

Sellafield

Issue 05

October 2016

The 60th Anniversary of

CALDER HALL

...the **station**,
the **people**,
the **area**...



Sellafield Ltd

Changing our skyline

Self-climbing platform set to remove legacy discharge stack

Stepping stone to growth

James Fisher Nuclear – from Sellafield to global success

In focus

Completing our mission in the Magnox reprocessing plant

The Sellafield Story...

Hands-on activities and virtual reality tell the story of the most iconic nuclear site in the world. From its pioneering use of the atom to support national defence and building the world's first civil nuclear power station, to the clean-up challenges of today.

Explore the Sellafield Story at the Beacon Museum:

Tuesday to Sunday 10am-4:30pm.
Monday opening is restricted to Bank Holidays and school holidays.



**The Beacon, West Strand,
Whitehaven, Cumbria, CA28 7LY**

www.thebeacon-whitehaven.co.uk

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Meet our contributors:

Phil Hallington



A second generation Sellafield worker, Phil moved to West Cumbria when he was three years old and his father was employed at Calder Hall. He said: "I was with my father on the site the day that Her Majesty The Queen came to open the station and he worked there right up until it closed in 2003. It meant a lot to him that he was there right up until the end."

David Moore

David, a local resident and chair of the West Cumbria Sites Stakeholder Group, is the other half of our walk down memory lane on page 19. For him, having Calder Hall on his doorstep was very useful. He explains: "The station was a brilliant weather forecaster. I used to look out of my window every morning to see which way the steam was going out of the cooling towers. If I couldn't see the steam it meant that the wind was so strong that even the steam couldn't get out of the cooling towers, so it was a really bad day. But, when the steam was going straight up into a clear blue sky, what a fantastic view that was."



Helen Fisher



Tasked with helping more small and medium sized companies to bid for and win work at Sellafield – either directly, or through our supply chain – Helen offers her top tips on page 86. For her, Calder Hall was literally her first impression of the Sellafield site. She said: "On the day of my interview at Sellafield I spent the morning walking up Wasdale Pike. The first thing that came into view at Sellafield was the cooling towers – they really dominated the skyline. I'll never forget it."

Ben Chilton

Our government relations officer, Ben, was at the launch of this year's Nuclear Industry Association jobs map (read all about it on page 98). He is also no stranger to Calder Hall and remembers two very different experiences of the station's cooling towers. He said: "We drove past the towers on a school trip to Sellafield and I remember thinking that they were the strangest things, with steam coming out of the top and water pouring out of the bottom. Fast forward a (few) years and I was stood with a group of visitors in the basin of the towers as they were being loaded with dynamite ready for demolition."



NEW BOARD APPOINTMENTS

We are delighted to announce that John Baxter and Anne-Marie Choho have joined our Board as non-executive directors.

Their combined experience within the nuclear industry and beyond will help us to deliver our vital mission at Sellafield.

John brings a wealth of project, engineering, safety critical and nuclear experience with him. Last year he retired from BP where he was Group Head of Engineering and Process Safety, responsible for policy, standards and competency for engineering activities across the group. Prior to this he was the Group Engineering Director at Powergen plc (now Eon AG), and earlier in his career he was a Member of UKAEA Board as well as their Nuclear Operations Director, running several nuclear sites including Dounreay, Windscale and also AWE. He started his career as a nuclear sub-mariner. John is a Fellow of the Royal Academy of Engineering and the Chair of the Advanced Nuclear Research Centre and Visiting Professor of Nuclear Engineering at Strathclyde University.

Anne-Marie recently left Areva, having led the restructuring of the company for the sale of part of the business to EDF. She is a trained engineer with a PhD in chemistry and expertise across recycling, waste treatment and R&D in the nuclear fuel cycle. In her most recent appointment as a member of the Group Executive Committee and Senior Vice President, she was responsible for supply chain transformation, Group performance and safety, security and quality.

Prior to this she was Areva's Executive Senior Vice president of Engineering and Projects, responsible for delivering the Group's nuclear construction and clean-up projects. Her career experience also includes seven years at the Hanford site where she was instrumental in the ramp up in the delivery of major projects. Anne-Marie has experience of working closely with nuclear regulators on complex nuclear facilities in Europe and the US. ■

Editor's Letter

The Sellafield Magazine recently reached its first birthday, having launched with our first issue in August 2015. The landmark has been somewhat dwarfed by Calder Hall with the station ready to celebrate the 60th anniversary of its official opening.

Much of this issue is dedicated to the station and the impact that it has had on people, the area and the nuclear industry. The feature includes an interview with our own head of policy, Phil Hallington, who is a second generation Sellafield worker, and local councillor and chair of the West Cumbria Sites Stakeholder Group, David Moore. They were only yards apart on the day that Her Majesty Queen Elizabeth II came to open Calder Hall, Phil inside the fence and David outside. Their shared and contrasting memories of the impact that Calder Hall had on the local community is a fascinating read.

The landscape of the nuclear industry today is an evolving picture. At the time of going to press the Government had just given the green light for the construction of a new nuclear power station at Hinkley in the south west of the country. Closer to home, NuGen have recently completed their latest consultation on proposed plans to construct the Moorside nuclear power station over the road from the Sellafield site. Read about how their plans are progressing on page 47. We also hope that our feature on the nuclear family tree on page 83 helps to explain who does what in the decommissioning side of the industry.

Elsewhere in this issue we get exclusive access behind the scenes of a Sellafield emergency exercise, showing the kinds of things that we practice on a regular basis to ensure that we are well prepared, should something unexpected happen.

We also get up close and personal with our Magnox reprocessing plant in the latest of our 'In Focus' features and take an in-depth look at the latest demolition project that will change the Sellafield skyline; the removal of a 60 foot stack from the top of a 60 foot building.

As always, we would love to hear your feedback on the Sellafield Magazine and it isn't too late to share your Calder Hall stories and memories. Send your messages to editor@sellafieldmagazine.com.



Ian Curwen meets the man leading a new approach to policing Sellafield page 89



David Moore reflects on growing up next to Calder Hall page 19



Legacy silo operators training for retrievals page 36



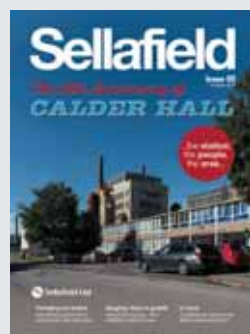
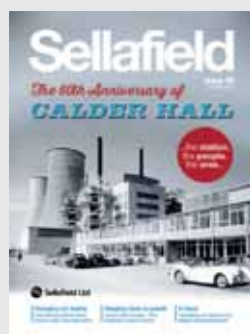
One of our photographers capturing a Sellafield emergency exercise page 58

Keep up to date with our progress at Sellafield:

 www.sellafieldsites.com

 [@SellafieldLtd](https://twitter.com/SellafieldLtd)

 www.sellafieldmagazine.com



On the covers

An external view of Calder Hall taken in 1956 and in 2016. As you can see, decommissioning is well under way.

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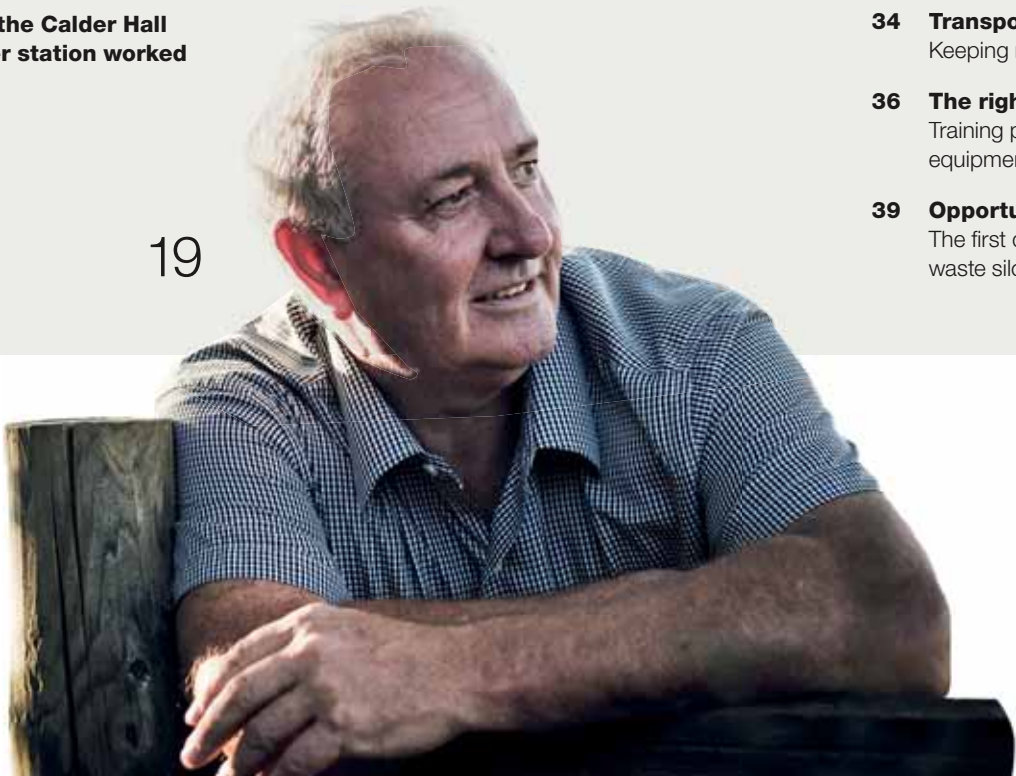
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IT'S GOOD TO TALK

How an open exchange of information and views helped to build relationships in Norway



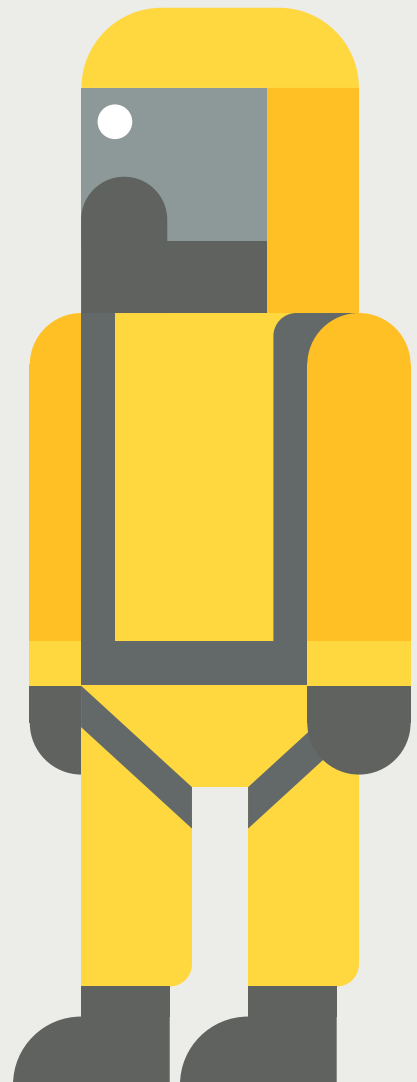
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LAUNCH

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IN CONTEXT:

Minimum safety manning levels

WE USE THIS TERM AT SELLAFIELD TO REFER TO THE NUMBER OF PEOPLE WE NEED TO SHUT A NUCLEAR PLANT DOWN SAFELY, KEEP IT SHUT DOWN SAFELY AND RESPOND TO THE UNEXPECTED.

Our minimum safety manning levels are built around the 'defence in depth' principle of nuclear safety and require levels of procedural rigour, peer review, observation and checks which are unheard of in other industries.

Sometimes we do not have the specified number of people required on a certain facility to meet the minimum safety manning levels. This could be for any number of reasons – such as an employee being ill.

This does not mean that there is an increased risk or hazard to people on or off the site. In fact, it is thanks to the rigour of the nuclear industry that every occasion this happens, even if it's for a single minute, it is recorded and logged.

Rex Strong, our head of nuclear safety, expands: "We operate in a manner to ensure safe, secure site operations. We never operate at a level where staffing levels are dangerous or even unacceptable. Our plant managers

are able to take steps in order to maintain safe operations at all times."

When manning levels are lower than expected and alternative cover cannot be provided, we change our plans – so work is not carried out unless there are enough suitably qualified and experienced people there to do it safely.

By doing this, we keep our plants operating, continue our vital work, and deliver our mission – in the safest way possible. ■



WHAT IS...

Reprocessing?

Like all forms of electricity production, nuclear reactors need fuel. The difference with nuclear reactors is that after five years the fuel becomes less efficient. So it is taken out and replaced with new fuel. We call the used fuel 'spent fuel'.

Simply put, reprocessing is the process by which we take the spent fuel and break it down into its component parts; uranium, plutonium and waste.

In Sellafield's earliest days this was done so that the plutonium could be used in atomic weapons as part of the national defence programme. Magnox fuel is reprocessed to retrieve re-usable nuclear material and to reduce the volumes of high level waste. The fuel is also reprocessed because the cladding around the fuel would eventually deteriorate if not treated. More recently it has been done so that the owners of the fuel can use the nuclear material to make new fuel.

This approach to taking a used product and seeking to get maximum use from its component parts is not unique to the nuclear industry. It isn't unique to any industry. You do it every time you recycle household waste. Glass and tin is collected, sorted, separated and either stored or recycled into new products and containers.

What is different, of course, is the presence of nuclear materials and so our processes take more time and more layers of protection than your standard recycling facility.

Once the nuclear fuel has been taken out of a reactor it is stored in a pond at the reactor site for 200 days to allow the short lived radiation to die away and for the fuel to cool.

It is then transported to Sellafield where it is placed into another storage pond to cool further.

When ready, the fuel is taken to either our Magnox Reprocessing Plant or Thorp, depending on the type of fuel. If it is headed for the Magnox Reprocessing Plant then it goes to another facility first to have the outer casing of the fuel removed.

The fuel is then chopped up and dissolved in nitric acid before solvents are added to separate the uranium, plutonium and waste. The waste is evaporated to dry it out and to reduce its volume before it is mixed with molten glass to form a stable solid block of waste. The nuclear materials are stored in high integrity stores.

In the next four years we will complete our reprocessing mission at Sellafield. All of the fuel on Thorp's order book has been delivered safely to Sellafield and will go through the facility by 2018. Magnox fuel now only exists in three locations; at the Wylfa site in Wales, in Calder Hall at Sellafield and in ponds on the site. Reprocessing in Magnox will be complete by 2020.

Thorp will continue to support our clean-up programme and the wider nuclear estate by receiving and storing used nuclear fuel. ■

52,000

More than 52,000 tonnes of Magnox fuel has been reprocessed

1964

The Magnox Reprocessing Separation plant began operating in 1964

2,000

Less than 2,000 tonnes of Magnox fuel remain to be reprocessed

8,500

Thorp has reprocessed more than 8,500 tonnes of spent fuel

2018

Reprocessing operations in Thorp will end in 2018

AGR

Thorp will continue to receive Advanced Gas-cooled Reactor fuel from the UK's power stations to provide safe storage

We have been reprocessing used nuclear fuel at Sellafield for decades, first in the First Generation Reprocessing Plant, then the Magnox Reprocessing Plant and, since the 1990s, in the Thermal Oxide Reprocessing Plant (Thorp). But what exactly is reprocessing?



Since July we have...



INSPIRED...

60 students aged 5-18 to spend a day
in the life of an engineer.

DONATED...

a total of £40k to ten local charities
as a result of our peer to peer
safety observation scheme.



INTRODUCED...

a new way to move historic
radioactive machinery and waste
from ponds to storage facilities and
save millions of pounds.



CUMBRIA

CREATED...

new jobs for the Cumbrian community following the signing of a number of contracts.

SAFELY...

completed 5 shipments of highly active waste to Japan.



CONGRATULATED...

our employees who have become the first in the UK to graduate with a BSc (hons) Degree in radiation protection.



ESTABLISHED...

a new rolling scaffolding system to speed up decommissioning and save £300,000 for the UK taxpayer.



CELEBRATED...

being named West Cumbria's employer of the year 2016.



Collaborative approach to risk reduction goes international

The G6 approach to reducing high hazards and risks at Sellafield is an agreement between six policy forming stakeholders who can influence what is done and when on the site. The approach has been so successful that it may now help decommissioning on an international scale.

A collaborative approach to accelerate the reduction of risks and hazards at Sellafield is being considered as an alternative approach to help clean-up nuclear sites in America.

The approach helped us to accelerate the rate at which we could remove canned legacy fuel from one of our 60-year-old ponds and put it into modern storage. Now it may help at one of the US Department of Energy's key nuclear sites in South Carolina.

Officials from the Department of Energy visited Sellafield to see the approach in action and believe that it could help with waste management and clean-up at the Savannah River site.

The visit was the culmination of a relationship that started in March 2016 at the Waste Management Symposium in Phoenix. Graham Jonsson, our head of independent performance assurance group explained: "The

symposium was attended by representatives of the G6 community; us, the Nuclear Decommissioning Authority, Office for Nuclear Regulation, UK Government Investments, Business, Energy and Industrial Strategy, and the Environment Agency.



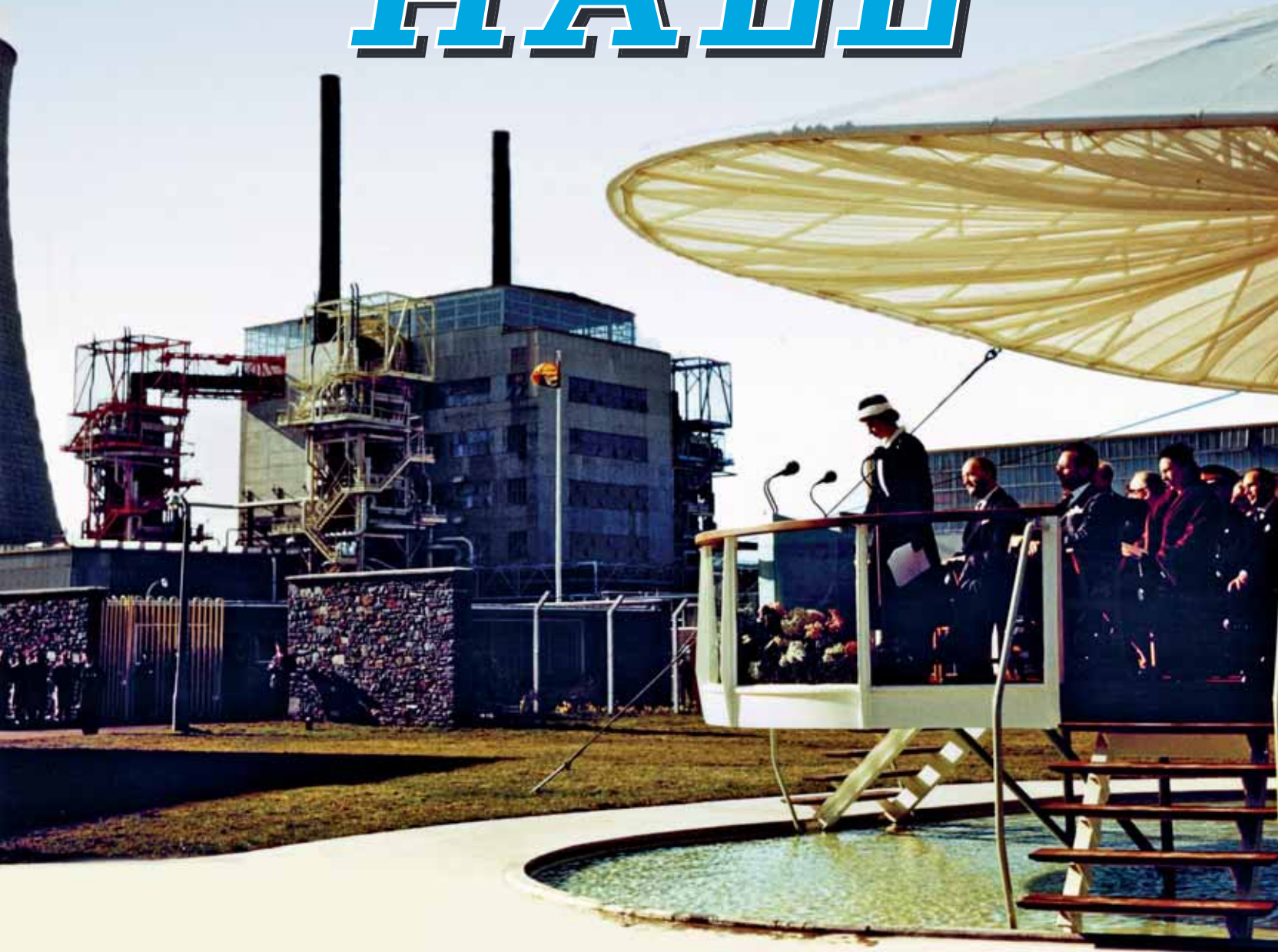
"The conference included a number of panel sessions, two of which were focused around UK broad decommissioning and Sellafield decommissioning, as well as a

number of technical papers one of which was focused on G6.

"It was clear that a common thread among these sessions was progress at Sellafield and how G6 had helped. This was of great interest to attendees from the USDoE which was further discussed at a number of visits to the Sellafield site to see first-hand the projects G6 had helped to accelerate."

Jack Craig, Site Manager for Savannah River was part of the delegation to visit Sellafield. He said: "The G6 principle adopted at Sellafield has clearly helped to accelerate decommissioning at the site, particularly in the legacy ponds and silos, not only by collaborative working between the site's owners, operators and regulators, but also by the workforce embracing the G6 ethos. This is a principle that I believe could be applied at Savannah River and is something that I will be evaluating in the future." ■

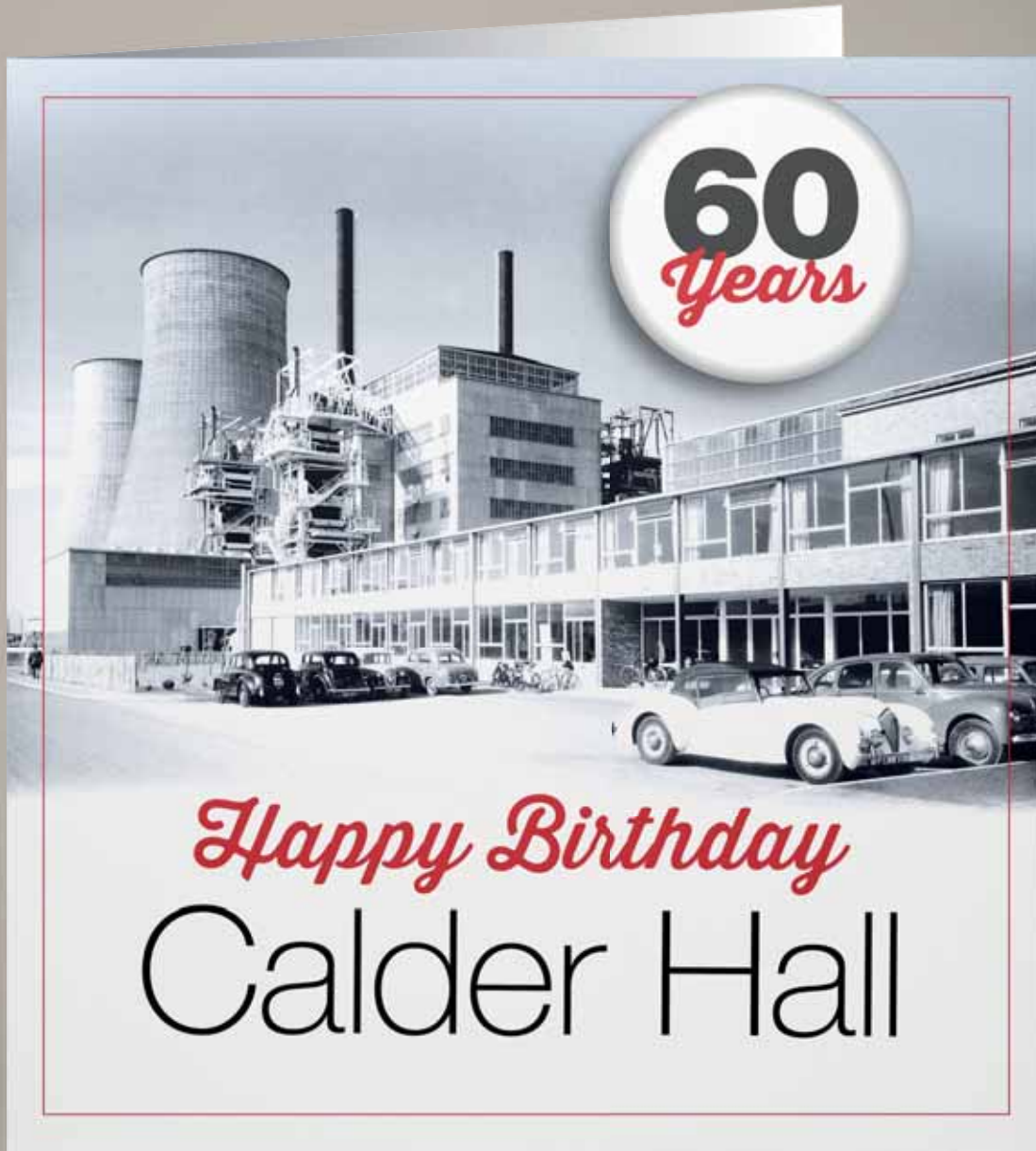
The 60th Anniversary of
**CALDER
HALL**



On 17 October 2016, it will be 60 years since Her Majesty Queen Elizabeth II came to West Cumbria to open Calder Hall, the world's first commercial nuclear power station. Here we celebrate the life of the station, we share the memories of people who have worked there and who have grown up in its shadow. We also explore how much every day technology changed between 1956 and 2003 while the station's original design and engineering endured, as well as a look at how much progress is being made in the clean-up of the iconic facility.



For more photographs and videos – including the building of Calder Hall – visit www.sellafielddmagazine.com



In October 2016, Calder Hall will reach its 60th birthday. Why celebrate the life of a redundant nuclear power station that hasn't generated electricity since 2003? Because Calder Hall wasn't just the first commercial nuclear power station, it is the father of the nuclear industry.

When we first started trawling through our archives in preparation for the 60th anniversary of the opening of Calder Hall we expected to find photographs and artefacts that depicted the life of the station's 47 years of operation. We hoped that some of them would have never been seen or published before. Happily, we achieved the latter and some of those exclusive photographs are included in the following pages.

But it was the conversations that we have had about Calder Hall, with current and past employees and with stakeholders that have given us a much richer picture of the iconic station.

We knew that Calder Hall held the title of the world's first nuclear power station, but we didn't know that we only just pipped the Russians to the post to claim the title (we started to provide

electricity to the national grid just before they could achieve the same in Russia).

We knew that the Chapelcross station in the Scottish Borders is an exact replica of Calder Hall – in fact it is known as Calder's sister station. But we didn't know that the Scottish replicated everything except the paint colour, deciding that Calder's pastel pink, green and blue wasn't manly enough for them.

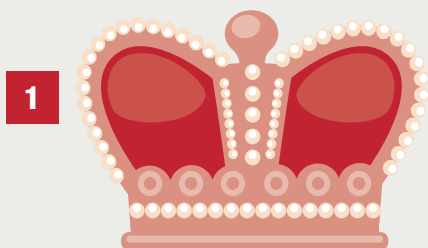
We also knew that a further 14 reactors were built on Calder Hall's design across the UK with a further two stations in Italy and Japan. We didn't know that a little wooden hut that still stands opposite the station today was set up as a training school for the operators at these new stations, making Calder Hall one of the earliest international training schools in the world.

Because we had sold the design to Italy

and Japan and because they needed fuel in order to commission and operate their new stations, we set up a commercial vehicle to provide the means to sell and transport the fuel. This commercial vehicle was the forerunner to the Nuclear Decommissioning Authority's International Nuclear Services organisation that is still going strong today. The ships were replaced by the specialist fleet that is operated by Pacific Nuclear Transport Ltd.

It was David Moore, local resident, councillor and chair of the West Cumbria Sites Stakeholder Group, who perhaps offered the best description of the station, saying: "It is like the father of the nuclear industry." Even if it doesn't quite sit at the top of the nuclear industry's family tree, it was at least the catalyst for national and international nuclear relationships that endure today. ■

10 FACTS ABOUT CALDER HALL



1

THE STATION WAS OPENED BY HER MAJESTY THE QUEEN ON 17 OCTOBER 1956.



2

It was the first industrial scale nuclear power station in the world to be connected to the national grid.

