

Issue 07 September 2017

Our man in Paris

The World Association of Nuclear Operators

Recycling Lives

Meet our new supply chain partner

Rise of the Anibots

Meet our latest robotic recruits





In Focus Inside our Site Ion Exchange Effluent Plant

A perfect partnership

Working with the National Nuclear Laboratory

In their words Local students discover Sellafield



Corporate strategy

Managing the legacy Making the most of the assets

We will safely and securely remediate the Sellafield site, to benefit the industry, nation and region.

Find out more - visit www.gov.uk/sellafieldltd

Editor's Letter

his issue of Sellafield Magazine comes later than originally advertised. As a publicly funded organisation we minimised our communication activity in the run up to the General Election in June.

It is our home within the civil service and as a subsidiary of the Nuclear Decommissioning Authority that prompted another highlight from the last few months. Our digital home has moved. We are now part of the GOV.UK platform. You can read more about the transition of our website on page 63 and don't forget to save our new address to your favourites: www.gov.uk/sellafieldltd

We have been busy since our last issue so our pages are bursting with stories about the progress we are making on the Sellafield site. You can read about the doors we have installed into the side of an old waste silo on page 54; about the robots our supply chain partner Forth Engineering have developed to help us complete radiological surveys on page 12; and find out everything you need to know about our Site Ion Exchange Plant in the latest of our 'In Focus' series on page 50.

At a corporate level, we have published our new strategy as well as our transformation plan. Together they provide an overview of our direction and our approach to fundamental and far-reaching changes in our organisation. We face some of the most demanding challenges in the nuclear industry, and some of the greatest change and opportunity in our history. Find out more on page 38.

Elsewhere in this issue you can see Sellafield through the eyes of a group of students who have grown up on the site's doorstep. The group from Westlakes Academy researched the site before producing their own article on 'things I never knew about Sellafield'. Meet the group and read winner Hannah Clarkson's article on page 70.

If there are any topics that you would like us to cover in future issues of *Sellafield Magazine*, email *editor@sellafieldmagazine.com*





On the cover

Studying the natural world inspired Forth Engineering to develop a colony of robotic ants that are helping us to map radiological environments at Sellafield.

Contents

- 8 What is... commissioning?
- **10 LATEST NEWS** Since February we have...
- 12 COVER Rise of the Anibots Cumbrian SME is looking to the natural world to solve industrial problems.



15 SME Factfile Forth Engineering Ltd

16 A nuclear family The mother and daughter duo taking the nuclear engineering world by storm



- **18 Our man in Paris** Meet some of the people at the World Association of Nuclear Operators
- 21 Asbestos removal Specialised contractor ready to remove 250 tonnes of asbestos
- 22 View from the Board Meet our new non-executive directors
- 24 Health Physics Advances in monitoring equipment
- 25 PHOTO FEATURE One Sellafield

- **34 Ten years of Sellafield Ltd** A decade of delivery
- **38 Corporate strategy** An overview of our new corporate strategy
- 42 Transforming Sellafield Meet our new Transformation Director
- 44 A dog's life Meet our canine colleagues
- **48 From the archives** Counting Room Laboratories

39





- **49 Filling the generation gap** EU nuclear conference for young industry professionals
- **49 The final countdown** Counting down to the end of reprocessing
- 50 In Focus: The Site Ion Exchange Effluent Plant Inside the building known as the kidney

of the Sellafield site

54 The first cut is the deepest Opening up one of our legacy waste silos





44

- 58 10 Facts about... Supply chain spend
- **59 And the winners are...** Meet the winners of our Community Choices programme

Our canine colleagues are being trained to firearms support standards

Meet our contributors:

Rachel Dowling



Rachel took some time out from her role in the Nuclear Industry Association to work as part of our stakeholder relations team earlier this year. While she was with us she interviewed our new head of community and development, Jamie Reed. Read the interview on page 66.

Hannah Clarkson

Hannah was one of six students who researched the Sellafield site for a writing competition at West Lakes Academy. Designed to encourage students to embrace longer form writing, we worked with the school to set a writing challenge – 'What I didn't know about Sellafield'. Hannah's engaging writing style really caught our attention and we are delighted to print her story in full in this issue.



Angela Seeney



Angela was 14 years old when she knew her future lay in the sciences and engineering. A doctorate in material science and three decades in business transformation later, and Angela is embracing a new challenge – leading our transformational change.

Euan Hutton

Euan is responsible for leading and developing all Environment, Health, Safety and Quality activities across the business. In this issue he gives us his view on our safety performance in 2016/17 as well as his priorities for this year.









64

Meet some of the unsung heroes from Magnox Reprocessing



FROM THE ARCHIVES Working at height

85

- 74 Simply outstanding Local academy goes from strength to strength
- 76 Behind the scenes The making of a safety video for our employees
- 78 Annual Review of Safety Our safety performance in 2016/17
- 81 Risk and Hazard Reduction
- 82 Performance against safety targets
- 84 Safety at a glance

85 From The Archive

- 86 Theatre is coming up roses Rosehill Theatre's opening night
- 88 Shadow apprentices Our apprentices shadow their local politicians and take to the stage in Westminster
- **91 Recycling lives** Our new supply chain partner recycles metal and redirects surplus food from landfill to those in need

- 92 A perfect partnership National Nuclear Laboratory and us
- 96 Unique nuclear archive opens for business
- **98 The way we were** Exploring the archive
- **100 PHOTOGRAPHER** in residence Sellafield through the lens
- 102 INTERVIEW Five Minutes With... Mike Mandzij





'All the world's a stage, and all the men and women merely players...'



WHAT IS...

Commissioning?

"Ensuring that our plants are

ready to operate is actually

one of our 36 site licence

conditions – the things that

order to maintain our licence

to operate Sellafield. Given its

and pre-operations activities

redevelop a facility from the

f you were buying a new piece of electrical equipment you would expect it to work. You'd also expect that the manufacturer would have tested it to make sure that it would operate safely and do what it is designed to do and before you plug it in.

Whilst the terminology might be different, this is exactly what commissioning at Sellafield is all about.

In simple terms, commissioning (and pre-operations, which follows) is the work that we do to demonstrate that new or modified plants

meet their design requirements, meet safety and performance criteria, and have appropriate arrangements for their operation and maintenance.

Paul Farran, our head of commissioning and preoperations, said: "Ensuring that our plants are ready to operate is actually one of our 36 site licence conditions – the things that we are legally obliged to do in order to maintain our licence to operate Sellafield. Given its importance, commissioning and pre-operations activities are an integral part of any project to construct or redevelop a facility from the very beginning."

On any project, specific

commissioning work is likely to include contributing to project delivery strategies, the project design specification and safety case, as well as testing, witnessing, recording and assessing results by suitably qualified and experienced personnel.

By doing this work from the outset, we're able to ensure that the move to full nuclear operations is as smooth and speedy as possible. Many of our large projects involve close working relationships with partners in the supply chain. From a commissioning and pre-operations point of view, this means we must ensure our requirements are clear and are outlined in the contract scope from the start.

We also integrate commissioning managers and preoperations managers into the major project teams from an early stage. Evaporator D is one of our projects that is

> going through its commissioning phase. The team is working closely with the Highly Active Liquor Evaporation and Storage plant team who will operate the evaporator.

The new evaporator is currently going through inactive commissioning. Once complete, an outage will take place – which means that all nuclear buildings at Sellafield will stop their operations to carry out maintenance work – so that the evaporator can be physically connected to the Highly Active Liquor Evaporation and Storage plant for active commissioning.

During active commissioning, the evaporator will start the role it was designed for – evaporating highly active liquor to reduce its volume.

Moving a plant into active commissioning is one of the final steps before full nuclear operations. It is the point at which radioactivity is added and therefore the point from which it would require nuclear decommissioning at a later date. Before using a new plant, we put it through its paces, to ensure it's ready to deliver its critical mission. Known as commissioning, the process makes sure that our plants are fit for purpose, safe and ready to operate. Some commissioning takes place before we introduce nuclear materials, some of it takes place after. Here we explain why this 'non-active' and 'active' commissioning is so important.

Plant ID:Tested:Re-Test:Manager:	

Since February we have...

CELEBRATED..

the successful assembly of a silo emptying machine in the Magnox Swarf Storage Silos.

WELCOMED...

two new members of our executive team, transformation director, Angela Seeney, and head of development and community, Jamie Reed.



a contract to process scrap metal from Sellafield.

REFLECTED...

on the last 10 years of Sellafield.





INSPECTED.

one of our tallest buildings using an aerial drone.



the first drum of legacy pond sludge.

FEATURED....

on Bloomberg TV and Good Morning Britain.

LOWERED....

the water level in the Pile Fuel Storage Pond for the first time ever to trial dewatering.

SYSTEMS

centrica

centrica

centrica

0.00

eal

eal

eor

CO

ELIMINATED...

CUT...

the risk of the ageing pipes in the First Generation Magnox Storage Pond leaking radioactive sludge or liquor.

the first holes in the side of

the Pile Fuel Cladding Silo.

CONGRATULATED...

our mechanical design apprentice Adam Sharp for winning National apprentice award.

REACHED

the Thorp shear target

for 2016/17 six weeks

ahead of schedule.

Rise of the

EVER WANTED TO KNOW HOW YOU CAN GO FROM A CAREER AT SELLAFIELD TO SETTING UP YOUR OWN BUSINESS AND THEN GROWING THAT BUSINESS TO INCLUDE CUTTING EDGE NUCLEAR DECOMMISSIONING TECHNOLOGY THAT SELLS AROUND THE WORLD? JUST ASK HUSBAND AND WIFE TEAM, MARK AND NICOLA, WHO DID JUST THAT AND TODAY STAND AT THE HELM OF A GROWING CUMBRIAN BUSINESS.

ANIBOTS





orth Engineering (Cumbria) Ltd began life with a very simple business idea: supply hoses that match customers' specifications. Fast forward 17 years and the company is a multi-award winning small to medium enterprise. I sat down with managing director, Mark Telford, to talk about what really makes their business successful and how the nuclear industry has influenced their customer focus.

After starting their careers at Sellafield, Mark and his wife Nicola founded their own business in 2000, believing that going it alone would make a huge difference not only in their lives, but also to the local community by employing local people.

Mark served his apprenticeship at Sellafield and later became a mechanical engineer working in and around the high hazard areas, such as the First Generation Magnox Storage Pond and the Magnox Swarf Storage Silo.

Mark said: "We decided it was time to take a leap of faith and really put our past experiences and knowledge to the test by going it alone."

In 2003, the business relocated to a fully equipped operations centre at Flimby. It included a dedicated warehousing and dispatch area as well as a customer demonstration and training area and an advanced technical centre.

Mark is very proud of the facilities they offer and how they have successfully transitioned to become a respected firm. He said: "We have successfully moved from a local Cumbrian startup to where we are now, acquiring business from across the county, while earning our clients' trust along the way.

"We take a real pride in being problem solvers, and this is usually achieved by using technologies combined with common sense and past experience."

"Our knowledge of the Sellafield site and its complex decommissioning programme has really made a difference in the way we think. We are very much driven by what our clients tell us

.

would be useful to them as there's no point in developing technology that's just going to sit on a shelf. We take a real pride in being problem solvers, and this is usually achieved by using technologies combined with common sense and past experience.

"We've developed many products and services to support the programme through the years, and continue to develop specialist camera systems, scanners, lighting systems and remotely operated vehicles."

Their work at Sellafield includes the development and deployment of remotely operated vehicles, using just some of the 150 vehicles that they have designed and manufactured over the past 20 years.

The company also invested in a deep recovery facility that replicates nuclear ponds, making good use of funding from Britain's Energy Coast.

The facility holds more than 1.2 million litres of water and is believed to be the largest scale wetted pond research and development facility in the UK. It was used for testing the equipment to remove the very first radioactive sludge from the First Generation Magnox Storage Pond back in 2015. n 2015, they joined forces with the University of Manchester, through the Knowledge Transfer Partnership (KTP) programme. The scheme is a flagship programme of innovation and enables them to develop new technologies. Mark said: "It's aimed at working together on a project central to our needs and offers ongoing collaboration supported by experienced staff and academics.

"The programme enables us to take new ideas forward or find innovative solutions to business challenges by working with the university."

Mark said: "The natural world is often the best inspiration for how to solve industrial problems. We have been looking at how different animals use their senses and how we can capture that to create their robotic counterparts. For example, we have developed a robotic spider that can deploy equipment in harsh environments within the nuclear, marine, gas, oil and subsea industries.

"We have also developed an army of robotic ants that can be used to map out a radiological environment that people can't physically access." Through the collaboration, Forth and the University of Manchester will soon be opening a new Robotics Laboratory on a brand new site in Cleator Moor, West Cumbria.

"The natural world is often the best inspiration for how to solve industrial problems."

Mark said "I'm extremely proud of what we have achieved to date, and even more excited for an equally promising future as the business continues to expand. We are proud of our small to medium enterprise status and our employees are absolute key to our success. We have a brand new trade counter which will open very shortly and have just acquired some more land at the north of our site which will enable further development when opportunities arise.

"We will obviously strive to work on more projects with Sellafield Ltd and other NDA estate sites, but we are keen to seek opportunities beyond the site and in other markets such as oil and gas, marine and offshore wind."

What advice would Mark give to other people thinking of setting up their own business or expanding to take advantage of the growing global decommissioning market? "Don't think that you have to know everything about Sellafield, or even that Sellafield is the only show in town. There is a multi-million pound global decommissioning market out there and if you have an idea that can be commercialised to capture some of that; go for it! Also, don't think that you have to do it alone. There may be other organisations out there that are already established that you can partner with to make your idea a reality."





SME FACTFILE:

Forth Engineering (Cumbria) Ltd

Located:	Flimby, West Cumbria
Founded:	2000
Number of employees:	32
Turnover:	circa £1.5m

Specialities and services:

Prototype Design – 3D modelling, AutoCAD, Mechanical Engineering, Project Management, Systems and Control Engineering, Construction, Trials and Testing, Research and Development, Product Manufacture

Accolades:

- British Energy Coast Business Cluster 2016
 Finalist Inspiring People Award
- Innovus 2016
 Winner Best Academic Collaboration Award
- British Engineering Excellence Awards 2016
 Winner Small Business of the Year
- British Energy Coast Business Cluster 2015 Highly Commended – Business Innovation
- CN Business Awards
 Mark Telford (Managing Director) Business Person
 of the Year 2015

Accreditations:

- Member of the Nuclear Skills Academy
- Member of Innovus
- Member of the Britain's Energy Coast Business Cluster
- Commitment to the Government's "Skills Pledge Scheme"
- ISO 9001; 2008
- ISO 14001: 2004

Website: www.forth.uk.com

A nuclear

Meet the Williamsons; a mother and daughter duo, both engineers helping to decommission Britain's oldest nuclear site, despite working for different employers.

hen we talk about the 'nuclea family' at Sellafield, we are usually referring to the vast supply chain community all working together to deliver the site's clean-up mission.

However, within that community, we have our own nuclear families, working hard all day before gathering at the dinner table to talk about their weekend plans.

Meet the Williamsons; a mother and daughter duo, both engineers helping to decommission Britain's oldest nuclear site, despite working for different employers.

Hayley Williamson is an experienced engineer working for Bechtel, while her daughter Charlotte is embarking on the first step of her career as a Sellafield Ltd apprentice.

Earlier this year, Hayley was part of the team that safely cut an access hole in the side of one of our most hazardous nuclear plants (full story on page 54), and Charlotte is preparing for a stint on the same project as part of her training.

"Mum was my inspiration," says Charlotte, whose next goal is to work towards a degree-level qualification. "Like her, I was good at sciences at school. Because of the example she set, I am turning that into an exciting career." Mum was my inspiration, like her, I was good at sciences at school. Because of the example she set, I am turning that into an exciting career.





The World Association of Nuclear Operators – or WANO as it is better known – was formed after the nuclear accident at Chernobyl in 1986. Nuclear operators around the world were determined that there wouldn't be another accident like Chernobyl so came together to carry out peer reviews of facilities, share operating experience and technical support as well as offering professional and technical development programmes.

In 2006, Sellafield was the first non-nuclear reactor site to be granted membership of WANO. Since then we have seconded 11 of our employees into the organisation and have welcomed 15 peer reviews, opening our facilities to nuclear operators from around the world so that they can identify areas where we can improve.

