a newly published NDA study.

During the construction and early operations stage of the £12 billion project, workforce numbers will peak at more than 1,000 staff.

Steve Reece, the NDA's Disposal Facility Development Manager, said: "The manpower requirements will be discussed with local communities who express an interest in hosting such a facility. This could include training, development and education investment to ensure that local people have the necessary skills required by the project."

It will be some years before a geological disposal facility, which could be between 200 and 1,000 metres underground, comes to fruition. The Government is leading on the site selection process using the internationally accepted approach of voluntarism and partnership with local communities. This process is set out in its Managing Radioactive Waste Safely (MRWS) White Paper which was published in 2008.

The initial work to investigate the potential geology at selected candidate site(s) could take about 10 years and will require an average of around 440 staff.

Once the geology is deemed suitable and following planning and other approvals, construction of the surface and underground facilities up to the first waste disposal (about 15 years) will require an average of around 840 staff, while the next 100 operational years will require an average of around 560 staff. The closure phase of about 10 years will require an average of around 190 staff.

Steve Reece added: "The study shows a geological disposal facility for higher activity radioactive waste will provide a local community with significant social and economic benefits over a long period of time from the employment it generates. As well as considering the overall number of jobs to be created we have also considered the skill levels



The facility will require hundreds of skilled workers

required and these range from semi-skilled – NVQ/SNVQ entry level to post-graduate. The majority of these jobs will require skilled people."

The study was produced using benchmarking against similar programmes around the world, including Sweden and Finland; through analysing typical underground construction activities such as sinking shafts and tunnelling.

The study assumes the facility could be built in a hard rock environment and is based on the disposal of the baseline inventory of waste set out in the Government's MRWS White Paper.

The eventual site could be in a different rock formation and the amount of waste to be disposed of could change. Both factors would have an impact on staffing levels and will be taken into account as the site selection process proceeds.

# Treatment and disposal route established for ‘orphan’ waste

Teams at Sellafield are celebrating after successful trials to establish a new treatment and disposal route for contaminated Low Level Waste (LLW) oil, a historic waste that has until now been regarded as a challenging ‘orphan’ waste.

Orphan wastes are non-standard types of LLW that cannot currently be disposed of at the UK’s national Low Level Waste Repository (LLWR) - for example because they do not meet the Conditions For Acceptance and do not have a defined route for either treatment or disposal.

Completion of the trials represents the first-ever volume of LLW-contaminated oils to be sent from the Sellafield site for incineration in the UK.

The trials successfully tested the process and route which involves transporting oil to a thermal treatment centre for disposal, and will be instrumental in dealing with a site inventory of approximately 250 cubic metres of LLW-contaminated oil. Following a study that identified thermal treatment as

the best option, engagement with the regulators was undertaken to enable the necessary discharge authorisation changes required to take place. Sellafield Ltd was granted a variation by the Environment Agency in 2010.

Work has been undertaken by Sellafield Ltd's Solid Waste Operating Unit (OU) working with engineering company P C Richardson, the Solid Waste Handling Team, Transportation Logistics, Facility Characterisation and LLWR Ltd, as well as the various waste generator plants during 2010/11 to trial the route and commission it for use.

Helen Cassidy, from the Solid Waste Technical team, said: “The identification and opening of this new waste treatment and disposal

route is a key contributor to our ability to offer timely, cost-effective and environmentally sound waste management for the Sellafield site.”

Two trials involved a range of processes as well as repackaging the oil into containers compliant for transport and treatment and marshalling of the waste and transfer to the facility.

Paul McDonald, Waste Advisor, and Richard Kipling, Solid Waste Technical Manager who worked alongside Helen throughout the project, said: “The successful trials have proven that Sellafield Ltd now has a viable treatment route for a waste stream previously considered an orphan waste - this is a major achievement in reducing the waste inventory on the site.”