3 **4-2-4**

CALDER HALL CONSISTED OF 4 REACTORS, 2 TURBINE HALLS AND 4 COOLING TOWERS. THE COOLING TOWERS WERE DEMOLISHED IN 2007.



4

Workington was the first town to receive its electricity from nuclear power produced at Calder Hall.

5 **22**

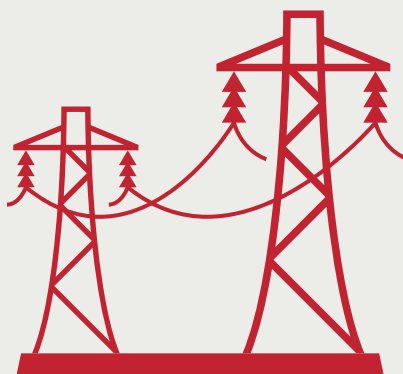
A further 22 magnox reactors were built in the UK at 10 sites – including an exact replica at Chapelcross.

6 **47 years**

CALDER HALL HAD AN ORIGINAL DESIGN LIFE OF 20 YEARS BUT OPERATED SAFELY FOR 47 YEARS BEFORE CLOSING DOWN ON 31 MARCH 2003.

7 **2.8m**

It produced enough electricity in its lifetime to power a 3 bar radiator for 2.85 million years or to meet the average electricity demand of England and Wales for 3 months.



8 **43 3/4**



THE STATION COVERS 43 3/4 ACRES OF THE SELLAFIELD SITE. THAT IS THE SAME SIZED FOOTPRINT AS BUCKINGHAM PALACE AND ITS GROUNDS.

9 **2**

Two magnox reactor sites were built overseas; Tokaimura in Japan and Latina in Italy.



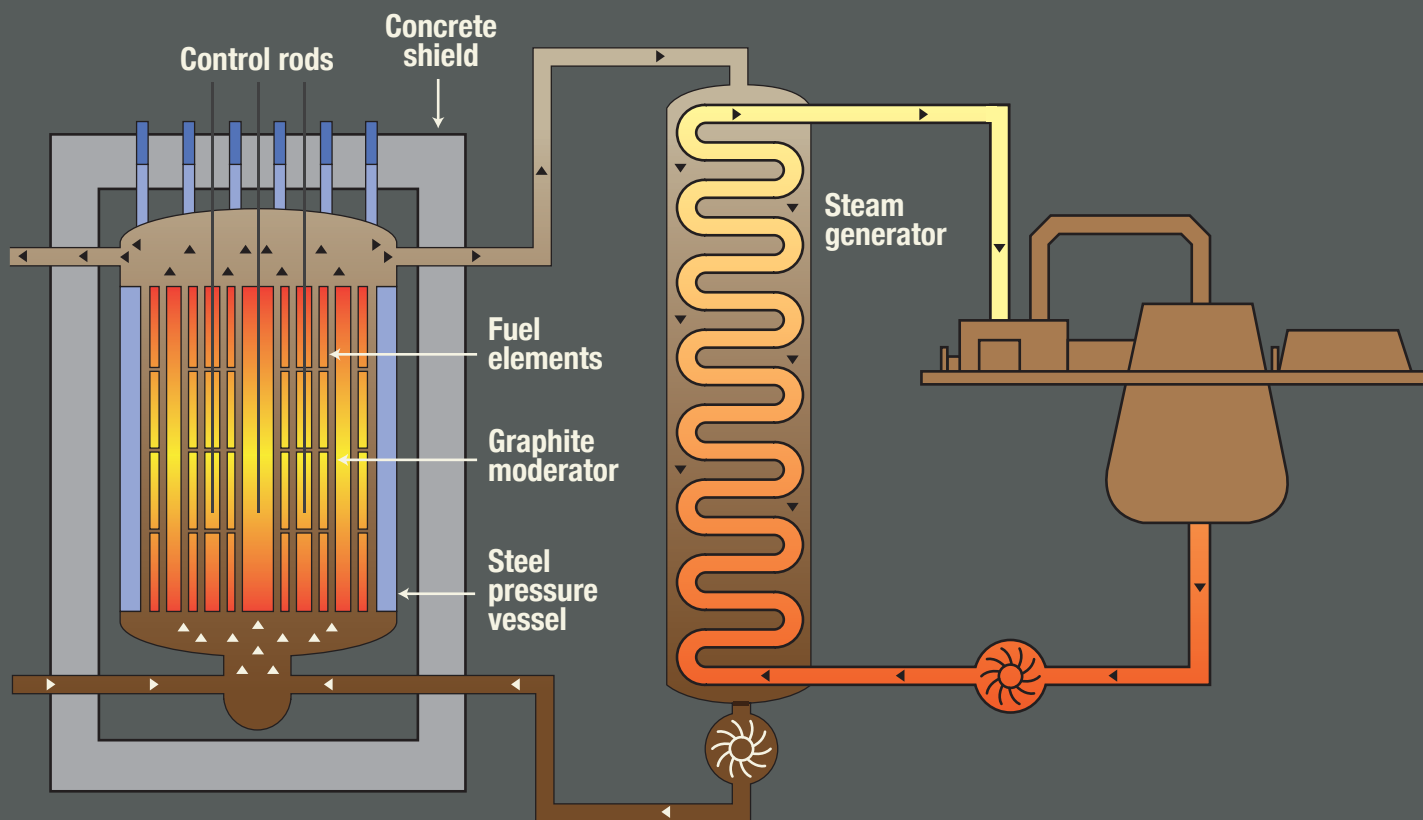
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THE SIZE OF THE STATION'S HEAT EXCHANGERS WAS LIMITED BY THE EHEN BRIDGE IN EGREMONT.

How the Calder Hall power station worked



A power station makes electricity: coal, oil, gas and nuclear (uranium) power stations all use the same processes to make electricity. The only difference between coal, oil, gas and nuclear power stations is how the water is heated.



Calder Hall had four reactors, inside which a nuclear reaction took place. The heat generated by this reaction was used to turn water into steam. The steam was then transferred via insulated piped into one of Calder Hall's two turbine halls. Here the steam was used to turn a turbine, which drove a generator to produce electricity.



A WALK DOWN MEMORY LANE

ON 17 OCTOBER, 1956, TWO FOUR-YEAR-OLDS STOOD WITH THEIR FATHERS AND WATCHED AS HER MAJESTY QUEEN ELIZABETH II ARRIVED IN WEST CUMBRIA TO OPEN CALDER HALL. BOTH WOULD GROW UP IN THE SHADOW OF THE STATION; ONE AS PART OF THE INDUSTRY AND THE OTHER A KEY FIGURE IN THE LOCAL COMMUNITY. SIXTY YEARS LATER, THEY SAT DOWN WITH US TO SHARE THEIR MEMORIES AND TALK ABOUT WHAT IT WAS LIKE TO GROW UP IN A COMMUNITY THAT WAS PHYSICALLY AND SOCIALLY TRANSFORMED OVERNIGHT.

For Phil Hallington and David Moore, the construction, opening, operation and decommissioning landmarks in the life of Calder Hall trigger memories of their own lives and relationships with the nuclear industry.

Their location on the day that Her Majesty Queen Elizabeth II came to Sellafield is symbolic of their different experience of living next to the iconic nuclear site. Phil, now our head of policy, accompanied his father, who worked on the site, and stood within the site fence to watch the opening ceremony. David, a lifelong Seascale resident, a local councillor, and Chair of the West Cumbria Sites Stakeholder Group, was with his father on the public track close to the Sellafield train station when the Queen arrived.

David said: "It is strange to think how close we probably were sixty years ago; you on the site and me just outside. I can still remember waving a little union jack as the cars went by."

The earliest record of David's family in Seascale is in 1598 as tenant farmers at Flemming Hall. He said: "Now we are dairy farmers at Croft Head Farm; which means that my family has only moved one mile in more than 400 years."

While the recollection prompted laughter on both sides, as David and Phil start to reminisce, it is clear that the transformation of the local area from a sparsely populated farming community into a hotbed of scientific innovation had not been without its challenges.

David said: "My earliest memories aren't so much about Calder Hall but the housing development that went on. We used to go and collect wood with the horse and cart, picking up the wood that the contractors had left behind.

"Before the start of the nuclear industry, Seascale had a population of about 200 people and within eight years there were 2,000 people here."

"My family came to the area when I was three and my brother was four," Phil recalled, "My father had been working at Capenhurst as an electrician and the attraction of coming up here from Liverpool was the promise of a council house in Mirehouse, on the outskirts of Whitehaven. We lived there until we moved to Seascale in 1964.

At that time you had to be in middle or senior management or a very technically important person to qualify for a house in

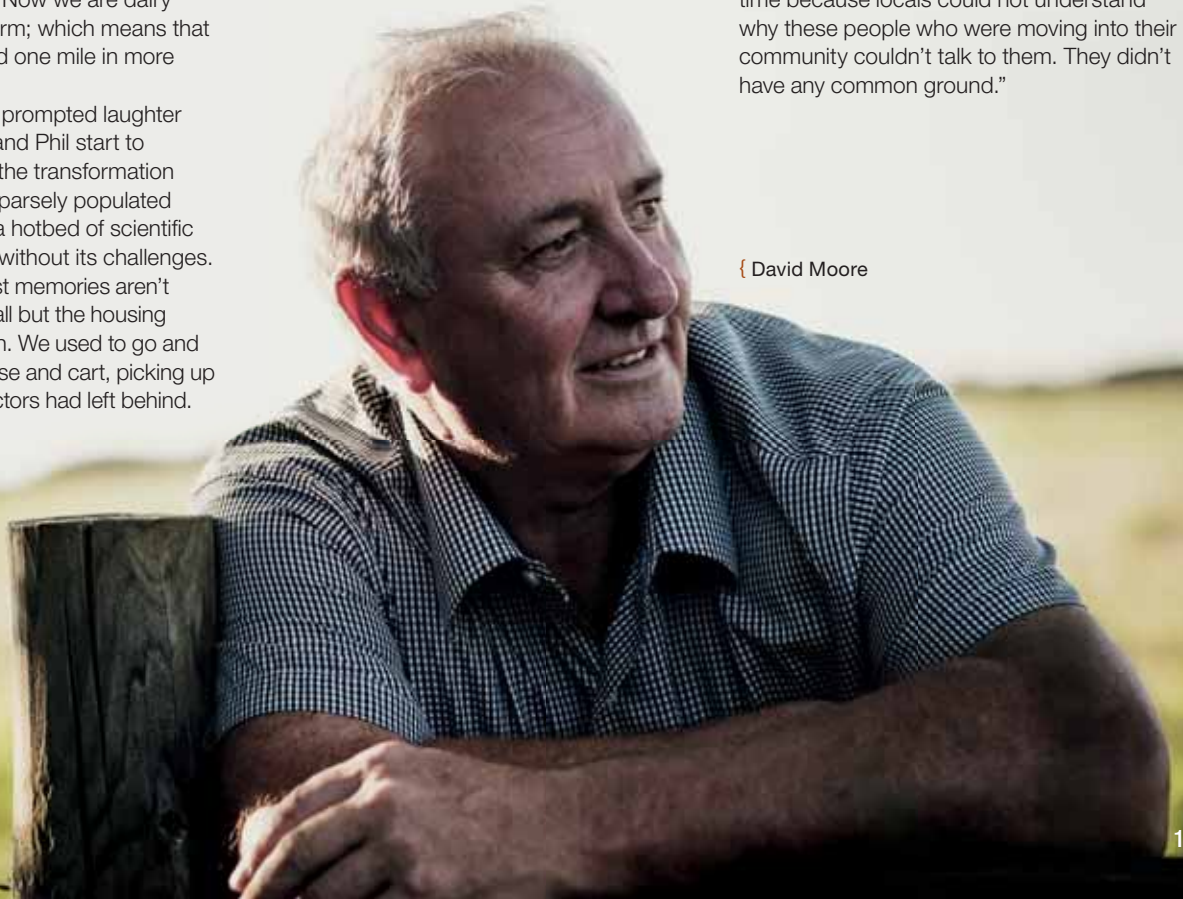
Seascale. So this wasn't a community that selected itself or grew organically."

David said: "For those of us who had lived here all of our lives, it was life changing, seeing a small community develop so suddenly into a busy thriving village."

The integration of generations of farmers and their families with the migrating nuclear workers wasn't easy, thanks in part to national security.

David said: "The problem was, locals were used to sitting down and having a good chat about what had happened in their day; whether that was rounding up sheep or issues with cattle. They were going out to the local pubs and the Windscale club at the time, and suddenly they were faced with people who could not talk about the job they did because they had all signed the Official Secrets Act. The scientists and engineers could talk to each other about work and the things that they were doing, but locals were excluded from that. It created a divided village for a long time because locals could not understand why these people who were moving into their community couldn't talk to them. They didn't have any common ground."

{ David Moore



"Do you know," Phil interjects, "I had never thought of it that way. When we came to Seascale I would have been 12 or 13 and the houses in the village were opened up to supervisory staff because the senior managers had decided to build their own houses in Beckermeth, Gosforth and further afield. When we moved here it was starting to become perhaps a little more cosmopolitan but there was still a sense of them and us in the community.

"I worked in the newsagents on a Sunday morning with a couple of paper rounds and I had a job in the local fruiterers on a Saturday delivering the grocery orders and I would see the different social things going on, but I had never thought about the unintended social consequence of something like the Official Secrets Act. It was the right thing to have in place, given the origin of the site in the production of plutonium, but it must have been an obstacle in terms of normal day-to-day conversations."

"I think it created distrust for a long time," David said, continuing: "My grandfather was very sceptical. He said that he would work with the scientists but he would never trust them. By the time you got to my father's generation; he had accepted that this was the way that we were going to be, farming wasn't going to be the way forward. By the time you get to me, the relationship has changed to the point where I was part of a group campaigning to ensure that West Cumbria would be considered as a site for new nuclear build."

Phil believes that the changing relationship over the years reflects the changing role of Sellafield. He said: It started out all those years ago with the production of plutonium, first in the Windscale part of the site and then, for a short time, in Calder Hall and gradually over time we have seen Sellafield supporting the nuclear industry around the world. We got to a point with Thorp where we were providing truly

commercial reprocessing services and that was a boom time for construction and for the economy. Now we are cleaning up and tidying away and looking to see what the next nuclear generation will look like. All of this stems from Calder Hall, really, and to have seen the beginning of that with my father, who worked at the station until it closed in 2003, was an incredible thing."

There were family ties in the life of Calder Hall for David too. He said: I remember when the Calder Hall cooling towers were demolished. I was with my grandson in the fields above Seascale Hall, looking right across to Calder Hall. He was sat on the gate and we were talking, waiting for the towers to blow, and I realised that he was four years old, just as I had been when the station was opened. An entire generation had passed between us but here we were watching another landmark moment at the station."

Calder Hall's influence didn't just stretch over generations, it reached around the world. Phil explained: "Calder Hall led to the construction of 14 reactors across the UK, but we also sold two reactors abroad; one to Japan and the other to Italy.

"There is a wooden hut just outside Calder Hall that still stands today. It was a reactor training school so that people could come and learn how to safely operate these new reactors. It was probably one of the world's first international training schools.

"I remember when I was about 10 years old, a gentleman from the Japan Atomic Power Company, Akira Machida, was being trained in the school and my father, then an electrical supervisor, invited him to our council house in Mirehouse for something to eat. So there he is, sitting at our dining table and taking notes in Japanese kanji. To a 10 year old this was the most interesting thing that I had ever seen. I found myself working and living in Tokyo in the mid-1990s and I visited the Japanese station at Tokai and found that the Japan Atomic Power Company had arranged for me to meet Machida-san again, decades after we had first met.

"These little family connections and industry connections that stem from Calder Hall go on and on. Here we are now looking at perhaps a new power station in West Cumbria that will have Japanese investment, and Calder Hall was the catalyst for these relationships. It is quite remarkable."

David adds: "Calder Hall is almost the father of the nuclear family, isn't it?" ■



Watch some of Phil and David's walk down memory lane on the digital issue of Sellafield Magazine at: www.sellafielddigital.com



{ Phil Hallington

Memories of Calder Hall...

Sellafield Magazine sought out colleagues from across the site and asked to hear their stories...

STEVE BEWSHER worked in Calder Hall from 1978 to 1992, and then again as part of the decommissioning team in 2004:

“Calder Hall was a station with a sense of pride. We all had the view that if we were to do a job, we were to do our best. This was shown in things like the floors of the turbine hall being polished, the turbines themselves being polished with car wax, and even the brass fixtures and fittings receiving the ‘brasso’ treatment. Our chief engineer, Percy Gill, had the highest standards, and signed off all work personally. In other words, it had to be done right.

“We had a family atmosphere with a ‘work-hard, play-hard’ ethos. So whilst we might be working on the turbines in a sweltering turbine hall during summer – when there was less demand for power or outside freezing working on the cooling towers in winter – when there was less demand for cooling water, we also managed to play cricket and football (using goalposts we manufactured ourselves), during lunch breaks. This only helped to strengthen team spirit.

“Calder Hall often felt like a different part of the Sellafield site – separated as it was, by the River Calder. But during shutdowns, employees came to join us from around the site and were quickly welcomed as part of a wider team.”

JOE STALKER echoes Steve’s views:

“We could all write a book of incriminating, funny or non-PC things that took place at Calder, but I’m not sure how many you’d print! It was as much the people as the place – including some amazing characters – sadly most of them have passed away, some legends, I don’t need to name them but they will never be forgotten.”

SUSIE POTTER worked on the demolition of the iconic Calder Hall cooling towers in 2007:

“The day the towers came down was amazing. There was a real sense of anticipation on the day in both demolition HQ where the gold command centre was based and across the whole site, from the sentries round the exclusion zone to the people monitoring the affected plants and those in the control centre. We’d done so much planning and preparation that everything went incredibly smoothly; the implosion itself was almost an anti-climax.

“Projects like the cooling tower demolition don’t come along very often and to have been part of the project team was an incredible experience; definitely a career highlight. I’ll still be telling people about the day I helped blow up Sellafield when I’m 90!”

DAVE MINSHALL was inspired to move to Cumbria and work at Sellafield by Calder Hall’s power generation firsts:

“Throughout my days trying to pick the best career path, the realisation that Calder was the first to generate commercial nuclear power, was dramatic and inspiring. When time and opportunity aligned, this vision of the future was instrumental in my decision to move to Cumbria and join the nuclear industry.”

TRACEY WEST’S family farmed near to Calder Hall:

“I remember Calder Hall and the cooling towers from the days of my youth when I used to visit my cousins – for many years their parents farmed at Midtarn Farm which is next to Sellafield.

“Whether we were in the garden, in the house or in a field, Sellafield and Calder Hall was always in view and it became the norm. “It was a happy family life, they had pets and ponies and farmed like anyone other farmer with family and friends often visiting. Having Sellafield on the doorstep didn’t affect the way they farmed and we all have good memories of growing up there.”

NEIL EDMONDSON worked at Calder Hall as a health physics monitor from 1992 to 1994 and then as a plant improvements and human performance manager from 2008 to 2015. He has two main memories:

“My first and proudest memory is when Calder Hall won the URS Safe Facility of the Year award in 2012 – the first time it was ever awarded outside of the United States. This was a massive achievement.

“My second, more amusing memory is of when I discovered the secret toilet that was built exclusively for the Queen when she opened the station in 1956. I won’t reveal where that is though!”

IAN TEASDALE and a number of his engineering colleagues considered one of the well-known ‘urban myths’ about Sellafield – whether the design of the plant was influenced by the size of the roads in the area, and a particularly tricky corner in Egremont:

“Having studied textbooks from the era, considered the technology involved and the economic and political drivers, they conclude that 18ft was, perhaps helpfully, the greatest diameter of heat exchanger that could be produced in the furnace and was also the limit on the narrowest piece of road.

Electrical output for the reactors was given as a design aim, and the heat exchangers were designed around this.”



OUT FOR 47

As we've seen, the technology behind the Calder Hall plant really was ground-breaking, delivering the world's first commercial nuclear power station. That the plant operated successfully for 47 years is a testament to both the teams of scientists and engineers who developed the technology, and those who operated it for more than two generations.





Washer/dryer
1950s style



Not so picture
perfect TV



A not-so-mobile
Bakelite telephone

You only need to look at other technology to see how impressive a feat this is.

Take the humble motorcar, for example.

In 1956, the new kid on the block was the Austin A35. This feat of engineering was an improved version of the A30, and was so named as it offered 35 horse power, enabling it to get from 0-60 in a shade over thirty seconds, offering a top speed of an impressive 71 mph.

More than 280,000 A35s were produced during its twelve year lifetime. The car was succeeded by the Austin 1100, Allegro and Maestro, and eventually the Rover 200 and 25.

The Austin brand itself lasted until 1987 when it was replaced by Rover. The Rover name managed another 18 years, until two years after Calder Hall's closure, with its infamous 2005 demise.

One thing is for sure, those early cars were very different in style, performance, safety, and features from those we had in the early years of the new millennium, and as a result, other than for a select few enthusiasts, the A35 is unlikely to be the car of choice.

In fact, in the UK since the 1990s, we've tended to keep our cars for an average of three

years before replacing them. So in just the last thirteen years of Calder Hall's life, most people will have seen four new cars.

The 1950s saw homes with more appliances than ever before, and this increased the demand for affordable electricity. As Sellafield's role expanded from supporting the war effort to harnessing the power of the atom, so did the range of products with a thirst for electricity at home, in the office and at hospitals across the country.

But look around the late 1950s home, and you'll realise just how different it is to the ones we're familiar with now. Whilst some of the products might have the same names, the reality is they looked very different and were much more primitive. Feature rich, they were not.

As with the car, it is unlikely that you'd see a washing machine, toaster, or even a telephone from the 1950s in use today.

In fact, in the case of the latter, technology has moved on, such that in 1956, if you wanted to make a phone call, you needed to contact the operator to do so. From 1958 you could make direct dial calls (but not to free-phone or international numbers).

With direct dialling came dialling codes. In the earliest days these numbers were mnemonics related to the town where the telephone exchange was based, but over time the system expanded and both telephone numbers and dialling codes got more complex.

As a result of increasing demand, telephone numbers changed across parts of the United Kingdom, with 1958, 1968, across the mid-1980s, 1991, 1995, being the most significant.

There are no areas that now have three digit phone numbers, and only Brampton, near Carlisle in Cumbria, has four digit local numbers.

Telephone handsets from the early days of Calder Hall's life would no longer work on the network, thanks to the change from pulse to tone dialling.

Instead we just have those memories of a simpler time. And reproduction 'Bakelite' phones.

So when you look at how far technology has moved on in other sectors, you begin to appreciate just how remarkable Calder Hall's 47 years of operations really were. ■

So when you look at how far technology has moved on in other sectors, you begin to appreciate just how remarkable Calder Hall's 47 years of operations really were.

NUCLEAR *pioneer*

Overseeing the design and construction of the world's first commercial nuclear power station may seem like a daunting task, but it was just one of many achievements for nuclear pioneer, Lord Christopher Hinton.



Lord Christopher Hinton has been described as one of the 20th century's most eminent engineers.

His contribution to the UK's nuclear industry included a leading role in the UK Atomic Energy Authority where he was responsible for the design and construction of a uranium extraction factory at Springfields, the reactors and reprocessing facilities at Sellafield (known then as Windscale) for the production of plutonium for the atomic defence programme, the fast breeder reactor at Dounreay and, of course, our own Calder Hall.

Born on 12 May, 1901, he joined the Ministry of Supply at the beginning of World War II and in

1946 became the deputy controller of nuclear energy production.

In 1954, when the Atomic Energy Authority was formed, he was as managing director of 'Industrial Group Risley' which comprised the Risley headquarters and laboratories at Culcheth, Capenhurst, Windscale, Springfields and Dounreay plus factories at Springfields, Capenhurst, Windscale, Calder, Dounreay and Chapelcross.

He received many honours including the life peerage in 1965 and he served as Chancellor of the University of Bath from 1966 until 1979. He was awarded the Order of Merit in 1976, and passed away in June 1983. ■



Lord Christopher Hinton (second from the right)

New fangled things *in 1956*

The opening of Calder Hall wasn't the only thing that made the headlines in 1956. It was also the year that saw the launch of...

Velcro



Liquid paper



Corgi toys



PG tips tea party



Lego



Non-stick frying pan



Elvis Presley



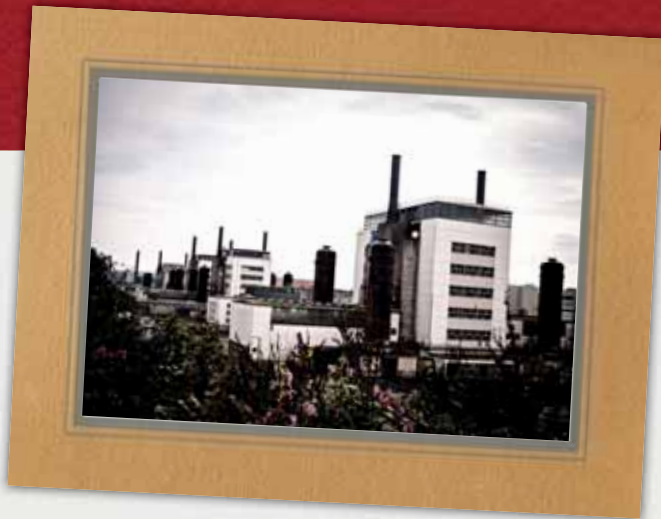
Hovercraft



Premium bonds



CALDER HALL: THIS IS YOUR LIFE



CALDER HALL LED THE WAY FOR THE UK IN THE USE OF NUCLEAR FUEL TO GENERATE ELECTRICITY. OPERATING SAFELY FOR 47 YEARS, IT WAS A FEAT OF BRITISH ENGINEERING. THE STATION CONTINUES TO BLAZE A TRAIL, THIS TIME IN NUCLEAR DECOMMISSIONING. AS YOU CAN SEE, THE CLEAN-UP OF THE ICONIC STATION IS WELL UNDER WAY.

Building Calder Hall

Starting in August 1953, Calder Hall was an ambitious design and construction project from an engineering and logistics perspective. Many parts of the station were constructed off site and brought to Sellafield by road; such as the heat exchangers that were transported from Renfrew in Scotland. Their journey included some challenges including some very narrow corners in the road in Egremont at the time.

Operating Calder Hall

The team would succeed, however, and less than three years later, in May 1956, the first reactor was operational. All four reactors were generating electricity by the end of 1959. The station was built to the best engineering standards of its time and would go on to safely generate electricity for 47 years, with the last reactor stopping operations in 2003.

Cleaning up Calder Hall

Calder Hall's four iconic cooling towers had dominated the Sellafield and West Cumbrian skyline for more than half a century before they were demolished in September 2007. The explosive demolition was 3 years in the planning to ensure that

when the towers were imploded they would fall within their own footprint.

Sellafield is a highly compact site and we have a need to build new facilities to help us retrieve, store and process the legacy wastes and fuels that need to be retrieved from our legacy ponds and silos. The land where two of the cooling towers once stood is now home to a new Silos Maintenance Facility (see page 96).

The following year we started to remove parts of Calder Hall's physical structure, starting with the pipework that connected the heat exchangers to the four reactors. Each duct that was removed weighed 45 tonnes and we needed the help of one of the biggest cranes in the world to dismantle the structures.

The external supporting steelwork and distinctive colourful stairwells on all 16 heat exchangers have been dismantled. The steelwork around each weighed approximately 340 tonnes and, wherever possible, the material was recycled.

In 2010 we completed what was, at the time, the biggest asbestos removal project in Europe. The material was stripped from Calder's heat exchangers, turbine halls and associated buildings. In all, 2,300 tonnes of asbestos cladding was removed in five years.

When Calder Hall stopped generating electricity in 2003, all four of the reactors were full of fuel that would, after a period of cooling, need to be treated in our Magnox reprocessing plant. A project to transfer the 40,000 fuel rods from the four reactors to our Fuel Handling Plant started in 2011. One of the reactors is now completely empty and the remaining three are on course to be empty by 2019.

Once the reactors are empty and initial post operational clean out work has been completed, Calder Hall will pose not nuclear or radiological risk or hazard. The site will enter a period of interim care and maintenance so that we can concentrate our resources on reducing risk and hazard elsewhere on the Sellafield site.