To understand what it is like to be part of such a global community we sat down with our own Stuart Robertson who has been on secondment in the WANO Paris Centre for the last six years; Jérôme Brisepierre who is on secondment to WANO from EDF and recently took part in a peer review at Sellafield; and John Palmer who works in our High Level Waste Plants and received a WANO peer review this year.

Stuart's favourite things

FAVOURITE BOOK THE HITCHHIKER'S GUIDE TO THE GALAXY

FAVOURITE FILM FIFTH ELEMENT

FAVOURITE FOOD UK – CURRY; FRANCE – FRENCH BAGUETTES

FAVOURITE HOLIDAY DESTINATION SOMEWHERE TO DO SOME SCUBA DIVING

FAVOURITE BAND AC/DC



... Stuart Robertson ...

I've been fortunate enough to have a good career path in WANO. I started as a reviewer, fairly quickly became team leader for peer reviews and around two years ago became one of the deputy programme managers. I am now the programme manager for Paris Centre peer reviews, the first person from a non-nuclear power plant member company to be given the role.

The Paris Centre office is made up of many different cultures. It covers most of northern Europe but also Brazil, Argentina and one of the four major companies in China. This brings its own challenge, but an enjoyable one; I really enjoy getting to know the cultures, getting to know how best to relate to them, and how to communicate effectively and get common understanding (which when you speak too quickly and with a northern UK accent, can be quite difficult!).

Dealing with multiple companies, cultures and countries can make scheduling peer reviews challenging.

My biggest task right now is to establish the 2018 and 2019 peer review schedule. This has to balance the availability of our peer reviewers with site date preferences, while ensuring that the members are able to meet their membership obligations of hosting a peer review at least once every four years.

I have a massive amount of respect for people who host peer reviews. I've never been on that side of the table but I recognise the hard work, dedication and openness that is required. The peer review comes and leaves the host with a report which maybe says that everything isn't as excellent as they thought it was. The peer review team then leaves and you have to deliver actions to resolve the gaps in performance identified.

It has been a privilege to be involved with WANO. I've been to most of the countries that WANO Paris Centre support; I've met many good people, seen many good things but I also feel that I have played a positive part in nuclear stations improving their performance.

I've had the opportunity at some of the plants I've worked with in Argentina, Finland, France, and Pakistan to return to see the improvements that they have made; feeling that even as a small part, I am making a difference; that Sellafield is making a difference, continues to motivate and encourage me.

WANO is about supporting members to improve the safety and reliability of their nuclear facilities. We do this firstly by assessing each station's performance against the best we have seen in industry, then by providing support through ongoing engagement and monitoring, support missions, benchmarking, training, workshops, seminars, and the sharing of good practices and operating experience.

The improvement cycle kicks off with a three week peer review. This identifies areas for improvement and, based on the areas for improvement identified, the nuclear power station – or Sellafield – will produce an action plan. We do a follow up two years later to check how well a station is progressing on resolving the areas for improvement, after which there might be a need to strengthen aspects of the action plan or for WANO to provide more support. Then, after another two years, another peer review is performed.

A good peer review is one that is insightful and helps a member to continuously improve, not to stand still.

For Sellafield, what WANO brings is that outside perspective. I'm a Sellafield boy through and through, I've spent all my career working for Sellafield and it's very easy to believe you're good, when you don't know what's really going on outside in the bigger world.

Being able to put people into WANO, having people going on WANO peer reviews as industry peers and to get an insight of what good looks like from the outside, is really important for our organisation and the Sellafield site.

One thing I have recognised since moving to WANO, is we're very good at beating ourselves up at Sellafield but there are actually many things that Sellafield does very well. Sometimes it is a pocket of one particular plant or it is a common thing that we do very well. That's a challenge for WANO, who need to do better at extracting the good practices that Sellafield has and sharing them with other members.

... John Palmer

he nature of our work at Sellafield and the nuclear inventory that we have on site means it is right and proper that we are open to our peers from WANO who can scrutinise our operations, judge any gaps to excellence and highlight areas where we can improve.

The feedback from the peers is brutally honest. They hold a mirror up to us as leaders, as team members and as an organisation as a whole and show where we fall short of the standards expected of the best nuclear operators in the world.

Peer reviews are labour intensive and take place over three weeks including on-plant visits and meetings. You really do get out of a peer review what you put in. A recent peer review at high level waste plants, included a team of our senior leaders, key line managers and support team members. During this review we were able to show how our improvement programme was delivering benefits as well as understanding the gaps that we still need to close.

Overall the process, although tiring and requiring serious commitment from all concerned, gives me a refreshed sense of determination to do more and to be more focused on improvement. In two years' time we will have peers back for a follow up, which I see as another opportunity to show that as an organisation safety is our highest priority and we absolutely do not stand still on our journey of continuous improvement.

"Overall the process, although tiring and requiring of serious commitment from all concerned, gives me a refreshed sense of determination to do more and to be more focused on improvement."

... Jérôme Brisepierre ...

have visited many nuclear power stations in Europe – Scotland, England, Spain, Germany, Sweden and Switzerland. I have also been to stations in China, Pakistan and Argentina but I have never visited Sellafield before.

To me the size of Sellafield site is impressive – it is like coming to a small town with the number people employed. In my company, to build and share experience you need to move between stations which means moving around France – at Sellafield you can do the same things within the one site.

I have previously been to La Hague and I also wanted to visit Sellafield – both facilities are very different to a nuclear power station. The way that at both sites the facilities are linked to deliver the overall mission is fascinating.

We sometimes get the opportunity to experience local cultures when we visit different countries for peer reviews and in Cumbria I had a go at sheep-herding! I had seen it being done but had never had the opportunity before to have a go myself, it was a great experience.

"To me the size of Sellafield site is impressive – it is like coming to a small town with the number people employed. On my company, to build and share experience you need to move between stations which means moving around France – at Sellafield you can do the same things within the one site."



What is WANO? The World Association of Nuclear Operators (WANO) is not a regulator, it is the nuclear industry working together to improve performance. They have more than 130 members across the globe and their head office is London. They operate out of four regional centres; Paris, Tokyo, Moscow and Atlanta.

Asbestos removal

When you think of risks and hazards at Sellafield you will probably picture radioactive waste and fuels. While these are a challenge, we also face a hazard that is common at many industrial, commercial and residential sites across the country – asbestos.
As the single greatest cause of work-related deaths in the UK – around 5,000 people each year – we rely on the experts in our supply chain to safely remove it.



Danger Asbestos hazard

sbestos was extensively used as a building material in industrial and residential buildings before the year 2000. It was used for a variety of purposes including fireproofing and insulation.

When materials that contain asbestos are disturbed or damaged, fibres are released into the air. If these fibres are inhaled they can cause serious diseases which may not affect you immediately as they often take a long time to develop.

A project is under way to remove asbestos from two buildings at Sellafield that contain a significant asbestos hazard in the form of sprayed coatings.

The work is being carried out by specialist site licensed contractors, Kaefer Ltd. They are creating a series of asbestos enclosures to make sure that the people removing the material are protected from any exposure to asbestos fibres. Over the next two years the team will remove approximately 250 tonnes of asbestos materials from the buildings before they are demolished.

John Baxter

New non-executive directors Anne-Marie Choho and John Baxter bring a wealth of experience to our nationally important clean-up mission. An engineer by trade, Anne-Marie has held senior positions across the globe as part of the French nuclear company Areva. Meanwhile John, who has served over 40 years in the energy industry and received a CBE for services to engineering, education and energy sector, has skills that he is keen to bring to bear on the transformation of Sellafield.

Since his last time at Sellafield several years ago, John Baxter was extremely impressed with the significant decommissioning and site clean-up progress when visiting earlier in the year.

He first came on site in 1974 as a trainee Royal Navy Engineer Officer, to see the activities taking place in support of the naval programme such as the storage of spent fuel and waste.

He said: "There has been very significant change, including how much better ordered and tidier the site looks. I had forgotten just how complex Sellafield is. In my short time with the company I am deeply impressed by the capability and expertise of the staff."

John brings extensive expertise to the Board, with 40 years in the energy industry including nuclear, electricity and oil and gas.

He started his career with the Royal Navy while studying mechanical engineering at Strathclyde University, and he served at sea on a Polaris missile submarine before moving to nuclear refitting at Devonport dockyard.

Following the Royal Navy, John spent 18 years with the UKAEA where he was involved in all aspects of the nuclear industry, including running the Dounreay and Windscale nuclear sites and AWE. His role as Director of Engineering was based at Risley, and he later joined the UKAEA Board and became a Director of Nirex Ltd.

John said: "During my time at Windscale, we achieved a number of milestones, and I distinctly remember the removal and transfer of the heat exchangers from the Windscale Advanced Gas-cooled Reactor."

During this period, John also sat on the UKAEA Constabulary Police Authority, before leaving the nuclear industry in 1998 to become Chief Engineer at the UK electricity utility, Powergen plc.

This was followed by a similar role at BP plc based in London, where he implemented consistent engineering standards across the group and developed the professional engineering capability, during a period of considerable change. He said: "BP has many comparisons with the nuclear industry, such as complex high hazard chemical processing and continual external scrutiny."

John has a strong interest in the engineering profession, and is a Fellow of the Royal Academy of Engineering and the Royal Society of Edinburgh. He is a past President of both the Institution of Mechanical Engineers and The Welding Institute. He has also been awarded honorary doctorates from Strathclyde University, where he is Chairman of the Advanced Nuclear Research Centre, and Robert Gordon University.

He said: "My experience in running large and complex, high hazard businesses that have undergone significant change and challenge means that I can support the company during this time of transformation. My prime focus is safety, security and quality."

"We need to transform the business to ensure the Sellafield operations are 'fit for purpose' to deliver safe and reliable operations. Often the least complex approach is better and I will use my decades of operating experience and professionalism as an engineer to help achieve that aim. We must always think carefully about the way we are doing any task to consider how to improve and wherever feasible, simplify our activities."

John and his wife Margaret are no strangers to Cumbria. They are keen fell walkers and have stayed many times in Bassenthwaite village over the past 20 plus years. ith a distinguished career in the nuclear industry, working with various nationalities at locations across the globe, Anne-Marie Choho brings a wealth of international know-how to our Board.

With a PhD in chemical engineering she joined Areva in 1988 as a research and development engineer. She then held several process engineering and technical management positions in France covering the nuclear fuel cycle – from nuclear fuel reprocessing, nuclear waste treatment and mixed oxide fuel fabrication projects.

She said: "I worked on the latest generation of reprocessing facilities at La Hague and the development of the Melox plant that now produces mixed oxide fuel assemblies. I also worked on projects for international customers such as the US Department of Energy sites at Idaho and Savannah River."

This led to her moving to the USA in 1996 to support the clean up of the Hanford nuclear site – managing and retrieving waste safely – as design engineer, technology programme manager and field engineering manager.

"Moving to the USA was a life changing experience. I witnessed how different cultures tackle technical activities, and this was a great way to share learning and help improve efficiency."

Anne-Marie also ran a course on nuclear waste vitrification at Washington State University to pass on her knowledge to the local community, and one of her pupils was our own operations director Steve Bostock, who was working at the site.

Her next move was to the mixed oxide fuel fabrication facility project at South Carolina as engineering manager, and she said: "The plant was close to the French design but used US standards and suppliers. There were some multi-cultural misunderstandings, which we resolved by developing great respect for each other."

In 2006, Anne-Marie returned to France and eventually became engineering and projects senior executive vice president where she ran large reactor and fuel cycle projects, dealing again with overseas countries such as Finland and China, and at one point looking after 6,000 engineers from five nations – US, Germany, Slovakia, China and France."

On her role with us, Anne-Marie said: "I jumped at the chance of working with the company last year as I haven't had direct experience of working in the UK and wanted to find out how Sellafield tackles its activities.

"I have a lot to offer the company. For example, I bring vast experience in how a company operates including with its supply chain, the challenges of transforming a company, technical knowledge of the storage and treatment of legacy waste, experience in moving from an operational mindset to a focus on decommissioning, and interactions with key stakeholders such as regulators and government on improving nuclear safety and security.

"I've so far been very impressed by the company's ability to diagnose weaknesses and be very open minded to new ideas and do things differently.

"Also, the long lasting technical focus of people who work here creates the desire to simplify procedures to get to where we want to be. We need to keep the workforce motivated and open minded, self-starters, and I look forward to working with them."

Anne-Narie Choho

Health Physics: Advances in monitoring equipment



Our health physics team help to ensure the radiological safety of our employees, contractors, and the environment. In Sellafield's early days some of the equipment they used was so large and heavy that it had to be wheeled about on a trolley. Today's equivalent is more effective and fits in their pocket. The next generation of health physics monitoring equipment is being introduced at Sellafield as part of our programme of continuous improvements in radiological protection.

The equipment our health physics monitors use is important in ensuring the radiological safety of our workforce and the environment.

Maurice Ray, radiological protection technical services support manager, explains: "We're introducing a new improved design of rate meters for health physics monitors that are more ergonomic.

"Our monitors use portable battery operated hand-held instruments to carry out radiation/contamination surveys of areas of plant and equipment. The new equipment is more compact making it easier to carry around. It weighs only 160g – so can actually fit in your pocket. It has a more sensitive response and is also more robust making it less susceptible to damage.

"This particular ratemeter can be used to detect alpha and beta contamination and displays instant readings on the screen at the same time. "All of our health physics monitors, around 400, will get a personal issue that they can take out on plant to do the vital work they do."

This work includes routine monitoring surveys; supporting plant sampling, maintenance and decommissioning operations; clearance of articles to be removed from controlled areas; low level waste monitoring; flask and waste container monitoring and dispatches from controlled areas.

"The new equipment will become the standard ratemeter for use on site. We have started to use these in a couple of areas, training people in the use of the new kit and the response so far has been very positive."





Solutions are being pioneered and accelerated by small and medium businesses, creating a hub of exportable innovation, skills and expertise for the global decommissioning industry.



Small companies are developing technology to help tackle some of the most complicated decommissioning challenges in the world.

One Sellafield

By **working together**, we are cleaning-up Sellafield's legacy facilities.



vhertel





lafield











. . .

(21-12)

3(21-52)

(pra Oficion





1

29

Nationw

One Sellafield







vhertel



There is no 'us' and 'them', we are all colleagues, keeping each other safe and working towards a **common goal**. hertel.com

phertel

YR62 EMX



The skills, innovation and diversity offered by the supply chain have played a role in our biggest decommissioning achievements.





One Sellafield: Hundreds of organisations are working at the same site, on the same mission. We are one team.







200/LL/866214 Servers Busy Company Comp		
RETRIEVALS PROJE	AZMD 4 SJAIRT ON SJAIRT SJAIRT SJAIRT SJAIRT	800

SOOF

STRENGTH IN PARTI









There is **a direct link** between the urgency of high hazard reduction and the skills and technology being developed by the supply chain.



Arri

CIT





1

One Sellafie

00000000

STATISTICS. 0000

33

is a collective effort, and will happen more safely and quickly if we work as one team.



v hertel

Work Safe Nome Safe

Ten years of Sellafield Ltd

In the lead up to the publication of our new Corporate Strategy and Transformation Plan we looked back at what has happened to our business, our sites and our people over the past decade. Not only has our skyline changed, we have also made real progress in the reduction of risks and hazards on the site. Here are just some of the highlights as well as views from our employees, customers and stakeholders.

Skyline

In the last decade we have removed more than 100 buildings from the Sellafield skyline, and built 11 new facilities to enable the clean-up of the UK's highest nuclear hazards.

Not everything has been delivered to time and cost, so we are focused

on the improvements we are making as we Transform Sellafield. These improvements include bringing in private sector expertise to strengthen our project and programme delivery capacity and capability. We have also developed a project academy for Sellafield to improve our capability and to provide training for project managers in other industries.

