NATIONAL NUCLEAR LABORATORY

innovate

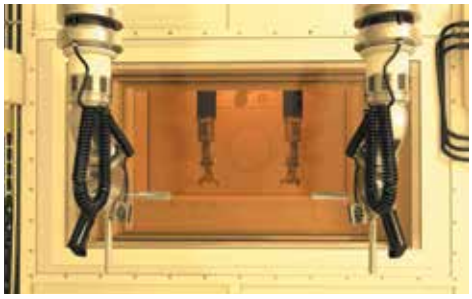
ISSUE 4 DECEMBER 2013

Major Facilities Investment for NNL

Energy Minister Michael Fallon appeared before the House of Lords Science and Technology Select Committee in December and made some important and positive announcements that affect NNL.

- Nuclear Innovation and Research Office (NIRO)
  A contract has been finalised to enable NNL to host NIRO. Initially, NIRO will be made up of a small core team supplemented by secondments (please see separate article on page 15).
- Central Laboratory Phase 3
  The Phase 3 (high active cells) project has been awaiting a decision on commissioning and Michael Fallon has announced the go-ahead. This will open up opportunities to develop high end nuclear R&D skills and the potential to reduce decommissioning costs through further R&D. Government will provide around £5 Million to NNL to commence the commissioning process.
- Nuclear Fuel Centre of Excellence (NFCE)
  Government is committing £8 Million to establish the NFCE, the latest in a number of R&D facilities needed to support industry and academia across the entire nuclear sector. The funding will provide shared equipment at NNL's Preston and Central Laboratories and facilities operated by the University of Manchester including the newly opened Dalton Cumbrian Facility.
- Early Nuclear R&D Programme
  There will be a £1.5 Million investment in an early nuclear R&D programme for this financial year (2013/14). This work will be carried out by NNL for Government.

These announcements are great news and represent major steps in cementing NNL's role at the heart of the UK's nuclear industry.



Technology Demonstration Day

NNL has hosted a Technology Demonstration Day at the Workington Laboratory. The event enabled customers, suppliers and other stakeholders to meet a range of representatives from various companies, preview technologies and discuss potential solutions to challenges.

Other companies demonstrating at the event included NBC Group, Qinetiq, Blue Bear, Igloo and Proxdynamics.

NNL Workington provides non-radioactive engineering and rig testing services. The facility carries out essential work on behalf of customers and supports the safe and effective operation of remediation and decommissioning activities at Sellafield.

Contents

NNL operates at six locations in the UK:

Sellafield, Cumbria
Workington, Cumbria
Preston, Lancashire
Warrington, Cheshire
Harwell, Oxfordshire
Stonehouse, Gloucestershire

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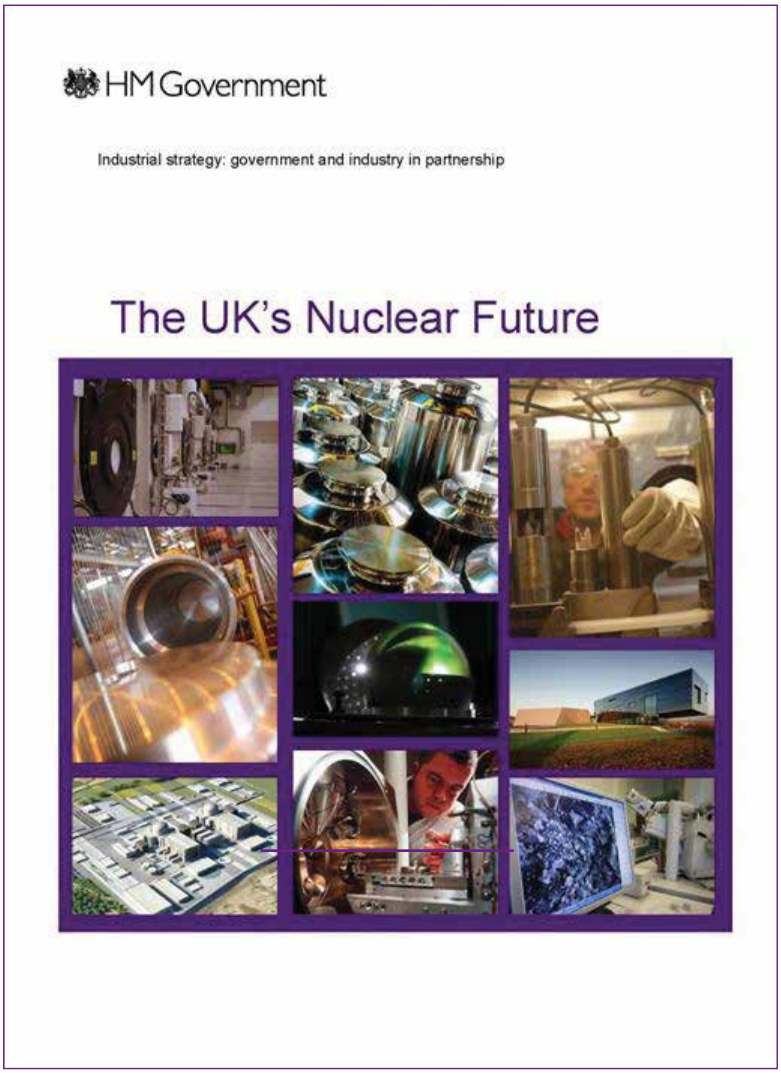
All Systems GOGO

Confirmation of NNL's transition to Government Owned, Government Operated (GOGO) governance arrangements came on 1st October with immediate effect. This brings to an end the stewardship of the NNL business by the SBM consortium. SBM comprises Serco, Battelle and The University of Manchester and has managed the operation of NNL since 2009.