Our current plans indicate that by 2027, only the four reactor buildings will be left of the original Calder Hall station. The reactor buildings will be dismantled to the point where only the concrete bio-shield that contains the reactor core remains. This 'safestore' principle is already in use for reactors in France, Germany, Italy, Spain and the USA, as well as for the other Magnox reactors in the UK. ■

Then & Now

THE SAME MACHINERY, EQUIPMENT AND CONTROL ROOMS THAT WERE USED TO OPERATE CALDER HALL ARE NOW BEING USED TO CLEAN UP THE STATION. THESE PHOTOGRAPHS SHOW HOW THE MAIN AREAS OF CALDER HALL HAVE STAYED THE SAME AND, ON THE OPPOSITE PAGE, THE PAST MEETS THE PRESENT.



Control room



Charge floor



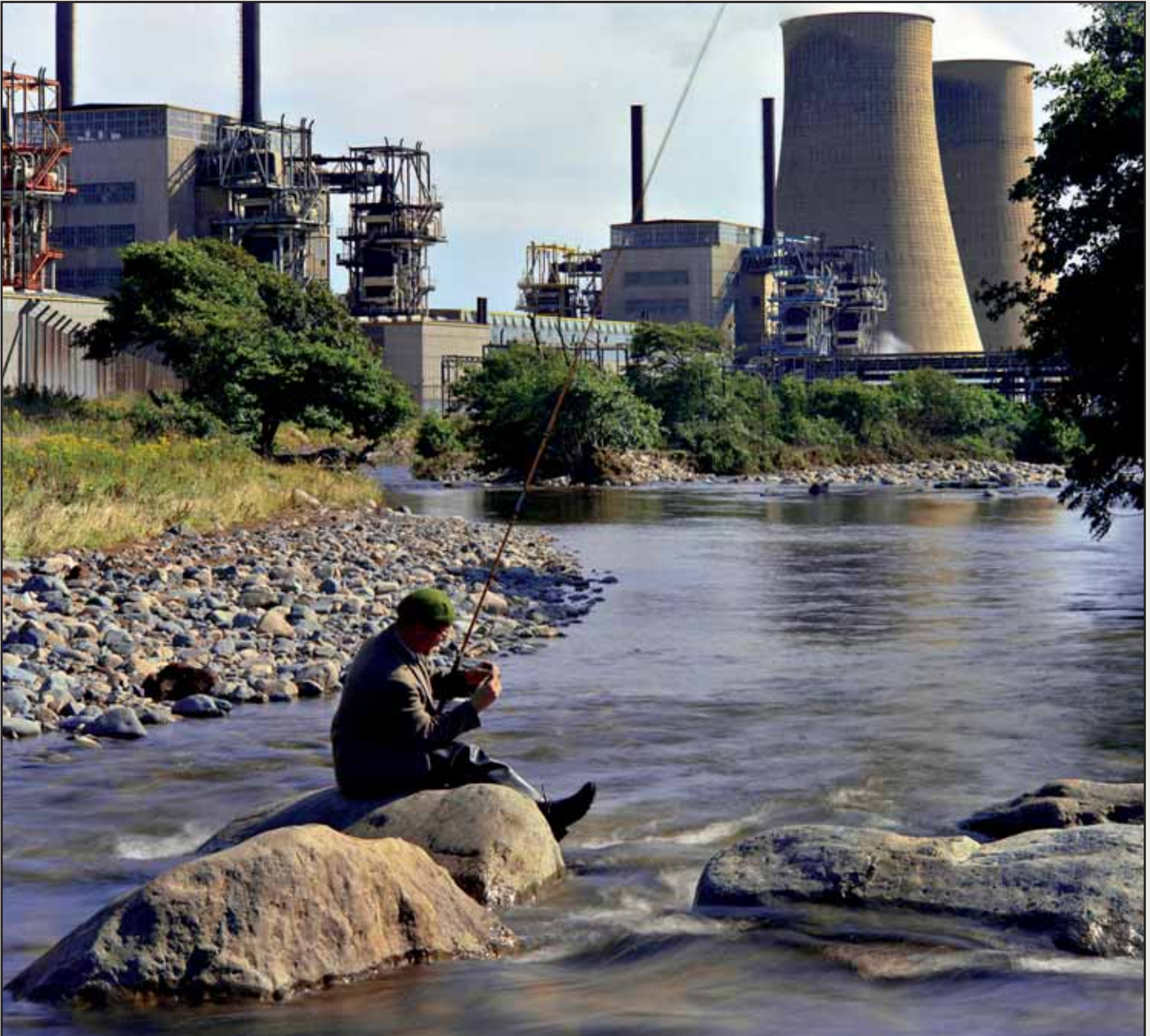
Turbine hall





Charge Floor

FROM THE
ARCHIVES



FISHERMAN 1962

A view of Calder site from the river with fisherman, June 1962.



Alan Bainbridge



When Alan Bainbridge joined the workforce at Calder Hall back in 1978, he didn't plan on it being a long-term thing, 38 years later and after going full circle from refuelling to being in charge of defuelling the reactors he tells us what's so special about the place, which made him stay.

Alan, tell us what you think makes Calder Hall special?

I joined Calder Hall in 1978, in what I considered at the time to be a 'stop-gap' job. My intent as a youngster was to become a farm manager, clearly that didn't happen and some 38 years later I'm still here. The happy thing is that I don't regret a single day of it either.

Working at Calder Hall has always given far more to me than it has taken. Anyone that knows me will have heard me say many times that Calder has a family atmosphere.

This has always been the case.

As an 18 year old I was in effect still a kid and as such I was very thankful for the way the older guys treated me. Regularly I'd get a message passed to wherever I was working on site to say that a pie or a plate of sausage was waiting for me in one of tea bars – that kind of care really makes you feel comfortable.

If you see the place itself it is like stepping back in time, when you walk into our control room and compare it to a modern reactor control room, they are worlds apart. You could be back in the 1950s.

What roles have you had while at Calder Hall?

I was lucky that I began my time at Calder as an operator, I'm very proud of that.

I trained on the power side originally as part of the refuelling team; my work covered the

electrical control room, the turbine hall, heat exchangers and water treatment plant so I really do know Calder inside and out.

It wasn't what you would regard as a scientific process that was used to decide whether I should initially train on the turbines or reactors. Me and another new starter, he was probably about 40 at the time, had a meeting with a chap who looked at us and said to me: "you look pretty fit, there are some big valves in the turbine hall, you can go in there!" The other fellow got told to go and work on the reactor desk!

The reactor hall and turbine hall operators at both Chapelcross and Calder Hall were just everyday people, when I began some of the team working there had been involved in the construction of Calder Hall so had a huge amount of knowledge but there wasn't an educational degree in sight!

I worked my way up through the ranks, as shift refuelling charge hand, shift refuelling foreman and then refuelling manager – I've gone full circle from putting fuel into the reactor when it was running, to taking it out now we are shut down.

Because I showed an interest, I was given the responsibility of looking after Calder's Emergency Arrangements, when we had four operating "at power" reactors that really was something to take on. As the years progressed and my role changed I picked up other responsibilities including acting as the nuclear

material custodian and Security Liaison. When asked by a new head of Calder – what do you do, my response was: "well anything to do with Calder really!"

As a refueller I started to push against the norms, historically the shift foremen at Calder Hall were ex-craftsmen who'd served an apprenticeship. I was fortunate that the management on my shift saw some promise in me and championed my cause to become a foreman myself.

Have you any funny stories that you can think of?

Well, yes some of them too funny to mention and I am not sure should be put in print! One memory that comes to mind though is, one of the operators accidentally dropped his keys from his shirt pocket whilst preparing a standpipe on the pile cap. This gave direct access to the reactor vessel. Inspections were carried out and we could see that the keys including his key ring, a plastic model of a footballer, were lying on the charge pan. It was recovered safely and after it was decontaminated, returned to its owner showing only slight injuries from its fall to the reactor core – the heat had melted it! ■

IN FOCUS:

Magnox Reprocessing Plant

Completing our mission

With over fifty years under its belt, the Magnox Reprocessing Plant is one of the oldest operational plants on the Sellafield site. It has been recycling the used fuel from the Magnox stations across the UK for more than half a century. It's a cliché but without this workhorse keeping Britain's lights burning, times would have been a lot darker, so what does the future hold for this stalwart?

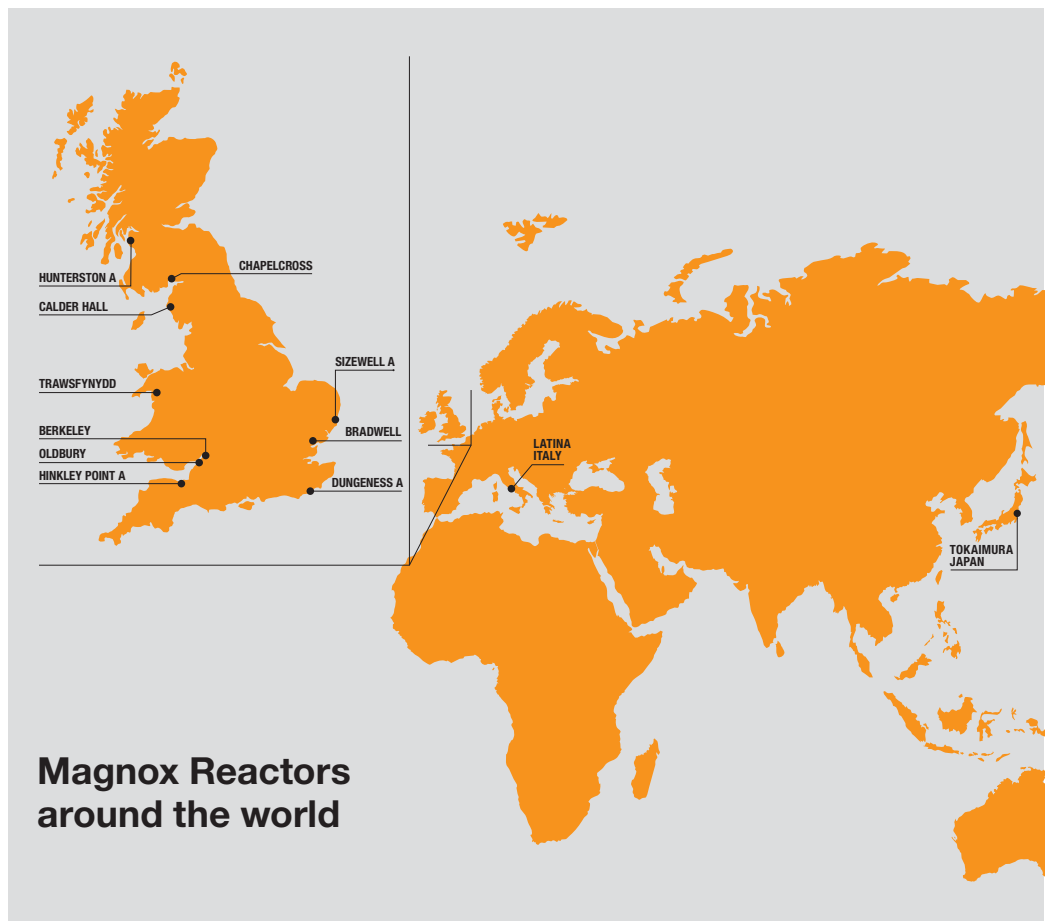
facts

The very first Magnox nuclear reactor was Calder Hall at Sellafield.

Calder Hall stopped generating electricity in 2003.

Magnox reactors were not only built in the UK, reactors in Italy and Japan were also built.

Wylfa was the last Magnox reactor in the world to generate electricity – Electricity production ceased on 30 December 2015.





A key part of our mission is to complete the reprocessing of all of the UK's Magnox fuel. Reprocessing the spent fuel is one of the final pieces of a complex jigsaw that make up the UK's Magnox Operating Programme. The reprocessing plant is the centre piece to that jigsaw.

Built as a dedicated facility to deal with spent fuel from the UK's early reactors, the Magnox Reprocessing plant came online in 1964. Prior to this, Magnox fuel was reprocessed in the primary separation plant, which originally was built to reprocess fuel from the Windscale piles in support of the UK's atomic weapons programme. It was later re-configured to manage the fuel from the Magnox stations, that was until the dedicated plant was up and running.

When the plant was designed nobody would foresee that it would be operating for more than 50 years, with the increased need and demand for electricity, the Magnox reactors' lifetimes were extended and so it has been a necessity to keep the plant running. As with anything working with ageing kit presents

challenges; luckily the team who work there, are experts in the field.

The Magnox Operating Programme

Set out by the decommissioning authority, the Magnox Operating Programme provides the coordination and oversight needed to ensure that all the steps in the dance to

Reprocessing the spent fuel is one of the final pieces of a complex jigsaw that make up the UK's Magnox Operating Programme

safeguard the reprocessing of the spent Magnox fuel are in sync. The Magnox Operating Programme was launched in 2001 and provides an integrated approach to ensure the safe management, reprocessing and final storage of the UK's spent Magnox fuel.

At the heart of the success of the Magnox

Operating Programme is the reliance of our Magnox reprocessing plant. Given the plant's age, it's easier said than done and it would be impossible without the knowledge and experience of the Magnox workforce who work tirelessly to ensure that the mission is completed.

To support this, the Magnox Throughput Improvement Plan was implemented in 2011.

With its main aim to deliver risk mitigation and improve plant performance, the programme has delivered over 30 improvements across the Magnox value stream to secure the completion of reprocessing.

Improvement in action

The final improvement delivered by the improvement programme was the replacement of Rodman, a vital piece of work to keep the plant running. Rodman is basically a remote arm which is used to recover fuel, debris and blockages in the Magnox reprocessing plant (much like the mechanical grabbers in the arcade that pick up a cuddly toy). Rodman 1 was in service for over 30 years and was beyond repair, prior to that the rods had to be recovered manually using long arm grabs. The

With less than 2,000 tonnes of fuel left to be reprocessed the end of the mission is in sight. It won't be plain sailing though...

implementation of Rodman 2 was complex, but working alongside our supply chain partners James Fisher Nuclear, this essential piece of kit was installed successfully.

Other tasks which have been delivered as part of the improvement programme are the return to service of the Thermal Denitration reactor 2. Without its reactor availability, the

whole of the Magnox value stream is stopped. The role of the reactors is to convert the uranium which is recovered from reprocessing operations into a reusable powder.

The improvement programme has been hailed as a huge success, solving problems across the whole of the Magnox value stream whilst reducing and mitigating risks it has resulted in improvements in performance.

With less than 2,000 tonnes of fuel left to be reprocessed the end of the mission is in sight. It won't be plain sailing though, some of the

fuels that are left to reprocess are potentially difficult, add to that the ageing plant it won't be easy but that won't stop this workforce.

Gary Rothery, head of the reprocessing separation plant explains: "It's a personal thing for many of the workforce in Magnox, a lot of the people have been here since they started working at Sellafield.

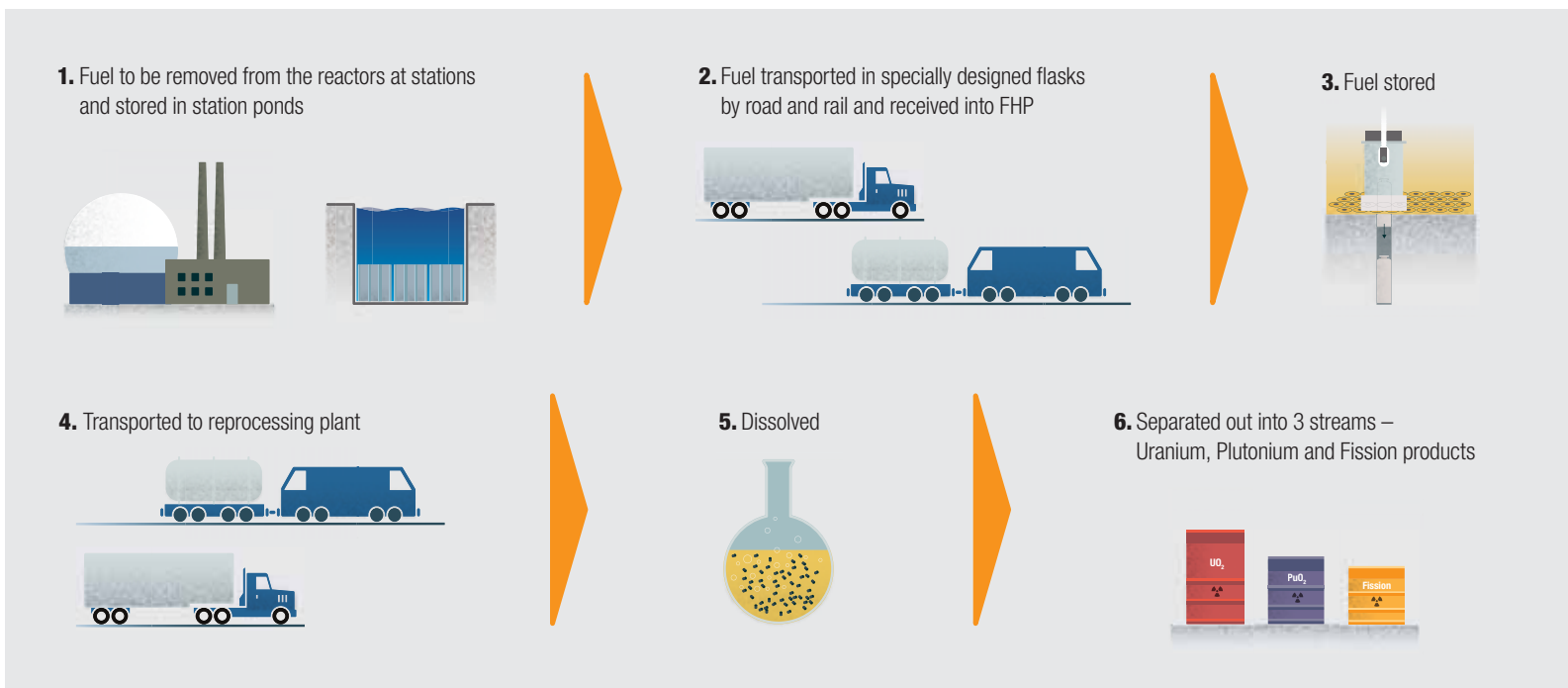
"It isn't an easy place to work. With the age of the plant and the challenges we face, including being the most highly regulated industry, everything we do is scrutinised – and rightly so, but sometimes it can be really demanding. Our determination keeps us going though and we are doing all we can to keep the plant running.

"Fulfilling the mission is a pride thing for many of us, we want to see the journey out, I know that when that last fuel rod is fed into the plant, I want to be there, it will be a momentous occasion.

"Magnox fuel is different to the oxide fuels that we know are destined for long-term storage in the Thorp pond. Magnox fuel isn't suitable for long term wet storage.

"We only have to look at all the work that is going on to clean up the First Generation Magnox Storage Pond, long term storage is not an option, completing the reprocessing is."

Success isn't just down to the reprocessing plant. We call it the Value Stream, if you think of it as a chain of activities, all which are dependent on each other. Each plant and



Magnox Reprocessing Separation Plant Timeline

<p>1964</p> <p>The newly built Magnox reprocessing plant starts operations, designed to take the fuel which has already been decanned (had its outer casing removed in the First Generation Magnox Storage Pond) and separate out the re-usable uranium and plutonium from the fission products.</p>	<p>1978</p> <p>Construction of the new Fuel Handling Plant begins. Designed to receive fuel, store in an enclosed pond and decan it prior to being sent to the Magnox Reprocessing plant.</p>	<p>1986</p> <p>The Fuel Handling Plant begins operations.</p>	<p>2001</p> <p>Magnox Operational Programme is implemented in order to take a holistic view of the whole Magnox life cycle.</p>	<p>2011</p> <p>The Magnox throughput improvement programme – implemented to focus on operations and performance improvements the programme delivers over 30 improvements.</p>
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facts

Magnox reprocessing is scheduled to end in 2020.

It is the only reprocessing plant in the world designed for Magnox fuel and has reprocessed fuel from Italy and Japan as well as the UK.

More than 52,000 tonnes of fuel have been reprocessed.

1993-1994 was the most successful year, 1,664 tonnes of fuel were reprocessed.



process is a link in the chain. If one breaks it has a knock-on effect on the rest. For example, in order to keep reprocessing we need the Magnox Encapsulation plant to be able to take the swarf (the casing from around the fuel rod) from the Fuel Handling Plant so they can continue to decan and send fuel off the reprocessing plant...

What happens after reprocessing

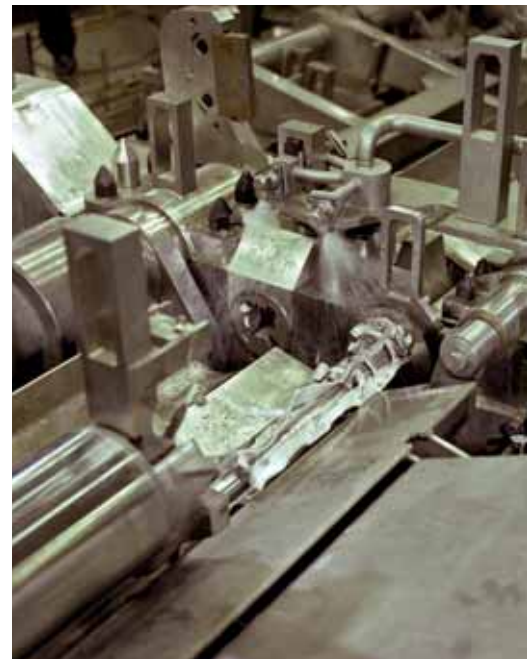
By 2020 all of the Magnox spent fuel will have been reprocessed and there is no longer a need for the Magnox Reprocessing plant. It isn't a case of switching the lights off and walking away, there will still be a huge amount of work to do.

This stage is called post operational clean out. Planning for this phase of work is already being carried out. It is the stage

of the plants lifecycle prior to dismantling and decommissioning. In simple terms, as much of the radioactive and non-radioactive material is removed and the plant is washed out in order to reduce the dose impact when it is dismantled.

This stage can take a few years and following its completion it doesn't go straight into decommissioning, in fact it undergoes a period of surveillance and maintenance and decommissioning wont actually begin for at least another 20 plus years.

Things are changing at Sellafield. The completion of our reprocessing programme, not just in the Magnox plant but also in the Thermal Oxide Reprocessing Plan – or Thorp, as it is known – is one of the biggest operational changes. ■



Future timeline

2020

Reprocessing operations will be complete (approximate dates)

2024

Surveillance and maintenance phase

2040

Decommissioning will begin

2060

Demolition phase

2012

Planning for post operational clean out following reprocessing operations begins. Using the knowledge of the workforce, detailed planning starts.

2014

The Magnox team celebrates 50 years of reprocessing operations, local and national media pay a visit to the plant.

2016

With more than 52,000 tonnes of fuel reprocessed, less than 2,000 remain.

Rodman 2, the new remotely deployed robotic arm is operational in the plant, supporting operations.

TRANSPORT

a key activity at Sellafield

A key activity at Sellafield over many decades has been the movement of nuclear materials and dangerous goods to and from the site to destinations around the world, using various methods of transport.



Without the safe and secure movement of materials, operations at Sellafield would soon be affected, and looking after this important task is a small team led by head of consignment operations, Martin Porter.

Martin said: "The function of the consignment team is to ensure that the transport of materials is undertaken in a manner which is safe, secure and compliant with national and international regulations.

"In its purest sense, consignment is a term applied to the activities that we deliver to satisfy our duty-holder obligations under Nuclear Site Licence Condition 5 – 'Consignment of Nuclear Matter'."

This is obviously a wide-ranging and diverse scope of work, and just radioactive materials alone involves about 3,000 movements between facilities on the site and around 1,000 movements that either leave or arrive at the site.

Each day, fuel flasks travel between site and the UK reactor sites operated by Magnox Ltd and EDF as part of the fuel cycle, and while reprocessing at Sellafield is programmed to end in 2020, EDF fuel receipts for storage will continue.

At the same time, waste shipments also leave the site daily as the company pursue its remediation and decommissioning strategies.

Martin said: "While fuel and waste make up a large proportion of our work, we also ship sample and research materials, and receive shipments from the UK under the national consolidation strategy which involves material being transported to Sellafield for long-term safe and secure storage."

We don't of course carry out transports alone, and have long-term close working relationships with fellow Nuclear Decommissioning Authority subsidiary companies International Nuclear Services and Direct Rail Services to deliver the NDA transport mission.

Beyond these relationships, our duty as a safe and secure consignor involves engagement with UK and international regulators as well as those that support the company in transport activities such as package designers, manufacturers, hauliers, port handlers and, of course, the receiving facility.

We use various modes of transport – whether it's trains, vehicles or ships – to move material such as spent reactor fuels, vitrified high level waste returns to international customers or packages of low level waste to the Low Level Waste Repository – so the list of partners is very long.

Head of communications for International Nuclear services Sam Wilkinson said "we

work with Sellafield Ltd on key transport programmes like the vitrified residue returns and the Dounreay Exotics Consolidation Project.

"The way we transport nuclear materials is safe, secure and tried and tested, and we know that with meticulous planning and close working with Sellafield Ltd and Direct Rail Services, we can continue to deliver good progress in these important programmes."

Our consignor duty is non-transferable so our work to establish and maintain the safety, security and compliance of all aspects of these diverse shipments, from inception to delivery, is not taken lightly.

Martin said: "We have a meticulous planning process for each shipment which can take anything from a few days to several years to deliver, depending on the nature of the shipment. During the delivery of our work, we continually engage with our stakeholders and test our arrangements through a robust scrutiny process."

In recognising that our duty-holding accountability extends until shipped materials are successfully unpacked at the receiving

facility, Martin said that "it's necessary to ensure that our supply chain are delivering their activities to meet our meticulous standards and on occasion we can only do this by having a presence at key operational stages, particularly when our shipments transfer between modes of transport."

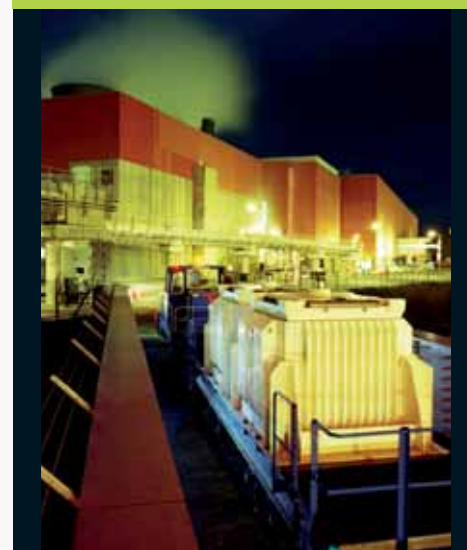
The consignment team has seen many rail yards, ports, airports and receiving facilities across the world. Martin said: "Travelling is part of the job, it can prove a little tiresome,

but the positive benefit is engaging with regulators, participants and counterparts who work with us to deliver our mission. Reaching out to stakeholders is a key part of our work and something we must continue to work hard at."

Looking to the future, each year the company's activities change shape as our mission evolves, and we have already begun work to ensure that the future clean-out, decommissioning and end-state activities are fully underpinned by the appropriate transport solutions.

In summary, the consignment team's work is diverse, detailed and meticulous, and consignment manager Mark Geldard added: "It's very rewarding when a shipment arrives safely and securely at its destination." ■

"We have a meticulous planning process for each shipment which can take anything from a few days to several years to deliver, depending on the nature of the shipment."



Martin Porter
Head of consignment operations

The right stuff

The people who will be operating the new waste retrievals machines in the Magnox Swarf Storage Silo will have a special role in nuclear decommissioning history – they will be the Buzz Aldrins of Europe’s biggest environmental clean-up mission. Sellafield magazine met some of our people who are being trained to operate the Silo Emptying Plant.

The task of removing the hazard from Western Europe's most hazardous building is as big as it gets in the nuclear industry. It has taken many years and many millions of pounds to design and construct the machinery that will perform the task of grabbing the waste out of the Magnox Swarf Storage Silo. And as *Sellafield* magazine was going to print, the first of three Silo Emptying Plant retrievals machines was in the final stage of being assembled in the facility, ready for commissioning and the start of retrievals in 2018.