Going up



Over the last ten years, **11 new structures** have emerged on the Sellafield skyline including:

- A **world-class store** for special nuclear materials
- A buffer store for radioactive sludge removed from the First Generation Magnox Storage Pond
- A **new discharge stack**, meaning that we can demolish the old one
- A new evaporator for high level waste
- An interim storage facility for intermediate level waste
- A maintenance facility for equipment and tools needed to retrieve waste from the Magnox Swarf Storage Silos
- A **new store** for 3m³ boxes of intermediate level waste
- A new site command facility
- A **new site perimeter fence** which, if laid end to end, would stretch from Sellafield to Lowca



Risk and hazard reduction

Our highest risks and hazards at Sellafield include two fuel storage ponds and two waste silos. These four buildings, known as the legacy ponds and silos, are up to 65 years old. Our mission is to keep them safe and to make them safer by removing their contents and demolishing them.

We have been planning the retrieval of nuclear fuel, sludge and waste from these buildings for

Coming down

We have removed **more than 100 buildings** from the Sellafield skyline



- Buildings that were used to process plutonium for the **first atomic bomb test** in 1852
- The Calder Hall cooling towers
- The ducts and associated pipework on the Calder Hall heat exchangers
- The filter gallery from the top of the Windscale Pile Chimney that was damaged during the 1957 Windscale Fire
- Uranium finishing plant

many years. We have worked with experts and innovators across the nuclear industry and beyond. In the last three years we have moved from planning to progress.

Facts and figures



Magnox Swarf Storage Silo

- First silo emptying plant machine installed
- Alternative waste route identified, saving time and money
- Activity in silos reduced in preparation for retrievals
- Passive ventilation system installed to mitigate risk of ventilation power outages

Next:

- Active commissioning of first silo emptying plant machine in 2018
- Solids retrievals to start in 2019



Pile Fuel Cladding Silo

- Waste retrieval facility constructed
- Compartment doors fitted and commissioned
- Deflector plates removed from compartments
- Three access holes cut in silo for waste retrievals

Next:

- Finish cutting all 6 access holes.Install the waste retrievals
- machine in 2018.Manufacture 3m³ boxes to
- store the waste.
- Waste retrievals to start in 2019.



First Generation Magnox Storage Pond

- Skip handler returned to service
- Sludge retrievals into Sludge Packaging Plant 1 under way
- Fuel export route opened to the Fuel Handling Plant and 40te of fuel exported

Next:

- Completion of the identified high risk redundant effluent sludge pipework isolations (17 out of 18 completed to date) in February 2017
- Retrieval of sludge from highest risk area of facility will start in October 2018
- Continued fuel and sludge export



Pile Fuel Storage Pond

- Bulk canned and metal fuel export complete achieving 70% hazard reduction
- Local effluent treatment plant installed and reduced discharges
- First sludge exported and encapsulated in Waste Encapsulation Plant

Next:

- Continued sludge export to Waste Encapsulation Plant
- Export of solids from the pond to further reduce inventory

Waste management

Our ability to look after nuclear waste is the cornerstone of our activities at Sellafield. It is vital to our risk and hazard reduction mission, to the completion of reprocessing, and ultimately, to the long term clean-up of the Sellafield site.

We manage many different kinds of waste at Sellafield, but the highly active liquor that is a by-product of reprocessing is by far the most hazardous. Not only is it incredibly radioactive, but it is also hot, acidic and highly corrosive. All of these things mean that it needs special care before it can be safely stored prior to its return to its country of origin or its eventual disposal.

At the other end of the nuclear waste scale, the way that we manage low level wastes has changed dramatically over the last ten years. We now divert almost 90% of our low level waste for treatment or recycling, and we no longer pay to remove spoil and soil we might want to use in the future. In the next ten years we need to apply the same thinking to intermediate level waste – with reduction in waste volumes the key.



- We have saved nearly £1m and removed the need for 1,100 lorry journeys to and from Sellafield by storing 5,500m³ of spoil from the Silo Maintenance Facility construction project on site, ready for reuse on other projects
- In 2010 we completed the removal of more than **23,000 tonnes of asbestos cladding** from Calder Hall's heat exchangers, turbine halls, and other areas of the plant



 In the last ten years our Miscellaneous Beta Gamma Waste store has gone from a site facility to a national asset. It now supports the UK nuclear industry and receives waste from hospitals across the country

Spent fuel management

Our spent fuel management expertise and assets have supported electricity generation for decades. It includes the reprocessing of spent Magnox nuclear fuel from stations across the UK and also the reprocessing of spent oxide nuclear fuel from overseas customers.

Next year the Thermal Oxide Reprocessing Plant – or Thorp as it

7,500+ tonnes of fuel reprocessed

• More than 7,500 tonnes of fuel have been reprocessed in the Magnox Reprocessing Plant and Thorp in the last ten years

is better known – will complete its reprocessing mission and Magnox will follow suit in 2020.

The oxide fuel storage parts of Thorp will then be used to receive and store spent fuel from EDF Energy, helping to keep lights on across the country and generating an income which goes towards our risk and hazard reduction mission.

x9

shipments completed

 We have honoured our commitment to return the high level waste generated during reprocessing back to its country of origin, completing 9 shipments in the last decade



As part of our look back at the last ten years at Sellafield we were delighted to publish blogs from our employees, supply chain, customers and stakeholders. Here are a few of their thoughts...


Doosan Babcock knows the importance of successful delivery of major projects to Sellafield, and we also know from experience that some of these have been difficult in the past. We regard our relationship with Sellafield as a vital part of our future in the nuclear industry, but we also know that is one that comes with a degree of responsibility – working at Sellafield is demanding and the expectations associated with delivering a mission critical project on one of the world's largest and most complex nuclear sites are high.

Paul Terry, project director, Doosan Babcock

Ten years ago I was the head of Calder Hall and my remit was to lead missionchange. I inherited a good team who were emotionally linked to the generating history of Calder Hall and its place in the UK nuclear programme. Our future mission though, was to defuel and dismantle the station. Some people could embrace that change and become an integral part of the new mission. Others found it tremendously difficult to accept the changes and there was a spectrum in-between. We also needed to bring in new people with different experience and forge better links with the supplychain and Magnox Ltd so we could share our learning and reduce the cost and schedule.

I would say that our experience at Calder is a microcosm of the changes that Sellafield is going through and will encounter in future; my advice is to embrace the opportunities.

Paul Brennan, head of infrastructure, Sellafield Ltd

Whilst the connection between our Advanced Gas-cooled Reactors (AGR) and the Sellafield site stretches back far longer than 10 years, there is a lot to be proud of within this period. Sellafield provides vital day to day support to the safe operation of our fleet of AGR reactors, by receiving and processing the spent fuel we generate. Without this continuous support, our ability to reliably provide clean, low carbon energy to support the UK would be quickly affected. The relationship between our two organisations in this period has developed markedly, with us becoming much more collaborative in the way that we manage the full end to end process of nuclear power generation.

Matt Exton, head of lifetime and transition, EDF Energy

There has been so much work done over the last 10 years that it's difficult to know where to start. Obvious ones to mention are the remarkable steps forward in terms of the biggest risks on the Sellafield site, the legacy ponds and silos.

The thing that stands out for me in terms of bringing the risks down on the site is the ever increasing acceptance that in order for risks to come down long term, they need to go up short term.

Lena Hogg, West Cumbria Site Stakeholder Group

Five years ago I started work in the Effluent and Encapsulation Plants as an operations manager. At that time the only focus was supporting reprocessing. Two years ago we started looking to the future and believed our plants could have a major role in accelerating high hazard reduction and I started looking at how we could exploit these opportunities.

Step forward to today and we have started to receive sludge from one of the legacy ponds and large items of waste from clean-up projects. The end of reprocessing is not necessarily the end of the useful lives of our plants; it is merely a transition from one important mission to another.

Howard Carpenter, Encapsulation Plants development manager

Clearly I've landed in an exciting job at an exciting time. The hard work of those who've gone before me has allowed me to take the wheel just as we're really getting going. Now, as we're properly setting off in waste retrievals, is the time to think about what 'getting going' really means.

We have a duty to remove waste from the old facilities as quickly as possible, so we're seeking solutions and new technology that will enable us to speed up the retrievals schedule by 25% through our new value streams approach. It's going to take a whole new way of working to make that happen and we will never take our eye off the safety of our activities.

John Oliver, waste retrievals director, Sellafield Ltd

Corporate

In April this year we published our new corporate strategy that sets out the organisation that we need to become, the drivers for this change and the commitments that we must deliver on; from keeping Sellafield safe and secure through to delivering millions of pounds of savings for the UK tax-payer.

The names Sellafield and Sellafield Ltd are often used interchangeably, but there is a difference.

The Sellafield nuclear site has led the development of the UK's nuclear industry, from the production of plutonium for the country's nuclear deterrent programme through to the development of nuclear power generation. Today we are faced with the challenge of cleaning up the legacy of the site's early operations, including some of the most hazardous nuclear facilities in Europe.

Covering six square kilometres, the site is home to more than 200 nuclear facilities and the largest inventory of untreated nuclear waste in the world. We employ approximately 11,000 people who, along with our supply chain partners, are tackling Sellafield's current diverse portfolio of decommissioning, reprocessing, spent fuel management, nuclear waste management and nuclear material management.

As a subsidiary of the Nuclear Decommissioning Authority (NDA), we – Sellafield Ltd – are the company responsible for running the Sellafield site. We do this by:

- Providing safe, secure site stewardship
- Making demonstrable progress in our mission to complete reprocessing and clean-up the site
- Providing a return on the investment that stakeholders make in Sellafield every day





But we are also a cornerstone of the country's energy policy, providing:

- Confidence in the next generation of nuclear power generation that can support a low carbon economy. Nuclear power is not a credible long term solution without integrated waste management and final disposal solutions.
- Support to the existing UK civil reactor fleet.
- An exemplar for complex brownfield remediation.
- A more economic nuclear industry by reducing overall lifetime clean-up costs, including asset and materials management, design development and project delivery.
- A base load of nuclear skills and capability, including nuclear construction, which forms the basis for education and skills retention.
- A regional hub for an industry sector that can pull on hubs from other industries such as robotics and autonomous systems in hazardous environments.
- Supply chain development via varied and novel demand for services over many years.

As a company we are also facing challenges; preparing for the end of reprocessing and delivering our mission as efficiently as possible while providing value for money for the public funding we receive. We have set ourselves some stretching targets:

Delivering a transformation that accelerates the high hazard mission.

 Bulk retrievals from legacy ponds and silos will be completed (against the Baseline Plan) 25 per cent sooner, completing this hazard reduction phase earlier.

Developing a culture that is characterised by people who:

- focus on delivering value
- empower others
- hold each other to account
- work collaboratively
- take ownership of and pride in their work.

Reducing costs by £1.4 billion (against the Baseline Plan) by 2020 and a further \pounds 1-1.4 billion by 2029.

Creating an agile organisation able to make high-quality decisions and deploy resources, flexible enough to take advantage of opportunities and respond to threats.

- Our organisation will be able to flex +/-£100 million in any financial year by 2020.

Facilitating a long-term positive impact on the UK and regional economies.

 We will help ensure a resilient and engaged supply chain is in place to support our mission at Sellafield, delivering added value while lessening reliance on our organisation. As a consequence of our changing mission at Sellafield, our increased effectiveness, efficiency and flexibility, it is expected that our organisation will be smaller.

To deliver this we will go through a number of transitions which will change our future shape and size. We need to be flexible, agile and responsive with an organisational culture that supports change.

To optimise the response to mission change, performance gaps and economic and funding uncertainty, we need to change. A transformation programme has been established to drive high priority changes at Sellafield.

As well as responding to operational change drivers, we believe we can transform performance and prospects for our organisation, partners, stakeholders and communities. We will go through a number of transitions which will change our future shape and size. We need to be flexible, agile and responsive with an organisational culture that supports change.





There are four key drivers for change:



Mission change

In 2020, we will see a major shift in our work scope as reprocessing operations come to an end. This is a reduction in scope of approximately a quarter and therefore the organisation will reflect the change and be appropriately sized.



Performance gap

We have implemented a new management model and will continue to strengthen stakeholder confidence by demonstrating improved value for money, consistent delivery and efficiency across our operations, projects, safety and security.



Potential economic changes

We will be more agile and flexible, allowing us to respond to any future funding adjustments.

Changing nuclear horizon

We will be proactive in responding to new opportunities such as those created by new nuclear build and those within the emerging Industrial Strategy.





You can view the Strategy online at: www.gov.uk/sellafieldltd

Transforming Sellafield

In the last issue of *Sellafield Magazine,* we introduced our transformation – an ambitious undertaking that will enhance performance and prospects for our organisation and our stakeholders. Driving this forward calls for a blend of transformational experience, technical gravitas and personal determination. Meet our new Transformation Director, **Dr Angela Seeney**.





ngela Seeney was 14 years old when she knew her future lay in the sciences and engineering. Even as a small child she enjoyed complex puzzles, and her teachers and parents inspired in her a belief that she could choose any career path – even one not then a popular choice for girls.

Indeed, she broke new ground for the female scientists really who would follow in her footsteps, becoming the UK's first female apprentice on the Engineering and Industrial Training Board scheme, and carving a successful career in the largely male-dominated oil and gas sector.

A doctorate in material science and three decades in business transformation later, and Angela is embracing a new challenge – leading transformational change at Sellafield Ltd. It's an opportunity she is relishing.

"I feel very fortunate. Sellafield is a complex challenge, and performance here makes a difference not only to the Nuclear Decommissioning Authority and ultimately to Government, but to our employees, supply chain, communities, and to many interested stakeholders. Transforming Sellafield, which for me is all about generating more value, is one of the most interesting jobs there is.

"Transforming the way we work will improve performance, accelerate delivery and reduce costs, while focusing relentlessly on safety and security. But also it will show Sellafield as a demonstrator for future prospects and encourage investment, and that will create lasting economic value for the site, partners, supply chain, and local communities."

Certainly, Angela knows a thing or two about changing the way complex organisations work. Her background in the oil and gas industry includes driving business transformations that yielded multi-billion pound returns on investment.

Angela spent 28 years with Shell, latterly transforming its market proposition on alternative energy solutions, building the organisation to support it. More recently, Angela worked in the

Oil and Gas Authority, the organisation that regulates and promotes the UK oil and gas industry. There she focused on the economic recovery of the UK's oil and gas resources in the North Sea, bringing together many and varied stakeholders to manage a complex challenge – turning around a legacy position to become a sustainable national asset. There are clear parallels with Sellafield.

"We were targeting significant performance improvements in the North Sea, promoting new solutions that would deliver a transformational increase in value for the UK."

Value is a recurring theme for Angela, but what does she really mean by it?

"Value, and operating with a value-led model, is generally about keeping cost as low as possible, minimising risk, and making the benefit as

great as possible. For example, taking out duplication or unnecessary steps from a process helps us work faster and that creates benefits.

"At Sellafield, value is removing high hazard faster so that we reduce the greatest risks sooner. It's spending less taxpayers' money, and doing more with the money we do spend. And as we transform our business, we will look at everything we do through a value lens. It will drive us to do things

differently."

Our relationships with the supply chain will be vital in unlocking value, and Angela champions collaboration at every opportunity.

"Working more collaboratively with the supply chain will invariably enhance outcomes. We can unlock real potential for Sellafield and the way we deliver our mission. But

> also, if we can help the supply chain develop, to be stronger and more vibrant and ready to embrace new opportunities, they can attract future investment into our local economies.

"I'm passionate about partnerships with all stakeholders. We all have energy, expertise and ideas. Tapping into all of that will deliver substantial benefits. This is an open invitation to join in, and help us make a material difference.

"We face a huge scale of change, but we need to make sure that future choices made about Sellafield are positive ones. We need to create the conditions that will develop and deliver the greatest

possible opportunity for a sustainable future at Sellafield." A huge scale of change, yes – but Angela is not fazed by

the task. Last year, the Women's Engineering Society named Angela as one of the UK's top 50 most influential women in engineering.

On a personal note, Angela is married with two sons, loves stand-up comedy and displays an infectious wit of her own. She is well-travelled, enjoys live theatre and music, and loves a good detective story... not a little girl any more, but still solving the puzzles. ■

Tapping into energy, expertise and ideas will deliver substantial benefits.

with the supply

chain will invariably

enhance

outcomes.

Adog's life

THE CIVIL NUCLEAR CONSTABULARY, WHO PROTECT NUCLEAR ASSETS AND SITES ACROSS THE COUNTRY, ARE NOT ADVERSE TO INNOVATIVE WAYS OF WORKING. THEY'VE RECENTLY INTRODUCED NEW TRAINING FOR THEIR POLICE DOGS, WHICH IS EXPANDING THEIR ROLE, ENABLING THEM TO BETTER POLICE THE SELLAFIELD SITE.