The change in arrangements first emerged as part of the Government's Nuclear Industrial Strategy earlier in 2013 although at that time the exact timing of the transition was not specified.

NNL has acknowledged the very considerable contribution made by managing contractor SBM in transforming the Laboratory during its stewardship since 2009.

Commenting on the announcement, NNL Chairman Richard Maudslay said: "NNL has made tremendous progress during the four and a half years since the company was created in its present form. We now operate on a fully commercial basis, carrying out work that is essential to our diverse range of customers.

"We will continue to use our technical skills and experience to best meet their needs. And of course we will continue to maintain our strong focus on safety and security – both of which are of paramount importance in this sector."

NNL Managing Director Paul Howarth added: "We are entering a very exciting stage of our evolution. As we move forward we can build on the progress already made to capitalise on a wide range of opportunities ahead.

"We have the chance to be at the heart of Government's plans for a national programme of nuclear energy R&D. We are also central to the research and development which underpins work to clean up the UK's nuclear waste legacy at sites such as Sellafield.

"In addition, we have major opportunities within our grasp both to refurbish our existing facilities and to commission new ones. Once that work is complete we will host some of the finest nuclear R&D laboratories anywhere in the world. Add this to all of our commercial work and our closer relationship with Government and the future for NNL has never looked brighter."

NNL Welcomes Hinkley C Agreement

On 21st October, EDF Energy announced that agreement had been reached with UK Government on a 'strike price' for the proposed new power station at Hinkley Point C in Somerset. EDF Energy is one of NNL's biggest customers and we were one of a number of companies to welcome this important step forward.

NNL Managing Director, Paul Howarth, said:
"This announcement is great news for the whole industry. The world nuclear market already recognises the extensive capability which the UK has across the fuel cycle, from enrichment and fuel manufacture, through the operation of our existing fleet to waste management and decommissioning.

"All underpinned by our recognised expertise in R&D, skills development and regulatory oversight. Adding new nuclear build to the picture really means we can tick virtually every box, and that puts the UK even more sharply at the forefront of global nuclear development.

"It also serves to further underline the vast range of opportunities in the nuclear sector for young people making their career choices. We look forward to working with EDF Energy and their supply chain to help make Hinkley Point C a reality."

NNL and the Dalton Cumbrian Facility

The official opening of the Dalton Cumbrian Facility (DCF) has taken place. DCF is part of the University of Manchester's Dalton Institute and is expected to bring world-leading academic research in nuclear energy to a region that already includes NNL and the Sellafield site.

DCF will have pioneering academic access to NNL facilities at the Central and Workington Laboratories. NNL and DCF are exploring every available opportunity to collaborate and both organisations are core contributors to the new National Nuclear Users Facility, announced as part of the UK Government's Nuclear Industrial Strategy.

Steve's American Adventure

NNL Business Manager Steve Thomson has been asked to participate in a very influential review board, examining waste treatment at the Hanford site in the USA.

A contract has been agreed to enable Steve to take up an invitation from the USDOE Office of River Protection (ORP) to take part in the Waste Treatment Plant (WTP) Executive Review Board. The WTP is being built at Hanford to treat waste stored in underground tanks. The waste will be retrieved, conditioned and turned into a glass based product.

Steve heads up the Waste Behaviour and Materials team in the NNL Waste Management and Decommissioning business. He brings great experience of high active waste management from the Sellafield site in the UK. USDOE have set up five multidisciplinary review teams to look at a number of aspects of WTP.

These include 'black cell' operations and erosion/corrosion studies. The teams report into the Executive Review Board of which Steve will be a part. The purpose of the Board is to provide expert oversight and governance for the multidisciplinary teams.

When it is completed, the WTP will retrieve and process around 56 million gallons of radioactive and chemical waste currently stored in 177 legacy tanks. WTP is one of the USDOE's most technically challenging clean-up projects taking up a construction site spanning 65 acres.

DSRL Deal Completed

NNL has signed a major contract with the Dounreay (DSRL) site in East Scotland to process several tonnes of uranium carbide fuel. DSRL is responsible for the clean-up and demolition of the UK's former centre for fast reactor research and development. At around £750k, the new deal represents NNL's biggest single piece of work for Dounreay.

Initial pre-treatment of the material will be carried out in the Central Laboratory, while the main processing will take place in the Preston Laboratory.

Welcoming the new deal, NNL's Waste Management and Decommissioning Director, Nick Hanigan, said: "This is excellent news for NNL as Dounreay is the second largest decommissioning market in the UK.

"We are pleased to have the opportunity to work with DSRL in this way and hope to have further discussions on other ways in which we can help them meet the challenges of accelerating the site's decommissioning programme."

NNL's Business Leader for Waste Management Technology, Myrian Wood, signed the contract, with Charlie McVay, Dounreay's Project Director for Waste.

Space Batteries – NNL Secures New Phase

NNL recently presented the final results of a two year 'Space Batteries' development programme to the European Space Agency (ESA). The purpose of the programme has been to determine the technical feasibility and cost of separating americium from plutonium so that it can potentially be used to power space batteries.