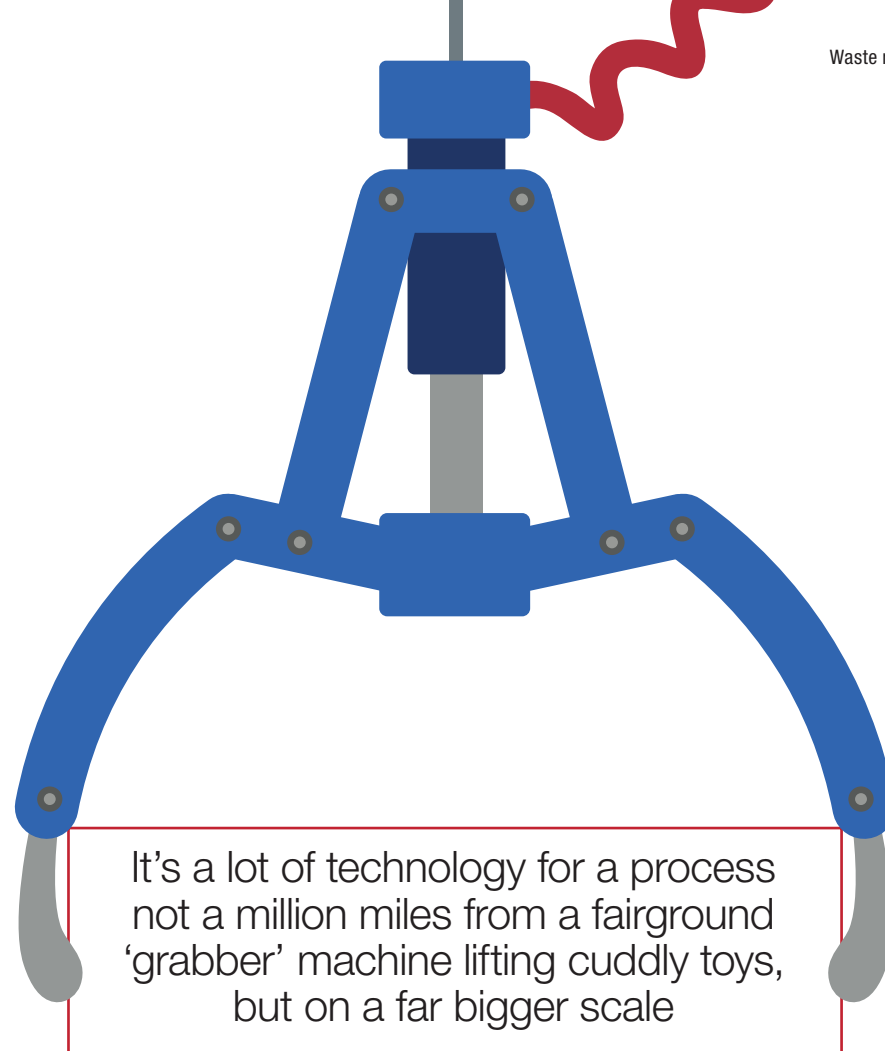
More than 13,500 different highly-engineered parts have been pieced together in this 360-tonne marvel of a machine to perform the task of lifting, sorting and packing away an estimated 60,000 items of nuclear waste and debris, including Miscellaneous Beta Gamma Waste, magnesium swarf and irradiated uranium metal.

It's a lot of technology for a process not a million miles from a fairground 'grabber' machine lifting cuddly toys, but on a far bigger scale (each of the 22 silo compartments currently storing the waste and radioactive liquor is big enough to hold six double decker buses).

So how does it feel to know that in around two years, you could be performing a task of national significance at the controls of a machine which will safely form the protective barrier between you and one of the most hazardous environments in the world?

"I feel up for it," said Magnox Swarf Storage Silos operator Laura, who has been with the company for nearly three years. "While I've been here, working in this facility has been all about care and surveillance: checking and surveying that everything is as it should be in the facility while we've been preparing for retrievals."

This safety-first principle has also underpinned the significant work undertaken to strengthen and upgrade the legacy facility so it is ready for retrievals. Major investment has been made on structural improvements and new building infrastructure such as pipework and electrical systems. Installing the machine and the other retrievals equipment in the facility is a bit like putting a brand new



It's a lot of technology for a process not a million miles from a fairground 'grabber' machine lifting cuddly toys, but on a far bigger scale

engine into the body of an old car – so we are carrying out exhaustive checks and tests to ensure that new and old will safely and successfully gel together.

Fellow operator Steph talks about the excitement of seeing the machine growing day by day as more and more of the modules have been lifted into the facility to be reassembled inside (the first module, the transfer tunnel, was lifted into the building in November 2015 and this has been followed by 22 more modules).

"Before it arrived all the talk was of what it would look like when it was here," said Steph. "Seeing it being built here is very different to looking at it on a piece of paper. In the last 11 months we've seen it go from nothing at all to a machine which has got bigger and bigger... and bigger! It's starting to feel very real now."

That reality is not lost on anyone working in the facility – everyone understands the importance of the mission and how vital it will be to work safely and start removing the waste as soon as possible. "We're at a really important time in the facility's history," said Laura. "I work with people now who were here when the third extension was built in the 1980s and they tell me how they stood at the bottom of the compartment before it was filled. That's just unimaginable now, but I'll be able to tell people I've been inside the cave in the machine. Soon no human will be able to go in there ever again." >>



Steph (on the left) and Laura.





TELBOT FACTFILE

7+360°

The TELBOT robotic manipulator arm moves on seven different axes, some of which have 360° rotations. A human arm moves on just three axes.

2.8m

Fully extended, it can reach 2.8m. But it will never be able to fully stretch its arm within the confines of the cave.

12,000 hours

It will be able to work for 12,000 continuous hours without needing any major work.

3.5t

It can exert up to 3.5 tonnes of power.

Limbering up

The first training sessions for operators to use the Silos Emptying Plant retrievals machine in the Magnox Swarf Storage Silo has taken place before the machine has even been assembled in the facility.

It has focused on controlling the TELBOT robotic manipulator arm, which is used to sort, clear and pick the waste which has been grabbed from the compartments below.

The arm was shipped over for the training from Germany, where it is manufactured as an off-the-shelf component in the chemical and nuclear industries. Its main advantages are it's durable, it can be removed and replaced relatively simply and it can operate in highly radioactive environments.

“Using the arm at first was a bit like trying to rub your tummy and pat your head at the same time, but you soon got used to it,” said operator Laura. “We’re told it’s a bit like riding a bicycle, so the training we’ve just had should come straight back to us when we go to the next phase.”

Fellow operator Steph said: “The arm was a lot bigger than I expected it to be, considering the relatively small space it’s working in. It moves as gracefully as a ballet dancer, but it’s also incredibly strong.”

It will operate in the confined spaces of the ‘cave’ at the bottom of the machine, so operators are being trained to be adept at moving the arm around this tight area so it can perform functions such as cutting larger items so they can be placed in the retrievals skip, packing down waste into the skip, washing down surfaces and scraping waste out of corners. The next phase of training due at the end of 2016 will be on the actual machine in the plant as part of its inactive commissioning. ■

Why is hanging a big door such a key moment for nuclear decommissioning?



These mighty portals will be the key to unlocking and emptying the Intermediate Level Waste contents of the last of Sellafield’s ‘big four’ legacy storage facilities to start waste retrievals.

The Pile Fuel Cladding Silo is filled with inert argon gas to stop a fire ever happening. Therefore getting waste out of the compartments while maintaining the sealed atmosphere within presents a unique engineering challenge.

It has taken years of planning, design and precision manufacturing by us and our supply chain partners Bechtel Cavendish Nuclear Solutions and Babcock Marine Technology to get the doors ready. The planning and design was done in Daresbury, with the actual manufacture and testing carried out in Rosyth, Scotland.

Each door weighs 12.4 tonnes – the equivalent of around 150 grown men – and all six will be installed on the 1950s silo by Christmas 2016. It’s the most visible sign yet of progress on one of our most challenging decommissioning tasks. ■



● ● Door Installation Frame

● ● Before the doors arrived a custom-built door installation frame was lifted onto the retrievals building in June next to the legacy silo. The frame holds the doors in place while they’re positioned onto the silo.



● ● Door arrival

● ● After years of being built for this special task, August was the first time a silo door had ever entered the Sellafield site. Until then it had only ever been used on a specially-built silo facility mock-up in Rosyth.



● ● Contractor

● ● Decommissioning the Pile Fuel Cladding Silo is a programme which involves a myriad of supply chain expertise – including the crane experts who lift the equipment manufactured by others.



●●● **Door lift**

●●● Lifting a 7-metre by 4-metre stainless steel behemoth in an area congested with high-hazard nuclear facilities is in itself an operation which requires meticulous planning.

●●● **Door in DIF**

●●● Precision engineering has ensured that the silo door fits snugly into the door installation frame 15 metres up on the side of the silo.



●●● **Door on silo**

●●● Safely installed on the silo, the door is ready to allow holes to be cut into the wall behind it. Once the rest of the retrievals equipment is installed we can start getting the waste out in 2020.



As specialist engineering, manufacturing and technical experts, **James Fisher Nuclear**, win a contract to help with the clean-up of the Fukushima power plant, we look at how the company has used Sellafield as a spring board for national and international growth.

Fishing for opportunity

Based in Egremont, just a few miles from the Sellafield site, James Fisher Nuclear has more than four decades of experience in nuclear decommissioning at Sellafield, and now their expertise is in global demand.

Bertie Williams, Business Director for the specialist engineering, manufacturing and technical experts, describes their evolution and recent growth as spectacular.

“James Fisher Nuclear is technically only 11 years old but has significant nuclear decommissioning experience stretching back around 40 years. We formed in 2005 following the acquisition and merger of Harsh Environment Systems Ltd, Nuclear Decommissioning Ltd, REMAC and Remote Marine Systems Ltd and then subsequently acquired Faber Design Consultancy in 2009.

“Over the last few years we have secured high profile decommissioning projects at Sellafield and across the Nuclear Decommissioning Authority estate and beyond.”

That work at Sellafield has helped us to move away from always using bespoke solutions to address our challenges as JFN have introduced technical solutions from other industries, delivering progress for us and value for money for the tax payer.

The deployment of submersible remote operated vehicles in two of our most challenging decommissioning projects, the First Generation Magnox Storage Pond and the Pile Fuel Storage Pond to characterise the environment, consolidate fuel ready for export and support the sludge clearance operations is a well-known example of this approach.

The company has also pioneered the use of carbon fibre based long-reach tooling for sampling floc and sea tanks, to a suite of

interchangeable hand tools for retrievals work from our legacy buildings.

A further example of their cross-fertilisation of technologies across industries is the combination of buoyancy bags and powerful magnets that they have used to move large items in our legacy ponds during decommissioning operations.

Proving that the old adage of ‘if it ain’t broke, don’t fix it’ is true, James Fisher Nuclear recently supplied a vital remote handling solution for our Magnox reprocessing operations. A key component of project success was to maximise the use of the design of the original manipulator which James Fisher Nuclear built and commissioned in 1986. Bertie said: “We only introduced additional functionality where it could make a significant difference to performance.”

Beyond the Sellafield mission James Fisher Nuclear are blazing a trail across the wider UK decommissioning industry. Bertie explained: “It’s easy to see a clear correlation between our work with Sellafield and our developing reputation with the rest of the world. We have recently won the contract for reactor core segmentation and removal at Winfrith; we provide the maintenance and calibration of all portable and installed radiation protection instruments across the Magnox stations, and we have a contract to develop characterisation equipment with Mitsubishi Heavy Industries and opportunities in China.

“Our most recent development is winning the contract to carry out trials for characterisation work in one of the most hostile environments on the planet under the damaged reactors at Fukushima.”

When asked what advice he would give to others looking to use Sellafield as a stepping stone to growth, Bertie can’t hide his passion

for the benefits of collaboration. He said: “For small to medium sized enterprises especially I would advise them to focus on their key skills and recognise that the nuclear industry demands quality and long-term reliability. Partner for the long term to ensure your team has the full breadth of skills needed. The Cumbria Nuclear Solutions Ltd consortium has demonstrated for ten years how smaller companies can successfully compete and grow by working collaboratively and with complementary skillsets, to offer a more complete package for the customer.

“Growth can also be helped by predicting what your customer needs now and what they might need in the future. For example, we are looking forward to the new characterisation demands that the Post Operational Clean Out of nuclear facilities will bring.

“The future for James Fisher Nuclear looks extremely bright. There is a continued need to develop strategies to deal with our legacy waste and we are on the brink of an unprecedented period of Nuclear new build activity so we will continue to develop new technologies for decommissioning to support Sellafield and further strengthen our new build offer so that we are well positioned to take advantage of the opportunities these exciting times have to offer.

“Another area of interest is the use of unmanned aerial vehicles. In other industries, these vehicles are considered to be reliable, cost-effective and flexible, a way of significantly reducing inspection times, and safer than many traditional inspection methods. We have fully licensed pilots experienced with safe operations on nuclear licensed sites so for us this is an area which could literally take off.” ■

James Fisher Nuclear

Employees: 450+

Head office: Bamber Bridge, Preston

Locations: Egremont, Malton North Yorkshire, a radiological calibration facility in Deeside and state of the art Non Destructive Testing and radiography inspection facilities in Deeside and Worcester.

Sellafield projects:

- Box Encapsulation Plant and Product Store/Direct Import Facility
- First Generation Magnox Storage Pond remote operated vehicle operations
- Deflector Plate Removal project in the Pile Fuel Cladding Silo
- Tooling framework for the Pile Fuel Storage Pond
- Evaporator Bravo return to service
- Part of the Decommissioning Delivery Partnership framework
- Remote handling equipment in the Magnox Reprocessing Plant



Measuring our performance at Sellafield

Every year we agree what acceptable, good and excellent performance at Sellafield looks like in our key areas of delivery.



DOWNLOAD

To download a copy of the performance plan visit www.sellafieldsites.com/press/performance-plan/

LATEST NEWS

To keep up to date with our performance, visit www.sellafieldsites.com/news/ or www.nda.gov.uk/what-we-do/our-priorities-and-progress



In the April issue of the Sellafield Magazine we published these targets – or success criteria as we know them – for the 2016/17 financial year. The table opposite shows our performance against these targets so far.

You can keep up to date with the progress we are making in the clean-up of Sellafield, as well as our performance in our commercial and waste management operations, by visiting www.sellafieldsites.com

1947

Construction of the nuclear facilities commenced

2 square miles

Area of Sellafield site

>100

No of nuclear buildings

619,000 tonnes

Sellafield site steam usage 2015/16

266,100 MWh

Sellafield site electricity consumption 2015/16

Key information and data 2016/17

Success Criteria – Key Milestones 2016/17

	Operating Plan Target	Pd5 Forecast	Acceptable	Good	Excellent
HAL: Evap D – Completion of Water Throughput Trial 5	Nov-16	Nov-16	Jan-17	Nov-16	
PFCS: Waste Retrievals Containment Areas – Prelim Design	Oct-16	Complete – Jun-16	Nov-16	Oct-16	Jul-16
PFCS: Silo Door Installed on Compartment 5	Nov-16	Complete – Sep-16	Dec-16	Nov-16	Oct-16
Decomm: 3m ³ Box Production Plan Approved	Sep-16	Complete – Aug-16	Oct-16	Sep-16	Aug-16
FGMSP: Demolition of Stack to 39m level	Oct-16	Jun-17	Nov-16	Oct-16	Sep-16
FGMSP: Strategic Decision on use of Self Shielded Boxes	Aug-16	Complete – Aug-16	Sep-16	Aug-16	Jul-16
FGMSP: D-Bay Complete D3 & E3 Isolations	Mar-17	Feb-17	Apr-16	Mar-17	Feb-17
MSSS: SEP 2 Installation Complete	Oct-16	Oct-16	Mar-17	Oct-16	Earlier than Oct-16
ISO: Approval of ATOS Extension Options	Sep-16	Sep-16	Sep-16	Sep-16	Sep-16
Infra: Fellside Boiler Park Complete Stage 3 Commissioning	Mar-17	Mar-17	Apr-17	Mar-17	Feb-17
Infra: Analytical – Approval of IPDG Business Case	Aug-16	Sep-16	Oct-16	Aug-16	Jul-16
BEP: Delivery of Low Active Effluent Vessel	Sep-16	Sep-16	Oct-16	Sep-16	Sep-16
BEP: Area 600 Detail Design Complete	Nov-16	Oct-16	Dec-16	Nov-16	Oct-16
SAV: Project Complete	Jun-16	Complete – May-16	Jul-16	Jun-16	May-16
SRP: Concept Design Complete	Aug-16	Complete – Jul-16	Aug-16	Aug-16	Jul-16
DESf: First Fuel Shipment received with all cans in store	Sep-16	Complete – Sep-16	Oct-16	Sep-16	Aug-16
SERP: Island Sites – Fully Operational	Jan-17	Aug-17	Mar-17	Jan-17	Dec-16
SERP: Cyber Protective Monitoring in Place	Dec-16	Jan-17	Mar-17	Dec-16	Oct-16
SERP: MSCF Piling Construction Complete	Nov-16	Oct-16	Dec-16	Nov-16	Sep-16
AILWA: Design Complete (incl HAZOP II Studies)	Jan-17	Dec-16	Feb-17	Jan-17	Dec-16
Site: Approval of Target Operating Model	Nov-16	Aug-16	Oct-16	Oct-16	Aug-16
Site: Introduction of revised T&Cs for New Starters	Aug-16	Complete – Jun-16	Sep-16	Aug-16	Jul-16

Key Production Metrics

		Actuals	Actuals	Forecast	Target	Acceptable	Good	Excellent	Target	Target
		15/16	Pd5 YTD 16/17	YE 16/17	16/17	16/17	16/17	16/17	16/17	17/18
PFSP	Active Commissioning Sludge Removal (drums)	NEW	0	30	10 Exported & 4 to Store	10 Exported & 4 to Store	30 Exported & 24 to Store	40 Exported & 32 to Store	Target not identified in Operating Plan	
HLWP	Vitrification (teU)	1304	69	950	1035	853	1035	1130	1279	1327
MAGNOX	Reprocess Spent Fuel & DFR Materials (te)	389	236	457	457	420	457	500	527	538
	Receipt of Spent Fuel (te)	376	106	418	465		Not Applicable		497	287
	AGR Fuel Receipts (te)	176	64	192	192		Not Applicable		192	178
	Fuel Exported to FHP (teU)	NEW	22	45	45	30	45	51	Target not identified in Operating Plan	
THORP	Shear Oxide Fuel (te)	460	269	427	395	350	395	405	450	135
	TR&S MEB Removals	105	54	54	145		Not Applicable		130	98
Safe Store Pu	Transfer Cans to SPRS	733	281	536	512	488	512	536	517	361

Major Procurements Placed & Planned

Procurement Scope	Estimated / Awarded Value	Contract Award Planned
Decommissioning Delivery Partner	£1bn	Jan-2016 – Complete
Cranes	£58.7m	Mar-2016 – Complete
Tanks & Vessels	£18.9m	Jul-2016 – Complete
High Integrity Doors	£80m	Oct-16
Multi Discipline Site Works/ Operations Site Works	£160m	Mar-17
Technical Services Strategic Partner	£750m	Apr-17
SIXEP Contingency Plant	£163m	Jul-17
CHP & Fellside Boiler Park Maint & Mgmt Agreement (OM & MA)	£98m	Apr-18

Capital Projects

Top 10 by Value (P50 £m; 2016mv)	Total Planned Cost to Go	16/17	17/18	18/19
Box Encapsulation Plant (BEP)	623	114	167	138
SIXEP Waste Retrievals	437	1	3	6
SEP Solid Waste Storage Retrievals	382	82	74	64
Electrical Supply	371	7	24	54
SPRS Retreatment Project	315	18	26	23
SIXEP Contingency Plant	313	9	10	10
Future Provision of Analytical Services	289	2	0	0
Pile Fuel Cladding Silo Retrievals	273	57	83	71
SPP1 Process & Export Facility	264	0	1	1
FGMSP Wetbays Residual Recovery Capability	254	0	0	6
All Other Projects	3,519	473	383	368
Total	7,040	763	771	741

*Excludes BUFT & DILWEP as subject to Change Control

FROM THE
ARCHIVES



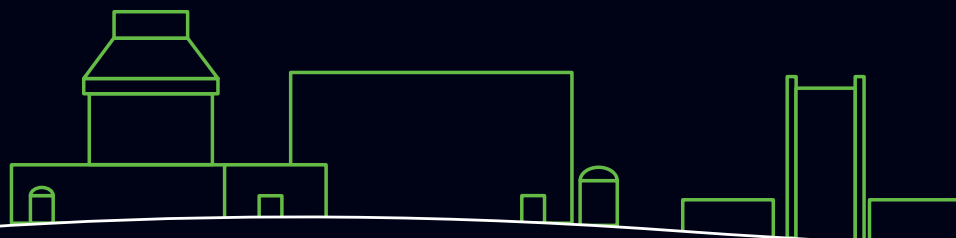
FIREFIGHTERS 1979

British Nuclear Fuels Limited apprentices practicing fire extinguisher techniques outside the original fire station in February 1979.

NU'GEN

How do you build three nuclear reactors?

In summer 2015, NuGen signed a land contract with the Nuclear Decommissioning Authority (NDA) for the UK nuclear developer to take responsibility for land adjacent to Sellafield Site – known as Moorside – signifying that assessment work had found the land to be suitable for the construction of three Westinghouse AP1000® reactors.



“this project has the best technology, with the best people in the best place.”

Tom Samson, CEO, NuGen

Moorside will become Europe’s largest new nuclear project, located less than a mile from the UK’s first commercial nuclear power station at Calder Hall. Moorside can play a vital role in securing the UK’s future energy supplies and deliver clean, affordable low-carbon electricity and will support a balanced energy mix.

Shortly after the land deal was signed, NuGen announced that it had entered into a long-term cooperation agreement with Sellafield and the NDA to support continued safe operation for all three organisations as work on the Moorside site powers forward.

Early in 2016, the first facilities were constructed on site at Moorside and the on and off-shore site characterisation work, which would inform the design and layout of Moorside, began. The site characterisation work is now more than two thirds complete and NuGen has just completed the second stage of its public consultation on the proposals for Moorside Project.

The proposed Moorside Power Station, associated marine off loading facility and associated railway enhancements are nationally significant infrastructure projects. Under the Planning Act 2008, NuGen is required to apply for a Development Consent Order. The Secretary of State will ultimately make a decision on whether to grant the order.

More than 3,000 people came to the consultation events which took place across Cumbria over an 11 week period and resulted in more than 1,000 feedback submissions. The Stage Two Feedback Report will be published later this year.

We are working closely with NuGen to identify the impacts that the Moorside project might have on our operations at Sellafield and to agree how these should be managed and mitigated. We are both also looking to identify areas of joint opportunity.

Craig Brannigan is NuGen’s Enterprise Risk Manager, and also responsible for much of the interaction between NuGen and Sellafield Limited and is a familiar face

around the nuclear industry in West Cumbria.

Craig started his career as an apprentice instrument mechanic at Sellafield in 1991. He was Apprentice of the Year 1995 and worked at Sellafield until he left the company in 2012 – as Head of Business Improvement at Capenhurst site near Chester.

Whilst based at NuGen’s Manchester city centre offices, Craig remains very involved in

“West Cumbria is the UK’s nuclear heartland and it’s unique because of the vast knowledge, experience and expertise across the workforce at Sellafield and in the supply chain.

“Sellafield has also seen large scale nuclear new build in the form of new waste handling and storage facilities. New nuclear generating capacity, however, is something



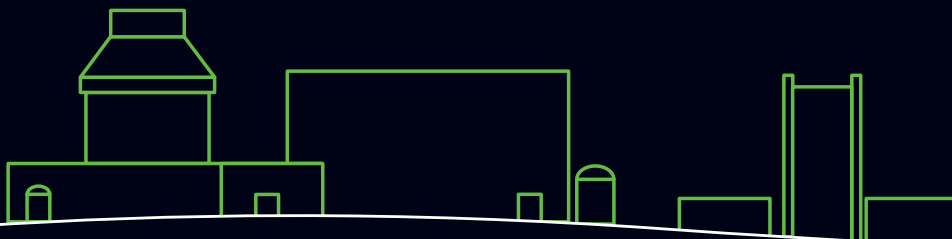
“...we need to help students, who are leaving school in the next few years, to have the right kind of skills to come and work in the electricity generation industry.” Tom Samson

the industry across the communities in West Cumbria as one of NuGen’s Bright Sparks mentors – working with schools close to Moorside helping students discover more about how electricity is made, how it’s used – and to explore the opportunities for a career in the electricity generation industry.

“If Moorside comes online in the mid-2020s, it means that we need to help students, who are leaving school in the next few years, to have the right kind of skills to come and work in the electricity generation industry,” said Craig.

that West Cumbria hasn’t had since the pioneering days of Calder Hall.

“So, in addition to the operational, regulatory, environmental and safety requirements that come with two sites working closely beside each other, there are two cultures to bring together and I think that is an important part of the engagement role. We both share a lot of common ground – such as our stakeholders and our commitment to achieving the highest standards of safety. Sellafield is a truly ground-breaking project, but its mission





of nuclear decommissioning and waste management is very different to our own.”

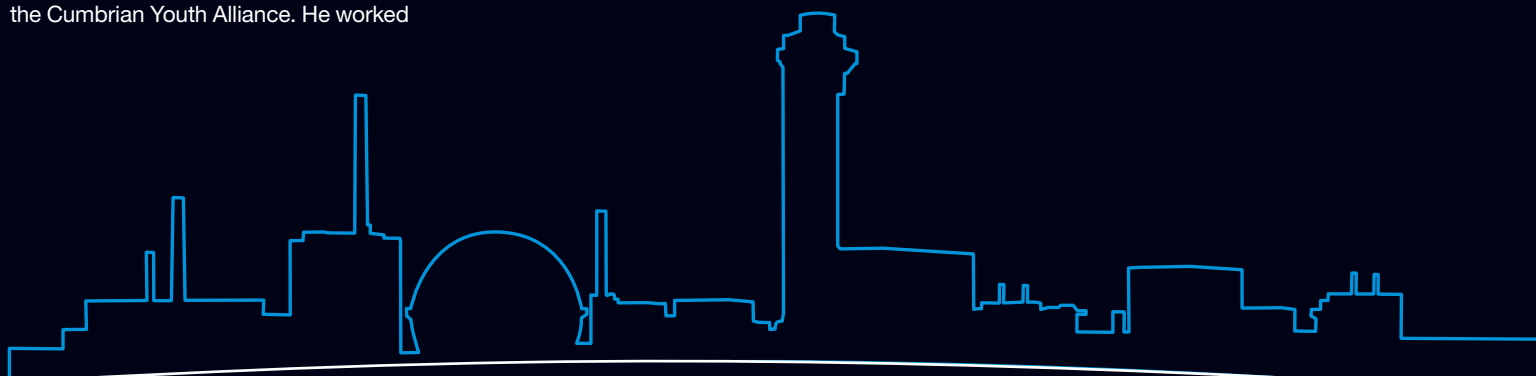
This kind of experience was invaluable to NuGen during the recent public consultation. Steven Torrens, NuGen’s Safety Case Manager, was part of the team who were on hand during more than 30 events over an 11 week period – where members of the community could come along and have their say on NuGen’s proposals for the Moorside Project.

Steven and his family are from Whitehaven and he is closely involved in the Bright Sparks Educational Initiative and in NuGen’s charity partnership with the Cumbrian Youth Alliance. He worked

at Sellafield from 2000 to 2002 as an Environmental Safety Advisor before going to work in the supply chain with Amec.

Steven said: “The Moorside Project is a 100-year commitment and offers an unrivalled opportunity for the communities of West Cumbria. It’s the largest ever private investment the region has ever seen and it has the potential to be transformational by enhancing important aspects of the local infrastructure and bringing around a thousand new jobs into West Cumbria – providing a catalyst for the supply chain and other investment.

“I am passionate about the opportunity that lies ahead for the people of the region, but we must not take their support for granted. I want to help develop the project in the best way for Cumbria. Our CEO Tom Samson has said ‘this project has the best technology, with the best people in the best place’ and I think he’s right.” ■



The first retrieval of radioactive sludge from the First Generation Magnox Storage Pond and the final retrieval of bulk fuel from the Pile Fuel Storage Pond were just two of the highlights from the 2015/16 financial year. Our financial performance in our final year of private sector ownership is now available for review via Companies House and on our website.