-

Police dogs usually work until they are 8-years-old

Police dogs are a familiar sight to those who visit the Sellafield site, and they have long been an important weapon in the Civil Nuclear Constabulary's armoury.

In recent months, new training has seen the role undertaken by these helpful hounds expanded.







Traditionally police dogs would be used for general purpose police work including supporting searches and being used for the detection of explosives.

In recent months, three teams of police dogs from both Sellafield and Dounreay have completed a pilot course, designed to strengthen the skills of the dogs to support firearms officers in their roles.

The aim of the firearms support dogs will be to aid operations such as searching and moving through an area quicker and safer for firearms teams.

The dogs can be tasked to work ahead of the team – clearing areas, locating a subject's precise location using scent, and detaining subjects, if required, either physically or by presence.

THE SKILLS THAT WE CAN PROVIDE, THROUGH OUR DOG TEAMS, TO FIREARMS TEAMS ON THE GROUND IS INVALUABLE AND POTENTIALLY LIFESAVING.

PC Neil Henderson, lead instructor for the course, said: "This has been a long time in the planning and is a very exciting time for the constabulary and our police dogs.

"The skills that we can provide, through our dog teams, to firearms teams on the ground is invaluable and potentially lifesaving. By the end of our training programme we aim to provide qualified firearms support dogs to both Sellafield and Dounreay sites, this can only enhance our capability in delivering our mission to defend civil nuclear sites and facilities."

Recruiting our canine colleagues:

The most common canine recruits for the Civil Nuclear Constabulary are German Shepherds, Belgian Shepherds, and Dutch Herders and they join the force as puppies from breeders that supply other police forces around the country.

The puppies are paired with handlers who bring them on until they are 12 months old, at which point they start training to become licensed to operational general purpose police standards.

This new programme will see the Civil Nuclear Constabulary further train the dogs to firearms support standards. The dogs usually work until they are 8-years-old, depending on their health and fitness.

When they have finished their service their handler is given the opportunity to keep them. If for any reason the handler is unable to keep the dog for its retirement we look for an alternative home.









Counting Room Laboratories

Counting activity in the laboratories in 1954.



Filling the Generation Gap...

ore than 40 of our employees took part in the largest ever European nuclear conference for young industry professionals – The Nuclear Young Generation Forum – showcasing the UK's world-leading expertise and opportunities in the nuclear sector.

Held in Manchester, the event attracted more than 350 delegates from 27 different countries, featuring expert speakers, interactive workshops and technical tours to sites such as Sellafield.

As a key sponsor our employees delivered presentations on a range of nuclear related themes, hosted workshops, supported and delivered a science and engineering interactive workshop for 100 local school children.

Technical Director Rebecca Weston spoke to the conference about the challenges, opportunities and transformation of the company that employs 12,000 people in the North West.

"The nuclear industry is in a key period of its history as the world looks for secure and sustainable forms of low carbon energy generation. Meanwhile, there's the vitally important work of cleaning up and decommissioning nuclear sites across Europe, including Sellafield," said Rebecca.

"It was fantastic for the north-west to host this event which, through engagement with young people will help to shape the future of the industry."

Graduate trainee, James Cunningham, who helped organise the event said: "Our attendees gained so much from the conference, from developing their understanding of the industry, sharing knowledge and networking to developing personal skills such as public speaking."

The Final **Countdown**

We are close to completing our reprocessing mission at Sellafield.

We have been reprocessing used nuclear fuel at Sellafield since the 1950s. As part of the site's early operations, fuel from the Windscale reactors was reprocessed in order to capture the plutonium needed for the UK's atomic weapons programme.

Used fuel is reprocessed by stripping the outer cover from fuel, dissolving the fuel and using chemical processes to separate uranium and plutonium from waste materials.

There are two buildings at Sellafield that are dedicated to reprocessing different types of nuclear fuel; the Magnox reprocessing plant and the Thermal Oxide Reprocessing Plant – or Thorp as it is better known.



Magnox reprocessing

Used fuel from the UK's fleet of Magnox reactors, including our own Calder Hall, is reprocessed in the Magnox reprocessing facility. Our ability to take the fuel from the stations in line with an agreed programme has been a critical support to their electricity generating programme.

Tonnes to go: 1449

as of 1 August 2017, there are 1,449 tonnes of Magnox fuel to be reprocessed until closure of the Magnox operating programme.



Thorp reprocessing

Thorp reprocesses Oxide fuel from both UK and overseas customers and, at the height of its operations, was the biggest Yen earner in the UK. Revenue from both Thorp and Magnox reprocessing is used to help fund our risk and hazard reduction mission.

Tonnes to go: 608

as of 1 August 2017, there are 253 tonnes of Advanced Gas-cooled Reactor fuel and 135 tonnes of Light Water Reactor fuel to be reprocessed. We have also received sanction from the Nuclear Decommissioning Authority to reprocess an additional 220 tonnes of Advanced Gas-cooled Reactor fuel before Thorp's planned closure date of November 2018.

IN FOCUS: The Site Ion Exchange Effluent Plant

We use water across our site and our nuclear operations. It provides vital cooling for fuel as well as acting as a barrier to radiation, protecting the materials and our employees. It is the job of the Site Ion Exchange Effluent Plant to filter the water we have used in our nuclear buildings, removing and capturing radioactive isotopes and materials before the water is discharged into the sea. You could say that the building is the kidney of our nuclear site.





ur Site Ion Exchange Effluent Plant at Sellafield acts as a filter and removes soluble caesium and strontium from water in our oldest fuel storage ponds, the First Generation Magnox Storage Pond and the Pile Fuel Storage Pond. It removes these radioactive isotopes before the remaining liquid is discharged to the Irish Sea. The facility also cools the water used in our modern fuel storage pond, the Fuel Handling Plant.

The Site Ion Exchange Effluent Plant has been a key contributor to improved environmental performance as discharges today are a fraction of what they were before the building started working in 1985.





Background

The design and development work for the building began back in the mid-1970s. Construction of the £140m project started in 1979. It started operating in 1985.

There are a number of effluent treatment plants on the Sellafield site, and the Site Ion Exchange Effluent Plant's role is to treat the effluents from a number of plants including one of our oldest fuel stores, the First Generation Magnox Storage Pond and one of our newest, the Fuel Handling Plant.

The First Generation Magnox Storage Pond is one of our priority hazard and risk reduction projects with work under way to remove fuel from the pond and to reduce the levels of radioactivity in the effluent.

The Site Ion Exchange Effluent Plant has been a key contributor to improved environmental performance as discharges today are a fraction of what they were before the building started working in 1985.

How it works

The plant's process is based on ion exchange; everything is formed from atoms, from living things to the food we eat to the clothes we wear. When an atom becomes electrically charged it is called an ion. At Sellafield, pond water which has been in contact with Magnox fuel contains radioactive caesium (Cs) and strontium (Sr) ions. The Site Ion Exchange Effluent Plant removes over 99.9% of these ions from the water before discharging it to sea.

Pond water that has been used to store used nuclear fuel, and effluent from risk reduction operations in legacy facilities, is piped to the plant for treatment.

The radioactive water is first fed into a reception tank, from there it is pumped through a series of vessels containing sand and a natural zeolite called clinoptilolite.

Two of these vessels are ion exchange columns, inside each column there is a bed of clinoptilolite, as the water passes through the first bed, the top layer absorbs the caesium and strontium, the next layer continues the absorption process. The second bed, or 'lag' bed, acts as a polishing bed removing the last of the caesium and strontium ions.

The treatment also involves sand bed filters that remove particulates from the fuel storage pond feeds. The sand beds are washed to remove the particles which form a radioactive sludge – this is then stored in tanks.

Gary Robson, operations manager, explains: "The plant actually does much more than just treat pond water; we are also responsible for keeping the pond in the Fuel Handling Plant cool, providing storage for sludge and spent ion exchange material, and processing sludge-rich, active liquors generated from hazard reduction activities in legacy facilities.

"Before we even get to the point of filtering the water we have to adjust the pH balance of the water. In the Magnox fuel ponds the water is alkaline in order to slow down the corrosion of the fuel cladding material. Clinoptilolite deteriorates under these conditions so to counteract this, we feed the effluent into a tower which bubbles carbon dioxide through to neutralise the water.

"Also, spent fuel emits heat. In order to keep the pond water cool, we can recirculate the pond water to heat exchangers, and the heat is then dispersed to the atmosphere through our small cooling towers.

"Although the plant is highly automated there are other tasks that we have to carry out. For example, after around three months when more than 60 million gallons of water have passed through the beds, it becomes less effective and so we have to carry out a bed change.

"We discharge the clinoptilolite to a storage tank and replenish the vessel with fresh clinoptilolite. There are two ion exchange vessels and the bed changes are rotated.

"The plant is available around 90% of the time. It is an ageing asset but the team is working hard to get the plant into a position where it can support the operations of a new contingency plant until at least 2060."









53

In Focus

At a glance

The treatment process is based on ion-exchange in order to remove the radioisotopes strontium and caesium from pond water

Clinoptilolite is a naturally occurring alumino-silicate which was sourced from the Mojave desert in California. We have enough Clinoptilolite to last the lifetime of the plant

The plant settles out and filters solids using a carbonation process to neutralise the alkaline pond water and then ion exchange to take out radionuclides

23 million cubic metres of water

Has processed over 23 million cubic metres of water in 32 years



Future

A new major project at Sellafield, a contingency plant for the Site Ion Exchange Effluent Plant, is under way. It is not a full replacement, but an extension of the existing facility that will use some of the existing building and equipment and the expertise of our teams. The contingency plant is due to be fully commissioned by 2025.





The first Cut is the deepest

Bisk and hazard reduction



How do you access intermediate level nuclear waste held inside an air-tight 65-year-old silo that has no doors? You develop an engineering solution, test it at a shipyard in Scotland, install tonnes of support equipment and then cut the first hole...

aking a hole to break through from one place to another has delivered some historic moments: the waving of Union Jacks and Tricolours as engineers joined the two sides of the Channel Tunnel in 1990; Howard Carter's amazement in 1922 as he dug through into Tutankhamun's tomb; or finally reaching the

Chilean miners stuck underground in 2010. Now we have delivered our own 'break through' which will

certainly go down in the nuclear decommissioning world as an historic moment. The hole in question is in the side of the Pile Fuel Cladding Silo and was made in April 2017. Due to the nature of the intermediate level waste on the other side, it certainly didn't involve

any people passing through it to celebrate. The story behind the hole, the first of six being made this year in

this legacy nuclear storage facility, is one which British engineering can be proud of. The logistical challenge of creating the opening to enable waste retrievals machinery to reach into this 'locked vault' where the contents have remained untouched for around 50 years has been enormous. Not least because the silo's atmosphere needs to be contained so that the inert gas argon remains inside

and removes any risk of a fire happening. Before the holes could be cut, a protective barrier was needed

to safely enclose and shield the waste inside before waste retrievals start in 2019. This barrier comes in the form of the six giant steel silo doors - each weighing 12.4 tonnes (the equivalent of around 150 grown men). Hanging a door that size is the mother of all DIY jobs and required a specially manufactured door installation frame to inch it forward into place onto the silo wall. Getting the 40-tonne frame into place onto the newly built waste retrievals superstructure next to the silo was in itself an engineering challenge, involving precision crane work.

The second half of 2016 was dominated by getting the frame installed and then all six doors into place on the silo wall. At that point, the next big piece of equipment – the retrievals access penetration rig – could be lifted into place in three pieces weighing around 90 tonnes in all (the equivalent of seven double decker buses).

Like the frame and the doors, the rig was built in a military shipyard in Rosyth, Scotland by Babcock Marine Technology for the main contractor Bechtel Cavendish Nuclear Solutions.

Our design team in Daresbury came up with the stepby-step plan and some of the UK's best advanced manufacturers and precision engineers delivered the kit to make it happen.

The rig allowed all of the drilling and cutting work to take place safely behind a protective plastic barrier and also held the large concrete piece being cut (called the monolith) safely in position with a 'swan neck' support arm so it couldn't fall out until we were ready to remove it. Once all of the cutting work was finished, the rig holding the monolith pulled back away from the silo, the silo door was shut and the monolith was bagged up and disposed of.

Steven Carroll, the head of the Pile Fuel Cladding Silo programme, says he has been staggered by the sheer amount of engineering, planning and preparation involved to cut six holes in a wall.

"This silo is one of our four highest priority decommissioning projects at Sellafield. Given the risk and hazard inherent in this facility and the fact we have been making irreversible alterations to the structure of the building, it's not surprising that we've been very, very careful to do this safely.

"We tested the procedure over and over again at the replica silo built at the manufacturing base in Rosyth. Nothing was left to chance. Operators even wore the same protective clothing and breathing apparatus in Scotland that they'd need on the actual job so that they could completely mimic the operational conditions.

"Once all six holes have been safely made this year we can clear the rig and all the cutting equipment from the top of the retrievals building. The next step will be to build and install the actual waste retrievals machinery in front of the silo door.

"It's an exciting time as we all press forward to start getting the waste out of this 'sleeping giant' in 2019."



The 2m by 3m 'Monolith' was pulled back by the extendable arm (bottom right) and then the door was closed.

The rig used to carry out the cutting was built in Rosyth and lifted into position next to the silo.



About the silo

The Pile Fuel Cladding Silo

is a concrete structure

29 10 18 LONG WIDE HIGH

and is divided into 6 compartments each containing intermediate level waste in dry conditions. It started accepting waste in

> when George VI was still on the throne, and is one of the

world's oldest nuclear storage facilities

Built at the dawn of Britain's atomic weapons programme



FACTS ABOUT SUPPLY CHAIN SPEND

1 NDA Nuclear Decommissioning Authority

We are a subsidiary of the Nuclear Decommissioning Authority. Each year, we receive money from government to fund the operations on the Sellafield site. In 2016/17 our budget was just over £2bn.

£

WE SPEND APPROXIMATELY £1.2BN WITH THE SUPPLY

CHAIN EACH YEAR: THAT'S

60% OF OUR TOTAL BUDGET.

Our supply chain extends further than just direct suppliers. Due to the complex and diverse nature of the work at Sellafield, our supply chain spans down multiple tiers. We are the Tier 1 contractor and our direct suppliers are Tier 2, but we have suppliers spanning as far as Tier 5.





5

23.5%-25% TARGET

WE ARE COMMITTED TO ACHIEVING GOVERNMENT TARGETS ON ENGAGING WITH SMES. THESE TARGETS ARE INCREASING YEAR ON YEAR. THIS YEAR THE TARGET IS BETWEEN 23.5 AND 25%, AND BY 2018/19 THE TARGET IS BETWEEN 29 AND 31%.



40000 THE MONEY WE SPEND DIRECTLY WITH OUR SUPPLY CHAIN SUPPORTS MORE THAN 4,000 JOBS. THIS DOESN'T INCLUDE ANY JOBS SUPPORTED BY OUR SUPPLIERS AT TIERS

3, 4 OR 5.

10 As part of the tender process for new contracts our supply chain must now make social impact commitments to benefit the local community around our sites.

2

3 95% OF OUR TOTAL SUPPLY CHAIN SPEND IS SPENT

WITH 100 COMPANIES. SIX OF THE TOP 100 ARE SMALL TO MEDIUM SIZED ENTERPRISES (SMEs).

During the 2016/17 financial year we spent money directly with 874 individual companies, 425 of

which were SMEs.



8 402 APPRENTICES

197 GRADUATES

68 TRAINERS

402 apprentices, 197 graduates and 68 trainees are completing their training working on Sellafield workscope as a result of the money we spend in the supply chain.

58

4





Giving The comunity a voice

We are part of our communities; those marked out by geographical boundaries and those made of people who are bound together by their interests and concerns. Just as our technical experts working in nuclear buildings are often best placed to determine the best course of action, the people who live and work within the community are most aware of the issues affecting them and what kind of intervention would work best. >>

DELIVERED IN COLLABORATION WITH Cumbria Community Foundation, Cumbria Newspaper Group, CFM and the Phoenix Enterprise Centre





91,760 VOTES WERE REGISTERED







G aining a better understanding of the issues that the community feel are most important, and then using that information to prioritise the projects and charities that we support, was something that we wanted to achieve this year.