From the left, Helen Cassidy, Paul McDonald and Richard Kipling



The Sludge Retrieval Hood in operation at the open air pond

## Unique project clears sludge from Sellafield's oldest pond

A new machine that sucks up sludge is helping to safely decommission the world's largest open air nuclear fuel storage pond.

The Sellafield sludge retrieval project has taken nine years of work, requiring significant engineering on the 60-year-old plant, as well as the design of bespoke equipment to operate in an underwater, radioactive environment.

The Pile Fuel Storage Pond (PFSP) poses one of Sellafield's most challenging decommissioning projects and an accelerated programme of work is underway.

The machine, known as the Sludge Retrieval Hood, was designed and built to suck up radioactive sludge from the pond floor. The PFSP contains more than 15,000 cubic metres of radioactive water, more than 300 cubic metres of sludge, various nuclear wastes and legacy spent nuclear fuel.

Radiation levels mean that the Sludge Retrieval Hood has to be deployed and operated remotely at the bottom of the six-metre deep pond, where it sucks up some 25 cubic metres of material per hour. The sludge is then transferred into the Sludge Corral, where it will be stored pending treatment through the Local Sludge Treatment Plant,

currently undergoing inactive commissioning.

The project is also cleaning sludge from open-topped metal skips stored in the pond. There were around 180 skips and 24 have now been emptied, cleaned and exported to create space.

Steve Cottam, Head of PFSP Programme Acceleration, said: "Decommissioning the PFSP has been hampered by the layer of sludge on the pond floor and in the metal skips. We've had to come up with an innovative solution to remove this radioactive sludge to allow the pond to be emptied.

"It is quite exciting to see the plant make the transition into full-blown retrieval operations. Getting to this stage has, however, been a series of challenges. Equipment was initially designed based on existing drawings and plant records, but we quite often discovered that conditions were not as expected, and sometimes had to make last-minute modifications to equipment. Even now we still find unexpected things!"

The PFSP, built in 1948, was the

very first nuclear fuel storage pond at Sellafield and sludge, in the form of algae, corrosion products and wind-blown material, has been accumulating ever since. It was built to store nuclear fuel and isotopes from the Windscale Reactors that produced nuclear materials for the defence industry.

Sludge retrieval operations commenced in 2008, when water lances were deployed in the bays to flush the sludge into the main pond. However it is only now that a machine has been developed to move sludge from the main pond itself.

Kevin Newland, PFSP Technical Manager, added: "Decommissioning the PFSP is a unique piece of work. Because the pond is open air, we have to proceed with the utmost caution as there is no building to contain any radioactive contamination. We need to prevent any radioactive materials being released into the environment and so we're looking for new and innovative techniques to successfully complete the project."

# Land to be marketed for development

The eastern area of the Harwell site is now on the verge of de-designation, enabling the land to be marketed for commercial development.

De-designation is the final step in achieving restoration of the land and marks the culmination of more than 20 years of remediation and demolition work.

The area once housed a range of legacy facilities and historically important reactors, including western Europe's very first reactor, built in 1946 and known as GLEEP (Graphite Low Energy Experimental Pile), as well as the 40-metre high Tandem generator from 1958.

As part of the formal process to release the land, the Office for Nuclear Regulation (ONR) has issued a variation to remove part of the Eastern Area Facility from the

Nuclear Site Licence.

RSRL Site Director Alan Neal said: "Delicensing by the ONR and de-designation by the NDA demonstrates that our work is done on this part of the site. The land can now be reused without any concern about its previous history.

"This is a real achievement for RSRL and the culmination of many years of hard work. I would like to thank everyone involved in realising this significant milestone. The NDA is currently working with RSRL on the de-designation, expected to be complete in the next few months, after which the land will be released to the partnership

that is developing the wider Harwell Oxford campus.

The campus, a world-leading location for business, science and technology, is a public-private partnership between the Science and Technology Facilities Council, UK Atomic Energy Authority and Goodman.