Financial Highlights

£1,972m

Record levels of investment in Sellafield Ltd by the Nuclear Decommissioning Authority: £1,927 million – an increase of £89 million compared to 2014/15 (£1,883m)

100%

Our increased scrutiny on financial performance and planning resulted in us continuing to use **100% of the funds available** (2015: 100%)

£43m

Through the safe delivery of our clean-up, operations and efficiency targets we achieved fees of £49 million (2015: £39 million) and a **profit after tax of £43 million** (2015: £33 million)

£92m

We increased our level of **investment in research and development** to £92 million (2014: £86 million)

The fee earned during the year is a reflection of our delivery and performance in all of our activities from risk and hazard reduction to operations and functional support.

Operational Highlights

Removal of the entire bulk stocks of historic nuclear fuel from the Pile Fuel Storage Pond reducing radioactivity levels at the 68-year-old pond by 70 per cent.

Beginning of bulk sludge transfers from the legacy First Generation Magnox Storage Pond to the modern Sludge Packaging Plant.

Completion of all major construction and commissioning activities related to the Separation Area Ventilation facility, paving the way for the demolition of a stack on top of one of the site's reprocessing plants.

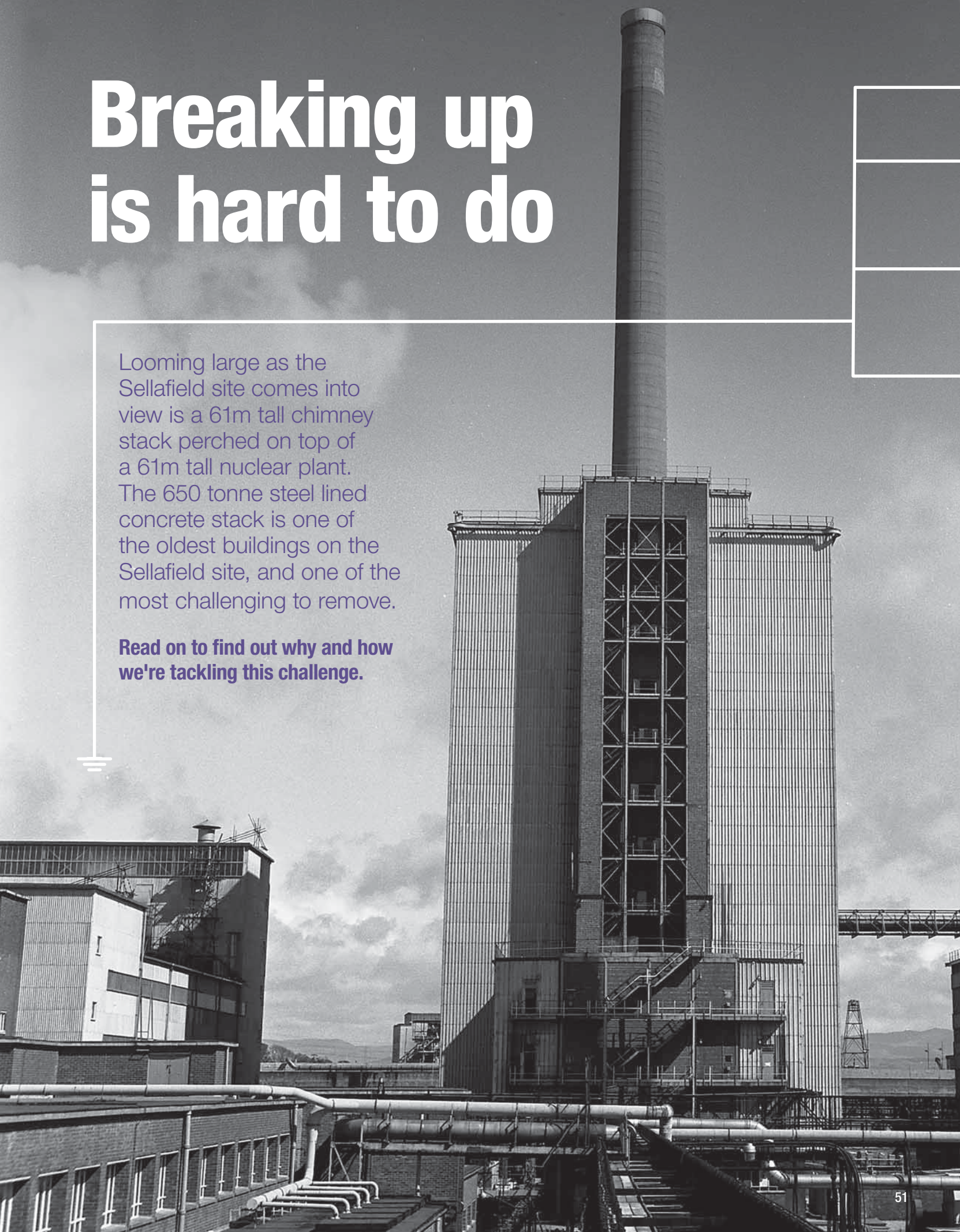
The Evaporator D project moved from bulk construction to commissioning on 3 August 2015, marking the end of the construction phase of the project.

Reduction of highly active liquor stocks, achieving a regulator mandated milestone. The stocks account for some 95% of the highly active waste at Sellafield.

Breaking up is hard to do

Looming large as the Sellafield site comes into view is a 61m tall chimney stack perched on top of a 61m tall nuclear plant. The 650 tonne steel lined concrete stack is one of the oldest buildings on the Sellafield site, and one of the most challenging to remove.

Read on to find out why and how we're tackling this challenge.



Demolishing a building which stands alone can be challenging.

Demolishing a chimney stack on top of a building, without affecting the building below can be challenging.

Demolishing a chimney stack on top of a building in the middle of an industrial site is even more challenging.

But that's the job facing the team who will shortly begin the demolition of the Primary Separation Plant stack.

The challenge of demolishing a chimney stack that doesn't meet modern safety standards, on top of a nuclear facility, adjacent to other high consequence nuclear facilities, without impacting on their operations, without the ability to use explosives or risk of dropping anything from the chimney, is a tough one.

Yet that is exactly the challenge we face in demolishing the chimney stack on top of one of our earliest facilities – the Primary Separation Plant.

The 61m chimney sits atop the 61m plant, making it the highest point on the Sellafield site. Because the stack wasn't built to modern safety standards, it needs to be removed.

However, the earliest facilities on the Sellafield site were built quickly to deliver their essential mission for the country, and without decommissioning in mind.

This means that we had to find an inventive, yet utterly safe solution, to the challenge of demolition. Such a solution needed to go nowhere near any explosives, needed to not impact any adjacent facilities, couldn't involve a crane

going anywhere near the facility.

Jeff Gaines, project manager explains: "Such a project emphasises the challenges of decommissioning the Sellafield site. All of the options that might be considered on other sites, and which can't be used here, would likely be significantly cheaper and much quicker. They would also be likely to involve a greater level of certainty, which means that the costs would be unlikely to increase dramatically, with more concrete timescales.

"Having to come up with a bespoke solution is more difficult, more time-consuming and therefore more expensive – but that's what we had to do."

Steve Slater, the former head of the site decommissioning programme, adds: "This project has the highest possible safety classification and that means we have to substantiate every single thing that we do, to show that what we are proposing will not fail. To do this, we have to undertake 100% inspections of every element. The importance of this cannot be overstated."



Sir Christopher Hinton (Above, second from left) on site with the stack in the background. The photograph was taken in 1967.

"The Battersea Power Station project, whilst in a different operational environment to Sellafield site, has afforded us a great deal of experience in both the design of a unique and specialist piece of access equipment, and the demolition of four old industrial chimneys. Our operatives, whilst already experienced in the demolition of tall structures, have learnt a lot from 30 months at Battersea Power Station and have shared this with the Delta team at Sellafield site."

Robert Bird, Delta's Managing Director



A 'savvy' approach to site clean-up

The demolition of the Primary Separation Plant chimney stack has been a top priority for a number of years. However this work simply wasn't possible until a suitable replacement was up and running.

This is because the stack was used for ventilation and therefore, the release of authorised aerial discharges.

Most of what we discharge is process steam and heat, but aerial effluent discharges also take place, under strict licence from the Environment Agency. The reason for the height of these stacks is so that discharges are diluted and dispersed to ensure there is no impact on the local community or the environment.

Work on the replacement – the Separation Area Ventilation stack – started with the appointment of Doosan Babcock as the main contractor in late 2008, with construction beginning in 2009 and was completed earlier this year.

The multi-million pound project included the 123 metre high replacement stack; a new, modern plant room; and route of new

pipebridges winding across the busiest part of the Sellafield site to link the stack to the plants, stores and process buildings it supports.

It has been designed to provide a ventilation service for at least 100 years, which will hopefully see the legacy Sellafield buildings safely decommissioned and demolished.

The project to construct and commission the facility was a challenging one – not least because of the number of different plants which needed to be connected, whilst the old one continued to operate.

But now it's operational, the project to remove the stack it replaces can begin in earnest.

The new ventilation and stack demolition projects help emphasise the challenges of decommissioning a complex, cluttered nuclear site, where numerous buildings and facilities are interdependent on each other.

In fact, construction work at the Sellafield site is only set to increase in the near future, as we build facilities to help us manage and store the wastes we create, enabling us to deliver our clean-up mission.

“At Nuvia our heritage and reputation is built on delivering solutions in complex nuclear environments. We are proud to be involved in this significant project, bringing our in-depth knowledge of the site and its unique requirements which we have developed throughout our 30 years of delivering successful projects in collaboration with Sellafield.

We conducted a world-wide search to find a company which has the expertise to assist us with the solution for the project and in Delta we knew we had found a local organisation that not only had world-class expertise, but also shared our affinity for exceptional operational standards.”

John Ball, Nuvia's Director for the region

What goes up must come down

So once you've established you need to take it down, you've built the replacement facility, and you've established you can't use traditional methods, the question is, how do you remove a chimney from the heart of a nuclear plant?

The answer is a combination of specialist technology, industrial tools and honest hard graft.

The specialist technology in question is a self-climbing platform – a bespoke piece of kit designed to ascend the stack allowing teams' access to 'nibble away' at it from the top.

The platform will descend incrementally, allowing for demolition of both the concrete wind shield and the internal stainless steel flue liner.

The platform has had to be designed especially for the tapered chimney stack, and is a first for the Sellafield site. However, the technology has been used successfully on the iconic Battersea Power Station chimneys, which are being replaced as part of a huge regeneration project.

A scaled-down replica of the chimney stack was built at the Delta International facility in Oldham to test the platform and the climbing methodology. This was important because of the taper in the stack – the diameter of the stack increases the lower down you go, so the platform must also increase in size.

In addition to the self-climbing platform, a new industrial lift and roof bridge structure had to be built to allow access to the base of the chimney. These will be used for the removal of waste materials once demolition commences.

The tower will be "eaten" by hydraulic jaws attached to a circular working rig at the top of the chimney.

As the rubble cannot be allowed to fall to the ground or inside the stack, it will then be transported down the lift in small containers – a meticulous and time consuming task.

The internal metal flue, when exposed, will be cut using plasma arc size reduction and lowered to the base for monitoring before disposal.

The concrete from the stack is likely to be characterised as exempt waste, with the internal flue likely to have no or minor levels of contamination. The concrete will be disposed of on the Sellafield site and the flue liner as low level waste.

When demolition commences, it will reduce the size of the chimney by around a metre a week.

Geoff Carver, delivery manager, describes the challenge and the importance of this work:

"This project is a complex one for a whole host of different reasons. But demolishing this stack addresses one of the biggest risks on site and must be done.

"However the work involved will actually temporarily increase the risk in the short term, as the stability of the stack will be compromised.

"We have undertaken extensive preparatory work to ensure the safety of the stack, surrounding facilities and those working on it during this period."

The highest level of risk will be reduced once the stack is demolished to a height of 47 metres. This work will be completed during 2017, with the stack reduced to its final height of 6m by the end of 2018.



"Our approach to engaging the supply chain enabled us to bring in skill sets from outside the nuclear industry. We mentored Delta, delivering the training and development required to bring their wealth of experience coupled with innovative technology and apply it on a nuclear licensed site. Our integrated approach has ensured that the teams now deployed to site are the same teams that have been committed to the project from the off-set and all sides continue to operate with the utmost attention to quality and safety."

Steve Miller, Nuvia Project Director

A team effort

Given the complexities we've outlined, the task of taking down the stack involves an ensemble cast. This includes our very own employees as well as specialists from our partners in the supply chain, who are bringing their own expertise to the job.

Supply chain partners

Seventeen different supply chain companies and more than 200 workers have supported our progress to date or will support future work to demolish the stack:

- **Nuvia Ltd**

Our main contractor: designed and installed self climbing platform, managed the manufacturing of the self climbing platform, and will perform demolition and waste removal work

- **Delta International**

Constructed and operate the self-climbing platform

- **Alimak Hek**

Constructed and operate the lifts

- **Sir Robert McAlpine**

Installation of the building Alimak foundation base

- **PPS Electrical**

Electricians

- **Emerson**

Actuators and control system

- **NIS NSG**

Manufacture

- **Oldham Engineering**

Carbon steel manufacture

- **Hydrobolt**

Bolt manufacture

- **Vinci**

Coefficient friction testing

- **ESR Technology**

Validation of the coefficient friction test report

- **Sanderson Watts Associates**

Structural stability

- **Interserve**

Scaffolding

- **Lloyd British**

Lifting appliance competent body – validation, witnessing and authentication of the self-climbing platform load testing and certification

- **Custom Covers**

Design and manufacture of the self-climbing platform roof canopy system

- **Amitri Veritas**

Independent certified body for CE marking of the self-climbing platform

In addition we've worked very closely with our regulators, the Office for Nuclear Regulation to progress the project smoothly.

Our employees

Working alongside our colleagues in the supply chain are a collection of our employees from right across the organisation:

Project team

A dedicated team from our Remediation department has led the project from the initial concept, through detailed design to construction and ultimately commissioning.

Security and Resilience

Ensuring the project is delivered in a way that supports our objective of safe, secure site stewardship.

Sellafield Fire and Rescue

Supported the development of safe operations, including assisting with emergency evacuation arrangements.

Internal regulation teams

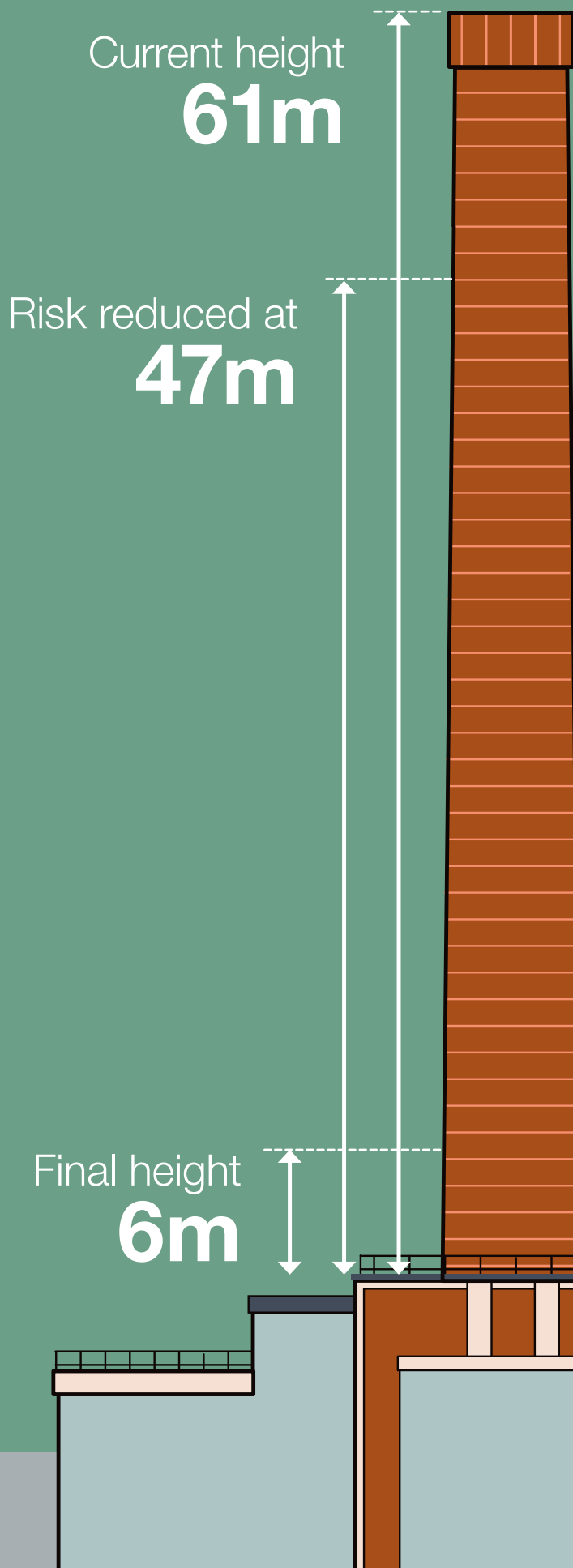
A number of different teams have worked to ensure that the project is safe, fit for purpose, and will deliver what we say it will. These checks ensure that we're doing the right work, in the right way at the right time, for the right cost.

The skills of those involved in the project is wide ranging, and includes project management, engineers, project controls, stakeholder relations, finance, quality control, emergency management, safety and security, to name but a few.

“ Together with Nuvia, our integrated approach has ensured that the teams now deployed to the site are the same teams that have been committed to the project from the offset and all sides continue to operate with the utmost attention to quality and safety.”

Eleanor Hill, Director at Delta

Meet the stack:



> 1950s

The Primary Separation Plant chimney stack was built in the 1950s and is the separation area's main ventilation discharge facility, serving many different plants and buildings in this particularly congested area of the Sellafield site.

> 61m tall

At 61m tall, atop a 61m building, the stack was the tallest building on the site until the building of the replacement ventilation stack.

> 6.1m diameter

The stack tapers from 6.1m diameter at bottom to 4.63m at its narrowest point. The tapered design was an important consideration when developing the self-climbing platform.

> Standards

The stack wasn't built to modern day safety standards, and this, combined with its location at the heart of the Sellafield site, means that it needs to be removed.

> 0.53 to 0.15m

The concrete wall varies in thickness from 0.53m down to 0.15m.

> Regulated

The project to do this is one of the highest priorities for our regulators, and as such, progress is reported to the government on a regular basis.

> Crucial outlet

As the stack is a crucial outlet for discharges, we had to build a replacement ventilation and discharge system before we could consider removing a single crumb of concrete. ■



West Cumbria Sites Stakeholder Group

The West Cumbria Sites Stakeholder Group is an independent body that scrutinises the work done at nuclear sites in the West Cumbria area

Join in
with the nuclear
discussion...

Dates and venues for the West Cumbria Sites Stakeholder Group (WCSSG) main meetings and Working Group meetings for 2016

Date	Event	Venue	Time
Tuesday 19th July 2016	Spent Fuel Management and Nuclear Materials Working Group	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Wednesday 20th July 2016	Low Level Waste Repository	Drigg and Carleton Village Hall	18:00-20:00
Tuesday 2nd August 2016	West Cumbria Sites Stakeholder Group meeting	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Monday 12th September 2016	Emergency Planning Working Group	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Wednesday 21st September 2016	Risk and Hazard Reduction and Waste Management Working Group	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Tuesday 18th October 2016	Spent Fuel Management and Nuclear Materials Working Group	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Wednesday 19th October 2016	Low Level Waste Repository	Drigg and Carleton Village Hall	14:00-16:00
Tuesday 1st November 2016	West Cumbria Sites Stakeholder Group meeting	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Thursday 24th November 2016	Environmental Health Working Group	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Wednesday 21st December 2016	Risk and Hazard Reduction and Waste Management Working Group	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Tuesday 17th January 2017	Spent Fuel Management and Nuclear Materials	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00
Wednesday 18th January 2017	Low Level Waste Repository	Drigg and Carleton Village Hall	14:00-16:00
Tuesday 7th February 2017	West Cumbria Site Stakeholder Group	Cleator Moor Civic Hall and Masonic Centre	13:00-16:00

Please note: Dates and venues could change and it would be advisable to confirm arrangements with the relevant contacts prior to the meeting:

West Cumbria Sites Stakeholder Group
Rosina Robinson: 019467 85802

Emergency Planning Working Group
Matthew Welsh: 019467 88503

Enablers Working Group
Rosina Robinson: 019467 85802

SFM&NM Working Group
Rachel Hodgson: 019467 71889

Environmental Health Working Group
Deborah Docker: 019467 72608

Low Level Waste Working Group
Cath Giel: 019467 70233

R&HR&WM Working Group
Thomas Dowd: 019467 78691

For more information visit

www.wcssg.co.uk



READY TO RESPOND

PREPARING FOR THE UNEXPECTED

OUR ABILITY TO RESPOND TO AN EMERGENCY ON THE SELLAFIELD SITE IS A KEY PART OF OUR NUCLEAR SITE LICENCE, AND A COMMITMENT THAT WE TAKE VERY SERIOUSLY. WE RUN AN EMERGENCY DUTY ROTA OF EIGHT TEAMS, EACH INCLUDING MORE THAN 25 ROLES, IN ORDER TO PROVIDE A 24/7 RESPONSE CAPABILITY. THESE ROLES RANGE FROM THE SELLAFIELD EMERGENCY CONTROLLER AND FIRE AND RESCUE PERSONNEL THROUGH TO ENGINEERS, PLANT EXPERTS AND PEOPLE RESPONSIBLE FOR GETTING INFORMATION OUT TO PEOPLE ON SITE AND IN OUR COMMUNITIES AS SOON AS POSSIBLE.

Each team typically starts their week long duty with a desk top exercise on a Friday morning and will be involved in our annual calendar of more than 40 half day emergency exercises. Everyone on our site participates in at least three of these exercises so that they can practice their response to our site alarms and so that we can rehearse our site wide roll call arrangements. Our independent regulator, the Office for Nuclear Regulation, observes at least two of these exercises to assess our performance.

Our response is tailored to the specific scenario being tested on the day, but typically involves a team at the affected building – known as the incident control centre – and teams in the Sellafield Emergency Control Centre and Strategic Management Centre. If the scenario is likely to test our off-site emergency response then the West Cumbria Emergency Control Centre would also take part.

The following pages show some of our emergency response teams in training.









SITE WIDE RESPONSE

Teams across the site follow local building procedures and instructions from the Site Emergency Controller in response to an emergency.







COMMAND CENTRE

Command and control teams coordinate the response to the emergency from the Sellafield Emergency Control Centre.







PEOPLE, PLANT, EQUIPMENT

A roll call checks that everyone is safe; building control rooms ensure that buildings are safe or shut down and equipment is deployed to help respond to the emergency. Our regulators and local agencies also practice their response to a Sellafield emergency.







WELL REHEARSED

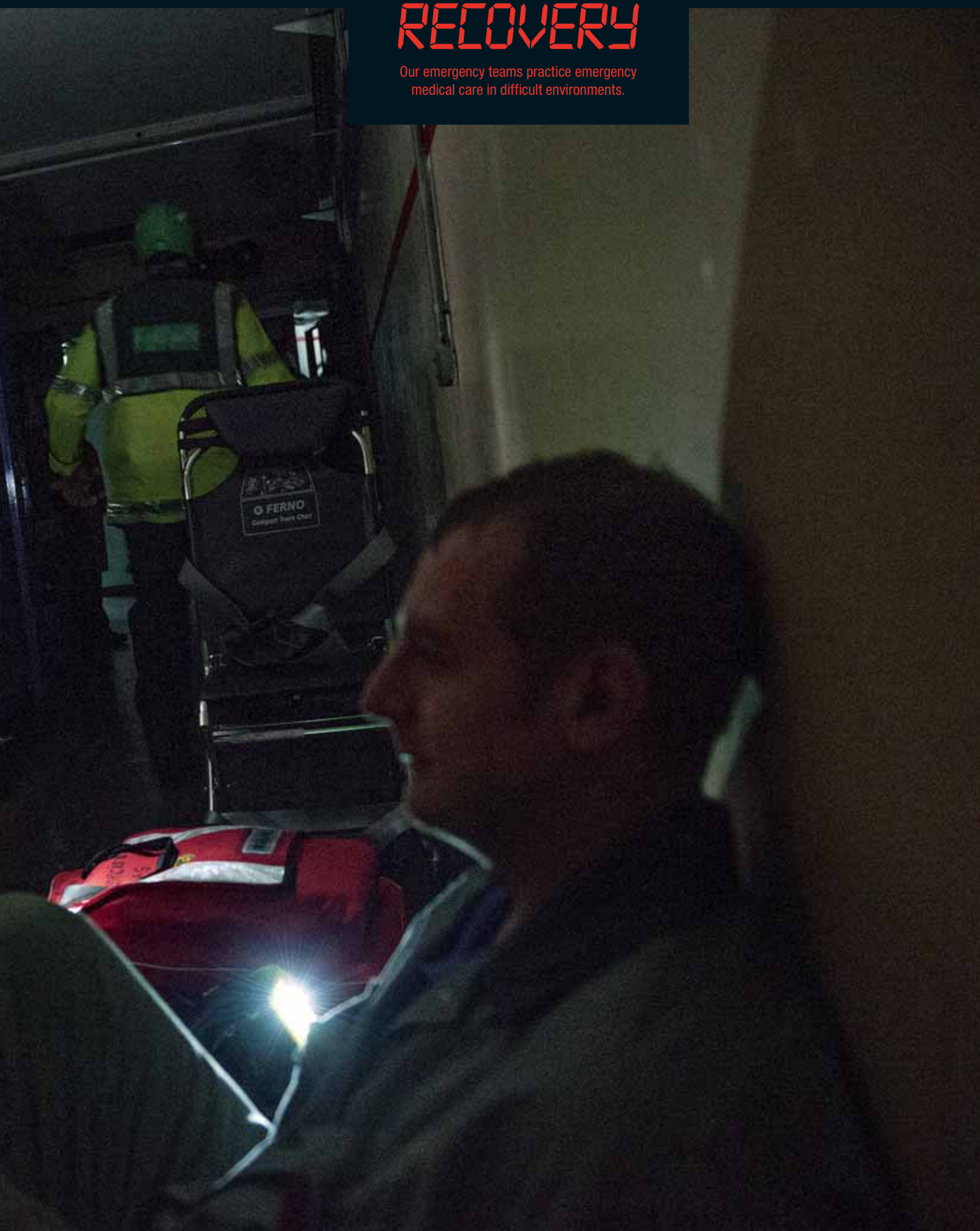
People know how to respond to alarms and where to go to get their protective equipment and respirators. Detailed information is shared as soon as possible.





RECOVERY

Our emergency teams practice emergency medical care in difficult environments.