The Community Choices crowd polling platform not only raised the profile of 68 local good causes to the Cumbrian community, it gave the community a voice in deciding which project would receive our funding.

HOW IT WORKED

During a four week window, 68 charities and community groups submitted applications for funding to help them deliver a sustainable project that would have a positive impact on the lives of people living within the boroughs of Copeland and Allerdale.

An independent panel whittled this list down to 43 projects across the following categories:

- Improving Cumbria
- Improving health and wellbeing
- Improving social inclusion
- Supporting stronger communities
- Supporting the younger generation

To create a more level playing field we created two competitions, one for small organisations and another for those with an annual income of more than £300,000.

The shortlisted organisations then had four weeks to generate as much support and gain as many votes as possible and the project with the highest number of votes in their category and funding bracket would then secure the funding.

improving Digital Literacy

As well as giving the community a voice and raising awareness of life changing organisations, we recognised the potential for Community Choices to help improve digital literacy in our communities.

The team from the Phoenix Enterprise Centre hosted dedicated IT centres within local towns that have evidence of lower levels of digital literacy or connectivity throughout the programme. They helped people to create email accounts, access the Community Choices portal and cast their votes.

THE RESULTS

Over the four weeks, an amazing 91,760 votes were registered from 9,176 different user accounts which resulted in the 19 winning projects being awarded more than £580,000.

In addition to the overall winners, 22 of the projects managed to secure more than 500 votes and were awarded a \pounds 1,000 grant.







19 WINNING PROJECTS







THE IMPACT

During 2017/18 we will track the progress of the 19 winning projects and the positive impact that they are having in the community. These include:

Rosehill Youth Theatre who will use their grant to refurbish a hall in Whitehaven to continue their work helping children to raise their confidence and self-esteem through performing arts. The improved facility will also be easier to hire out, generating additional income to keep the space open and sustainable.

Nurture Lakeland will carry out vital repair work to the badly eroded Brown Tongue path on Scafell Pike, England's highest mountain. This path is well-used and loved by local residents and without vital repair is becoming damaged and eroded.

Creative Wellbeing is going to deliver a total of 75 energy-themed activities, including print-making, drumming, felt-making, drawing, singing and bookbinding, across Allerdale, Copeland and Carlisle, to enhance the health and wellbeing of the participants.

Cumbria Rugby Union Football Club

is leading and coordinating a county wide #ThisCumbrianGirlCan campaign to support, encourage and inspire more women and girls across Cumbria to be more active.

Rosehill Arts Trust will use the funding to finalise the redevelopment of the Whitehaven theatre. The venue will provide opportunities for everyone to participate and enjoy the performing arts and to develop their skills whether as part of a community choir or an apprentice in the restaurant.

Wigton Baths Trust will replace its water tank, almost doubling the number of available showers, providing a better experience for people who use the community pool and hopefully leading to an increase in visitor numbers.

Mirehouse Residents' Group's Fit for

Life scheme will offer healthy eating and fitness classes to residents of the Whitehaven estate, plus utilise the community garden to introduce a food co-op.

Watchtree Nature Reserve, near Carlisle, is going to resurface 1 mile of trails to allow visitors of all abilities greater opportunity to explore. The resurfaced trails will allow greater access for visitors on foot, using wheelchairs or pushchairs and by bike, including adapted cycles for disabled visitors.

SASRA Ltd will develop its facilities in Seascale, improving access and increasing capacity so it can offer a wider range of activities and attract new users.

2199 (Workington) Air Squadron ATC

will buy outdoor equipment so that participation in the Duke of Edinburgh Award expeditions is more affordable for cadets from less affluent areas.

Healthy Hopes Cumbria offers workshops covering health and wellbeing topics to encourage positive change. It will now offer more sessions, led by experienced workers to improve levels of emotional wellbeing, resilience and independence.





AWARDED MORE THAN £580,000



Cumbria Reducing Offending

Partnership Trust will use the funding to improve the employability of some of the most socially isolated people in the whole of Cumbria. This will be done through mentoring, identifying and challenging barriers, and recognising educational needs that can be addressed, thus preparing individuals for a more productive life.

Citizens Advice Copeland and Allerdale have teamed up to run a mental health project which will address the need of people with mental ill health for specialist welfare benefit, debt and housing advice in West Cumbria. The funding would provide dedicated workers to champion the cause of people with mental ill health problems.

The Punch Bowl in Great Broughton is a thriving community pub, owned by 60 local shareholders and run by volunteers who came together to save the 17th century coaching inn from closure. They will repaint the pub's exterior, using local contractors and volunteers to carry out the work.

Seascale Community Beach Park

Project is going to use the grant to buy play equipment for the beach park, increasing the quality of tourist visits to Seascale.

Mayfield School Development Fund

will provide technology to help young, nonverbal people communicate through electronic communication aids, improving their quality of life by helping them to be socially active.

Egremont RUFC will increase young people's participation in the sport by making sure its single pitch has improved drainage. The pitch is regularly waterlogged as it has no installed drainage system, which hampers its extensive youth development programme.

West Cumbria Domestic Violence's Freedom Project will offer group and individual sessions with counsellors so the young people and children affected by domestic and/or sexual abuse have a safe space and the appropriate help they need. Safety Net (UK) supports the recovery of those affected by rape, sexual abuse and domestic violence in North and West Cumbria. Using the funding, they will to roll out #bemysafetynet, a county-wide training and education programme in schools to support staff and pupils, provide information and counselling to make sure young people feel safe, stay safe and feel included. ■

GO 2 GOV.UK

rom August 2017 our digital home will be GOV.UK and our corporate website will close. What does it take to create a new website and join other civil service organisations and departments in just three months? Collaboration and an unwavering focus on user needs.

When you think of using GOV.UK, everyday tasks like taxing your car, paying your tax or enquiring about your pension might come to mind. The platform does help people to complete these tasks, but it is also home to every government department – from the Prime Minister's office to the Nuclear Decommissioning Authority. And we have joined their ranks.

GOV.UK is the website for the UK government and as a wholly owned subsidiary of the Nuclear Decommissioning Authority and a publicly funded organisation; we fall within the website's remit which is to provide:

- information and services for citizens and businesses
- detailed guidance for professionals
- information on government and policy.

The process of moving from a corporate, standalone website to being part of GOV. UK took a team of seven people from our organisation and from the Government Digital Service (GDS) – the team responsible for GOV.UK – just three months to complete.

The team completed a detailed review of the corporate website; what were users looking for, which pages were they visiting, how long were they staying, where did they go next? This information, coupled with insights from subject matter experts across our business, gave us a real insight into the needs of our users.

Amanda Diamond, transition content lead at GDS said: "All our content starts with user needs. By doing this, we make our products and services simpler and easier to use, helping people get what they need faster.

"Working with the team at Sellafield has been a wonderful example of collaboration. They have been willing to learn and adopt new processes and have been an exceptionally professional team to work with. We're delighted to welcome them onto GOV. UK and look forward to seeing how their content develops in the future." Head of corporate affairs, Emma Law, said: "The process of moving to GOV.UK has helped us to build on our commitment to openness and transparency. This principle isn't just about explaining what happens at Sellafield behind our security fences, and simplifying the science of what we do; it is also about providing information in a way that everyone can access. The 'digital by default' ethos of the GDS team has pushed us to ensure that our content can be viewed by anyone, on any device, and to make sure that people can find what they are looking for easily.

......

"GOV.UK received more than 68 million unique visits in the last twelve months and we are excited by the opportunity to tell our story and that of our supply chain on such a global platform."

> To keep up to date with our work at Sellafield, bookmark our new home page or add us to your favourites.

o www.gov.uk/sellafieldltd



Unsung heroes

BUILDING SERVICES TEAM, MAGNOX REPROCESSING

UNSUNG HEROES

Est. 1987

For enabling reprocessing operations to keep operating.

📚 Sellafield Ltd

Our unsung heroes The name of the team 'building services' doesn't really tell you much about what this small group do and what they are responsible for, but the work they carry out is vital in enabling reprocessing operations to keep operating. The team is made up of ten operators and one team leader and the tasks they are responsible for are broad ranging.

hey are an important piece of the Magnox reprocessing jigsaw, Gary Rothery, head of Magnox Reprocessing Operations explains why: "This team consistently deliver what they need to. Their work is really varied, one day could involve them transferring drums of Uranium trioxide (UO₃) powder from the plant to the Drum store, whilst managing drum moves within the store and exporting the drums to Capenhurst. Without this service, we would not be able to operate the Thermal Denitration Plant, which is essential for sustained Magnox Reprocessing operations, and would ultimately affect Magnox East River operations, where the fuel is prepared prior to it reaching us, and all of these things would have an adverse effect on the Magnox Operating Plan.

"Added to this the team are also responsible for the collection and transfer of various waste materials such as glass, aerosols and batteries from local collection areas within the facilities and they are responsible for collecting the Plutonium Contaminated Material, packaging it and ensuring it is removed for storage compliantly.

"It's important that these jobs are carried out, without them waste could lead to local housekeeping and fire safety issues and would result in Magnox Reprocessing being non-compliant with legislation and site arrangements.

"The support tasks that they carry out ensure compliance with the Sellafield site arrangements, the service provided by this team allows the remaining teams to focus on operating and maintaining the facilities in order for us to do what we are there to do – reprocess Magnox fuel.



"WE HAVE LOTS OF HEROES IN MAGNOX REPROCESSING, BUT THIS SMALL TEAM REALLY ARE THE UNSUNG HEROES OF MAGNOX REPROCESSING."



"Cumbria could have the fastest growing economy in the country, but the clock is ticking." We have a nationally important decommissioning mission to deliver at Sellafield. In helping us with this mission our supply chain is developing technologies and solutions that could be exported to take advantage of the £250bn (and growing) global decommissioning market. A supply chain that was delivering for Sellafield and other national and global customers would create a diversified local economy with a higher rate of growth than any other community in the country. This isn't a pipe dream it is a future that is within our grasp but it isn't something that any one organisation or body can achieve alone. How do we play our part? That's the challenge for our new head of community and development, **Jamie Reed**.

RACHEL DOWLING (RD): WELCOME BACK TO SELLAFIELD. I IMAGINE A FEW THINGS HAVE CHANGED SINCE YOU LAST WORKED HERE.

JAMIE REED (JR): They certainly have. When I was here 12 years ago British Nuclear Group had just been created and the Nuclear Decommissioning Authority was only just being established. Since then the mission, model and skyline at Sellafield has transformed completely and there are completely different relationships with NDA, the supply chain, the community and the government. I understood and was involved with a lot of these changes as an MP on the outside looking in but being back inside the fence definitely gives you a unique perspective.

RD: HOW DIFFERENT IS IT LOOKING AT SELLAFIELD FROM THE INSIDE, COMPARED TO LOOKING AT IT FROM WESTMINSTER?

JR: I was lucky because my previous role on the site meant that I had a very good understanding of where the site had come from, the challenges it faced and the national importance of the work under way on the site. But things change and new processes come on line, new buildings are constructed, new acronyms are invented and it is harder to keep up with that pace of change when you are on the outside.

RD: YOU'VE MENTIONED THE PHYSICAL CHANGES ON THE SITE, BUT DO YOU THINK THAT THERE HAS BEEN ANY CHANGE IN THE CULTURE WITHIN SELLAFIELD LTD?

JR: Yes, but I think culture change is a continual process in a dynamic industry like this one; it has to be. When I left the focus was very much on fuel manufacture and reprocessing as those were the business priorities at the time. Now there is a much sharper focus on the national mission of decommissioning, waste management and environmental remediation.

What we are doing at Sellafield today is not in the interest of shareholders but of the

country as a whole and this brings a sense of urgency, intensity and momentum that you can see on a daily basis. My job is to help to use this momentum to derive the maximum possible benefit from the work we do and the public money we spend.

RD: WHAT SORT OF BENEFITS DO YOU MEAN?

JR: There is no other site like Sellafield in the world. It's where many of the major developments in the 20th century nuclear industry were pioneered but no thought was given to how some of the oldest plants and buildings would eventually be decommissioned so we face a huge challenge for which there is no blueprint. In meeting this challenge our scientists, engineers, operators and suppliers are developing ground-breaking solutions and techniques that are infinitely exportable. The global decommissioning market alone is worth in excess of £250bn and the experience and vibrancy of our supply chain means it's among the best placed and equipped in the world to capture this market.

RD: CREATING A CENTRE OF NUCLEAR EXCELLENCE?

JR: I would argue that Cumbria is already a Centre for Nuclear Excellence. We don't just have the most iconic nuclear site in the world; we are also home to the UK's National Nuclear Laboratory, the national Low Level Waste Repository and have been selected as the development site for the next generation of nuclear power stations at Moorside. And don't forget that the Nuclear Decommissioning Authority is still the only government body that has its headquarters outside of London. Their transport and export subsidiaries Direct Rail Services and International Nuclear Services are in this county and Barrow is home to the UK's nuclear port and Pacific Nuclear Transport Ltd. That community is also making nuclear submarines at BAE Systems as part of our national defence programme. Our supply chain is starting to export their technology to the global decommissioning market. We also have

a developing skills infrastructure with facilities like the established construction skills centre and the new national nuclear college.

I don't think that we should be afraid to take credit for the centre of excellence that we have created; we need to build on it.

RD: IT ALL SOUNDS GOOD, BUT SELLAFIELD IS STILL A CLOSURE SITE, ISN'T IT?

JR: It is, and you don't need to look 100 years into the future to see the site starting to reduce its scope. In the next three years reprocessing will come to an end and once we've removed the hazards and reduced the risks on the site the Government will need to make some significant decisions about our future. If we want them to choose continued investment in our business, industry and community we've got to make it easy for them, so the challenge for us is to keep delivering, keep moving forward and keep aiming for more.

We have to do everything we can to help ensure that the economic activity of today is replaced with a foundation for further growth in the future, and not just in the nuclear sector. This will take a combined effort with the public and the private sectors working together towards a shared and visible goal. If we do this Cumbria could have the fastest growing economy in the country, but the clock is ticking.

RD: YOU ARE ONLY A COUPLE OF MONTHS INTO YOUR NEW ROLE – IF YOU COULD SKIP AHEAD TO MAY 2018, WHAT DOES SUCCESS LOOK LIKE FOR YOU?

JR: I hope that, in partnership with all of the relevant organisations and authorities, to have created a concrete set of options for the government for Sellafield and for the decommissioning industry in our area going forward past 2020 and towards 2025, 2030.

What's to stop us, not as Sellafield Ltd, but as a nuclear sector, accessing the £250bn global decommissioning market and bringing that money back to the UK?

IT'S A NEW HIGH POINT FOR OUR DECOMMISSIONING MISSION: THE SELF-CLIMBING PLATFORM BEING USED TO DEMOLISH THE STACK ON TOP OF THE PRIMARY SEPARATION PLANT REACHED THE TOP OF CHIMNEY THIS SUMMER. NOW THE ONLY WAY IS DOWN AS IT BEGINS TO 'EAT' AWAY AT THE STRUCTURE.

> months to make the journey up the 61m stack, a metre at a time

> > 2

years to carry out the full demolition, piece-bypiece, down to its final height of 9 metres by the end of 2019

650

tonnes: Removing the structure will reduce our seismic risk considerably

Decommissioning





Istorically the highest point on the Sellafield site (until its replacement was built), the 1950s Primary Separation Plant stack needs to be removed as a priority as it does not meet modern seismic safety standards. But first we needed to get the platform where the demolition work will take place to the top of the structure.

Aerial drones were used for the first time in the separation area of site to inspect the condition of the stack beforehand. Like a monkey shinning up a tree, the platform held on and pulled itself up the chimney for more than half a year. Find out more from the video on our YouTube Channel and the Sellafield website.