The Joint Venture was established in 2008 to deliver the Government's vision for the creation of a world-class centre for science, technology and innovation. Harwell Oxford is now occupied by a range of more than 150 research organisations and science-focused businesses.

## Business optimisation

# Industry accolade for rail subsidiary

The NDA's rail transport subsidiary Direct Rail Services (DRS) has collected a prestigious industry award as the UK's 'Best Performing Rail Freight Operator'.

DRS, based in Carlisle, which transports nuclear material and conventional freight across the UK, also received further recognition as the most improved rail operator on performance over the whole year.

The awards, which are based on validated industry statistics, confirm DRS as the leading rail freight operator in the UK.

The Golden Whistle Awards are organised by the Institute of Railway Operators (IRO) in conjunction with Modern Railways Magazine to celebrate operational excellence in the industry, and to recognise the fact that sound operating practices are essential to run the safe, punctual and successful rail operations.

Neil McNicholas, DRS Managing Director, said: "This achievement is a reflection of the commitment and effort from the DRS team in ensuring our services are the best in the industry. Credit for this prestigious

award goes to our workforce who deserve recognition for these tremendous efforts."

DRS, which has depots around the country and a staff of almost 300 people, has been part of the NDA since 2005. Its initial focus was nuclear but the business has diversified into more general freight services which now account for more than half of its operations.

Nuclear material, including spent fuel, has been transported by rail

since the early 60s, travelling more than eight million miles without any incident involving the release of radioactive material.

The company is also collaborating with the Port of Workington in Cumbria on improved rail capability that will assist in opening up the area's trading route with the rest of Europe. The NDA and Nuclear Management Partners (NMP), the parent body of Sellafield Ltd, have invested significant levels of funding to improve infrastructure at the port.



Nuclear flasks in transit by rail



A ruined castle is just one of the NDA's unusual assets

## Return of land enables private-sector investment

With thousands of trees, several nature reserves, a stone circle and 19 nuclear sites, management of the NDA's landholdings is, to say the least, a varied challenge.

A "diverse portfolio" is how Head of Property David Atkinson sums up the complex set of assets handed to the NDA six years ago via its predecessor organisations, the UKAEA and BNFL.

Today, those assets yield £7 million of annual income from rents and service charges, while recent land sales and transfers will bring in capital receipts of £450 million, vital contributions to a decommissioning mission that is heavily funded by the Government.

But in the NDA's early days, the most immediate task was to unravel and understand the patchwork of properties and land under its ownership before arriving at a decision on how to maximise their value. As well as the land occupied by nuclear facilities, for example, many additional parcels of land were inherited, lying outside the area regulated by the nuclear licence but important for infrastructure, potential expansion or rights of way. The potential existed to make use of these.

David said: "We started from scratch aiming to carry out an inventory and have been learning all the time. The records were poor, though, and each of the sites had their own domain which created difficulties in trying to arrive at an overview."

"The assets were wide-ranging and sometimes rather unexpected. We inherited a ruined castle at Dounreay and a stone circle near Sellafield, for example. We also have hundreds of tenants, often farmers working the land around our sites but also businesses and residential households. Managing these, as can be imagined, is interesting and frequently requires a non-standard approach."

The nature reserves and other unusual assets are managed in line with UK biodiversity policies, or, where appropriate guidelines for preserving ancient sites.

The NDA's property company was established as a separate business entity and its operations underpin the broader technical mission of nuclear clean-up by focusing on the return of restored land to the private sector, facilitating the competition process and taking advantage of emerging opportunities with new energy developments.

With site restoration as the ultimate goal of the NDA's strategy, the property company is pursuing the release of a number of sites that have been decontaminated and are ready to be marketed as brownfield or greenfield land - a landmark step in demonstrating that tangible progress has been made.

So far, 10% of the land-holdings have been sold into the private sector, which has reduced NDA liabilities and enabled investment in both business and job opportunities. There is potential for selling a further 15-20% of the remaining 2,900 hectares in the near future.