GOLD COMMAND

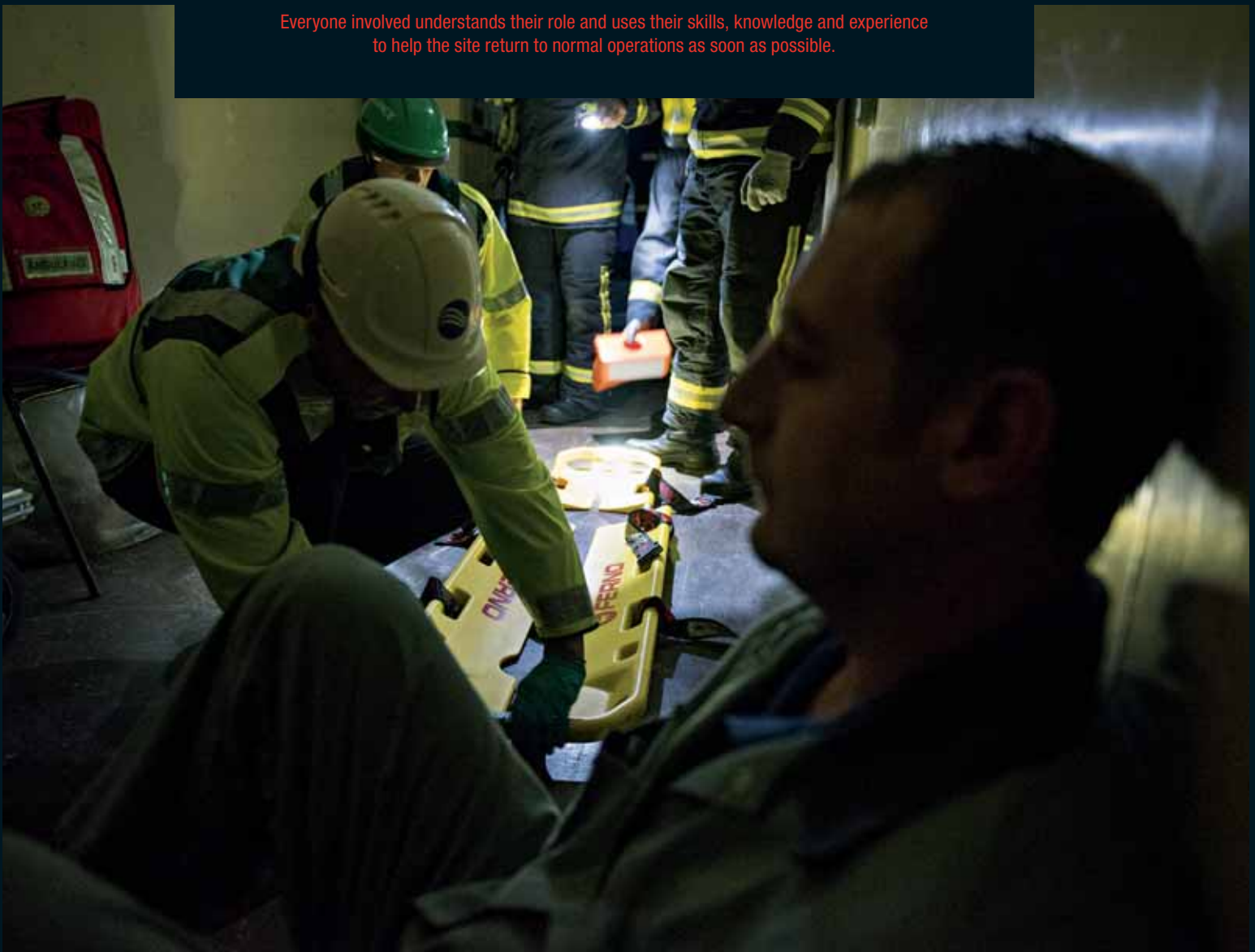
Our response to an event at Sellafield would be coordinated by our teams in the Sellafield Emergency Control Centre and Strategic Management Centre. If the event had the potential for off site consequences then our teams would continue to lead the tactical response on site but Cumbria police would take overall Gold Command.

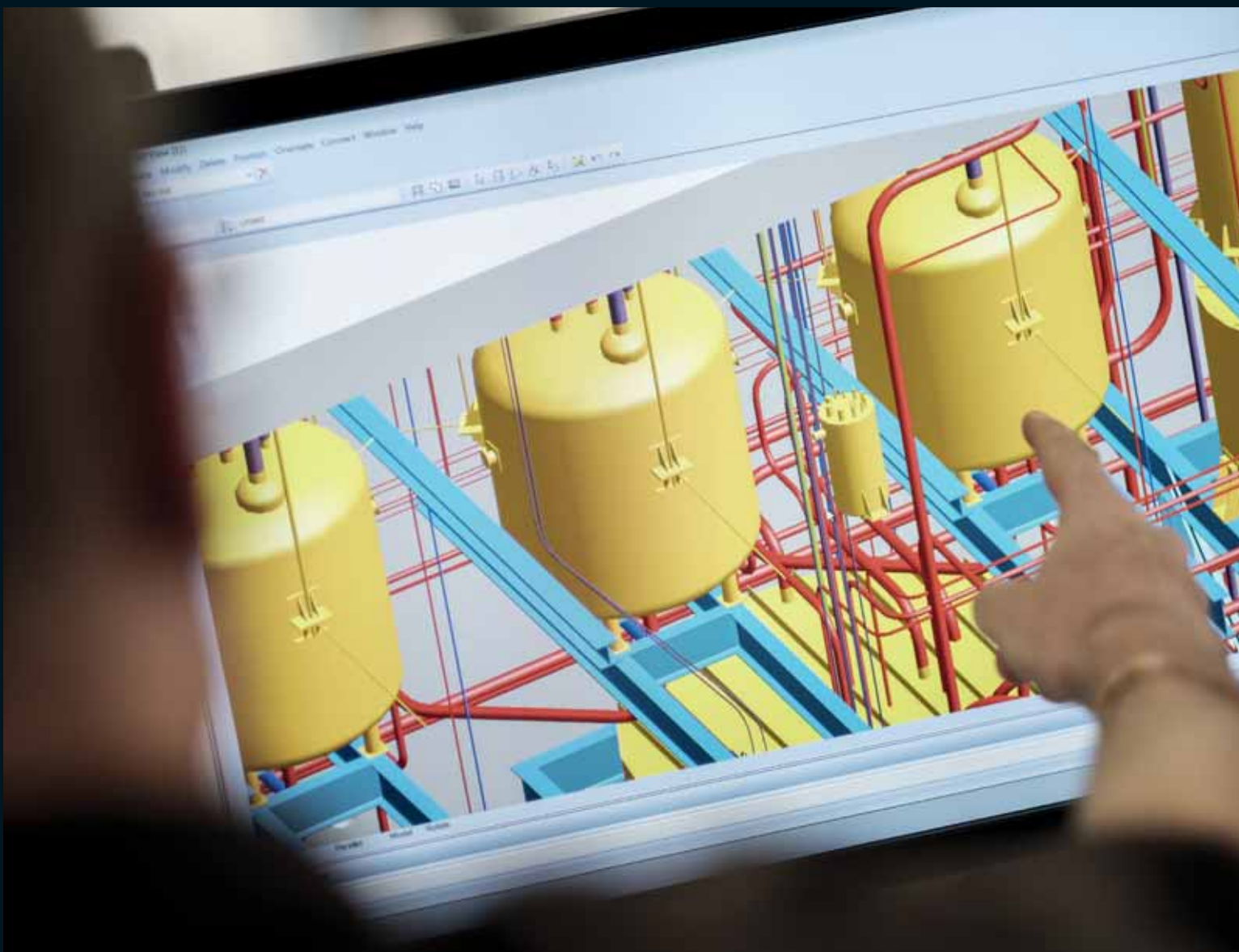




WELL TRAINED EXPERTS

Everyone involved understands their role and uses their skills, knowledge and experience to help the site return to normal operations as soon as possible.







I need a hero

With no chip pan fires, and very few cats stuck in trees (but more of that later), the role of the Sellafield Fire and Rescue Service is different to that of your traditional county fire service.

We met with Dominic Harrison, our Chief Fire Officer to find out more about the vast range of services provided by Sellafield's emergency response team.

The first thing you realise when you speak to Dominic is that the role of the Sellafield service is much, much broader than dealing with fires. Thankfully, putting out fires is something the team have to do very infrequently, so much of their work relates to the 'rescue' element.

That's not to say they're not prepared for fires. Dominic says: "Due to the nature of our role, we have kit which would be the envy of any fire station, and many a fire service. Some of these items can only be found in Penrith or Kendal, and some can't be found nearer than Manchester."

The Sellafield Fire and Rescue service operate co-response arrangements – providing both fire and ambulance services. This is a model which is becoming increasingly popular with fire and ambulance services across the country.

In simple terms, this means that the service will dispatch fire, ambulance or both services, as required. The firefighters are all well trained, by national ambulance services, and are equipped to provide an emergency health response. If paramedics are also required, then this service will be provided by the North West Ambulance Service, as it would elsewhere in the region.

For Sellafield, it is the most efficient way of delivery an appropriate emergency response, as Dominic explains: "We provide a wide range

of emergency response services, and we don't want people to worry about which service they require. Whatever the need – we'll respond."

And they'll respond quickly – the vast majority of calls receive a response within five minutes. This is much better than typical response times for either county fire and rescue services or ambulance services.

"We provide a wide range of emergency response services, and we don't want people to worry about which service they require. Whatever the need – we'll respond."

Given that real life fires are a rare occurrence on the Sellafield site, much of the service's time is spent on training and skills development. This ensures that they're prepared to respond to the numerous unique hazards posed by our bespoke, specialist and complex facilities, on the crowded, cluttered site.

There are more than a thousand drills and exercises each year, and an increasing number of these involve the Fire and Rescue Service. Our work to enhance our Resilience capabilities has also seen us purchase new equipment, and the teams all need to be familiar in how to use this effectively. In addition, the Sellafield reference accident has recently changed. Both of these have shaped how the team is resourced and operates.

Dominic says: "As Sellafield's mission is changing, so is our role. So it's important we ensure all our firefighters understand this and are fully trained. This means thoroughly testing new pieces of kit, understanding new plants and following new emergency arrangements. This can be challenging, not only because of the pace of change, but also for practical reasons – for example, it's hard to test some of our specialist kit on site, when there are lots of people and vehicles. So some training takes place out of hours or off-site."

The service must respond promptly to plant emergencies – whatever these may be, so teams need to be familiar with the plant and its workings.

Dominic explains: "This is a crucial part of our role, because if we are responding to an emergency, knowing where to go and how to do so means not only an improved chance to keep the plant operating but could also mean the difference between life and death."

They also provide a number of services to support our facilities including specialist training – for example in the use of breathing apparatus, and emergency recovery arrangements for projects – for example for work in confined spaces and at height, such as on the soon to be demolished First Generation Reprocessing Plant stack (see article on page 51).

Ensuring our building, projects and operations meet fire safety legislation is another important part of the service's role, and is one that is picked up by the Fire Safety team. Our role is to work as an internal regulator,

ENSURING WE'RE RESILIENT...



ensuring we operate as we should. The team are trained to the same high standard as the external regulators and offers the same range of services to proactively ensure our people's safety isn't compromised.

Dominic ends by saying: "The Sellafield Fire and Rescue Service is a multi-skilled team ready to respond to a range of emergencies, including fires – however uncommon they might be. We're proud of the work we do, the support we give and the training we undertake, to ensure we deliver for Sellafield."

And what of cats? Well, like all fire and rescue services, the Sellafield team has responded to some unusual calls, and dealt with some quirky incidents over the years.

These include:

- **Helping someone who's head got stuck in a barrier gate**
.....
- **Finding a dead sheep on the Sellafield site**
.....
- **Nearly having a pregnant lady give birth during a lock down in the snowstorms**
.....
- **And finally, helping rescue a polecat that had got trapped in the razor wire of the site perimeter fencing.** ■
.....

WATER CANNONS THAT CAN DAMPEN AND CONTROL THE PLUME FROM A NUCLEAR EVENT, MOBILE CONTROL CENTRES THAT OFFER FULL OFF-SITE INCIDENT MANAGEMENT CAPABILITY, HIGH PRESSURE WATER PUMPS THE LIKE OF WHICH NORTH AND WEST CUMBRIA DOESN'T HAVE, NEW MULTI-CAPABILITY FIRE TENDERS, NUMEROUS EMERGENCY POWER GENERATORS, AND STATE OF THE ART FLOOD PROTECTION BARRIERS ARE JUST SOME OF THE ITEMS IN OUR RECENTLY ENHANCED SUITE OF RESILIENCE EMERGENCY RESPONSE KIT.

Ensuring we're prepared for emergencies has been an important part of our work since the dawn of site. However in recent years our focus has shifted, as a result of the 2011 Japanese tsunami and the impact on the Fukushima Daiichi nuclear power plant.

Following this incident, the government asked Mike Weightman, the then Chief Inspector of nuclear installations and head of the Office for Nuclear Regulation, to examine the circumstances of the Fukushima accident to see what lessons could be learnt to enhance the safety of the UK nuclear industry.

While Dr Weightman's reports found no significant weaknesses in the UK nuclear licensing regime, they did make a series of recommendations to further enhance nuclear safety across the industry.

Here at Sellafield the response to Fukushima has seen the delivery of £150m of Resilience improvements, responding to 138 individual recommendations from UK and European regulators along with our own self-imposed improvement recommendations – focussing on ensuring our facilities can cope with situations beyond their design capability.

These improvements include sourcing, siting and implementing a long lasting maintenance regime for a range of specialist kit, which is designed to help manage the unexpected. Of course, we hope never to need to use this – keeping it as shiny as it looks now – but in reality, we will drill, exercise and test all of these items to ensure that should the worst ever happen, it can be deployed effectively, and with confidence.

Steve Lightfoot, the head of capability for the resilience programme, said: "The resilience improvements we have made have been all about extending our ability to ensure we can cope with incidents beyond the norm and beyond the design basis of our plants and facilities.

"This includes situations like seismic

incidents, extreme flooding, and long-term loss of power or site access. Consequently, we've got a lot of new supplies that help us cope with such events. These range from portable flood barriers, fire and rescue kit, repair equipment to mini-emergency control centres and even supplies of food, water and sleeping bags in case we are ever cut-off."

Linked to this, we have also delivered a programme of emergency management improvements, which include greater awareness of emergency event initiators, likely outcomes of these, and better ways of dealing with them; through to enhanced training for those who respond to any emergencies on site and regular testing of the new capabilities.

As well as this collection of new equipment, we have also delivered a programme of further emergency management improvements, which includes enhanced training for those who respond to emergencies on site, and extending the pool of employees who are able to both use the equipment and support any response more broadly. ■



Not just a fire service...



The Sellafield Fire and Rescue Service do more than just put out fires, and are well trained and highly skilled in the following areas:

- 1 Ambulance response
- 2 Urban search and rescue
- 3 Deployment of resilience equipment
- 4 Rope access and rescue
- 5 High volume pumping
- 6 Fire extinguisher and access control training
- 7 Response to road accidents and entrapments
- 8 Breathing apparatus response, support and training
- 9 Advice and support on working at heights
- 10 Mass decontamination
- 11 Flood mitigation
- 12 Advice and support on 'hot' work and confined space operations
- 13 Salvage and damage limitation
- 14 Fire safety advice
- 15 Fire safety training
- 16 24 hour alarm monitoring

As well as other specialist services. ■



Detailed Emergency Planning Zone

Preparing for an emergency and actually being in an emergency situation can be a very different experience therefore providing timely information and advice is key to keeping people safe in time of a real crisis.

While we would take the lead in responding to and recovering from an emergency situation on the Sellafield site by setting up the on-site emergency control centre, a whole host of stakeholders and agencies would become involved in any incident with the potential to have consequences beyond our boundary fence.

One of these agencies is Cumbria County Council who are responsible for preparing an off-site emergency plan to protect the public in the unlikely event of a radiation emergency.

As part of these emergency arrangements there are detailed response plans for the immediate six kilometres

around the Sellafield site. This is known as the Detailed Emergency Planning Zone.

This zone includes local populations up to and including Thornhill to the north of Sellafield and Holmrook to the south.

Households in the zone can receive an automated information and warning system, provided they have opted to receive them. Information packs are also issued and include information on listening to the local radio station for updates, advice on sheltering and logging on to our website.

The responsibility for residents outside the six kilometre zone is managed through the Cumbria county emergency control centre also known as 'gold command' who lead on all communications for the county and follow the same methods of using local radio stations and websites to keep residents informed and updated. ■

HOUSEHOLDS IN THE DETAILED EMERGENCY PLANNING ZONE CAN OPT IN FOR THE AUTOMATED INFORMATION AND WARNING SYSTEM BY FOLLOWING THE INSTRUCTIONS IN THE INFORMATION PACK THEY RECEIVED BY POST.

PROJECT AND PROGRAMME PARTNERS



Our mission is to clean up the Sellafield site and manage nuclear waste, and the complex nature of the legacy we have to deal with needs meticulously planned solutions. That is where our Major Projects division comes in. It is their job to take the often ground-breaking solutions devised by our boffins and drive them from being ideas into fully operational buildings, silos, bunkers, bridges... whatever is required to complete our mission.

These projects can often cost hundreds of millions of pounds of taxpayers' money, and take years to complete. But in the past, there have been times when our big projects have taken too long, cost too much and not always delivered what they could have done.

So with the spotlight firmly on this part of the business, we are changing the way we deliver major projects, with a stronger focus on our supply chain. We are moving away from individual contracts for delivering one off projects towards longer term relationships with the supply chain which will deliver a portfolio of projects. This will be

achieved through the Project and Programme Partners, and we have already started the process to have them working alongside us by the end of 2017.

This is a very different approach to our historical one, which has usually been a case of us devising a plan, pushing it out to a variety of individual contractors, and then checking that what they are doing is correct. By having longer relationships and closer working practices, the aim is to make sure our projects, while maintaining our excellent safety performance, will be delivered faster, meaning Sellafield is made safer more quickly and the taxpayer spends less.

But there is a wider point to this. Sellafield has become a vital part of the West Cumbrian and Warrington economies, offering jobs and opportunities to thousands. We want to make sure those areas continue to blossom. By building our supply chain to be a world class deliverer of multi-million pound projects, our hope is to secure the future for generations to come. ■

Sellafield Safety Worker **Best in Britain**

A Sellafield safety worker has beaten 100,000 people to be named the nation's best health and safety officer

Helen Edwards, a lead safety representative and Prospect Union safety rep at Sellafield, has won the 'Health and Safety Representative Award' at the prestigious Trades Union Congress Awards 2016 for her work in keeping Europe's most complex nuclear site safe.

The awards recognise the outstanding achievement of union reps in representing workers, learning at work, union organising and improving health and safety conditions in the workplace.

Helen said: "There are over 100,000 union health and safety representatives in the UK so to be named the best is a great honour.

"I'm delighted to accept the award which not only recognises my work but also that of the other 250 voluntary safety reps on site who are the most proactive, highly educated and well equipped safety reps in the country.

"Juggling a busy day job as well as the demands of a safety rep role can be challenging, but our passion for making sure colleagues, the site and the local community are safe for generations to come makes it all worthwhile."

The safety reps play an important role in the development and maintenance of a healthy safety culture at Sellafield, working hand-in-hand with our management team to address concerns or potential hazards in the workplace in order to prevent accidents or injuries.

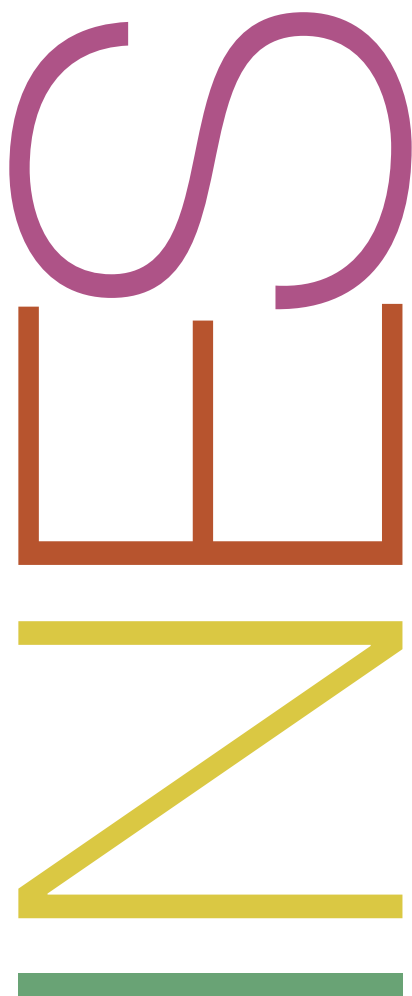
Euan Hutton, our director of environment, health, safety and quality said: "Safety is our number one priority. It is fundamental that every single one of our 11,000 employees and thousands more contractors go home safe every day.

"I'm proud to have people like Helen leading the way, ensuring the protection of our workforce and the community continues to be at the heart of everything we do.

"We recognise that our union health and safety reps play a huge role in keeping the site and the workforce safe today, tomorrow and in the future, and for that we thank them." ■



To hear how Helen feels to have won this prestigious award, visit www.sellafieldmagazine.com



International Nuclear and Radiological Event Scale

What do people think when they hear that there has been an event on a nuclear site? How concerned should they feel? That is where the International Nuclear Event Scale (INES) comes in, providing a consistent explanation of the significance of nuclear events. Iain Gray is the UK INES national officer and an inspector for the Office for Nuclear Regulation. Here he tells more about his INES role.

INES – the International Nuclear and Radiological Event Scale – communicates to the public the safety significance of events associated with the use, storage and transport of radioactive material and radiation sources.

Developed initially in 1990 by the International Atomic Energy Agency with the Organisation for Economic Co-operation and Development Nuclear Energy Agency, the scale is now used for the rating of a wide range of nuclear and radiological events or accidents. It was first developed to classify events at nuclear power plants, before being extended to all installations associated with the civil nuclear industry, including Sellafield, and to events involving sources and the transport of radioactive material.

In the UK, the Office for Nuclear Regulation inspector Iain Gray is the government appointed UK INES national officer who independently verifies the initial ratings of an event provided by sites or duty holders.

Iain has spent 40 years in the nuclear industry covering power plant design, fusion research, radioactive waste management and transport, nuclear safety and strategic consultancy, and regulation.

Alongside his INES national officer role, he is an ONR mechanical engineering specialist inspector, based at Cheltenham.

He said: “To carry out the INES national officer role you have to have a breadth of knowledge of the UK industry covering decommissioning sites, operating plants and radioactive materials transport. I have experience in these areas, and when I was given the opportunity to carry out the role three years ago I jumped at the chance.”

INES uses a numerical rating from one to seven and associated descriptors to explain the significance of events associated with sources of ionising radiation. Levels one to three are incidents, and levels four to seven are accidents.

It is designed such that the severity of an event is approximately ten times greater

for each increase in level of the scale. The levels consider three areas of impact – people and the environment, radiological barriers and control and defence in depth. Events that have no safety significance are rated as below scale or level 0.

UK sites or duty holders, including Sellafield Ltd, provide an initial INES rating for events at their site, before Iain determines the final rating.

He said: “A level one – known as an anomaly – is the lowest level of incident, and I’m pleased to report that we have not had an event rated as a level two or higher in the UK for seven years.

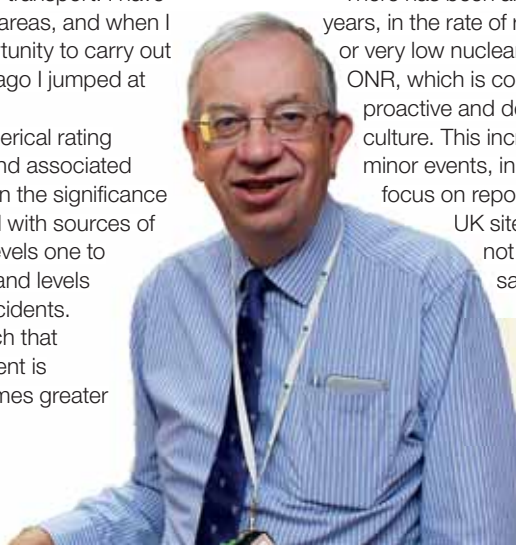
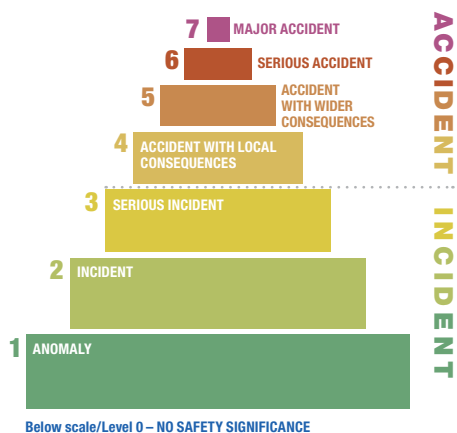
“If there was an event rated at level two or above I would report it to the International Atomic Energy Agency. They would then publish details of the event on their website.

Iain takes part in emergency exercises, leads an annual workshop for licensees and duty holders in the UK, and also attends the international biennial technical meetings, participating in discussions and decisions on the application and development of INES.

He said: “Meeting up with national officers from other countries, and licensee representatives in the UK is an opportunity to share learning and best practice on the application of the scale.

“INES reporting is a communications tool, it’s about learning and not intended to be a stick with which to beat the UK sites. It’s important to stress that it’s not unusual to have events rated as level one and it’s not a measure of the safety of the site.

“There has been an increase, over recent years, in the rate of reporting of events of no or very low nuclear safety significance to ONR, which is consistent with a positive, proactive and developing reporting culture. This increase in reporting of very minor events, in part, reflects an increased focus on reporting and learning by UK sites, even if the event did not result in any adverse safety outcome.” ■



Iain Gray,
UK INES
national officer

Inspiring Innovation

Giving engineers the freedom to deliver creative solutions to actual-world problems facing the Sellafield site, is the mission of our new Innovation Centre, and one that is already reaping the benefits.



The Sellafield Innovation Centre will undertake design projects and produce working prototypes to provide proof of concept in response to the Sellafield site's demands. Projects will address problems facing the business and exploit opportunities in order to reduce downtime, improve operations and projects and benefit safety.

The new centre has already proven successful by offering a potential solution to a spares obsolescence problem in the Thorp reprocessing plant.

The passage of time meant that crucial power supply isolators used in the plant have become obsolete. Over time, the current isolators have reached the end of their useful life and have to be replaced. Our stockpile of spares is running low, and should we run it, it'd threaten the final few years of reprocessing in the plant.

Working with Thorp system engineers, the Innovation Centre is working to develop a replacement using 3D scanning technology. Should this prove successful, we will use the supply chain to produce actual replacements, saving significant amounts of time and money, securing the future of reprocessing.

The development of working prototypes will provide confidence in designs, ensuring a right-first-time approach in which money spent on further design and development is spent at lower risk thanks to the knowledge that the concept is proven.

Describing the centre, chief engineer, Steve Cockayne, said: "This is a fantastic new facility that enables our teams – from engineering and beyond – to get creative and deliver solutions that work, enabling us to speed up our decommissioning mission.

"The projects we are encouraging are ones that not only have the potential to make a significant impact to business success and require innovation, but are the ones that will work to develop our engineers' capability – ensuring they're the best in the business.

"Ideas are developed over a short period

and are supported and proven by advanced prototyping. This is the ideal environment in which innovative ideas can be encouraged and developed with minimal risk, and it's one that is already proving successful."

State-of-the-art design tools, software and prototyping machinery such as 3D printers, 3D scanners and electronic circuit prototyping machines will sit alongside conventional tools and equipment, providing a platform for a team of engineers to test ideas, increase readiness and rapidly improves designs towards a successful solution.

The Innovation Centre is housed within Sellafield's engineering workshop facility. This will enable close working with both the wider Sellafield network and client operating units. The centre has excellent IT which enables easy communications with the supply chain and strong collaboration with clients.

Given the innovative, ideas based approach, the centre is not governed by our standard processes during prototyping and development. This means ideas can be developed and taken forward – or abandoned – more quickly than would ordinarily be the case.

As a business that is changing, with a mission that is shifting, offering innovative and speedy solutions can only make sense. The Innovation Centre will deliver just that, whilst also offering a test-bed for new technology that will likely be a focus of a future work.

As a business that is changing, with a mission that is shifting, offering innovative and speedy solutions can only make sense. The Innovation Centre will deliver just that, whilst also offering a test-bed for new technology that will likely be a focus of a future work. ■

Projects will be conducted as follows:

Approx. 6 weeks, with an optional +2 for further development

£15k + £5k contingency budget

Start with Functional Specification

End with:

- Proof-of-concept working prototype
- Design Report
- Technical Specification
- Technology Readiness to Level 6 or as otherwise agreed with client
- Handover of information to nominated detail designers

This is a fantastic new facility that enables our engineers to get creative and deliver solutions that work

Our Nuclear Family Tree

The UK's nuclear industry spans from decommissioning to new build, from research and development to waste management, and from national defence to energy production. Who is responsible for what in this multi-billion pound industry and where does Sellafield fit in to the UK's nuclear family tree?

While it has been said that the only constant is change, the pace and scale of change in the UK and our nuclear industry this year has been far-reaching.

Britain has voted to leave the European Union; the government department responsible for nuclear decommissioning – the Department for Energy and Climate Change (DECC) – has merged with the Department for Business, Innovation and Skills (BIS) to form the Department for Business, Energy and Industrial Strategy; and, closer to home, we have moved from private sector ownership to a subsidiary of the Nuclear Decommissioning Authority (NDA).

It is too early to know how leaving the EU will impact Sellafield; the effects could be minimal but could potentially alter the way in which we are regulated, buy goods and services, forge partnerships or focus our funding. The fact is we simply don't know

until Britain has negotiated a new relationship not just with Europe but with the rest of the world. Until we do, we remain focused on the day job of delivering our nationally important clean-up mission.