WE HAVE A LONG HISTORY OF SUPPORTING SCIENCE, TECHNOLOGY, ENGINEERING AND MATHS EDUCATION PROGRAMMES IN PRIMARY AND SECONDARY SCHOOLS IN OUR COMMUNITIES. BUT WITH A WORKFORCE OF AROUND 10,000 COVERING FIELDS AS DIVERSE AS NURSING, DEEP SEA DIVING, PROJECT MANAGEMENT AND COMMUNICATIONS, THERE ARE OTHER WAYS WE CAN SUPPORT OUR WORKFORCE OF THE FUTURE, AS A RECENT PROJECT WITH WEST LAKES ACADEMY SHOWS.

or those handy with a football, a career in the professional sport might be in their future. Those more comfortable with science, engineering, technology and maths might be the nuclear decommissioning experts of the future. Some skills have an obvious application; it is easy to see how to turn your capability into a career.

For some students at West Lakes Academy in Egremont, it was harder to see the link between English and a potential future career. Carly McLeod, Key Stage 3 coordinator for English, explains: "There was a real disconnect for some of our students between English, particularly creative writing, and the real world. Our year eight boys in particular struggled with longer writing tasks and

their performance had slipped when compared to their female classmates."

Next generation

They aren't alone, across the country in 2016, girls' outperformed boys' GCSE performance in English by 15% – a greater gap than at any point in the last ten years. Whilst the situation at West Lakes isn't quite as significant as that, it was clear that it was an area for further improvement. Our interactions with the

schools in our communities are traditionally based around science, technology, engineering and maths – subjects that fit most closely with our mission. However, we have a far greater suite of skills that we can share.

Working with the students to produce a feature article for Sellafield Magazine created an

opportunity for Ian Curwen and Ben Chilton from our Stakeholder Relations team to talk to the class. Melissa said: "It was great for the boys in our class to meet and talk to men that they can look up to who have made a career from their English skills. I don't think that any of them had considered a career in communications before."

lan Curwen, stakeholder relations officer, said: "Following discussions with Melissa and the English department, we realised that the opportunity to write for a magazine, help design the pages, and then see their article in print, was something that might excite pupils and help encourage them to write.

"We worked together to come up with a

suitable assignment that would meet the National Curriculum and also give us something really interesting for the magazine. Following this, a colleague and I visited the school to speak to year eight pupils about this assignment, our careers in communications, and why English skills are crucial." After more than sixty years of pioneering work, it's

What

I didn't

know about

Sellafield

understandable that lots of what we do here at Sellafield is well documented. But despite this, there are still misconceptions about what we do behind our security fences and lots of things about the site that people don't know about. So we set them the task of researching the site and writing an article on 'what they didn't know about Sellafield'.

Thanks to his research ł into our Thermal Oxide Reprocessing Plant (Thorp), Koby Conway understands that the plant takes used nuclear fuel and reprocesses it. But it was the role of a building manager in the nuclear facility and the way that he imagined the role compared to the life of a school child that really grabbed our attention. "First, a building manager would wake up at 6 o'clock (you'd probably be asleep),

5

and start work at 7 o'clock (still asleep?). They check their emails (a bit like us checking our text messages) and make

- sure that everyone on plant
- knows what they need to do."

4



across the country in 2016,

girls' outperformed boys'

English by 15% – a greater

gap that at any point in the

GCSE performance in

last ten years.



- It was our role in supporting the local community that surprised **Finn Henderson**. His entry included his account of our support after local flooding and in support of local food banks. "In 2015 a terrible storm
- hit Cumbria called Storm Desmond and some people lost everything. Sellafield Ltd and other companies got together to raise money to help. The company also helped to collect food and money for foodbanks and over one summer holiday helped to provide hundreds of
- food parcels."



We have many storage ponds at Sellafield - some open air and some within buildings. They might look like swimming pools, but in her entry, Callie White pointed out that they are nothing like the pools you might encounter "Sellafield has many tanks of water that may look like a swimming pool but in actual fact they are used to store things. Some of the ponds are full of radioactive waste. They have a 350-tonne machine that has been installed to tackle one of the biggest nuclear clean-up jobs in the world, getting the waste out of the ponds."

ATOM

Sam Potter was particularly interested in the amount of radiation that comes from Sellafield and her article compared the dose that nuclear workers receive to the amount you might get on a long-haul holiday flight. "Who would like a trip away to Miami, Florida or New York City? Me too, but have you ever thought about the radiation picked up from those transatlantic flights? You could perhaps pick up the same amount of radiation on a flight that lasts less than twenty-four hours than the average annual occupational exposure of a nuclear worker."

Кору Соптау

6

Chloe Fawcett ŧ

Sam

Potter

Callie White And the winner is...

Hannah Clarkson





f I ask you to think of London, what is the first thing that you can think of? Red double-decker buses? The London Eye? Having afternoon tea with the Queen in Buckingham Palace? Stereotypes are usually the first things to come to mind. Stereotypes like these are not

usually frowned upon, so why is it that when people imagine

Sellafield to have

pollution surrounding the plant and to 'glow in the dark', we find it so peculiar?

First of all, the answers are no and no. As far as pollution is concerned, by reprocessing spent fuel, Sellafield allows 97% of it to be recycled back into new fuel, resulting in less waste. It may surprise you to know that we are all exposed to radiation from many sources such as rocks, medical x-rays, our food and transatlantic aircraft flights. Additionally, people receive doses of radiation from these natural sources that are much higher than a nuclear power worker.

Not forgetting that Sellafield is as

old as the UK's nuclear industry

itself, so you can trust me when

I say that they know what they're

doing. But if there was 10,000

you really can't afford to make

As for 'glow in the dark', that's

people at your workplace,

mistakes!

sadly not so true. Although wouldn't it be cool if it was? If you search the topic in Google, there will be website after website that argues both yes and no. In one way, they are correct to say yes:

"Nuclear reactors have been known to glow a bright blue colour. This is because the

> reactors radiate a change particle that travels faster than the speed of light. The blue glow is the equivalent

of a sonic boom, also known as Cherenkov radiation."

However, this is the particle that makes the glow and not the reactors meaning that, no, the reactors and the plant itself do not glow. But if you want to see a glowing nuclear power plant, you can always watch The Simpsons.



Stereo












WEST ACA

Sinply Bindly Bi

Fantastic educational opportunities are crucial to West Cumbria's success, will continue to cement this area's credentials as a Success, while contained to come this area's creating as a chain contained by the supply chain contract of Nuclear Excellence, and help us – and the supply chain - to grow the workforce of the future. It is against this backdrop that West Lakes Academy has triumphed with a sensational Ofsted report that recognises its striking achievements.

chieving an outstanding Ofsted rating is a tough ask – in fact there are only five secondary schools with such an accolade in the whole of Cumbria. For West Lakes Academy in Egremont to be rated so highly is a sensational achievement.

The academy was awarded the highest possible rating in all five areas of assessment – Leadership and Management, Teaching and Learning, Personal Development, Behaviour and Welfare, Post-16 Provision and Outcomes for students, at its inspection in March 2017.

This is a triumph for the academy and all those who have been involved in its success, and one which is rightly being celebrated. However, what people might not realise is that this success is the crescendo of a neardecade-long journey of improvement.

We along with the Nuclear Decommissioning Authority and the University of Central Lancashire make up the trio of organisations that sponsor the academy. Employees from the three work closely with the academy's leaders to support its development.

We became a sponsor back in 2008, when the academy was created. It replaced two former schools, Ehenside in Cleator Moor and Wyndham in Egremont. Wyndham was the first purpose-built comprehensive in the country when it opened in 1964, so educational pioneering is part of the area's DNA. Jonathan Johnston, West Lakes Academy principal, said: "Since the academy opened its doors, performance has improved and results have risen steadily to the current position where they are some of the very best in the county – comparable with red brick institutions steeped in history.

"I am incredibly proud of our success. The three sponsor organisations and our governors have been integral to this, working with our talented staff and students to drive improvements."

One of the people who have travelled the West Lakes journey is Adrian Thompson, who chairs the academy's governing body on our behalf.

He said: "I am delighted to have been a part of West Lakes' development. Governors are drawn from a range of backgrounds from the sponsor organisations and the community, all of whom make an important contribution to the success of the academy and its students.

"West Lakes' success is one that we wish to see replicated across West Cumbria, and many of my colleagues are helping to do this by giving up their time to inspire and support young people through education at other institutions."

To encourage educational achievement and inspire the next generation towards their future careers, we are supporting the development of the £33m Campus Whitehaven, which will open in 2018 and provide modern learning facilities for St Benedict's School, the West Cumbria Catholic Sixth Form Centre and Mayfield School.

Our Social Impact team also work with supply chain companies and our own ambassadors to coordinate and provide support to local schools, especially, but not restricted to, the fields of science, technology, engineering and maths.

Behindthe



arlier this year, teams across our business gathered to watch a video in which a worker received a life-changing injury. The scenario was fictitious but the ensuing conversation about how it could happen and what teams could learn from it to avoid a similar thing happening to them, was powerful.

Our Head of Nuclear Professionalism, Andrew George, explains: "Our personal safety is based upon our choices and the choices of others around us. Whether we are at home or at work, we commonly make decisions based upon a number of factors.

"Our personal values drive our behaviour, however we can be significantly influenced by our peers. We can also become frustrated with processes and systems that sometimes drive us to take short cuts; ultimately the standards and behaviours demonstrated by our leaders set the example for us on a day-to-day basis.

"We wanted to bring something different to our company, using media to create conversations around these factors, the challenges of every day work and help strengthen our safety performance." We all make decisions every day that are based on our knowledge, experience and understanding of the right thing to do. Helping the people working on our mission at Sellafield to understand the impact of the choices they make every day is just one of the ways that we are helping to strengthen our safety performance.

Human performance manager, David Eldon, took the lead in turning the video from an idea into a powerful tool. He said: "The videos are works of fiction, some are based on events that could happen, and others loosely connected to similar events that have happened across industry. Typically, they take you through the decision making process that led to an incident. The videos have been designed to be relevant to everyone working for us – although some are based within operational facilities, their messages still resonate with office-based staff.

"The feedback we are getting from the videos is excellent; they are seen as very authentic and highlight some of the areas we need to focus on to continually improve our safety performance. We're also looking at how we can share these with industry peers to enable other teams to benefit from this engagement tool."













"We wanted to bring something different to our company, using media to create conversations around the challenges of everyday work and help strengthen our safety performance."

-IK

Annual review of safety

A statistically strong safety performance in 2016/17 isn't good enough for our environment, health, safety and quality director, Euan Hutton, while we continue to experience near-misses and reportable events. Here he gives us an overview of last year's safety performance and his priorities for this year.







We have every conceivable safety challenge at Sellafield

Within the Sellafield nuclear licensed site we have teams of people working at height, in radiological areas, on construction projects, and on demolition projects. They are working to empty not just our most hazardous nuclear buildings, but they are addressing the country's biggest nuclear challenges. They are doing this work 24/7 and are working cheek by jowl with teams operating nuclear reprocessing and waste plants, and teams who are moving nuclear materials around the site on our complex road and rail network.

To put that into context, the Hanford nuclear site in America has similar facilities and challenges but covers a footprint of 586 square miles. We have a congested footprint of just 2 square miles.

Keeping our workforce, supply chain partners, facilities and the environment safe, is our overriding value. This is a constant and relentless pursuit that requires everyone's focus and attention, every single day.

We have made great strides towards removing our biggest risks and hazards at Sellafield

This was my first full financial year as director of environment, health, safety and quality, but I have been part of the Sellafield team – as an employee and as a supplier – on and off for the last 25 years.

This time on site means that I really appreciate and am proud of the work that our teams have done on our highest hazard facilities – the legacy ponds and silos. To be able to say that we are actively removing waste, radioactive sludge and fuels from the two ponds; that we have installed the first of the retrievals equipment into one of the waste silos; and that we have started making the access penetrations in the side of the second silo; really is remarkable.

Emptying and then ultimately demolishing these legacy facilities will be among the biggest steps that we can take in making Sellafield safer sooner.

We complied with an improvement notice regarding the management and control of legionella in a cooling tower system

In September 2016 we were issued with an improvement notice by the Office for Nuclear Regulation in relation to the condition and cleanliness of cooling towers supporting one of our facilities at Sellafield.

We have complied with this improvement notice, and continue to progress improvement work to further enhance our organisational arrangements, assets, and infrastructure to ensure that our cooling towers are not only safe now, but also in the future. It is important to me, personally, that we continue to demonstrate that we are listening to our regulators and the best way to do that is to respond with action.

Statistically, our safety performance in 2016/17 has been good

As a large organisation with employees based in offices and on what is effectively a large industrial site one of our measures of safety performance is conventional safety statistics. Because of the nature of our work at Sellafield we also measure our safety performance in terms of nuclear, environmental and radiological safety.

I am pleased that we met the majority of our headline safety indicators, with all bar one of the targets met.

We have achieved our best ever performance in greater than one day Lost Time Accidents

One of the ways that we look at conventional safety is through lost time accidents, which is the amount of times that an employee had to take time off work as a result of a safety event. In 2016/17 our greater than one day lost time accident performance was our best ever rate, but this is still too high.

You can't just measure safety by numbers; near-misses are the things that keep me awake at night

There were a number of near-miss events this year. Falling objects, poor behaviours by people working at height, and striking live underground cables are all events that are not acceptable and could have seriously injured someone. We have investigated these events and have taken actions to help prevent similar events happening in the future.

We have had International Nuclear and Radiological Events Scale events over the past year

We had two radiological events at Sellafield that have been categorised as level 2 on the International Nuclear and Radiological Event Scale. Both events involved occupational exposure to individuals above the statutory dose limits. One event involved a skin dose, the other an internal dose from a wound.

A third event categorised at level 2 involved two operators carrying out radiography operations when their electronic personal dosimeters alarmed. Although no one received a significant radiation exposure and there was no release of radiation to the environment, it was assessed as a level 2 because of degraded defence-in-depth operation arrangements.

These events are a reminder of the significant range of safety challenges our teams face on a day to day basis. We must learn from these events and improve our performance so a review of the key causes is under way *(INES events pages 82-83)*.



A strong safety culture isn't hierarchical – staying safe is everyone's responsibility

We are encouraging our teams to talk through safety issues every day. Local team safety conversations give our employees the chance to raise and address any safety gaps or concerns. Our workforce really is our best safety resource to identify and resolve local safety hazards.

We have developed a series of nuclear professionalism videos. These have a strong safety message and highlight the part that we all play in keeping everyone safe.

(See page 76 for more information on these videos).

We are reviewing our safety performance against our peers and across industries

It is good to get a view from other people in our industry on where we can improve. We have undertaken a safety peer review of our performance through the UK Nuclear Operators Safety Directors' Forum that focused on identifying any organisational factors that might be impacting our safety performance. We will also be benchmarking our performance and safety arrangements, against those with world class safety performance.

Sustained improvement in our EHS&Q performance is my priority this year

We are embarking on the biggest change to our mission in many decades. As reprocessing in both Thorp and Magnox comes to a conclusion, we will have completed two of the most dominant and important product lines on the site.

With completion comes a new mission. We will become an environmentally-focused site clean-up and waste management organisation. The way in which we will deliver this work will move from the certainty of repeatable operations to a more adaptable and fit for purpose approach, where human compensatory measures will replace erstwhile engineering controls.

The need to deliver quality goods and services will not change, but the manner in which the required quality is assured will be different.

Protecting the environment is fundamental in all that we do. We will be promoting an improved environmental mind-set to ensure that the environment is prioritised and championed at all levels to deliver fit for purpose, sustainable, environmental outcomes through the application of Best Available Techniques and As Low As Reasonably Practicable decision making processes.

We are reviewing our radiological protection arrangements to ensure that they are robust and are consistently applied and we are developing a programme for enhancing leadership and management for safety across the company.

We will also continue to benchmark against industry best practice, bringing and applying learning back to Sellafield where appropriate with an increased focus on industrial safety.

Risk and Hazard Reduction

One of the key ways that we can protect the environment and improve the nuclear and radiological safety of the Sellafield site is by cleaning-up our oldest nuclear facilities – our legacy ponds and silos.

Pile Fuel Storage Pond

The end of 2016 saw the Pile Fuel Storage Pond making another significant step in hazard and risk reduction. The first transfer of sludge from the pond's corral to the Local Sludge Treatment Plant and the first drum export from Drum Filling Plant to Waste Encapsulation Plant took place in December 2016.

The ongoing work of emptying the pond of solid waste continued, with the programme consolidating and exporting more than 80 tonnes of solid waste (metallic waste including skips, pipes etc.) in 2016/17.