Releasing land involves a series of steps to ensure that all contamination has been addressed and that Government Ministers are willing to lift the NDA's statutory responsibilities. Delicensing of land that has been part of a nuclear-licensed site requires consent from the regulators, while 'de-designation' marks the final, legal completion of the NDA's remit.

The first de-designation took place last year, when an area around the size of four football pitches was released at Capenhurst, and will be redeveloped by neighbouring nuclear business Urenco. Land at Harwell, Berkeley and Oldbury, meanwhile, is also undergoing the delicensing and de-designation process. The land at Oldbury, along with a greenfield site at Wylfa, may be used for the construction of the UK's next generation of nuclear power stations.

The goal is always focused on securing best commercial value for the taxpayer. At Hinkley A, for example, an agreement was recently reached with EDF Energy, who plan to develop a new nuclear power station on adjacent land and will now use the basement of the redundant turbine hall to deposit spoil from excavations. As well as avoiding the need for lorries to take the material along village roads, the agreement will reduce decommissioning costs at Hinkley A.

There are also opportunities to facilitate renewable energy developments such as wind, wave and tidal through making land available adjacent to or on existing sites.

"Our land has the potential to be re-used, often for economic development, and we have a responsibility to extract maximum value for the taxpayer. As the drive for renewables gathers pace, particularly offshore, we are able to work towards realising these opportunities, which bring benefit to both the local and national economy," said David.

# Waste disposal is the last option

A tour around the Low Level Waste Repository (LLWR) is a fairly peaceful experience: the surroundings are typical rural Cumbria, with a quiet village and the towering Lakeland fells in the distance. Grey buildings are dotted around the grassy site and the occasional truck drives slowly by, hinting at industrial activity somewhere.

Wildlife exists in abundance and is zealously protected: Deer, otters, natterjack toads, great crested newts all have a home here, and are encouraged to thrive.

There are few visible signs of the intense drive that has been taking place over the last few years to develop alternative ways of dealing with the Low Level Radioactive Waste (LLW) produced around the UK. In line with EU and UK environmental directives, large

quantities of new waste are now diverted away from this site, where space is limited, to more appropriate solutions.

Last year's UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry, published by the NDA, led to the latest initiatives which developed in parallel with the strategy and in collaboration with all the organisations that generate LLW. These include civil

and military nuclear sites, medical establishments, research facilities and commercial organisations.

The impetus for the new strategy came from Government policy, formulated in 2007 and is driven by environmental considerations, which require more emphasis on upfront waste prevention, reducing the amount of waste generated, reuse, recycling and recovering some kind of value. The goal is that disposal to a near-surface facility such as LLWR, or other specified landfill, should be the last resort for material that can't be treated elsewhere.

This waste hierarchy in turn drives the approach successfully being implemented for LLW nationwide, in which LLWR plays a leading role.

LLWR, near the village of Drigg, is still the only repository for most of the nation's LLW, as it has been for more than 50 years, but it now has an additional function as a broker, offering advice, guidance and alternative disposal routes for the various different kinds of material.

Already, far less waste is being consigned to the repository. From a

### Low levels of radioactivity

LLW covers a wide variety of everyday material that has become slightly radioactive such as rubble from demolished buildings, metals, overalls, wood, paper, rags, tools, glass, concrete, clothing, filters, etc. It is safe to handle and comprises by far the largest amount of radioactive waste from the nuclear industry – millions of tonnes in total – but contains only a tiny fraction of the radioactivity, 0.01%.

The quantities, however, are still very small in comparison to the 335,000,000 tonnes of waste generated by households and other industries each year.

Standing motionless next to LLWR's perimeter fence for an entire year would give a barely measurable increase in an individual's average radiation dose received over the same period from naturally occurring sources such as cosmic rays, the ground, the atmosphere and medical procedures.