Something we do know is that we now fall under a new government department with a new structure and priorities; the Department for Business, Energy and Industrial Strategy. By merging DECC and BIS the government has brought together responsibility for business, industrial strategy and science with energy and climate change policy. This balances the dual priorities of economic growth and carbon reduction in a way that can benefit UK business and scientific innovation. It also brings all government responsibilities for civil nuclear together into a single department that will continue to work closely with affiliated bodies including the NDA and Office for Nuclear Regulation.



Our biggest change this year has been the transfer of our shares from the private sector to the Sellafield site owners, the NDA, on 1 April. Chief Executive of the NDA, John Clarke, said at the time: "Much progress has been made under the old arrangements but in the long term they are not suited to a site like Sellafield. The work that needs to be done at Sellafield is very complex, often difficult to define and spans many years. The new arrangements will accommodate the challenges at the site more easily and allow for longer term planning. The private sector will still be heavily involved in delivering work at Sellafield but no longer as an owner.

"This is a new chapter for Sellafield. Without a commercially driven contract, the NDA and Sellafield Ltd will be working to exactly the same goal, safely delivering the mission as quickly and efficiently as possible."

That mission is the safe acceleration of risk and hazard reduction at Sellafield and the provision of our unparalleled nuclear material, fuel and waste management services to the industry. For example, we:

- Support the clean-up of the Magnox nuclear power stations by receiving and reprocessing their used nuclear fuel
- Keep the lights on across the country by providing spent fuel services to EDF Energy
- Save millions of pounds for the UK tax payer by receiving and storing nuclear materials from other nuclear sites, making best use of our waste management capability and capacity and removing the need to spend money on new facilities across the country
- Support the growing nuclear supply chain who are able to sell the skills and experience they gain from working with us to the wider nuclear market and beyond

As the family tree on the opposite page shows, regardless of our ownership models or government departments, our sites and facilities are intrinsically linked by the shared goal of the safe use and storage of the nuclear atom. ■

Department for Business, Energy and Industrial Strategy

Charged with delivering a comprehensive industrial strategy, leading government's relationship with business, furthering our world-class science base, delivering affordable, clean energy and tackling climate change



Office for Nuclear Development

The Office for Nuclear Development (OND) focuses on removing potential barriers to investment, and facilitates new nuclear investment in the UK



Nuclear New Build

Moorside and Hinkley



National Nuclear Laboratory

Provides independent advice to the UK Government and works with other National Laboratories around the world to deliver a full range of research and technology to support the nuclear fuel cycle



Radioactive Waste Management

A subsidiary of the Nuclear Decommissioning Authority, they are responsible for the delivery of a geological disposal facility and provide radioactive waste management solutions



Direct Rail Services

National rail freight operator serves the nuclear fuels industry and other customers in the United Kingdom



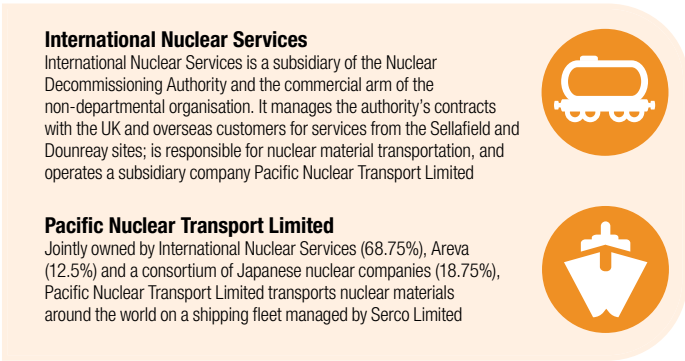
International Nuclear Services

International Nuclear Services is a subsidiary of the Nuclear Decommissioning Authority and the commercial arm of the non-departmental organisation. It manages the authority's contracts with the UK and overseas customers for services from the Sellafield and Dounreay sites; is responsible for nuclear material transportation, and operates a subsidiary company Pacific Nuclear Transport Limited

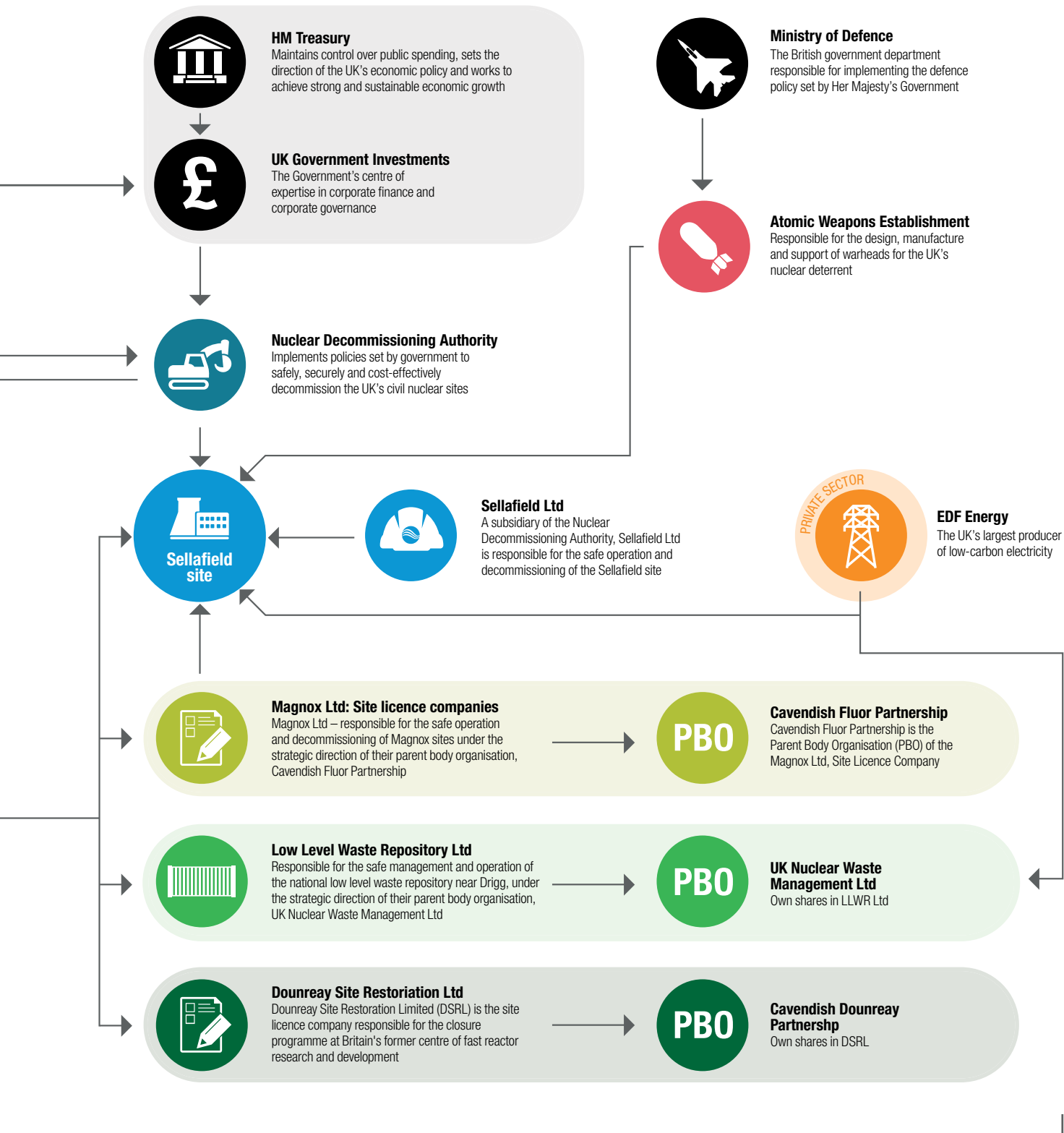


Pacific Nuclear Transport Limited

Jointly owned by International Nuclear Services (68.75%), Areva (12.5%) and a consortium of Japanese nuclear companies (18.75%), Pacific Nuclear Transport Limited transports nuclear materials around the world on a shipping fleet managed by Serco Limited



The nuclear family tree...



Regulators



Office for Nuclear Regulation
The Office for Nuclear Regulation's (ONR) mission is to provide efficient and effective regulation of the nuclear industry, holding it to account on behalf of the public. ONR Transport's contribution to achieving the mission is to regulate safety and security during the transport of radioactive material by road and rail in Great Britain



Environment Agency
An executive non-departmental public body responsible for the protection and improvement of the environment

Industry associations



Nuclear Industry Association
The trade association for the UK's civil nuclear industry, representing more than 260 member companies across the supply chain



Nuclear Institute
The UK membership organisation for nuclear professionals

Security



Civil Nuclear Constabulary
A specialist armed police service dedicated to protecting the civil nuclear industry

SME top tips

Are you a micro, small or medium sized enterprise looking to secure new opportunities? If so we have collated some tips that will help you to achieve this.

We are committed to supporting and encouraging local suppliers, including social enterprises and charities to bid for work both at Sellafield and also outside of the Sellafield system as diversifying into new markets will help to drive local economic growth and resilient economies.

Learn from experience

The wisest people are the ones who see every experience as an opportunity to learn. Win or lose, the more you learn the more effective you will be.

Proactive feedback

Don't be afraid to ask for feedback from clients, this could be the difference between winning and losing your next work.

Our standards

Ensure you understand and meet the required standards as these get filtered down through the supply chain, and look to continually improve.

"Providing labour or materials at Sellafield requires full understanding of the applicable Sellafield procedures. You need the skills, capabilities and competencies for any individual to undertake any specific work on site. For materials or equipment, a full understanding of the contract quality requirements is essential."
Les Turner, Morgan Sindall.



What is an SME?

A SMALL OR MEDIUM-SIZED ENTERPRISE, OR SME, AS DEFINED BY THE EUROPEAN COMMISSION IS A BUSINESS OR COMPANY:

IT HAS FEWER THAN
250 EMPLOYEES;

250

AND HAS EITHER: (A) ANNUAL TURNOVER
NOT EXCEEDING €50 MILLION

€50m

(approximately £40 million)

OR (B) AN ANNUAL BALANCE-SHEET
TOTAL NOT EXCEEDING €43 MILLION

€43m

(approximately £34 million)

Certification v demonstration

Consider formalising the hard work you invested in to meet the standards and verify it through certification and accreditations. ISO 9001, ISO 14001, Cyber Essentials.

Questions

Remember it is a competition so answer the question asked to score the highest mark.

Unique selling point

Identify what this is for your company and broadcast it to the market and supply chain. Look for opportunities and use your unique selling point to win work, don't assume that opportunities will come looking for you.

"If a supplier identifies 'Innovation' as their unique selling point and develops a service or product which helps to solve a problem for us as a customer, demonstrating that product or service will often have more impact than just talking about it." Dianne Richardson, Balfour Beatty.

Know when and when not to network

Do your homework before the event and identify who will be there and is it the right event for you? Provide enough information to spark the interest but hold some back to follow up with. Make the most out of the information you gather, pull out the relevant points and use it!

"Britain's Energy Coast Business Cluster organise monthly networking meetings that are excellent opportunities to build contacts in the supply chain and network with potential suppliers, clients and partners in Cumbria and beyond.

"Listen carefully when you're networking – and listen between the lines. Someone new may not seem like an obvious prospect for your business but Cumbria is a very connected community so you never know who else that someone may know!" Britain's Energy Coast Business Cluster.

BRITAIN'S ENERGY COAST BUSINESS CLUSTER

is a private sector-led group of over 330 organisations, from SMEs to global businesses. Members include world class, innovative and highly competitive companies that offer high value jobs in the region.

Further information is available online at www.becbusinesscluster.co.uk



Be persistent and resilient

Be clear on your vision, maintain a certain level of challenge and keep raising the bar ever higher. If things don't go to plan, take a step back and ask yourself 'what can I learn from this, is this a battle we should be fighting?'

"All of us get knocked down, but it's resilience that really matters. All of us do well when things are going well, but the thing that distinguishes athletes is the ability to do well in times of great stress, urgency and pressure." Roger Staubach. <http://greenspacecoaching.com/2012/11/resilience-why-do-we-need-it/>

Get others to promote you

Showcase your testimonials and reviews of your products/services in your literature, online presences and other marketing materials.

Pursue payment

If you have a contract and your invoice is not paid on time, contact the client, it is likely there is an error on the invoice.

Don't struggle alone

If you have a contract and are struggling to deliver, ask the client for support, they want to help.

Make contact

When contracts are awarded make contact with the successful bidder and share your capabilities.

"Don't wait until you find out who the successful bidder is, it is key to build relationships so they know what you do and have a personal connection. This helps it to be more of a pull from them than a push from you." Ivan Baldwin, Bendalls Engineering.

Collaboration v competition

It's positive if you can but you don't have to go it alone. If you don't have all the capabilities to compete consider collaborating with others in the supply chain and build your capability with complementary businesses.

CASE STUDY:

CUMBRIA NUCLEAR SOLUTIONS LIMITED

is a real demonstration of the benefits of collaboration, delivering over £60m of work over the last 10 years. It is a mix of SMEs and large and global companies which was created in 2006 to compete for a framework contract with us. The alliance enabled these organisations to work collaboratively to deliver the full project lifecycle, without eroding the small company value proposition.

CNSL is made up of:

- React Engineering (SME)
- Shepley Engineers (previously SME)
- Stobbarts (now Jacobs Stobbarts, previously SME)
- James Fisher Nuclear
- White Young Green
- Westinghouse Electric Company

Frameworks they are part of at Sellafeld:

- Design Framework Alliance 1
- Design Framework Alliance 2
- Decommissioning Delivery Partnership

Some places to look for opportunities...

- **Tenders Electronic Daily (TED):** www.ted.europa.eu/TED/main/HomePage.do
- **Constructionline:** www.constructionline.co.uk
- **Nuclear Market:** www.nuclearmarket.com
- **Complete Tender Management (CTM):** <http://suppliers.sellafieldsites.com/procurement-opportunities>
- **Contract Finder:** www.contractsfinder.service.gov.uk/Search
- **Innovus:** www.innovus.org.uk
- **Britain's Energy Coast Business Cluster:** <https://www.becbusinesscluster.co.uk/>
- **Sellafeld Ltd website, Suppliers section:** www.sellafieldsites.com/suppliers
- **Sellafeld Ltd 2016-17 Procurement Plan:** <http://suppliers.sellafieldsites.com/files/2012/12/2016-17-Procurement-plan-final-10.05.2016-1.pdf>
- **Procurement Plan Schedule 2016-17:** <http://suppliers.sellafieldsites.com/procurement-opportunities>
- **Sellafeld Ltd 2016-17 Procurements on a Page:** <http://suppliers.sellafieldsites.com/files/2012/12/Sellafeld-2016-17-Procurements-on-a-Page-final-10.05.2016-1.pdf>
- **Guide to Delivery Routes – A guide to the Strategic Alliances, Enabling Frameworks and other delivery routes for Sellafeld Ltd:** <http://suppliers.sellafieldsites.com/files/2012/12/0051-External-Yellow-Pages-Final-Low-Res.pdf>
- **Contract Quality Requirements** <http://suppliers.sellafieldsites.com/files/2013/02/SLM-4.06.02-Issue-3.pdf>
- **Sellafeld Ltd Code of Responsible Business Conduct:** <http://suppliers.sellafieldsites.com/files/2012/12/Sellafeld-Ltd-Code-of-Responsible-Business-Conduct.pdf> ■





POLICING

Sellafield differently

With a move from armed officers with their eyes fixed on the barbed wire, to community patrols and behaviour detection – the way the Civil Nuclear Constabulary police the Sellafield site is changing – learning from high profile schemes at Britain’s major railway stations and events like the 2014 Commonwealth Games.

Read on to find out what this new approach looks like, and how you might come across it when you’re near the Sellafield site.

Unpredictable ground patrols and behavioural detection officers on the lookout for suspicious activity are two elements of the Civil Nuclear Constabulary’s new approach to protecting the Sellafield site.

And this new approach has already reaped dividends, with criminal activity being spotted and arrests being made during the week of Project Servator’s launch.

Even though these were for criminal activity rather than related to terrorism, they show this new way of guarding Sellafield is proving successful.

Project Servator sees highly visible yet unpredictable deployments of specially trained officers around the Sellafield site and the surrounding area. The deployments involve officers working together with communities to report suspicious activity. These officers are deployed to deter, help detect, and provide reassurance and confidence to members of the public.

In the vicinity of the Sellafield site, communities are likely to see patrols in locations they might not have before, and at unfamiliar times. You might also see more

of a police presence with increased ground patrols in local villages.

This approach is all about gaining a new understanding of the threats to the Sellafield site, and how potential attackers could look to exploit these.

Sergeant Jim Williamson is leading the project. Jim says: “We have been delighted with the response we have received to Servator – both in local communities and from those who work at the Sellafield site. It is clear that our visible patrols have attracted the attention of the community, and are doing their job.

“The Servator approach isn’t new, and has been tested – we’ve learned from the work of both the City of London Police and British Transport Police who implemented the schemes first, and from Police Scotland who used the method to police the Commonwealth Games.

“What we’ve done is learn from what has worked well elsewhere and have adapted this to the specific characteristics of the nuclear sites that CNC protect, and Sellafield in particular – which is by far the largest.”

CNC have been preparing for the launch since the turn of the year, and this has seen officers including Jim taking part in a range of different exercises – many of which push officers outside of their comfort zones training in new techniques.

Their officers have been keen to undertake this training, knowing it will expand their skills at the same time as helping protect the site.

Jim continues: “Officers have been supportive of the new approach and are keen to get involved. They are as pleased as I am with the reaction from employees and the public.”

“A key part of our approach to look differently at the Sellafield site, and people’s behaviour when near to it. This has proved successful already – our officers noted some suspicious behaviour, which led them to investigate further and question two individuals. They were subsequently arrested and handed over to Cumbria Constabulary as a result of criminal activity.

“Obviously I can’t go in to the details of the behaviour our officers are looking out for, but I can tell you that it is evidence based, and proved particularly successful



during the Commonwealth Games. The British Transport Police also used it with positive results during high profile deployments at London’s mainline railway stations.”

Jim ends by reminding us: “Our officers welcome engagement with the public, so if you’re near to or are visiting the Sellafield site, you might well be stopped by an officer for a discussion. This is nothing for people to be worried about. The idea is that we get as many eyes and ears looking to protect the Sellafield site as possible.

“The Servator strapline is ‘trust your instincts’ and this really sums up what this approach is all about. If people think something seems suspicious or doesn’t quite fit – then I’d urge them to get in touch.”

As part of their new approach the CNC have a new Twitter account, visit www.twitter.com/nuclearpolice to see it.

The Servator team can be contacted by calling 019467 73999. Alternatively call the dedicated Sellafield Civil Nuclear Constabulary control room on 019467 76011. ■



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: 1,736

as of 21 September 2016, there are 1,736 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: 863

as of 21 September 2016, there are 398 tonnes of Advanced Gas-cooled Reactor fuel and 245 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.



Reduce,



Reuse,



Recycle

As householders, we are all used to the idea of segregating the waste we produce and have been provided with different disposal routes, through a rainbow of wheelie bins and plastic collection bags and boxes. Although waste management on a nuclear licensed site like Sellafield is a little more complex, the principles of **reduce**, **reuse** and **recycle** are still valid.



Those close to the nuclear industry will recognise the main categories of nuclear waste; low, intermediate and high.

High level waste comes from the separation of plutonium and uranium during reprocessing and it can't be reused or recycled. This waste is evaporated to **reduce** its volume before it is mixed with glass to form a solid, stable substance which is kept safely in our purpose built store.

Intermediate level waste is mixed with grout in drums and stored in engineered stores on the site. While we can't reduce the amount of intermediate level waste created, we can **reduce** the cost of managing it.

This can be done by segregating any of the waste that has a lower radioactive content and find new ways of treating the lower level intermediate level waste.

The biggest volume of the waste that we generate at Sellafield is low level waste. It includes things like single-use PVC suits that have been used as personal protective equipment. Historically we have sent all of this material to the Low Level Waste Repository, where the space is a limited national asset, with little thought about how we could reduce the volume.

Since the mid-1990s we have been compacting low level waste in stainless steel drums for disposal at the Low Level Waste Repository. This approach obviously **reduces** the amount of storage space required but does not directly reduce the amount generated.

Our attitude to waste, driven by focusing on a very broad interpretation of reduce, reuse and recycle, has been changing for more than 20 years.

A significant quantity of low level waste has historically been generated by material crossing into and eventually out of a radiological area. Some simple examples of where we have **reduced** our generation of low level waste include:

- removing packaging, as far as possible, from equipment being delivered to nuclear active facilities;
- using different materials that can be easily decontaminated. Traditionally scaffold boards are made from wood which is a porous material that is very difficult to monitor for radiological contamination and/or clean. The simple alternative is plastic or resin boards – they might cost more to purchase but are more easy to manage in a potentially contaminated environment;
- developing other waste routes that provide a more cost-effective means for disposal.

In terms of **reusing** materials, we are a member of the Nuclear Decommissioning Authority asset register scheme. This system provides a forum for people to find and reuse equipment and materials that were purchased for projects and can safely be used again. Successes from the register scheme include the reuse of robotic arms following completion of a project and the reuse of project consumables such as cabling.

Recycling material is, in many ways, one of our current core missions at Sellafield as we managed used fuel from reactors and convert it into plutonium and uranium.

With regard to low level waste management **recycling** is about decontaminating materials and object to levels below those of low

level waste. We do this in a number of ways including high pressure washing and using chemical processes on porous services. The balance to be achieved we always need to ensure that any indirect waste generated by the recycling of the material is taken into account when evaluating a new approach.

We have also **reduced** the volume of low level waste produced through recycling. Examples include using rubble from demolished buildings as infill for excavations.

Legally, if there is any material that is potentially contaminated (a risk that can't be discounted on a nuclear site) then before it can be recycled it has to be sampled and subject to technical analysis and any risk associated with recycling considered and approved. To date this has proven difficult to manage due to the time delay it introduces into any project but we have started to build up a stock of sampled and cleared material we can recycle, instead of having to buy fresh infill.

At Sellafield we have unparalleled capability in the management of waste. This capability is not just about the processes and facilities but the behaviours and attitudes we display with regard to waste. It's all part of the bigger picture approach to the clean-up of the Sellafield site, which aims to ensure all waste is managed in the most cost-effective, appropriate way. ■

Norwegian dialogue



Openness and transparent communications are at the heart of our engagement with stakeholders about Sellafield. For one Norwegian stakeholder group, ongoing dialogue with us has helped to build trust and understanding about the site and our operations.

Open, honest and transparent conversation is one of the ways that we share the Sellafield story. Over the last 15 years we have been part of an ongoing dialogue with Norwegian stakeholders who have raised their concerns about the site initially about discharges and more recently highly active liquor stocks. For our part we kept them informed about our activities and progress in areas of their concern.

The relationship began in 2001 when representatives from Bellona, a Norwegian non-governmental organisation, visited Sellafield and expressed their concerns about liquid discharges from the site into the Irish Sea.

The dialogue developed through continuous briefing and updates on progress and has led to a culture of 'no surprises' with frank and honest discussion between all parties. These updates have taken place at a number of conferences held in the UK, Norway and Brussels. The first took place in Cumbria in 2003 and the latest in June of this year.

In addition, Norwegian stakeholders, including Ministers and an Ambassador have visited Sellafield.

The agenda for the conferences was driven jointly by a steering group formed with members from our own organisation with the Nuclear Decommissioning Authority, Bellona another Norwegian non-governmental organisation from the Lofoten Islands, Guardians of Our Common Seas. Agreement was reached on the location, timing, agenda content, speakers, travel and accommodation. By working together mutual understanding developed and confidence grew. This has been perhaps the most important element of the dialogue.

Participants in the conferences have included representatives from the UK Government, and the British Ambassadors to Norway, the Norwegian Government, including ministers and the Norwegian Ambassador to the UK, Norwegian and British members of parliament, the Nordic Council, the west Cumbrian community, and Norwegian communities. Bringing



Pictured:

Some of the conferences and visits to Sellafield over the last 15 years.

communities together has enabled a much better understanding of each other's interests and concerns.

At one of the earlier conferences, Arne Ivar Mikalsen, Nordland representative of Venstre, Norway's Social Liberal Party expressed his concerns on how an accident at Sellafield that could damage the environment and economy of his community, stating that, "Nordland, is the home of the world largest cod fisheries which is so vital to the local and national economy. Potentially of equal importance is the resource that the seabed may offer in future. It is my duty to ensure that the sea is protected for many generations to come. I participate in these conferences to gain an understanding and seek assurances about the risks from Sellafield".

"We've come a long way since our first meeting with our Norwegian stakeholders 15 years ago. We've moved away from confrontation and through the exchange of information and views we have been able to sustain a mature dialogue built on trust."

Speaking at this year's conference, our chief operating officer, Steve Bostock, commented on the progress that has been made,

"We've come a long way since our first

meeting with our Norwegian stakeholders 15 years ago. We've moved away from confrontation and through the exchange of information and views we have been able to sustain a mature dialogue built on trust. These conferences have been the main reason for this and our stakeholders and

friends now tell us they have confidence in how the site is being run and our plans for the future. For me it's been a pleasure to participate over the last few years. I've met

some good people and learnt a lot about the concerns that Norway and the wider Nordic region have about Sellafield. In return I hope I've been able to aid their understanding of the site a little."

The dialogue has now moved to a new phase and it's been agreed this year's conference will be the last. However, the UK and Norway, led by industry and the NGOs, will continue dialogue. Meetings will continue to take place to discuss progress and challenges. ■



S M F

SILOS MAINTENANCE FACILITY



Our ability to empty and ultimately demolish our most hazardous facilities on the Sellafield site relies on us having buildings available to receive, process and store the legacy wastes and fuels that we will retrieve. It also relies on the development, testing, use and maintenance of a suite of retrieval equipment. To meet this challenge, a new maintenance facility is emerging from the ground where the Calder Hall cooling towers once stood.

When completed in 2018, our new Silos Maintenance Facility will support the retrieval of historic nuclear waste from the Magnox Swarf Storage Silos and Pile Fuel Cladding Silo. In particular, it will help the Magnox Swarf Storage Silos emptying plant retrieval machines, carrying out changes to the type of tools the retrieval machines use, loading new equipment and testing new equipment before it is used in the silo.

The multi-million pound facility is being constructed where two of the iconic Calder Hall Cooling Towers stood before they were demolished in 2007.

Looking back at the progress made on the project, Maria Pennington, construction manager can't hide her enthusiasm, as she explains: "Just three years ago the project was in a phase of site preparation, which involved clearing the site of any rubble and other materials before we could actually begin work on the building foundations.

"Balfour Beatty and Cavendish Nuclear are working with us to deliver the facility, from construction and installation through to safety testing.

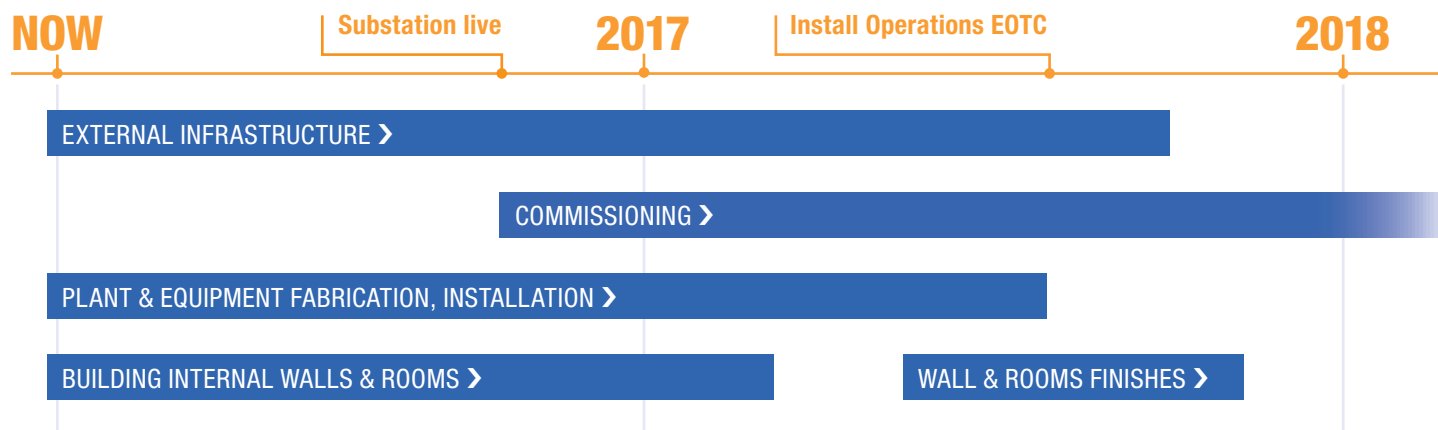
"Together we have now completed the foundations for the building, and the main internal structure, where the work to support and maintain the Magnox Swarf Storage Silos silos retrieval machines will take place. We have also erected the structural steel framework for the building, with each beam weighing more than two double decker buses, and we have installed the administration block, which contains the offices and changeroom facilities.