The success of the project so far has led ESA to declare their intention to award further work to NNL. Progress to date has seen development of a chemical process flow sheet and examination of design and costs for a production plant to deliver on the scale required by ESA.

A small quantity of plutonium has already been used to separate americium and studies to examine the security, safety and environmental impacts expected for the final production plant have been completed.

Further work is expected to take another two years. This includes additional flow sheet development and increased quantities of americium will be processed. Pellets will be produced that could potentially be used in final batteries.

NNL has MEGAHIT

A host of representatives from the European space agencies and industries were hosted by NNL as part of the latest 'MEGAHIT' Steering Committee. NNL's involvement in the MEGAHIT consortium is as a direct result of space battery work being carried out for ESA.

MEGAHIT is funded by the European Commission under the 7th Framework Programme for Research and Technological Development. This is aimed at building a European roadmap for megawatt level nuclear electric propulsion. NNL has an increasing profile in the space community and received an approach to join MEGAHIT and lead on the nuclear side of the project.

Since any space reactor will be of an advanced design, NNL advanced fuels and reactor design expertise will provide an essential link between land and space based technology. As work package leader for the road mapping element of the project, NNL also has responsibility for delivering workshop output into a plan for further research.

Maintaining an External Focus

NNL has continued to keep a high profile at external events and had a strong presence at a number of high profile energy sector conferences during the latter part of 2013.

The Energy Business Opportunities (EBOC) conference was organised by Britain's Energy Coast Business Cluster and took place at Energus near Workington in Cumbria during October. The aims of the event included exploration of opportunities that exist as part of the development of Britain's Energy Coast and to raise awareness of the skills, products and services available in the region.

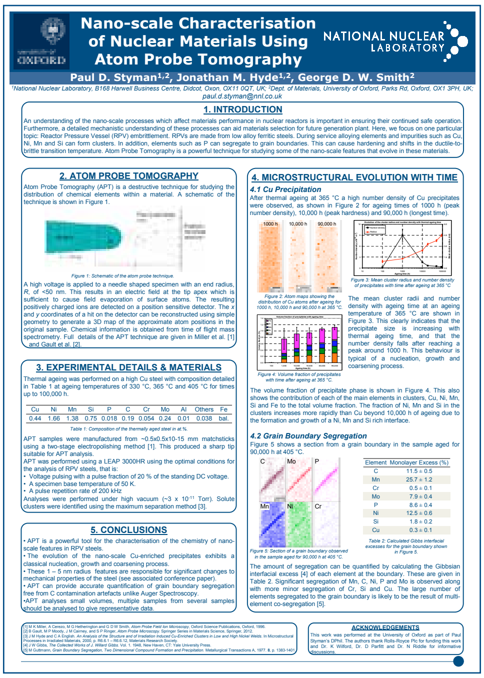
NNL also participated strongly in the inaugural Nuclear Institute Congress held in Manchester. Managing Director Paul Howarth chaired the Congress organising committee and NNL contributed throughout the programme and was a key sponsor and exhibitor. The Congress is viewed as a flagship event that brings together leaders from across the industry to address all aspects of the Government's Nuclear Industrial Strategy.

NNL celebrated success at the Congress winning the Young Generation Network (YGN) Best Poster Award (please see separate article on page 6).

Manchester was also the location for the Nuclear Decommissioning Authority (NDA) Supply Chain Event 2013. NNL exhibited as buyers from the supply chain and as sellers into the market. NNL made the most of opportunities to participate in 'Meet the Seller' and 'Meet the Buyer' sessions. There were further celebrations with NNL winning a NDA Supply Chain Award and also making the shortlist in another category (please see separate article on page 6).

NNL attended and exhibited at the Nuclear Industry Association's flagship Energy Choices 13 conference in London in December. The event highlighted the benefits that nuclear brings to the UK economy through current power generation, new build and decommissioning. Developments and updates from across industry were presented. The programme featured stakeholders, speakers and panellists from across all corners of the civil nuclear industry.

Victorious Poster Boys



NNL Harwell based Materials Research Scientist Paul Styman celebrated success at the recent Nuclear Institute Congress when he won the Young Generation Network (YGN) Best Poster Award.

Paul, and his colleague, Chief Technologist Jonathan Hyde, were victorious with their poster 'Nano-scale Characterisation of Nuclear Materials Using Atom Probe Tomography'.

Understanding the nano-scale processes affecting materials performance in reactors is important in ensuring continued safe operations.

Paul and Jonathan's poster focused on Reactor Pressure Vessel (RPV) embrittlement.

The YGN is a group created by the Nuclear Institute to offer the opportunity for younger members to further their knowledge and create greater networking between the generations. It was founded 15 years ago and has over 1,500 members, including a number from NNL.

NNL Triumphs at NDA Awards

Now in its third year, the Nuclear Decommissioning Authority (NDA) Estate Supply Chain Event 2013 took place in Manchester during November. NNL was among the exhibitors and sent a strong delegation. The event is a combination of informal networking, seminars, presentations and exhibitions.

NNL had great success in winning a NDA Supply Chain Award during the event and also made the shortlist in another very competitive category. This added to the interest in NNL and the exhibition stand was very popular among delegates.

NNL won the award for:

'Best Innovative Solution from a Larger Supplier'

The award was presented to Graham MacKay and Steve Parkin, members of the Particle, Sludge and Slurry Science team in the NNL Waste Management and Decommissioning business.