The first ever dewatering trial of a legacy pond took place in early 2017, with the water level of the pond lowered by 23cm by removing 800,000 litres of water. This allowed us to trial a number of decontamination techniques as well as collect radiological data on the wall conditions to inform future descaling, dewatering and decommissioning plans. The water level was restored after the two-week trial.





Magnox Swarf Storage Silo

The team in the Magnox Swarf Storage Silo have assembled a Silo Emptying Plant machine in November 2016. This will be the first machine to start retrieving waste from the facility.

Continued hazard reduction progress has been made through liquor activity reduction with the team removing more than 550m³ of liquor, taking out over 2,000TBq of activity from the facility in 12 months. Activity levels are less than one third of what they would have been without the liquor activity reduction project.







First Generation Magnox Storage Pond

We successfully retrieved a total of 51 tonnes of fuel from the First Generation Magnox Storage Pond and sent to our Fuel Handling Plant.

The team also marked a huge step forward in hazard and risk reduction after completing the isolation work on the redundant effluent and sludge pipework system which was hydraulically linked to the pond and seriously corroded in places. This has effectively removed the risk of a leak or spill of radioactive material from the ageing 420-metre network of pipes.

51tns

Pile Fuel Cladding Silo

The team in the Pile Fuel Cladding Silo made visible progress in the decommissioning of the waste silos throughout 2016/17, including the installation of six doors onto the side of the silo and the start of hole cutting in the silo to allow access for the waste retrievals equipment. They have also removed three of the silo's six deflector plates which were installed to ensure that waste did not become blocked at the top of the facility while it was operational.



Safety Performance



Note: This metric represents the number of nuclear incident reports categorised as significant under our sentencing scheme. There were two nuclear SIRs recorded this year. One involved the fall of a non-irradiated fuel assembly (see INES Level 1 event below). The other involved a non-irradiated fuel assembly being suspended during lifting operations.



Note: This records the rate of all recordable injuries including medical treatments, lost time accidents, and RIDDOR (Reporting of Injuries, Diseases and Dangers up Occurrences, Requisitions)

medical treatments, lost time accidents, and RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) reportable injuries.



2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17

Note: This metric records the rate of RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) injuries which result in employees being away from work from more than seven days, and Specified Injuries.

No. Environmental SIRs



Note: This metric represents the number of environmental incident

Note: This metric represents the number of environmental incident reports categorised as significant under our sentencing scheme. The five recorded were:

Diesel powered compressor omitted from register. A chemical used for decontamination purposes was not included in our nonradiological discharge conformance paperwork. A small amount of non-radioactive grout washings entered a surface water drain listed within Sellafield Ltd's non radiological environmental permit for the discharge of storm water only. A small volume of post-analysis chemical samples were disposed of via Sellafield's surface water drainage system. A small release of treated effluent has entered the site's drainage network and subsequently the river Ehen, from one of the site's settlement tanks.



Note: This metric records accidents which result in individuals being away from work for more than one day.



Note: This metric records the number of RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) Dangerous Occurrences.

RIDDOR Injury Rate

No. Radiological SIRs



Note: This metric represents the number of radiological incident reports categorised as significant under our sentencing scheme. There were five recorded this year. Three of these were INES Level 2 events (reported below). The remaining two SIRS were: During routine operations in a waste metals recycling facility, a small area of contamination, measuring roughly 2mm in diameter, was found on the floor. There was no contamination of personnel or material. Whilst carrying out routine work in our analytical laboratories, a bottle containing uranium and nitric acid was knocked over causing a small spillage onto the work bench and the floor. As a result there was a small area of contamination. There was no harm to the employees and no radiological or environmental consequences.

INES EVENTS



Note: The International Nuclear and Radiological Event Scale (INES) is a rapid alert system used for consistent communication of events across the nuclear industry. These are categorised between Level 1, which is anomaly, to Level 7 which represents a major accident (see INES scale pictured bottom right).

In 2016/7 we had three INES events rated Level 2 and two events rated as Level 1.

Level 1 event, May 2016 – fall of non-radiated fuel assembly

While lowering a non-irradiated fuel assembly, it became detached from its lifting adaptor and fell less than 1m into its storage canister. There was no harm to employees or the general public and no radiological or environmental consequences.

Level 2 event, August 2016 – Triggering of personal alarm during digital imaging

Two operators were carrying out digital imaging of legacy crates, using X-ray equipment to identify the contents, when their electronic personal dosimeters alarmed during screening operations. The incident took place in a redundant reprocessing facility. Neither of the operators received a significant radiation exposure and there was no release of radiation to the environment. This was assessed as a Level 2 rating because of degraded defence-in-depth operation arrangements.

A management investigation concluded that radiation measured on the electronic personal dosimeter was due to the X-ray generator, rather than from ambient radiation levels in the cell, or originating from the crates in storage.

Level 2 event, January 2017 – Personal contamination event

One of our employees was contaminated during highly active sampling operations in the Magnox Reprocessing Plant.

The employee became aware of this contamination during routine monitoring, when exiting the plant. They reported for health physics investigations and subsequently attended the site surgery where the contamination was removed through chemical washing.

It has been assessed that the external dose to the hand the individual received was greater than the annual dose limit detailed within the lonising Radiation Regulations.

This sampling work is known to be of a high risk, and a number of protective measures are put in place to prevent contamination. As a result of the investigation, changes have been made to improve the process. In addition, we have carried out observations of the task and are confident that the individuals carrying out the process are suitably qualified and experienced.

Level 1 event, February 2017 – Electrical fault in calibration centre

During the routine calibration of monitoring equipment in the Health Physics Instrument Calibration Centre an electrical fault occurred which caused the system to stop working. This caused a radioactive source to be exposed inside a shielded cell and elevated levels of radiation were detected, while the shield door was open, triggering an alarm.

Trained operators closed the system down, and the source lowered back into a shielded enclosure. No-one was in the area where the elevated levels were detected, and there were no safety implications.

Level 2 event, February 2017 – Personal wound contamination

While carrying out routine work in a glove box wearing protective clothing including latex gloves, an employee felt a pain in their hand and immediately called our health physics team for assistance.

The individual attended the site surgery where the wound was monitored and dressed. A follow up monitoring assessment a few weeks after the initial injury identified a small point of contamination which required further medical intervention to remove the contamination.

A provisional dose estimate indicates that the dose received is greater than the statutory annual dose limits. An investigation is under way.



Below scale/Level 0 – NO SAFETY SIGNIFICANCE

2016/17 Safety at a glance



We monitored 166 hectares of beach



Our annual **'particles in the** environment' report is published on www.gov.uk/sellafieldltd



Our annual **'discharges and monitoring'** report is published on www.gov.uk/sellafieldltd



Our marine discharges from Sellafield remain at historic low levels and well below permitted levels



Our annual 'groundwater' report is published on www.gov.uk/sellafieldltd



A revised **Environment Policy** was endorsed in support of our changing mission



Our employees undertook almost **40,000** observations to keep each other safe under our peer to peer safety scheme



We were awarded **9 gold awards** and **1 silver award** in 2016 from the Royal Society for the Prevention of Accidents



We created a series of videos focused on nuclear professionalism



We have **actively encouraged** our employees to join the conversation on safety. We also rolled the scheme out to our supply chain with their senior managers making **commitments to improve the safety performance** across projects through collaboration and conversations.



Our graduate management trainee scheme was re-accredited by the Institute of Environmental Management and Assessment



A site lead is in place for **co-ordinating the recovery and overall improvements** for Legionella across all the Sellafield Cooling Towers and domestic water systems



Our first cohort of **quality apprentices** started work on site



We completed **benchmarking safety visits** with Kier, Balfour Beatty and Magnox Ltd



We helped to improve supply chain capability in manufacturing items to the right quality first time by completing six supply chain assists



We produced a suite of **education packs** to promote a positive nuclear safety culture across our organisation and supply chain



Sellafield Ltd has taken part in World Association of Nuclear Operators (WANO) interventions including Leadership Technical Support Missions and Performance Improvement workshops



Standard Rules permit issued by EA allow us to re-use **60,000m**³ of excavation spoil, thereby eliminating the costs and impacts associated with importing back-fill material from off-site





Working at height

Construction workers on top of the 125 metre high Windscale Pile Chimney in 1950



When he started working with us as part of our long-term supply chain agreement – the decommissioning delivery partnership – Doosan Babcock project director Paul Terry might have pictured getting his hands dirty on some of the highest nuclear hazards in the country. What he might not have anticipated is taking on the responsibility of delivering a £2.5 million theatre refurbishment. Jason Savage went behind the scenes of Rosehill Theatre's opening night to see the nuclear industry's commitment to West Cumbria in action.









n 'As You Like It', Shakespeare famously wrote: "All the world's a stage, and all the men and women merely players; they have their exits and their entrances, and one man in his time plays many parts". As Paul Terry, a project director with Doosan-Babcock sits on the stage of the refurbished Rosehill Theatre in Whitehaven. I wonder if he can relate to the famous prose.

"While the poem is about the seven stages of man, I can certainly relate to the notion of wearing many hats," he said, continuing: "When I first became involved in the Sellafield mission as part of the decommissioning delivery partnership, I knew that our commitment to the local community was important to Sellafield Ltd. To have the opportunity to help deliver the Sellafield mission and demonstrate our commitment to the community by lending my project management skills to the refurbishment of this theatre has been an amazing experience."

Rosehill's jewel-like 208 seat theatre was created by industrialist Sir Nicholas Sekers in 1959 and opened with a performance by the London Mozart Players. It has an illustrious past and has hosted some of the most famous names in music and theatre, including Peggy Ashcroft, cellist Rostropovich with Benjamin Britten on piano, Jacqueline du Pré, Alfred Brendel, Victoria de los Angeles, George Solti, and Joyce Grenfell. Even a fledgling David Bowie trod the boards that Paul is sitting on tonight.

"When you first get involved in a project, you automatically shift into project management mode; spreadsheets, budgets, deadlines - these are the things that drive you and keep you awake at night. But with Rosehill, there was also an emotional connection. Even sitting here tonight, despite the new paint, the new fittings, and the extension, you still get a sense of the great performers who have played here before. To be part of a project that creates a stage worthy of today's best performers is an honour."

The pressure was on for Paul and the rest of the team as they sought to restore the theatre to its former glory. Our corporate centre director, Andy Smith, who sits on the Rosehill Theatre Board explained:

"Our original interior was designed by Oliver Messel, the leading stage and film designer of the early/mid-20th century. We recently partnered with the Victoria and Albert Museum and they hold a substantial collection of Messel's work but Rosehill is the only known theatre with a Messel designed interior."

A sympathetic restoration of the theatre on the inside is juxtaposed by a more significant face-lift on the outside of the building. The extended facility also boasts conference facilities, a bar, additional parking and a 60 seat restaurant.

Richard Elder, Rosehill's chief executive officer, is clear that the theatre's future can only be secured through diversification.

"We want to offer all of the amenities that people expect from a night at the theatre, a great performance, great food and great surroundings. What is special about the way we are expanding the theatre though is our commitment to keeping the community at the heart of the development. It was designed by local firms and will be run by local people."

One of the groups to immediately benefit from this community approach is Lakes College whose catering students are working under head chef John Fell, who is also leading catering apprenticeships for some of the students. Richard added: "Future plans may also include extending the partnership with the college and students to include horticulture and growing produce to supply the restaurant."

"The sky really is the limit and we are grateful to the nuclear industry for the technical and business support they have given us. That, along with the support of local foundations, businesses and individuals, alongside the Department for Communities and Local Government through its Coastal Communities Fund and other major national trusts, has seen us successfully raise £2.7m of capital funding and use that to create the theatre you see today."

For more information visit www.rosehilltheatre.co.uk











88



Apprentices across the UK are tackling a whole range of disciplines in the classroom and workplace.

ur young trainees are no exception, with over 550 apprentices learning their trades in 21 diverse schemes such as Nuclear Scientist and Engineer Degree Apprenticeship.

However, when they joined our scheme, some of our young people didn't envisage they would have the opportunity to take part in unique opportunities outside of the organisation - including meeting Members of Parliament in London and their constituencies.

Three of our apprentices - Matt James, Jess Wilson and Luke Fearon - shadowed Members of Parliament earlier this year.

Meanwhile, Adam Sharp and Chelsea Riley were invited to the House of Commons to meet 150 apprentices from across the UK where Adam was the star speaker.

Matt James, a third year advanced electrical apprentice and active science, technology, engineering and maths ambassador, met former Warrington South MP David Mowat. He said: "I started the day at David Mowat's office, then visited the Town Hall and met Council officials before visiting BBC studios in Manchester where we watched David talk on Sunday Politics.

"The day was really interesting and different to what I expected. Going to the BBC was an experience I'll never forget. I was treated brilliantly, this opportunity doesn't happen every day and it's something I will never forget."

Meanwhile, mechanical craft apprentice Jess Wilson visited Workington MP Sue Hayman's office.

She said: "We met local residents and two organisations to discuss local activities, and this experience was very insightful. I got to learn about some of the issues in the community, while Sue Hayman heard about my work and education with the company. Sue was very welcoming and easy to talk to which is a valuable asset as a key stakeholder.'

Business Administration apprentice Luke Fearon visited Barrow and Furness MP John Woodcock in the House of Commons

"The day was really interesting and different to what I expected. Going to the BBC was an experience I'll never forget. I was treated brilliantly, this opportunity doesn't happen every day and it's something I will uever forget."

Luke said: "I now have a greater knowledge and real interest in politics following my visit. I was fascinated by the history of the Houses of Parliament, I gained an insight into the life of an MP and the tasks they face on a daily basis and I am now more aware of some of the issues faced by our politicians."

John Woodcock said: "I was delighted to hear that Luke is benefiting from on the job training at Sellafield Ltd. The development of young people through education and training is crucial in giving young people the skills they need to provide opportunities and jobs for their futures, and obviously apprenticeships play a big part."

Finally, mechanical design engineer Adam Sharp and project management apprentice Chelsea Riley mingled with government officials, industry representatives and young apprentices at a National Apprentice Service event, and also attended an All Party Parliamentary Group on Apprenticeships meeting in Westminster.

Adam, who was named Advanced Level Apprentice of the Year in January and also appointed apprentice advisor to the Institute for Apprenticeships, shared his apprentice story to the National Apprentice Service audience, including his move from Yorkshire to Cumbria and joining our training scheme as an 18-year-old.

He said: "I was delighted to share my story with apprentices from across the UK and also hear their stories which we can share with other aspiring students.'

Chelsea said: "At the All Party Parliamentary Group meeting I spoke about my own experience, and how I wish I would have known about the variety and benefits of apprenticeships earlier on. I gained confidence from speaking at this event as I



- Com AND ADD ADD

Jess Wilson with Sue Hayman MP

was outside of my comfort zone, and I developed a better understanding of perceptions and experiences of apprentices from across the UK."

Chelsea is a member of the Apprentice Council, organised the Apprentice Charity Walk 2017 that has raised money for charities West House and Hospice at Home, and supports the Brathay Challenge.

She added: "I wouldn't have been selected to go down to London for the two events had it not been for the various activities I have tackled. These activities have been beneficial to my own personal growth and career development, and I'd like to thank my company for their support."

"The development of young people through education and training is crucial in giving young people the skills they need to provide opportunities and jobs for their futures, and obviously apprenticeships play a big part."

One Sellafield

recyclind

Recycling lives

How can a contract to process scrap metal from Sellafield reduce the amount of waste sent to landfill, bring a disused industrial site back to life, and create a food distribution charity with centres throughout Cumbria? Ask our newest supply chain partners, <u>Recycling Lives</u>.

anaging director for Recycling Lives, William Fletcher, and his team have arrived in West Cumbria and are ready to make their mark. William said: "We are pleased to have won the contract for scrap metal collection and processing from Sellafield, and we are really excited to be able to use this contract to create social value across Cumbria."

RecyclingLiv

The team is preparing their new facility close to the port of Workington, bringing the empty site back to life and offering jobs and training opportunities. They will open their doors to the public and other businesses from September.

They will also set up a food distribution charity with centres throughout Cumbria, which will also need staff and volunteers.

William explained: "We work with the national organisation, Fareshare, taking surplus food from manufacturers, suppliers, and supermarkets, that is headed for landfill, and distribute it to charities and community groups in deprived areas. We are working with local authorities to identify food collection points throughout Allerdale and Copeland."