"Over the summer we completed the installation of the overhead travelling crane, which had to be lowered into the building using two large cranes – one of which weighed the same as a Boeing 747.

"This was a crucial phase in the project work as it enables the project team to press ahead with the installation of plant and equipment inside the shell of the building during the next phase of the work, and recently we completed the installation of the building cladding which now provides us with a weather proof facility." ■

The facility will provide:

- Road receipt and despatch of tools and equipment
- Clean storage and the ability to receive and export transport flasks
- Flask inspections
- Tool loading and unloading
- Waste and tool package maintenance for the Magnox Swarf Storage Silos
- Radiological equipment maintenance workshop
- Clean room workshop
- Accommodation and plant access for health physics, shift teams, management and retrievals operators



Mapping the nuclear nation



People have used maps to help explain and navigate the world around them for thousands of years, from ancient cave paintings to satellite navigation. But maps tell us so much more than how to get from A to B. They also tell us stories.

The Nuclear Industry Association's (NIA) Jobs Map is a must for anyone looking for a fascinating snapshot of the UK civil nuclear industry today. Produced annually for over a decade, this powerful visual tool details the range and diversity of UK nuclear companies and underlines their significance to local and national economies.

This year's offering continues to tell this story. Last month the NIA launched its 2016 Jobs Map UK to a packed Westminster audience of politicians and leading industry figures, showcasing the most up-to-the-minute stats and facts about the industry and proving its enduring ability to surprise people by its reach and range.

Sellafield Magazine met Rachel Dowling and Rupert Lewis from the NIA at the launch to understand more about who uses the map and what it tells us about the state of the nuclear nation.

Sellafield Magazine: For people who don't know, what is the NIA?

Rachel Dowling (RD): The NIA is the trade association for the civil nuclear industry in the UK. It represents more than 260 companies, including Sellafield Ltd and many organisations within its supply chain. We work to improve interaction between our members and promote better engagement with the public, media and politicians to improve understanding of the industry and support its development.

SM: What is the Jobs Map and how do you use it?

Rupert Lewis (RL): It's a really interesting and engaging way of demonstrating to people the amount and variety of nuclear companies

across the UK and the numbers of people they employ. It has a number of uses from understanding the national context of the industry to the specifics of a particular region or sector.

RD: The Jobs Map UK was designed as a tool to provide Government and other decision-makers with up-to-date and accurate figures about the nuclear industry, and over ten years later it still is. It helps demonstrate the vital contribution NIA members and their employees are making to the UK economy. Many MPs are often surprised to learn how many of their constituents work in nuclear.

SM: Is this why you chose Portcullis House in Westminster for the launch?

RD: We've traditionally launched the Jobs Map during the autumn political conference season but decided to try something different this year. Doing it this way means representatives from our member companies can also attend and speak to parliamentarians directly.

SM: Do you think this new approach has been successful?

RL: I think the attendance level speaks for itself. We have representatives from 15 of our members and politicians from all over of the UK have given up their valuable time to come and learn more about the vital work each company is doing, including Iain Wright, Chair of the Business, Innovation and Skills Select Committee. The Jobs Map helps enormously in informing and improving this kind of engagement, which is a good thing for our industry. We hope to encourage more members to use these sorts of tools to help tell their stories and better understand their place in the wider nuclear family.

SM: Who else can use the Jobs Map?

RD: The short answer is anybody that is interested in learning more about the national significance of nuclear or who wants to explain this to others. We're constantly encouraged by the new ways in which people are using

NIA members employ:

	2015	2016
Total	63,484	65,791
Women	10,877	14,531
Apprentices	1,239	1,940
Graduates	611	1,074



Rachel Dowling
Public Affairs
Executive



Rupert Lewis
Communications
Executive

the information. In recent years we're finding more and more young people are using the Jobs Map to inform their career planning, for example, as it offers a quick and accessible means of understanding which nuclear companies are operating in a particular area.

SM: Which aspects of the Jobs Map do you find the most interesting?

RL: For me it's the way it demonstrates just how widely the nuclear industry is spread throughout the UK, from Dounreay on the northernmost tip of Scotland to Dungeness on the south east coast of England and almost everywhere in between. This shows how integral our industry is not just to the national economy but also to regional economies, often in some of the most remote communities in the country. It also highlights the UK's concentrated centres of nuclear excellence, like Cumbria that boasts almost 16,000 jobs in the civil nuclear supply chain alone. Whatever your views on nuclear it's interesting stuff.

RD: With the recent approval of Hinkley Point C, more new nuclear on the horizon and a vibrant supply chain perfectly placed to capture the emerging global decommissioning market the story is a good one for UK nuclear. Next year we might need a bigger map. ■

Whatever your views on nuclear it's interesting stuff...

NIA
Nuclear Industry Association

Jobs Map UK.
The UK Civil Nuclear Industry

There are over 65,000 jobs across the UK civil nuclear supply chain covering a wide variety of expertise including power station operations, research, legal services, waste management and decommissioning.

65,791
Jobs throughout NIA membership in 2016

Number of Employees by Parliamentary Constituency Summer 2016

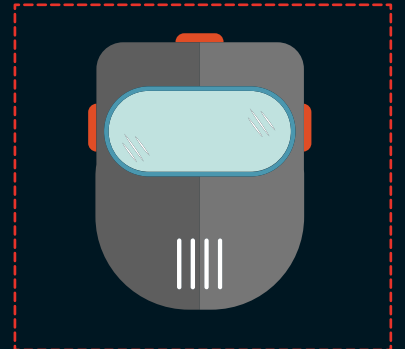
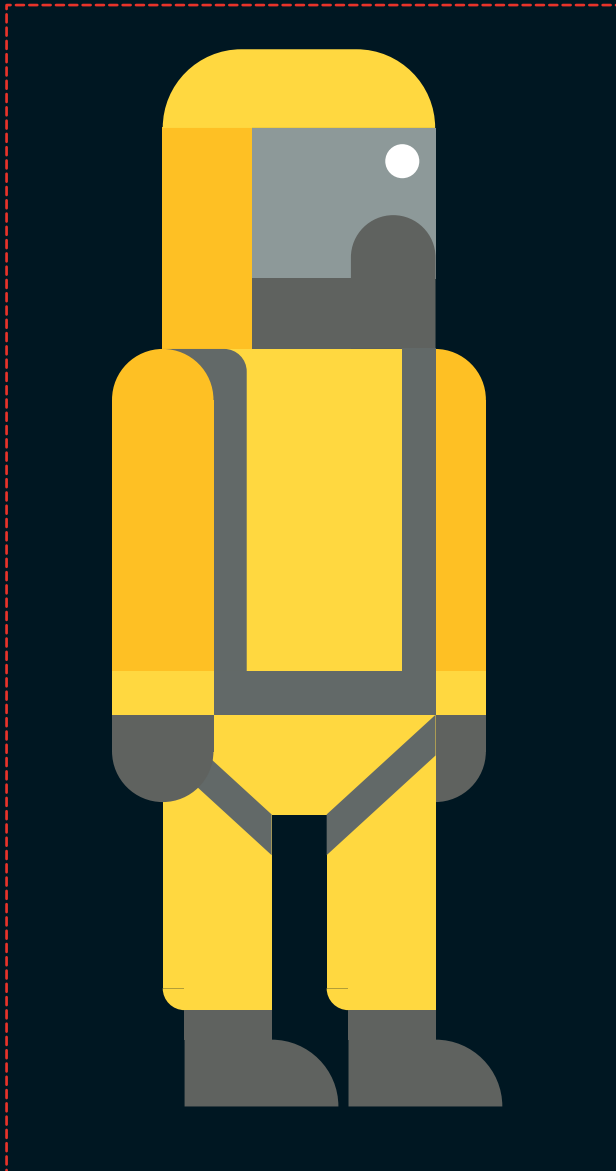
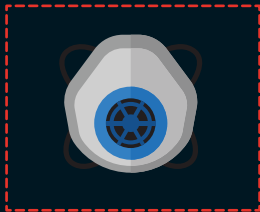
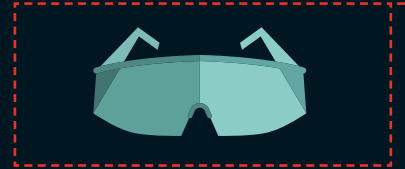
Follow us: @NIAUK

Follow us: @ra_garok

Region	Jobs
East of England	14,531
London	1,940
South East	1,074

View and download the full NIA Jobs Map UK 2016 at:
www.niauk.org

THERE'S NO-WEAR QUITE LIKE IT



The Sellafield site is a unique and potentially hazardous working environment, so we need to ensure people have the right tools to do the job. This is where personal protective equipment (PPE) comes in, to some it may just look like the high-viz jackets, hard hats and gloves typical of any industrial site, but the provision of this high quality, cost-effective PPE is crucial to the safety of our people and the success of our nuclear clean-up mission.

A family owned business called Arco is a leader in this field, working to help keep people safe at work for over 130 years.

Having worked with Sellafield since the 1980s, Arco recently won two new contracts which will see the firm provide conventional, off-the-shelf PPE across the entire Nuclear Decommissioning Authority's estate, which includes Sellafield Ltd, Dounreay Site Restoration Ltd, International Nuclear Services, the

Low Level Waste Repository, Magnox Ltd and the National Nuclear Laboratory.

With headquarters in Hull, they have had a Cumbria based factory for two decades and are opening yet another distribution centre just miles from the Sellafield site, providing jobs and training for local people.

Bryan Lawrie, Arco Sales and Marketing Director tells us more:



Q. Tell us something about Arco.

A. We are the UK's leading safety company and a family owned business that has been working to help keep people safe at work for over 130 years. Our headquarters are in Hull but we have a network of 49 stores around the UK, including one in Cumbria. We offer a wide range of innovative safety solutions and training services, from the latest in safety footwear and clothing to protection for those in high risk jobs such as confined space training solutions and high specification respiratory protection. We are leading the debate about safety through our support of the British Safety Industry Federation and our own work in Westminster, making sure that worker safety remains a top priority with the Government.

Q. Describe the service you provide.

A. As experts in safety, Arco is able to offer a wide range of safety products from some of the world's leading brands and our own brand ranges along with expertise in safety consultancy and mortal risk training services. This expertise enables us to provide a genuine total solution for our customers and we can advise on product selection, provide product training such as respiratory face fit testing and build a genuine partnership with our customers to help them keep their people safe at work. We have also invested in our own product quality assurance laboratory where we test products to ensure they fully comply with the standards and are safe, beyond doubt.

Q. What experience do you have of the nuclear industry?

A. Arco has been working in the nuclear industry for 30 years and during this time, our well-established expertise guarantees the customer that each product supplied, is fit for purpose. At Arco, our number one objective is keeping people safe and ensuring workers go home safe to their families at the end of the day.

This is why at Arco, 'it's not just safety gear', it's about our service, our expertise and knowledge across all industrial sectors that enables us help keep those people safe. As a result, Arco is a trusted safety supplier for some of the UK's leading companies.

"It's not just our safety gear, it's our service, expertise and knowledge that enables us to help keep people safe"

Bryan Lawrie, Arco

Q. How long have you been working with Sellafield?

A. Arco has been working with Sellafield on a regular basis since the early 1980s and this partnership was a key reason for the opening of our trade counter in Carlisle in 1996. From here we serve businesses large and small located across Cumbria and the surrounding area.

In December 2015, our Carlisle base became Arco's hub for our efforts in helping the local community after the severe flooding caused by Storm Desmond. Our

team was on hand, providing resources to local communities, customers including United Biscuits, councils, the army, flood response centres, to ensure that businesses recovered quickly from the damage caused.

Q. You plan to open a distribution centre in West Cumbria – how will this help you deliver the Sellafield contract?

A. Our key objective is to ensure Sellafield experiences an effortless and high quality safety partnership with Arco, that's why we are currently in the process to source a facility which allows us to bring our expertise closer to the customer and to the local community. The facility will host warehouse, packing and shipping capabilities for Sellafield as well as providing local businesses with a new safety store to purchase their goods. In addition, we hope the new facility will host safety training capabilities not just for Sellafield, but for local workers. We expect this facility to be operational in early 2017 and in the meantime, we will be utilising our existing Carlisle facility to support the Sellafield contract.

Q. I understand you are also bringing a training capability so you can upskill local people?

A. We will be bringing a host of safety and employment expertise and will upskill the local community in risk management, PPE and safety awareness. We will also be working closely with the local schools to provide support and training in core skills areas, with career seminars and training on interview technique etc. ■

03 JUNE 2016

DESIGN INDUSTRY DAY

The next generation of nuclear workers started their career with us in September; including seven new apprentices who have embarked on the newly launched degree level apprenticeship.

A group of seven bright young things beat stiff competition from more than 100 applicants to secure a place on our new degree level apprenticeship, and will now study either electrical, mechanical or civil engineering.

The group started their adventures with a visit to our engineering design capability offices at Risley and also to their training provider at Wigan and Leigh College. They spent some time with the new line managers, mentors and tutors who will work with them over the next five years of their apprenticeship journey.

They will spend the first three years of the programme on an academic study programme at Wigan and Leigh College where they'll complete a level 5 HND in their chosen discipline. During this time they will also take part in the Duke of Edinburgh Award scheme.

After the initial ten months they move into an office environment and attend college on a day release basis.

During their time in the office they will complete a series of nuclear training courses

and have the opportunity to take part in national competitions such as the Brathay Challenge and Tall Ships Challenges. They then have the opportunity in years 4 to 5 to progress further and complete a level 6 BEng in their chosen discipline.

John Patterson, our head of project engineering management, said "This is the first year we have moved to the new Nuclear Scientist and Nuclear Engineering degree apprenticeship, we recognise that we need more chartered engineers within the industry and this apprenticeship is an excellent start on the journey to professional engineering status."

Apprentice mechanical engineer, Henry Wilson, said: "I am really looking forward to starting the apprenticeship scheme and studying for the Higher National Diploma in mechanical engineering. I am also excited to start working in the design office at Hinton House next year and to have the opportunity to work on real projects while learning practical design skills." ■



DATE:
03 June 2016

LOCATION:
WIGAN and LEIGH COLLEGE
and
HINTON HOUSE



The smartest

Nestled between the sweeping coast of the Irish Sea and the rolling hills of the Lake District, Sellafield is renowned for its dramatic skyline and iconic buildings. But the nuclear site has more than just a striking face.

Sellafield site is home to the greatest concentration of PhDs in the UK.

1,234

Over the past three years over 1,234 employees – 11% of the entire Sellafield Ltd workforce – have been studying for a higher education qualification.

60+

Over 60 graduates are currently putting their engineering, science, business and mathematics degrees and masters to the test at Sellafield.

6

Sellafield Ltd launched six new degree apprenticeships to give the site's youngest nuclear experts the chance to achieve a full bachelors or masters degree, while training on the job.



town in Britain

A mini-town, home to over fourteen thousand nuclear professionals, Sellafield lays claim to being one of the smartest places in Britain.

From harnessing nuclear power to generate electricity for the country, to setting international standards in hazard reduction, Sellafield has been an intellectual powerhouse since its conception in the 1940s.

Fast forward 60 years; the site no longer produces nuclear power but who's to say it's not still a 'power station', one which produces a different type of power... brain power.

Today, the best and brightest minds from across the country form a 'smart community' at Sellafield, solving some of the world's most complex technical, commercial and environmental challenges and creating pioneering technology and innovations.

From engineers and scientists, to project management and safety professionals, thousands of world-leading experts make up a highly-skilled task force in charge of transforming the Sellafield site.

With all that brain power it's no wonder Sellafield can proudly say it's home to the greatest concentration of PhDs in the UK.

And it's not just bold claims, our workforce and that of our supply chain and key partners have the certificates, mortar boards and bursting CVs to back it up.

Over the past three years alone, over 1,234 employees – that's 11% of our entire workforce – have been splitting their time between the day job at Sellafield and studying for a higher education qualification.

Take Rebecca Weston, Sellafield Ltd's Technical Director, for example.

Rebecca has a strong academic background, with science and engineering degrees including a research doctorate (PhD). She's professionally registered and through experience become a Chartered Physicist, Chartered Engineer and a Fellow of the Institute of Physics. She recently studied while working to add an Executive MBA to her growing list of qualifications.

She said: "Our site is home to some of the world's most renowned nuclear experts, from science fellows to specialist engineers to nuclear safety case experts, who are all dedicated to maintaining safety while getting on with the work at the site and creating a secure, environmentally sound space for tomorrow. We also have people at the top of their game in other fields not always associated with a nuclear licensed site; not least our project, finance and legal professionals.

"The challenges at the Sellafield site are many and complex. The decommissioning work is planned to take over 100 years but we have our smart community – world class professionals with a wide range of different skills sets, knowledge and technical capabilities – at the helm, helping successfully complete our mission – and improve on the original plan set out."

At the heart of our 'smart community' is a network of bright young sparks who will shape not only the future of Sellafield, but the world's entire nuclear sector.

Hungry to learn, with plenty of drive and ambition, our trainees are at the top of their game.

As future leaders they are given responsibility for key projects at Sellafield, shaping the way they develop and solving complex problems – some that have never been faced before.

Straight out of the best universities in the country, over 60 graduates are currently putting their engineering, science, business and mathematics degrees to the test at Sellafield.

And it's not just the graduates who can proudly put letters representing their degree next to their name; as of September 2016, we launched six new degree apprenticeships to give the site's nuclear experts the chance to achieve a full bachelors or masters degree, while training on the job, or retraining for a new job.

An innovative new model in training, the degree apprenticeships in Quality Engineering, Operations Engineering, Civil Engineering, Design, Scientific and Technical Specialist, ensure the next generation of nuclear workers have the work-ready skills, knowledge, experience and competence required to drive forward our mission to clean-up the UK's nuclear legacy and help tackle some of the most complex nuclear challenges faced in the world.

When you consider all of these factors – or people – combined together in a footprint of just two-square miles, it's no wonder Sellafield is fast becoming known as a national and international intellectual hub. ■





PHOTOGRAPHER *in residence*

"It's all about scale and the idea that the diggers are tiny. I love how the building is dwarfed by the "mountain" in the foreground. It's my way of playing with the size that is Sellafield and somehow adding extra interest to what is "just" a building. It is one of my favourite things about working with the Sellafield team, that they give me freedom to be myself and to capture the artistic side of the industrial site."

Thomas Skovsende





DELIVERING **VALUE** THROUGH **COLLABORATION**

Working together is at the heart of our new approach to collaborative procurement. We sat down with the new head of the Shared Services Alliance, **Jonathan Evans**, to talk about how we are combining our buying power with the rest of the Nuclear Decommissioning Authority's estate and his aspiration to help the estate become the 'nuclear client of choice'.



**Shared
Services
Alliance**

INTERVIEW BY



LAMMISA ZARRINI

Lammisa Zarrini: What is the Shared Services Alliance?

Jonathan Evans: It is a procurement alliance made up of the Nuclear Decommissioning Authority (NDA), its subsidiaries and site licence companies; Direct Rail Services, International Nuclear Services, Radioactive Waste Management, Dounreay, the Low Level Waste Repository, Magnox and Sellafield Ltd, as well as the National Nuclear Laboratory.

LZ: Why was it formed?

JE: Our collaborative procurement programme focuses on procurement sourcing shared requirements across the NDA estate, such as facilities management, travel booking, IT services and radioactive waste management.

The alliance members spend around £450 million each year through these collaborative contracts – that is 25% of the NDA's annual supply chain spend of £1.8 billion.

We were formed in 2010 to deliver savings by bringing people together from the alliance member organisations to identify how we could add value and save taxpayer money by purchasing the common goods and services we need together. This approach has already achieved savings of £286 million.

LZ: What is next for the alliance?

JE: We want to build on the success that we have achieved by taking steps to enhance our cross-estate network. To do this we must implement a new delivery model.

The new model will help sustain and grow savings, enabling us to achieve a further £175 million of cashable savings by 2020 through new collaborative sourcing strategies, while working to improve and simplify the way we procure. We want to; reduce the cost and complexity of supplying to the estate to make us a more attractive client.

LZ: How will the new 'delivery model' work?

JE: We are bringing together a full time team of 16, who will lead the delivery of the Collaborative Procurement Programme. The team is a mix of existing people from within the estate and new recruits.

We're utilising a category management approach across the alliance's shared areas of spend, covering six collaborative categories; People, Buildings, Technology, Corporate, Operations and Nuclear.

Each category will have a cross estate team to work with the alliance network on the full procurement lifecycle; developing the category strategy, strategic sourcing to establish new routes to market, undertaking supply management activities on live contracts and working with the alliance members to complete business change projects to unlock new opportunities.

We are also broadening the alliances remit to include leading improvement projects across the entire estate, such as integrating and standardising procurement processes or developing simplified terms and conditions.

LZ: What difference do you hope the model will make?

JE: We have always operated as a voluntary network of people across the estate, who often support the alliance on top of their day job. We can only take this arrangement so far. The biggest difference will come from having full time specialist capability dedicated to shared services procurement.

The new model will focus on wider range of opportunities, looking at how we can standardise our requirements to allow suppliers to deliver more efficient services to the estate, understand our demand better to make firmer commitments to suppliers on quantities and work, together with the supply chain to introduce new ideas that will make services more integrated and effective for us to use.

LZ: How will these changes benefit the supply chain?

JE: We want to deliver a change in how we engage with the supply chain. Thinking differently and embracing supplier innovations will help us identify new solutions to contribute to savings by changing the way our businesses buy and use shared services.

With nine alliance member companies, we have developed many

different ways of doing things to achieve the same outcomes. Feedback from suppliers is often that we are too complex and difficult to supply to. We need to work together to be a more integrated client.

For example, we will improve the pre-qualification questionnaires we ask suppliers to complete as part of the tendering process. By agreeing a single set of questions for all the essential elements we need to cover, such as safety management or financial health, we can publish a common question template through our existing estate wide online tendering tool. Suppliers will only need to answer these questions once to be able to use their answers in any tender responses across the estate.

This reduces the burden and time spent by suppliers on tendering and makes it easier for smaller companies to participate in the process. It's all about removing barriers so more suppliers can get involved and we can realise the benefits from new ideas.

LZ: What do you think are the biggest challenges for the alliance?

JE: Our ultimate challenge is how to make savings for the NDA estate. We've done well so far by pooling our requirements and using our combined buying power. Now we have to go further and look for other opportunities from collaboration. We'll need to challenge ourselves and look at how we shape, structure, simplify and standardise our requirements, ensuring the service levels we specify and the standards we set are proportionate to what we are buying.

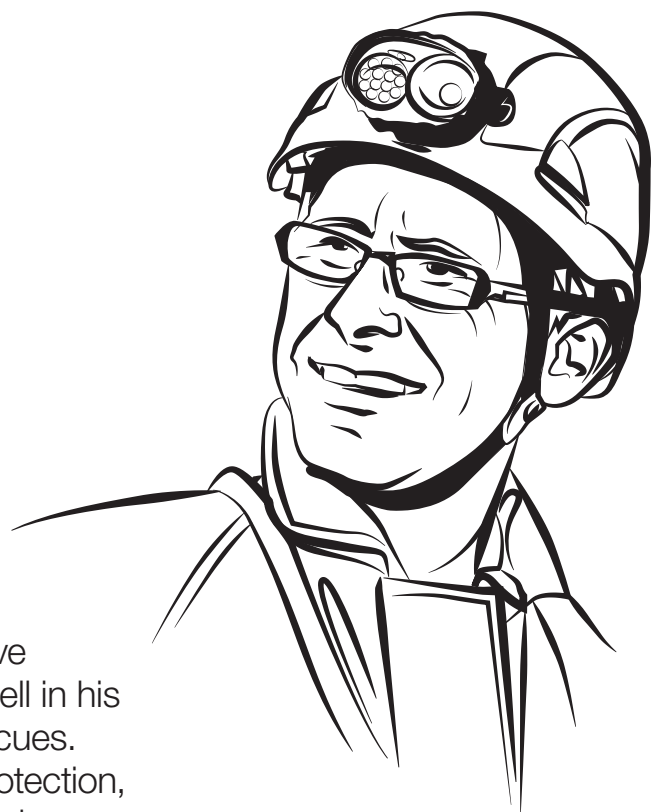
The alliance is made up of a diverse mix of businesses with different missions, lifecycles and sizes, yet we do need many of the same goods and services to function. We must recognise our differences as well as our similarities and focus on areas where it makes sense to collaborate.

It is about being pragmatic and not aiming for perfection. Even small improvements can make a significant difference to both us and the supply chain.

This won't be easy but by working together we can deliver value through collaboration.



Julian Carradice



A questioning attitude and commitment to safety serve Sellafield environmental manager, Julian Carradice, well in his day job and his volunteer role in emergency mine rescues. We sat down with him to talk about environmental protection, doing drop tests with 100kg dummies, and how he balances a full time career with community volunteering.

Your day job is environmental protection at Sellafield, Julian. What does that mean?

Sellafield is a surprisingly diverse and very complex site, so there are lots of aspects to environmental management that some people might not be aware of, or even heard of for that matter. It certainly isn't just about plants and trees.

It involves managing radioactive and non-radioactive waste and discharges. We have a duty and responsibility to reduce any potential health and environmental risks wherever and whenever possible. We take that responsibility seriously.

Even in my previous role as a manufacturing support manager I was exposed to Sellafield's commitment to safety and environmental protection, so much so that when I started studying for an environmental diploma at the University of Manchester I was surprised at how much I already knew.

What does an environmental manager at Sellafield do?

My role covers environmental protection across the business, but particularly to our site laundry, analytical laboratories, utilities, sewage plants and any other areas where environmental impacts could occur.

Nuclear is rightly a very highly regulated industry and we have to comply with a range of rules and regulations across our operations. We have an obligation to comply with environmental protection legislation and

discharge permits for both radioactive and non-radioactive aerial, liquid and solid wastes.

Part of my job is to give advice to the business to make sure that everyone understands and follows these rules. When I'm not reading rules and regulations, I'm checking them.

When you aren't at work you can be found helping with emergency mine rescues. That sounds pretty dangerous?

It is a high risk job as the rescues are often in environments with potential for low oxygen levels, unstable false floors, loose rock overhead, flooded passages and work at height, so safety is paramount.

My roles at Sellafield and mine rescue have developed skills that I can transfer between the two roles; doing dynamic risk assessments, having the confidence to only do tasks that I have been properly trained for and have respect for hazardous environments. Using the right equipment to protect ourselves is also something that I use in both my day job and in mine rescues. Taking undue risks isn't good for me or the people that I am trying to rescue.

So our safety culture helps you in your mine rescue role, are there any skills that you have developed in your volunteer role that you have then been able to use in your day job?

Yes, actually. Probably more than I realise. When I was a manufacturing support manager, I helped to design and manufacture Windscale suits, or 'air-fed suits' as they are known today. One day we came across a bit of a challenge. We had to manufacture an air-fed suit that could be used when working at height on some of our decommissioning projects. The suit had to work with and around all sorts of equipment like harnesses and lanyards which made it challenging to say the least. If we had no experience behind us it would have been even more difficult, but I was able to use my knowledge of fall arrest systems, peak forces and impacts from climbing and mine rescue experiences.

How do you balance a full time job with a volunteer role that could call on you at any time of the day or night?

The company is hugely supportive of everyone who volunteers for emergency services. When we get a call, it's not always convenient for the business – let's be honest, it's probably never convenient for a member of staff to suddenly leave work – but Sellafield clearly recognises the importance of the work that community volunteers do and willingly allow us to commit to the service.

If it wasn't for the flexibility we've been given, lots of emergency service volunteers unfortunately wouldn't be able to commit to these roles, so it's a big ask, and one which we all really appreciate. ■

Sellafield

NEXT ISSUE

Issue 06
February 2017

In focus:

Thorp

Transforming Sellafield:

The site's
changing mission

New build:

Waste store
takes shape

End of an era

Decommissioning the Windscale Pile Chimney

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