Steve and Graham's award winning project has produced the test sludges being used to underpin process development for the new Sellafield Direct Encapsulation Plant. The team has delivered non-radioactive replicated sludges using legacy magnesium metal obtained from Westinghouse. They also used equipment recycled from other projects and second hand purchases from other industries.

This resulted in a cost saving to the customer, Sellafield Ltd, of over 60%.

Also shortlisted was the NNL Vitrification Test Rig (VTR) for its support to Sellafield Ltd. Led by Julian Roe, the team is also part of NNL's Waste Management and Decommissioning business and was nominated in the category:

'Best Example of a Supplier Going the Extra Mile'

The VTR has demonstrated exceptional commitment to the operation of the Waste Vitrification Plant (WVP) at Sellafield. WVP processes high level waste into a glass based matrix designed for long term storage. The NNL VTR team is renowned for providing expert support, rapid response and problem resolution often at short notice.

More recently, their technical support was fundamental in maximising WVP melter lifetimes. This resulted in a world-beating 438 melter pours being achieved earlier this year. Longer melter lifetimes reduce major site hazard and have the potential to make very significant cost savings over the remaining lifetime of WVP.

In the Media

NNL has again attracted considerable recent interest from the media. We like to think this is a sign that we are doing things right and presenting opinions that people find interesting. Selected highlights of our media coverage are:

Channel 4 News

A crew from Channel 4 News visited the NNL Central Laboratory and filmed in the Plutonium and Minor Actinides (PuMA) facility. Opened in 2010, PuMA features equipment that runs experiments with greater quantities of civil plutonium than any other research laboratory of its type in the UK.

Channel 4 News was keen to film workers handling plutonium as part of a piece discussing disposition options. The crew conducted an interview with NNL Laboratory Manager Des Wright.

BBC World News

NNL Fuel Cycle Solutions Director Fiona Rayment was interviewed on BBC World TV by environment analyst and reporter Roger Harabin. The interview complemented an article discussing thorium fuels that appeared on the BBC News website.

Interest in the thorium fuel cycle has grown notably in recent years. NNL has published an independent review of the thorium fuel cycle in a position paper. The review highlighted strengths and weaknesses in a UK and global context.

Daily Telegraph

NNL External Relations Director Adrian Bull took part in an interview with Mike Hanlon a freelance science journalist writing for the Daily Telegraph. Mike was preparing a piece about new reactors being planned in the UK.

The article, 'Why Britain's New Reactors are Old-Fashioned', appeared during November and featured Adrian explaining why investors in nuclear plant prefer to use tried and tested technology from a project risk perspective.

Prestigious Prize for NNL Geologist

NNL Research Fellow Nick Smith has been awarded a prestigious four year Industry Fellowship by the Royal Society. Fellowships are awarded to scientists for work on a collaborative project with an academic organisation. Nick's Fellowship is hosted by The University of Manchester and will fund 50% of his research time.

Nick's primary focus is the fundamental and applied research into remote 2D and 3D laser-based characterisation techniques in the nuclear industry. Future research will be carried out at the NNL Workington Laboratory and has significant potential to solve key characterisation challenges.

Reflecting on his award, Nick said: "I consider the award of this fellowship a huge honour both personally and for NNL. "I very much look forward to working with The University of Manchester and the Royal Society over the next four years."

A Chartered Geologist and Fellow of the Geological Society, Nick is NNL's lead geologist. He also holds visiting research/teaching roles at three UK Universities and membership of the European Federation of Geologists and the European Geosciences Union.

Keith Bowls Them Over in Japan

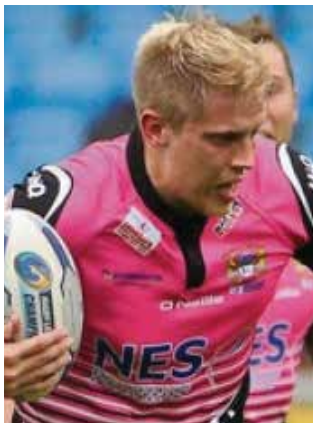
Former NNL Business Leader Keith Franklin is providing key support to the British Embassy in Tokyo via a long term secondment. Keith's role includes the provision of technical advice and support following the 2011 earthquake and tsunami and the impact on the Fukushima Dai-ichi nuclear power station. Keith's continuing presence and contribution in Japan has been a major positive for NNL and the UK.

While the majority of Keith's work is serious and technical, he recently lightened the mood by organising an event of a sporting nature. His prompting saw a team from the Embassy take on a Tohoku XI, including members of the Japanese national side, in a cricket match.

The dramatic international sporting occasion was played out on a baseball pitch in the town of Minamisoma, part of which falls just within the 17-mile exclusion zone around the Fukushima Dai-ichi plant.

The match received widespread publicity, including a feature in the UK Sunday Telegraph and 'The Cricketer'. It was an important step in helping to show the international community how areas close to Fukushima Dai-ichi are safe to visit and are slowly returning to normal life.

NNL's World Cup Brothers



It's unusual and a great family honour to have brothers selected to represent their country in international team sport. The Phillips brothers, who both work for NNL at Sellafield, became the latest having joined up with the Scotland squad at the Rugby League World Cup.

Brett and Callum are electrical and instrumentation craftsmen on the same NNL engineering team. They are also semi professionals at local team Workington Town. Workington play in the Kingstone Press Championship, which is the second tier competition operating below Super League. Older brother Brett plays second row while Callum plays hooker or half back.