A container is manoeuvred into place at Vault 9



**Waste is grouted with a cement mix before being placed in vault**

2006 peak of around 740 containers a year arriving for disposal, there are now more like 300 a year.

"That is more than 1,000 tonnes diverted in the last 12 months," said LLWR's Managing Director Dick Raaz. "And we believe our efforts will see overall cost savings for taxpayers in the region of £2 billion – that is the saving on potentially having to build another repository if this one were to reach capacity."

"We know from existing Lifetime Plans, published as recently as 2008-2009, that the cost of managing LLW, and there's more than three million cubic metres of it, will be around £10 billion, which is accounted for in the funding provision. Our objective is to put in place measures that will reduce that figure by as much as possible."

Dave Rossiter, Head of National Strategy Implementation, pointed out that the rigorous level of environmental protection provided by LLWR's highly engineered vaults was simply not necessary for certain kinds of LLW, and the alternatives can be both better value and better for the environment.

Supported by a team of 30 people – set to expand by 15 – the site works with a number of suppliers, via a framework of contracts, to offer waste producers various options for processing LLW, many of them at existing waste facilities elsewhere

in the UK. A key requirement is that material is segregated by the producer into different waste types at the site where it arises. Often, the waste no longer even needs to pass through the repository.

One option is metal recycling, which involves off-site treatment such as melting or shot-blasting. This removes contamination, leaving clean metal that can then be recycled in the conventional scrap metal market, together with a reduced volume of secondary waste for disposal at LLWR. More than 95% of the original metal can be retrieved in this way.

Another option for suitable material is combustion, using existing facilities with the appropriate permits, both in the UK and overseas. The first shipment, around two tonnes, recently passed through a facility in the South of England that generates electricity via the combustion process. Volume reduction is more than 90%.

LLWR also offers high-force compaction treatment to crush waste in order to reduce the volumes for disposal, and is adding more options to its existing packaging service. Among the latest developments are a re-usable transportation container and a more efficient, flexible disposal liner that will cut the amount of space 'wasted' in a steel box.

"The new transportation container will last 10 years and can be re-used hundreds of times, which is clearly more environmentally acceptable as well as cheaper than the standard single-use containers," said Dave.

LLWR is also working on more flexible solutions for waste categorised as Very Low Level, which typically has concentrations of radioactivity just above natural background levels. This will include using suitably licensed conventional landfill sites, reflecting Government policy and helping to preserve the capacity of the repository.

There were more than 60 different initiatives under way, said Dick, which will make a significant contribution to implementation of the strategy. "The pace of change is unbelievable. This tiny site is a major strategic project for the UK. The need for another repository was looming in 2008 but now we're confident that we have deferred that for decades, possibly eliminated it altogether."

Jo Van Straaten, the NDA's National Programme Delivery Manager for Waste, added: "The role of LLWR in taking the lead for our national LLW programme is working well, acting as a catalyst for the changes in culture and approach that are needed to implement and comply with Government policy."

## Sellafield dialogue with Norwegians

A high-level UK delegation participated in a conference in the Arctic Circle as part of an ongoing dialogue between Sellafield and Norwegian stakeholders.

The conference, held in Norway's Lofoten Islands, was attended by representatives from Sellafield, the NDA and the new Office for Nuclear Regulation (ONR) with stakeholders from Norway, Sweden, Iceland and Greenland.

As part of the dialogue, Norwegian Environment Minister Erik Solheim had visited Sellafield the previous week accompanied by representatives from Bergen, Stavanger, the Norwegian government, regulator, NGOs and media.

The event, jointly organised by Sellafield Ltd and two Norwegian NGOs, Bellona and Guardians of our Common Seas, was the latest in a series of meetings dating back to 2003 aimed at exchanging information and building confidence between all the parties. The

Norwegians are focused on safety performance and how the risks associated with the hazards on site are being reduced. Of particular interest to them is the management of Highly Active Liquor (HAL) stored at Sellafield.