The centre that Recycling Lives set up in Lancashire has just served its one millionth meal, and has diverted more than 400 tonnes of goods from landfill since October 2015.

Our supply chain director, Martin Chown, said: "We insist that companies that win work with us invest to support local growth, ensuring that our local communities derive maximum economic benefit from the money we spend at Sellafield.

"Recycling Lives has these values at its core, and I'm excited by their plans to create jobs and support disadvantaged people in west Cumbria, as a result of winning work at Sellafield."

Find out more about Recycling Lives and the difference they are making in Cumbria in the next issue of *Sellafield Magazine*.



A perfect partnership

Sellafield has a long and proud history of innovation – from its early days as a research centre through its pioneering work on harnessing the atom to keep the UK's lights on, becoming a centre of expertise in the reprocessing and storage of nuclear waste and now as the go-to place for the world to understand how to decommission and maintain its nuclear legacy But it cannot work alone to achieve its mission to make the site safe for future generations. The company has partnerships and links to organisations based across the world – and some much closer to home.

The National Nuclear Laboratory (NNL) is one of those organisations – although many may not even realise it is a separate entity in its own right.

A number of its major laboratories are actually situated within the fence of Sellafield's 6km² site in West Cumbria, and the two organisations have worked closely for decades to deliver research and development for the site.

Dr Rebecca Weston is Technical Director for Sellafield Ltd. She said: "This highly technical, specialist work underpins most of what is done on the site to introduce new plant processes and improve operations. The work done in NNL is vital. When you're dealing with the kind of stuff we are, changing how we handle and process it can't just be done through guesswork.

"The labs offer test rigs to look at different options, and the talent and knowledge that comes from our lengthy partnership to help achieve the best results. Our plants aren't getting any younger, and new challenges are being posed every day. We need the technical expertise NNL has."

Whether it is looking at how best to deal with waste or making sure our robots can operate in some of the



"THE WORK DONE IN **NNL** IS VITAL. WHEN YOU'RE DEALING WITH THE KIND OF STUFF WE ARE, CHANGING HOW WE HANDLE AND PROCESS IT CAN'T JUST BE DONE THROUGH GUESSWORK."



"OUR LONG RELATIONSHIP MEANS THAT WE SHARE AN UNRIVALLED KNOWLEDGE AND EXPERIENCE OF HOW EACH OTHER WORK."

harshest environments on the planet, it can be tested and perfected in NNL's laboratories.

"To be successful the futures of Sellafield Ltd and NNL are inextricably linked," added Rebecca. "Our long relationship means that we share an unrivalled knowledge and experience of how each other work. We also have the advantage of being situated on each others' doorstep, which helps reinforce our links. But we know there are challenges ahead – and both companies will need to be flexible in the way we work together to deliver innovation for the clean-up mission."

Chief Executive Officer of NNL, Dr Paul Howarth said: "We have a strong, complex and unique relationship with Sellafield Ltd. The company has always accounted for the largest portion of our work, and around half of our workforce – and our biggest nuclear laboratories – are based on the Sellafield site.

"However, unlike any other organisation on the Sellafield site, we operate nuclear facilities on the site for multiple customers. This brings its own challenges in terms of the relationship with Sellafield Ltd as the site licence holder. It is a complicated relationship which requires NNL to purchase a number of services from Sellafield Ltd, meaning that each organisation is both a supplier and a customer of the other. But this relationship has developed well over time so there is now a clear understanding in terms of operating the facilities and third party access arrangements. In addition NNL staff have access to certain Sellafield Ltd facilities and plants, where they work side by side on daily operations supports.

"As we work more closely together – in the national interest – we will continue to bring tremendous value to Sellafield's mission whilst ensuring that we collaborate on key enabling activities such as building a skilled UK workforce, utilising unique laboratory facilities and developing the supply chain to serve the nuclear industry in Cumbria and elsewhere."

IN IT FOR THE LONG HAUL -A COMPLICATED HISTORY

The UK's civil nuclear industry was restructured in 2005, creating the Nuclear Decommissioning Authority and carving up British Nuclear Fuels Ltd to create Sellafield Ltd and what would eventually become NNL.

But the story goes back much further than that – 50 years further. A Research and Development department had existed to serve



Sellafield since its early days, evolving over time to remain fully aligned to the complex needs of what had become a very complex site. The name was actually a misnomer, as it offered both R&D and analytical services. Most people were based on the Sellafield site, with a few in laboratories at Springfields, near Preston, and in our offices around Warrington.

The knowledge of nuclear materials and processes held within the department was second-to-none and it was known as the centre of excellence and knowledge within the international BNFL Group.

The end of BNFL saw the analytical services part move into Sellafield Ltd, while the R&D became a separate company – Nexia Solutions Ltd.

Three years later in 2008 Nexia Solutions became NNL, and now sits, like Sellafield's owners the NDA, within the Government's Department for Business Energy and Industrial Strategy. The big difference is that NNL is run as a commercial business with no direct Government funding – whereas NDA's funding comes largely from Whitehall. It's not all scientists in white coats looking at test tubes – as well as research and development, NNL handles a lot of the materials created by our processes – taking delivery of our containers, opening them up and identifying their contents, before placing them in shiny new homes.

That history means that no-one knows Sellafield better than NNL. Contained within its walls is an in-depth knowledge of Sellafield's unique nature. Sellafield remains NNL's most significant customer – although it isn't its only customer.

MAKING IT OFFICIAL

Last year Sellafield and NNL decided to take the plunge and further strengthen their long relationship with a collaboration agreement.

The collaboration agreement sets out the principles by which the two Governmentowned organisations will work together, in partnership, to deliver more value to the UK by developing technical solutions to support

"THAT HISTORY MEANS THAT NO-ONE KNOWS SELLAFIELD BETTER THAN **NNL**."

delivery of Sellafield Ltd's mission.

The agreement builds on the many successes the two organisations have achieved together over the years and outlines the overarching principles that will be applied when Sellafield Ltd and NNL work together.

These principles will allow Sellafield Ltd and NNL to focus both on developing new technologies and on sourcing them from the supply chain, other national laboratories and academia, so that cost-effective and innovative research and development can be used to accelerate the hazard and risk reduction work on the Sellafield site.

Working together – examples

There have been many benefits to the close relationship between Sellafield Ltd and NNL over the years, which have helped accelerate the mission to clear up the site and potentially saved billions of pounds.

These include:



ILW

millior

could be adapted for use in a specialist nuclear environment for the management of challenging nuclear waste, rather than creating new robots at vast expense.

Identifying that industrial robots

 Creating a simpler way to deal with our intermediate level waste – a change which will reduce the site's clean-up bill by hundreds of millions of pounds.

 Research and development identified that kit involved in our Magnox reprocessing was not required, resulting in a £49million saving and a safer overall process. £1 billion







By working with NNL, we extended the life of one of our existing evaporators, which boil down waste for safe storage. This meant a new one didn't need to be built, effectively saving over £1bn.

- NNL identified a different way of dealing with waste from Magnox which meant that an entire new waste store didn't need to be built at all – saving millions.
- We're working with NNL to improve our treatment of effluent, meaning less will be discharged into the sea and allowing us to speed up the decontamination of the site.
- Working together we identified a method which simplified and accelerated the treatment of waste from our Magnox Swarf Storage Silo. This took the process from 22 steps to just three, reduced the amount of waste produced and saved the taxpayer an estimated £1bn.

Unique nuclear archive opens for business

ucleus (The Nuclear and Caithness Archives), a unique archive bringing together a vast collection of records, plans, photographs and drawings from the earliest days of the UK's nuclear industry has opened its doors for the first time.

Located near Dounreay in Scotland, the £21 million NDA-funded facility opened in February to store and preserve records from the entire estate of 17 sites.

Most documents will gradually be converted into digital format and made available for research. Right now, however, the focus is on trawling through tens of thousands of records (possibly millions) in detail, assessing their value, establishing whether any, such as duplicates, should be destroyed... and transporting the lot north.

The 'sift and lift' operation has already been under way for a number of years: Sellafield alone has more than 80,000 boxes of archived records in off-site storage, as well as material on site plus various offices. If laid out, it's estimated this would stretch to more than 120km of paperwork. The 12 Magnox Ltd sites have a similar-sized collection, while electronic records across the estate are believed to number hundreds of millions.

The decision to build the facility, named Nucleus (The Nuclear and Caithness Archives),

at Wick satisfies the NDA's obligations to find a safe home for its own records, and at the same time meets its responsibility to help offset the economic impact of closing sites that were once major regional employers.

Secure pods containing up to 26km of shelving will hold the records which will all be catalogued, indexed and preserved. Decaying old documents will be transferred to archivequality paper and digitised. Humidity and temperature are controlled to minimise the potential for deterioration.

Nucleus has a dual role: as well as nuclear records, in a partnership agreement with Highland council, it also houses a local A NEW NUCLEAR ARCHIVE HAS OPENED NEAR DOUNREAY IN SCOTLAND. THE ARCHIVE WILL HOLD THE KEYS NOT ONLY TO THE NUCLEAR INDUSTRY'S PAST BUT ALSO THE VALUABLE **RECORDS THAT WILL HELP US TO CLEAN-UP SITES LIKE** SELLAFIELD IN THE FUTURE. IN PREPARING DOCUMENTS READY FOR THE ARCHIVE OUR TEAMS ARE UNEARTHING A WINDOW INTO OUR SOCIAL, AS WELL AS TECHNICAL PAST.

collection of historic Scottish material that be safeguarded for many generations. Simon Tucker, managing director of has outgrown its existing home. It is hoped Nucleus will be granted Place NDA Archives Ltd, said: "All sites have of Deposit status by The National Archive at accumulated large volumes of important Kew during 2017, making it one of the largest records over the decades, some from the accredited repositories outside London.

> Nucleus will also fulfil an important role for the geological disposal facility being developed for the UK, acting as a central repository for detailed waste records that must

1940s. We cannot be sure of precise figures, but we need to ensure this information is retained and managed, proactively shared, made accessible, where appropriate to do so, and preserved for the future.'



The way we were

hen investigating the contents of the main Sellafield site archive, prior to its relocation to the new nuclear archive, a haul of 20 historical logbooks were found – all penned, in their own styles, by the Windscale pile control engineers.

What we imagined would provide a helpful insight into how the piles operated, and how we disposed of the waste in number one pond (or the Pile Fuel Storage Pond as it's now known), has proved to be much more revealing.

Tim Harris, who has used the compendium to help aid our understanding of the Pile Fuel Storage Pond, said: "Exploring these books has presented a treasure trove of history, not just of our processes, plants and operations but also on society and what living in West Cumbria – or West Cumberland as it was known – in the 1950s was like.

"The candid nature of the entries in the

logbooks also helps explain the challenges they faced and the implications for the pond – understanding these will help us to speed up retrievals."

Those challenges varied from operating reactors that were unproven prior to use, design flaws and equipment failures through to finding enough trained operators who hadn't already reached their annual dose limits. The Cumbrian weather was also well documented, including the heavy, drifting snow of 1958, as well as reports of potential protestors days before the first ever CND mass demonstration in London.

The recovery work after the Windscale Fire in 1957 is also documented. Tim said: "We were amazed to discover that the engineers working at Windscale at the time took no annual leave from October 1957 through most of 1958.

"What is very clear is that 1950s West

Cumberland was different to the place we know today. But the tireless commitment to nuclear professionalism hasn't changed."

Back to the pond, and the information in the books helps us to understand what materials were placed in which of the bays, and also what condition this might be in. The way that the skips were loaded into the bays was not always fool proof, and this meant that sometimes the contents did not stay upright. On some occasions, the skips could be recovered by 'slingers' in a rowing boat, but on other occasions, we know this wasn't the case.

This information is invaluable in developing our knowledge and delivering suitable retrieval approaches and it is reassuring to know that they will be kept safe for future generations in the new archive. ■ Exploring these books has presented a treasure trove of history



Photographer in Residence

PHOTOGRAPHER in residence

Making photography just a reflection of our day to day life is something I have been trying to do for years. Enhancing what can be mundane daily chores. Like a safety briefing in a shed on a construction site. Important yes, but not very photogenic. Or is it? Adding layers and capturing the moment when one is laughing but another is very serious. What was said? It's just daily life captured.

Thomas Skovsende







Mike Mandzij, a senior structural engineer, looks back at his career in the nuclear industry and his time spent in Ukraine. His retirement is on the horizon but instead of putting his feet up, Mike is setting his sights on a new goal.

What does being a senior structural engineer involve?

I work on the Magnox Swarf Storage Silo project, solving problems in the legacy silo that are considered to be a danger to safety. When designs or structures are misinterpreted, problems can occur. I work to resolve these issues as quickly as possible to allow safe working on site.

You've spent many years working in the nuclear industry. Did you always think you'd become a structural engineer?

Over 30 years in fact, since the early 1980s. I always saw myself as an engineer but I'd originally hoped to become an aeronautical engineer, the only set-back being that the aircraft industry in the UK reduced dramatically after I had finished my degree. I then started to develop an interest in buildings and seismic loading on buildings which, at that time, BNFL were seriously considering. In the past I've also been involved with structural analysis and design of nuclear containment structures and plant items, all of which gave me the experience to work here at Sellafield Ltd as a structural engineer. It's not what I always thought I'd be doing, but it's certainly something I have enjoyed.

What made you want to get involved in the Chernobyl New Safe Confinement project?

My ethnic background was the main driver. My parents are both from Ukraine, but came to the UK as displaced persons after they were removed from the country by

Germans. I think this is why I've always felt a connection to the country and why I wanted to offer my help following the Chernobyl disaster of 1986. I asked the ministry of Chernobyl what help they needed to deal with the consequences of the incident and on their request, I took three engineers from Ukraine to the top of the pile chimney and various other areas on the Sellafield site, five years after the Chernobyl disaster.

Working in a foreign country must have been daunting, was there anything you found challenging?

Thankfully, it was less daunting than it sounds. I was already familiar with the people in Eastern Europe so didn't feel as out of place as I might have. My understanding of languages also helped me settle in guickly; I speak and understand Ukrainian. Czech and Slovak. I actually felt surprisingly comfortable in my surroundings, the biggest challenge was getting used to the rules and regulations of the country.

Stringent rules and guidelines often dictated how things should be designed and accommodated in the industry, something I wasn't used to.

How does the new safe containment at Chernobyl work?

It closes off the area around the fourth reactor which is substantially contaminated. The reactor base contains a lot of radioactive matter that has been vitrified. When fuel fell onto the layer of sand in the base of the reactor, it reacted with the heat and created a vitrified type of product which people associate with 'the elephant's foot.' Immediately after the accident, engineers created a robust concrete structure, but the shelf life wasn't long and developed cracks and holes in the roof.

The negative atmosphere was dealt with by filtering the air so that works to dismantle the elements of the reactor with the worst radiation could be done safely. Radiation tends to fall away quite quickly so although the new safe confinement was only built 200 yards away from the reactor, it is considered safe. The new building was rolled into place on rails and is now complete.

How did you fill your time when you weren't working?

My understanding of languages kept me busy in my spare time. As the only member of the team that could speak Ukrainian, I put my skills to good use and became a sort of tour guide for my colleagues. I wanted them to feel as connected to the area as I did and appreciate the many cultural marvels of the country.

With retirement on the horizon, will you still keep your links with Ukraine?

Absolutely. Renewable energy is something that has always sparked an interest with me and a colleague of mine in Ukraine at the University of Food Technology has asked me to deliver lectures with him to show the students that there are other ways to make energy. This is something I'm really looking forward to and I'd love it if, long term, I could help Ukraine reduce their reliance on gas, coal and oil. One thing's for sure, I won't be putting my feet up, I need a stimulus, I like to keep active and it keeps the pennies rolling in.

Issue 08 December 2017

IS SILE

In Focus: Evaporator Delta

One Sellafield:

Meet the teams at Reays Coaches and Recycling Lives

Ten years on:

From Calder Hall Cooling Towers to construction site

> Available December 2017



Meet the miniature addition to our fleet of remote operated vehicles





Transforming Sellafield

Did you know that we will remove waste from our highest hazard buildings sooner than planned?

Find out more at **www.gov.uk/sellafieldItd**