Scotland began with a win and a draw in their first two Group C games. The team defeated Tonga 26-24 in a close game before finishing all square with Italy 30-30 in an exciting encounter. Both matches were at home for the brothers, taking place at Derwent Park, the home of Workington Town.

For the game with Italy, the squad received a rousing welcome and a full house in a region that has a great appetite for the game. Scotland then moved on to Salford for their next game with the USA and found themselves 8-0 down at half time. The team rallied to score 22 second half points with Brett claiming his first try for his country to begin the fight back. It was his first start in the tournament having been a replacement in the opening two games.

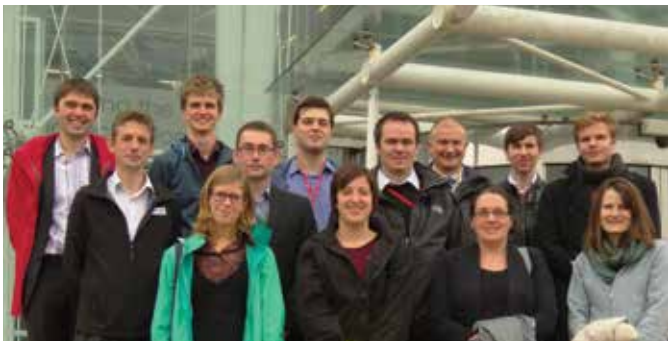
Finishing top of their Group meant the Scots moved into the quarter finals and a match against defending world champions New Zealand. There was no fairytale ending unfortunately as the Kiwis secured a semi final place with a 40-4 win. Although disappointed with the result, Brett earned another start and gained more valuable game time against top class opposition.

While Brett has been involved on the pitch, younger brother Callum gained valuable experience from being part of the squad. Both brothers have been playing the game from a very early age starting at Seaton Rangers amateur club. They had glittering amateur careers progressing to British Amateur Rugby League (BARLA) international tours. Their eligibility to play for Scotland came via their grandfather.

Bursary Students

NDA
Nuclear Decommissioning Authority

NNL carries out industrial supervision of funded bursary PhDs on behalf of the Nuclear Decommissioning Authority (NDA).



NDA has funded bursaries for several years and the scheme is part of an overall University Interactions Programme. Each year, an open call for proposals is made to Universities and research institutes to a value of £500,000 to encourage research projects. This typically funds around half a dozen PhD projects each year.

In addition, NDA funds a number of PhD Case awards. There are currently 40 students at various stages of their PhD. Project topics have been split up into five subject areas:

- Waste Characterisation
- Waste Packaging and Storage
- Land Quality
- Decommissioning
- Spent Fuel and Nuclear Materials

NNL provides a tailored programme of expert and specialist industrial supervision of the NDA PhD portfolio. In addition, NNL arranges visits for each of the five research theme groups to a nuclear site.

Sessions have already taken place at Sellafield covering Spent Fuel and Nuclear Material and Waste Characterisation. The six students working on Characterisation were joined in their visit by contributors from NNL, Sellafield Ltd, Low Level Waste Repository Ltd and NDA.

NNL People: Sarah Harris

With the profile of nuclear generated energy making the news and enjoying a comeback in the UK, NNL continues to provide key services to already operating nuclear power stations.

The Reactor Operations Support (ROS) business is made up of several key teams, each providing products to customers that support safe ongoing operations. Within ROS, the Reactor Chemistry and Materials (RCM) team is a major contributor. Led by Business Leader Sarah Harris, the team provides support to the UK's fleet of seven Advanced Gas-Cooled Reactor stations, the Pressurised Water Reactor at Sizewell and Britian's last remaining Magnox station at Wylfa.

"We operate a compact team of 23 people across two sites at Stonehouse in Gloucestershire and Harwell in Oxfordshire," said Sarah. "Our main customers include nuclear power station operators EDF Energy and Magnox Ltd. It's extremely important that the existing stations operate as efficiently as possible."

Key Customers

EDF Energy operates AGR and PWR stations in the UK, while Magnox is responsible for the station at Wylfa. Magnox has a number of other reactors at various stages of decommissioning.

"Our other key customers include the Electric Power Research Institute (EPRI), Sellafield Ltd, AMEC and Rolls-Royce," said Sarah.

EPRI conducts research, development and demonstration to support the generation, delivery and use of electricity. Rolls-Royce leads on nuclear propulsion for the Royal Navy submarine fleet and AMEC is a partner to utility companies involved in new nuclear build and the refurbishment of existing sites.

Keeping the Lights On

The RCM team contributes chemistry based services for reactors.

"We provide advice on gas coolant composition as well as carrying out modelling for gas and water cooled reactor radiation chemistry and corrosion. We have experience in providing cost-effective, timely support and solutions to power station aqueous chemistry and corrosion problems." said Sarah.

"We conduct corrosion studies on the materials used to support the structural integrity of reactors. It's a significant contribution towards making sure safe and efficient operations are maintained."

There's also other work supporting the Post Irradiated Examination (PIE) of reactor fuel and components and the team works with the NNL Windscale Laboratory at Sellafield.

"We work closely with the PIE team at Windscale," said Sarah. "RCM has unique knowledge and experience of the behaviour of graphite in reactors."

Windscale is equipped for destructive and non-destructive analytical work on reactor fuel and other components including graphite. "We make a strong contribution and we have formidable experience especially when dealing with graphite, the material that acts as a moderator in a nuclear reactor," said Sarah.