At the conference, the NRPA presented the findings of their latest Sellafield report. The second of two reports, based on a highly unlikely hypothetical scenario concerning a release from HAL storage tanks, considers the potential impact it could have on the Norwegian environment and agriculture.

Discussions also took place about Sellafield in the context of the recent events in Fukushima. The conference was an opportunity to communicate the forthcoming change to the regulatory specification regarding the storage of HAL. Dr Ian Hudson,

the NDA's Head of Programme, Sellafield, said: "This was my first participation in the dialogue and I was encouraged at the spirit of co-operation and openness in which the conference took place.

"We understand the concern of the Norwegians and our aim was to ensure they understood how the change to the HAL specification will help us reduce the hazards at Sellafield quicker. We are committed to further meetings and the continued exchange of information. We look forward to welcoming the Norwegians when they come to West Cumbria in 2012 for the next conference."

The event concluded with a statement jointly agreed between Sellafield and the Norwegian NGOs: <http://www.nda.gov.uk/stakeholders/newsletter/>



From the left: NDA Chairman Stephen Henwood, Norwegian Environment Minister Erik Solheim and Sellafield Ltd Spent Fuel Director Stuart MacVeau are briefed by John Dougan, Head of HALES facility at Sellafield



Developing the harbour will help to diversify the local economy

## Funds support harbour expansion

Scrabster is the UK's most northerly mainland port, lying sheltered from the powerful tides that race through the Pentland Firth between the Scottish mainland and the Orkneys.

The harbour is well placed to take advantage of the burgeoning marine energy industries that are developing offshore wave and tidal projects, as well as the recently discovered oil and gas reserves west of Shetland.

For the communities of northern Scotland, the developments promise jobs and investment as nearby Dounreay continues to wind down its 1500 - 2000-strong workforce in the years ahead.

Backed by £2 million from the NDA's socio-economic budget, an ambitious £21.5 million project will bring a deep-water channel to Scrabster Harbour, additional lay-down areas at the quayside with heavy lifting facilities and an improved range of services including

fuel and water at each berth.

The upgraded facilities will help to underpin the growth of marine energy and have the potential to play an important support role for the oil and gas fields that are opening up. It is estimated that the harbour development could bring up to 350 new jobs to the area over the next few years.

Anna MacConnell, the NDA's Stakeholder and Socio-Economic Manager at Dounreay, said: "The NDA is wholly supportive of this development. The harbour improvements will be vital in assisting the region's sustainable future once Dounreay ceases to be a major employer."

Financial assistance for the project, which is being spearheaded by the Scrabster Harbour Trust, has come from a range of organisations including Scottish Government, Highlands and Islands Enterprise, the NDA, the European Regional Development Fund and European Fisheries Fund.

Seabed sites in the Pentland Firth and Orkney waters were the first to be made available for commercial scale development of wave and tidal energy in Scotland and indeed the whole of the UK.

The projects to be developed are believed to represent the largest planned development of wave and tidal energy worldwide.

# Excavations to start on waste vaults

Construction work is due to start later this year on a shallow, permanent disposal facility for waste material that has accumulated at Dounreay over the years.

Low Level Waste (LLW) will continue accumulating over the coming decades as the nuclear site is gradually cleaned out and buildings demolished, creating tens of thousands of tonnes needing disposal.

Dounreay Site Restoration Ltd has awarded a contract to Graham Construction for the first two of up to six underground vaults on NDA-owned land northeast of the site, with excavations starting around October.

The facility will be capable of taking up to 175,000 cubic metres of

debris, the equivalent of up to 760 double-decker buses.

By volume, LLW accounts for more than 80% of the radioactive waste that will be produced during demolition of the site, although it accounts for less than 0.01% by radioactivity.

LLW comprises paper, rags, tools, glass, concrete, clothing, scrap metal filters, etc, containing small amounts of mostly short-lived radioactivity.

The NDA's Dounreay Programme Manager Stuart Chalmers said

the facility was fundamental to the successful and efficient decommissioning of the site.

Approximately 140,000 cubic metres of rock will be removed to create each vault. Crushed rock from later phases will be recycled to landscape the flattened plant, reducing the total site restoration bill by several million pounds.

Some 8,000 tonnes of aggregate made from the rubble of buildings already raised is being used to build roads and hardstanding areas.

DSRL project manager Audrey Cooper said: "We're aggressively reducing the amount of waste we generate in the first place through new, more efficient ways to decommission and better ways to segregate and reduce the volume. We expect this to reduce the total size of the facility we'll need to build, bringing down the cost further."

The contract for the first phase – design and construction of two vaults – is valued at approximately £13 million. The first vault is due to open in 2013.

The project to find a long-term solution for Dounreay's LLW began in 1999, and included consultations with the community and other interested organisations. Disposal at the site emerged as the best environmental option, avoiding requirements to transport material on the road network and aligning with the 'proximity' principle of managing waste as close to the source as possible.

Once completed, the site will be capped and grassed over to merge with the surrounding landscape.

The NDA is investing £4 million in a community fund attached to the development, to assist with regenerating the local economy, with the first payment of £1 million due at the start of construction. Funding decisions will be made by community representatives, with the NDA and DSRL providing assistance where required, and the money will be spent on activities that fit with the NDA's socio-economic policy.

## That caps it - tallest chimney sealed



Dounreay's tallest chimney has been sealed, above, marking a visual end to a £10 million project.

The massive five-tonne cap was fabricated by a local company, as part of a project to deliver a new bespoke ventilation system to the Fuel Cycle Area.

Steeplejacks worked from scaffolding at the top of the 55-metre stack, liaising with the crane driver and teams on the ground to fit the steel cap over the mouth of the chimney and bolt it into place.

The modern ventilation system serves the complex of buildings, dating from the 1950s, that historically handled and stored the site's nuclear material and waste. In all, more than 300 tonnes of steel were fabricated into a network of ducts, chambers and two new, smaller ventilation stacks.

The project was particularly challenging as the buildings are located in close proximity, creating a congested working space.



One of the nitrogen tanks is lifted into place

## Tanks create the right atmosphere

Installation of two new 27-tonne nitrogen tanks for the Dounreay Fast Reactor breeder building marks another notable step forward in preparation for taking apart the redundant reactor.

The breeder removal requires nitrogen gas as part of the process to dismantle the elements and package the slugs.

The existing nitrogen plant at the DFR could not supply sufficient gas to the new purpose-built building and, following a review of the options, a decision was taken to install new equipment.

Once a suitable position was agreed which allowed access for road tankers, the planning, design and excavation works began.

Installation of the tanks was carried out by DSRL and its contractors in time to meet a performance target for the project, which cost in the region of £160,000.

This is an essential element of the breeder removal process as it provides an inert atmosphere for the process cells and NaK cleaning process.

The next phase of work will be the installation and commissioning

of the Magnox flask leak testing equipment. DSRL has worked with Sellafield and Caithness design engineering company Mowat Technical Design Services Ltd to design internal flask furniture specifically for the breeder removal process.

Stuart Chalmers, Programme Manager, said: "The NDA continues to facilitate cross-SLC collaboration. This is an excellent example of inter-site working and sharing expertise to achieve an NDA strategic goal."

Dounreay's experimental fast breeder reactor was at the forefront of British research and development into nuclear energy during the 1950s-60s.

Housed inside a steel sphere, it became the first fast reactor in the world to provide electricity to a national grid in 1961 and closed in 1977. Its 14MW output was enough to power a small town like Thurso. Decommissioning DFR is one of the most significant challenges in the UK today.