Strength in Depth

Stonehouse is located just off the M5 motorway in Gloucestershire and is only around half a dozen miles from EDF Energy headquarters at Barnwood. The NNL team has been located at Stonehouse since 2007. The move ended a presence at the Berkeley nuclear power station for NNL and its predecessors dating back over 40 years.

"We have very good people working as part of a committed team," said Sarah. "Stonehouse in particular is in an ideal location for meeting customers and the future is very bright."

Although based at Stonehouse, Sarah is a regular visitor to Harwell. "It's important that we're integrated as a team," she said.

"We value the contribution made by both sites. Each of our people is committed to the team. We've introduced new blood over the past few years and the team is benefitting especially when set alongside the vast experience we already have."

Mixing Technical and Business

Sarah is one of three Business Leaders in the NNL ROS business. Like her two colleagues, she leads an area that is self contained. "Business Leaders have overall responsibility for sales, proposals, technical delivery, project management and controls," she said.

She understands the technical challenges facing her colleagues having begun her career as a chemist. "I took a Chemistry degree at the University of Leicester and completed my PhD at Southampton.

"In 1998, I joined a small R&D company and conducted corrosion studies on Sea King helicopters. It was great experience but I realised I needed to work for a larger company to progress."

She arrived at British Nuclear Fuels plc (BNFL) in 2000 at Berkeley as an electro-chemist again working on corrosion studies but in a nuclear environment. She enjoyed a secondment at Risley before returning to Berkeley to work on stress corrosion cracking in long term storage containers. "That was a great programme," she said. "Challenging but rewarding."

She then became Deputy Team Leader in her current team before taking a career break when daughter Takara was born in 2006. She became Business Leader in 2012. "You feel a great responsibility for the people in the team. It's a real opportunity to pull a team together, make sure we do a good job and look forward with a strategy for growth."

The team has already been involved with the Generic Design Assessment (GDA) of new reactors on behalf of the Office for Nuclear Regulation (ONR). The work helps to make sure that any new nuclear power stations built in the UK meet the highest standards of safety, security, environmental protection and waste management.

First Day Meeting

A key meeting for Sarah took place in the gatehouse at Berkeley site on her first day in the industry back in 2000. Her future husband Dion was also a new starter. Dion is now a Group Head at EDF Energy looking after Reactor Physics.

Taking up a career in science means that Sarah is something of a pioneer in her family. Originally from Stoke–on-Trent, her dad was a butcher and her mum a cashier. Away from work and family, she enjoys keeping fit. "My thing is stationary biking." She has done 'proper' biking too having cycled across mountainous Switzerland and also in Turkey in a real heat wave.

Did she have any interesting jobs as a student that put the pressures of being a Business Leader in NNL into perspective? "I was a 'Sponge and Fettler' in the pottery industry as a teenager," she recalls. "It was my job to make sure the fired plates had smooth edges and all blemishes had been removed from the surface. Now, that was HARD work but still a great experience!"

Making Productive Visits

Linking effectively with academia is becoming increasingly important for NNL. By working collaboratively with Universities, NNL is supporting the development of better technical skills and relevant academic research.

Experimental work in the Universities helps to investigate basic science and conduct smaller scale research to establish proof of principle. NNL can then move the science forward to laboratory scale research, development and testing and convert principles into proven technology to be deployed into the industry.

NNL has been making expertise available to the Universities over the years. Chief Technology Officer Graham Fairhall is a Visiting Professor with the Dalton Nuclear Institute at The University of Manchester.

A further Visiting Professorship has been announced with Dalton. Robin Taylor (left), NNL Senior Research Fellow for Actinides, has taken up the position and is aiming to develop a joint research group made up of students and NNL people based in the Central Laboratory.

NNL has also announced that Engineering Design Manager Paul Scully is a new Visiting Professor at Strathclyde University. Paul will contribute expertise on plant and process for students.

Colette's Middle Eastern Award

Hosted by Baroness Symons, the Middle East Association's Women in Business Awards are growing in stature and became a personal triumph for Colette Grundy, NNL Principal Scientist in Safety Management.

Colette was nominated for her technical work in leading a workshop on the safety of nuclear reactor designs held in Jordan earlier this year. She was placed in the top three women who have made a significant contribution to the development of business between the UK and the Middle East and Africa.

Colette was presented with a certificate by Foreign Office Minister Alistair Burt. Her winning nomination highlighted her leading role in the development of nuclear energy in Jordan. She has been advising about the safety of nuclear reactor designs and led the three day technical workshop for senior Government officials in Amman.

Her role has seen her advising on nuclear reactor safety requirements and regulation to provide assurance on the safety of any new nuclear reactor designs planned to be built in Jordan. Colette also had input into how members of the Jordanian public may be consulted on nuclear safety.

Her advice has made an important contribution to the long term safety of nuclear energy in Jordan. Congratulations to Colette as she continues to build her reputation as a respected nuclear scientist who has helped considerably to raise the profile of women in the nuclear industry.

Best Summer Placements

Young people from Cumbria, Scotland, London and Hertfordshire returned to school after the summer break with NNL's celebrated work experience course under their belts. The success of the programme, led by Corporate Social Responsibility Co-ordinator James Murphy, resulted in a detailed feature in the Cumbria Newspapers Education Supplement.

NNL placements are designed to meet the tailored needs of each student and are proving extremely popular with young people, parents and schools. Plans are being developed to take it out to areas surrounding other NNL sites around the country. The programme is managed by James, who is based in West Cumbria and works in the Central Laboratory.

He said: "We understand how important it is for young people to have work experience, which meets their individual requirements and, for us, persuades them that science, technology, engineering and maths can form the basis of a fulfilling and fascinating career.

"Even if these young people don't eventually join NNL, we hope their experience will help to draw them into other technology-based industries and it's particularly satisfying when they are able to join the nuclear industry."

The programme begins with an induction day that highlights principles of safety, radioactivity and how to behave in the environment of a nuclear research and development laboratory. Then on day one, students move into their chosen field of interest where they can, under supervision, watch or take part in real experiments in NNL's non-radioactive laboratories and see and use equipment that is not available in school.

Lee Fox, a pupil at St Benedict's school in Whitehaven, took the engineering option. He said: "I decided I wanted to have engineering work experience after attending an Engineering Awareness Day and seeing what opportunities were available.

"I managed to arrange a placement and spent two weeks working with the electricians and fitters. It was really enjoyable and gave me a range of experience in engineering and in what NNL can provide. I hope now that I can take up a craft apprenticeship when I leave school."

Andy Royle, Engineering Technology teacher at St Benedict's said: "Well planned work experience is extremely helpful to students on the verge of deciding their future careers. It was an opportunity I missed when I was at school and I'm really pleased for students like Lee who have an opportunity to spend time with companies like NNL."

While the majority of the students came from West Cumbria, others travelled from the north and east of Cumbria and from south-west Scotland, Hertfordshire and London.

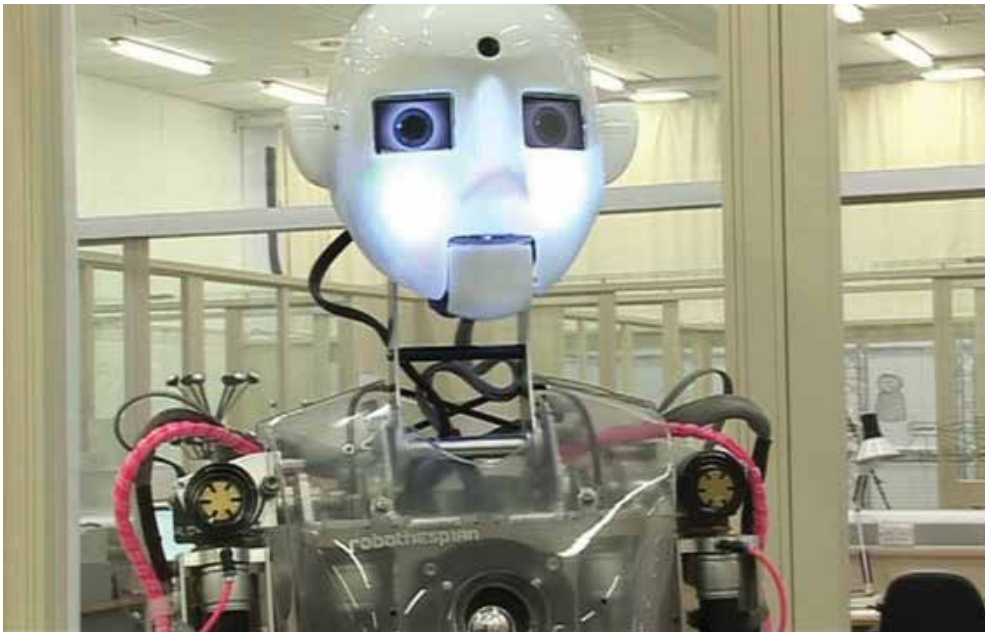
NNL People Services Director Liane White said: "The fact that families will make the journey to West Cumbria, in some cases spending part of their summer holidays here, so that their children can have experience in NNL speaks volumes about the quality of the programme which has been developed in West Cumbria, and especially the effort which James has put into it."

Updating the APPGs

Made up from politicians representing all of the main parties, All Party Parliamentary Groups (APPGs) meet together on a relatively informal basis to discuss matters of interest or concern. They are a means of bringing parliamentarians and interested stakeholders together on a reasonably regular timescale.

The APPG on Nuclear Energy recently hosted NNL MD Paul Howarth (above) and Dalton Nuclear Institute Director Andrew Sherry. Paul and Andrew made a joint presentation to update the APPG on progress with nuclear research. The presentation was well received with positive feedback. The strong turnout featured industry colleagues, including NNL customers and a number of MPs and peers.

Head of External Relations Adrian Bull spoke at the Engineering APPG about the nuclear industry. Adrian appeared with representatives from the wind and fracking sectors in the House of Lords. The event attracted students and recent engineering graduates as well as representatives from industry and the political parties.



NNL Hosts 'Robotics for Nuclear'

Knowledge transfer is critical in enabling businesses to be at the forefront of technology and innovation. Knowledge Transfer Networks (KTNs) are a key means for doing this. They enable the innovation communities to connect, collaborate and find out about new opportunities in key research and technology sectors.

NNL was pleased to host a KTN event themed 'Robotics for Nuclear' during November at the Bristol Robotics Laboratory (BRL). A leading academic centre for multi-disciplinary robotics research in the UK, BRL is a collaborative partnership between the Universities of the West of England and Bristol

BRL is home to a vibrant community of over 100 academics and industry practitioners. This group leads current thinking in service robotics, intelligent autonomous systems and bio-engineering.