## Revised strategy published

The NDA's new Strategy, which sets the direction for delivering the nuclear clean-up programme, has now been approved by UK Government and the Scottish Ministers.

Approval of the Strategy follows a lengthy period of engagement and discussion with stakeholders, beginning in 2009 and continuing through 2010. The first strategy was published in 2006 and, under the Energy Act of 2004, must be updated every five years.

At the launch of the Strategy in London, Chief Executive Tony Fountain said: "Hazard reduction is our absolute priority and that is why we are prioritising our resources to tackle our most challenging facilities.

"We are also pursuing an 'optimised programme' for the decommissioning of the 10 Magnox sites - the first generation of electricity producing reactors - with accelerated progress at two 'lead sites', Trawsfynydd and Bradwell. At other sites, innovative solutions to tackle specific issues will be trialled and best practice shared, bringing forward the overall timescales and reducing costs.

"Other significant challenges are around the effective management of nuclear materials and waste. We need to utilise our current and planned infrastructure more effectively to deal with the growing amounts of waste generated by the decommissioning programme and to work with Government on the implementation of policy with regards to long-term waste management and the future use of our plutonium stockpile."

# **Collaboration on decommissioning and waste management techniques gets the grey matter working ...**

New waste management techniques and technologies were under the spotlight when members of the Nuclear Waste Research Forum (NWRF) gathered at Dounreay for their latest quarterly meeting.

The itinerary included a visit to the new Breeder Fuel Removal Facility and the site for the LLW facility, where construction starts soon.

The NWRF encourages collaborative research across the nuclear industry and is attended by waste producers, regulators, NDA representatives and the Site Licence Companies (SLCs). Established by the NDA, the NWRF aims to ensure strategic coordination of research and development by determining and sharing common R&D needs, risks and opportunities, as well as considering how best to address them collectively.

The visit enabled the Dounreay Site Restoration Ltd (DSRL) team to demonstrate progress on their decommissioning projects and share some of the technologies being used.

Other highlights included a demonstration of how laser scanning technology from the oil and gas industry has been applied to build 3D maps of facilities, which assists in planning decommissioning and waste management activities, and a presentation from Magnox, also using technology from outside the nuclear industry, to destroy contaminated oil.

A particular topic of interest was DSRL's plan to use Tru-Shield containers for packaging some of their waste. These self-shielding containers use lead for shielding and might provide an opportunity for recycling old lead from NDA sites. This topic had all the waste producers considering the packaging they are intending to use and it was clear that everyone will be monitoring Dounreay's progress in using them.

Matthew Clark, Integrated Waste Manager at the NDA, said: "DSRL hosted an excellent meeting that



**NWRF members examine a Tru-Shield waste container at Dounreay**

provided a great backdrop for the enthusiasm shown by the attendees for collaborative working."

NWRF plays a key role in identifying the areas of research and development that will best address the waste management and decommissioning challenges facing the whole industry. The members were also keen to identify ways to ensure that collaboration across the industry genuinely works and yields results.

Sellafield Head of Technology Mike James, who is Co-Chair of NWRF along with DSRL Chief Engineer Neil Buchan, said: "Neil and I are focused on developing the role of the Forum to support and build on collaboration across the industry and our stakeholders in the field of research, development and technology transfer.

"Holding the meeting at different establishments to share good

practice across the industry is a key feature of our work and participation from several of the SLCs, Atomic Weapons Establishment (AWE) and EDF demonstrates the level of interest and commitment from industry.

"This visit to DSRL has provided the group with invaluable information and experience of the excellent clean-up work at Dounreay to take back to their respective organisations. I would like to thank Neil and his colleagues for an excellent meeting and, more importantly, demonstrating the progress at Dounreay."

Darrell Morris, NDA's Research Manager, added: "The NWRF along with the newly reconstituted NDA Research Board form key components in the coordination of R&D across the nuclear industry. The development of new technology, supported by R&D, is fundamental to delivering our mission."