Robotic innovations are of great interest to the nuclear industry as work is frequently conducted remotely. Bob Bowen from the NNL Remote Engineering Team was among the speakers at the event.

Bob and the NNL team are involved with the design, development and deployment of purpose built, remotely operable intervention systems. These are deployed in active nuclear plants and facilities. The team also provides remote handling and robotics support, including design and development, to pre production plants and is involved in decommissioning and site remediation.

At the KTN event, Bob discussed the nuclear specific challenges associated with tele-operations. His wealth of hands-on experience on Sellafield site provided a particularly useful insight to delegates hoping to enter the nuclear market but have little or no experience of the challenges to be overcome.

Overall, the day proved very successful in linking representatives from facilities across the UK with representatives from Small to Medium Sized Enterprises looking to solve the challenges which must be met before robotics can be more widely applied in the nuclear industry.

It presented a tremendous opportunity to network in a vibrant scientific venue. The BRL facility covers an area of over 3,000 square metres and accommodates specialist workshops, wet laboratories and two flying arenas with multiple 3D motion capture systems.

Robert's Fast First Year

It's been quite a first year with NNL for Robert Alford. A new starter on the graduate programme in August 2012, Robert soon settled into the Chemical and Process Modelling team at Warrington. He also made quite an impression on the NNL Corporate Responsibility programme.

The newly graduated chemist has already added to his early experience by taking up a secondment in the Particle, Sludge and Slurry Science team based in the Workington Laboratory. The secondment is about to become a permanent move although he will be maintaining strong links with his former team by continuing to undertake chemistry based modelling work.

Robert's role at Workington supports clean up activities on the Sellafield site. He is involved in inactive trials that underpin the application of technologies at the site. In his first year, he has been an enthusiastic contributor to the NNL Corporate Responsibility programme which saw him win an internal 'IMPACT' Award earlier this year.

He has frequently demonstrated his unique and entertaining 'Chemical Origami' technique that he developed with the Royal Society of Chemistry. Robert used Chemical Origami when mentoring students aged between 14 and 16 during the nuclear engineering courses that NNL runs with the Smallpeice Trust.

Robert has also participated in water rocket challenges with schools. Pupils construct rockets from items such as recycled plastic bottles, tennis balls and duct tape before launching them in a safe environment. He is keen to pass on his passion and enthusiasm for science and the nuclear industry as an active ambassador for both STEMNET and CHEMNET.

His hectic early career with NNL has also resulted in a nomination for the prestigious Nuclear Graduate of the Year Award run by the National Skills Academy Nuclear. Robert has been informed that he is one of the finalists for the award, which will be presented at a glittering Skills Academy Awards Dinner in Manchester next March.

Commenting on his first year, Robert said: "So much has happened since I came to NNL. It's been quite a year! I'm delighted with the opportunities and experience I've gained so far.

"I'm looking forward to maintaining a strong technical career and contributing to the success of NNL. Winning the IMPACT Award for Corporate Social Responsibility was a big surprise so soon in my career and the nomination for the Nuclear Graduate of the Year Award is a huge honour that I very much appreciate."

Nuclear Innovation and Research Office (NIRO)

The intention to set up NIRO, hosted by NNL, featured prominently in a number of key areas of the Government's Nuclear Industrial Strategy earlier this year.

NIRO is an important step towards a UK national programme for nuclear R&D. NNL has been working closely with Government over the past few months to agree details and the contract has been finalised.

NIRO will operate separately from NNL's commercial activities and will report into Government via the new Nuclear Innovation and Research Advisory Board (NIRAB). NIRO will be based at NNL Warrington.

Initially, NIRO will be made up of a small core team, which will be supplemented by secondments from across the nuclear sector including Government, industry and academia.

Two key leadership positions have been confirmed with Gordon Bryan (pictured) appointed NIRO Director and Andy Howarth Head of Technical Business Development. Gordon joins from NNL Strategic Business Development and Andy from the NNL Fuel Cycle Solutions business.

NIRO has a remit to:

- Advise Government and industry on nuclear innovation and R&D into future nuclear energy technologies
- Co-ordinate UK involvement in international nuclear programmes
- Ensure public R&D programmes align with industrial and energy policy aims
- Explore how funding can be secured, not only from Government, but also from the private sector, EU and other international organisations and programmes related to future nuclear energy systems
- Review at regular intervals the status of UK nuclear innovation and R&D

NIRO is expected to become quickly established and will make a vital contribution to the UK mission to build a coherent national programme of nuclear energy R&D.

Cycling to Prevent Broken Hearts

A perfect opportunity to keep fit and raise money for a tremendous cause inspired three NNL cyclists to stretch the lycra and take part in a moonlight bike ride.

Starting at the famous Trafford Centre in Manchester at midnight and finishing by the instantly recognisable Blackpool Tower, the event was lit up by the ever popular illuminations.

Anastasia Lloyd-Wallis, Jeremy Davison and Peter O'Brien took part to raise funds for the British Heart Foundation (BHF). The BHF is the UK's number one heart charity and aims for a world where people don't die prematurely from heart disease.

The generosity of NNL sponsors, family and friends means that the fabulous threesome made it 52 happy miles by raising a very impressive cash total of over £700.

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NATIONAL NUCLEAR LABORATORY

NNL is proud to be a member or partner in the following organisations: