

innovate

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NNL Technical Conference 2014

The inaugural NNL Technical Conference took place at the University of Manchester on Thursday 1st May.

The event was the first in a series of annual conferences organised as part of the strategy to raise NNL's scientific and technical profile and showcase capability to both an external and internal audience.

The conference featured an introduction from Managing Director Paul Howarth and was hosted by Chief Science and Technology Officer Graham Fairhall. An extensive programme of presentations covered each of the NNL Businesses and Corporate R&D. The NNL BEST Award announcement and presentation also took pride of place at the event (see page 15).

The keynote address was given by John Perkins, Chief Scientific Advisor at the Department for Business Innovation and Skills (BIS). Another guest external presentation came from Neil Smart, R&D Alliance Manager at Sellafield Ltd, who examined 'Future Opportunities for Nuclear Research Supporting Sellafield'.

Networking opportunities were included in the programme and delegates were given three votes each to nominate a winner in the NNL competition to find the best poster from over 20 entries. The winner was judged to be 'Spacecraft Power and Propulsion Systems' prepared by Zara Hodgson and Dave Ross.

Post conference feedback from delegates has been very good with some learning points for next time. Feedback confirmed that NNL's technical work was showcased across a wide range of areas and presented at the right level. If you did not attend, but would be interested in coming to next year's event please contact Peter O'Brien (peter.o'brien@nnl.co.uk) and we will send you the details.



Maintaining Standards

A rigorous independent assessment by Lloyds Register has been successfully completed to confirm NNL's continued certification to ISO 9001 (Quality Management) and ISO 14001 (Environmental Management) standards. The new certification covers a three-year period across all of NNL's sites. In addition, NNL has also been successful in achieving re-certification to the ISO 27001 (Information Security) standard. ISO International Standards ensure that products and services are safe, reliable and of good quality.



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NNL in Export Showcase

Earlier this year, NNL took part in a key UK Trade and Investment (UKTI) event for the nuclear sector. UKTI is a Government organisation, which works with UK businesses to secure success in international markets and also encourages the best overseas companies to look to the UK as their global partner of choice.



The showcase promoted the capability available in the UK's nuclear supply chain to senior decision makers from many important overseas markets. This presented a tremendous opportunity for delegates to hear from Government, policy makers and industry on a range of topics across the nuclear fuel cycle.

Over 200 UK delegates were joined by another 100 plus representing overseas markets including Bulgaria, India, Japan, USA, Vietnam, Turkey, Hungary, Russia, Slovakia, Malaysia, Saudi Arabia, Romania, UAE and South Korea. NNL fielded a strong team and provided an exhibition based around capability.

Following on, NNL also took an active role in another UKTI event – the Energy, Education and Training Conference. The UK's training and skills based export capability in the energy sector was examined and promoted.

NNL's participation in the 'All-Energy' two day event for nuclear professionals in Aberdeen also presented another great

opportunity to meet with UKTI advisors representing the Czech Republic, Turkey and Germany. UKTI will lead on various events over the coming months in each of the three nations with NNL supporting. At 'All-Energy,' NNL was involved in a UKTI presentation on 'Business Collaboration Opportunities between UK and Middle East and North Africa (MENA) Region'.



**UK Trade
& Investment**



Advanced Gas-cooled Reactors (AGRs) operated by EDF Energy in the UK use fuel manufactured at the Springfields site near Preston by Westinghouse (Springfields Fuels Ltd). The method used to cool operating AGRs can result in carbon being deposited on the fuel that affects

AGR Triumph at Preston

energy generating efficiency. NNL has been celebrating a successful conclusion to an intense programme of fuel modification work to trial a solution to the issue.

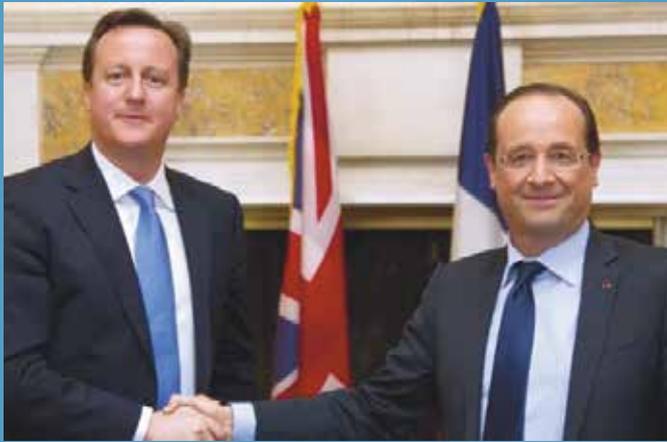
Work at NNL's Preston Laboratory saw receipt of pins from Westinghouse and the implementation of a manufacturing process to supply a large number of modified pins for a full reactor trial. The process involves the surface treatment of the fuel's stainless steel cladding. The Preston Laboratory has qualified a route for the handling and processing of pins, which is a significant new capability for NNL.

The required stainless steel coatings are produced by re-treating

cladding in an atmosphere based on hot hydrogen with added moisture. The NNL team optimised the furnace gas atmosphere to ensure a reliable process and collaborated closely with EDF Energy, Westinghouse and Birmingham University to selectively oxidise test pins to the required tolerance.

The project has required flexibility in working arrangements to meet all deadlines set to extremely tight timescales. There has been excellent team working at NNL Preston across various disciplines including support from engineering, craft, process operators, technical teams, safety, health physics, procurement and security.

French Connections



NNL has announced the signing of three ground breaking agreements with key French organisations – AREVA, CEA and EDF. The agreements were signed as part of the 2014 UK - France Summit and deepen and strengthen the co-operation and close working which already exists between the UK and France. These cover existing and advanced reactors and the development of fuel cycle technologies in support of energy and climate objectives. Details of the individual agreements are:

NNL/AREVA

Through a letter of intent, both organisations will work more closely together on developing nuclear fuel cycle technology, building on NNL's involvement in the UK's Nuclear Fuels Centre of Excellence. They will also collectively look at technologies to enhance existing plant lifetime.

NNL/CEA

Again through a letter of intent, the two organisations will build on an existing memorandum of understanding to enhance co-operation on advanced fuel and reactor technologies, particularly with regards to the ASTRID fast reactor.

NNL/EDF

EDF is keen to strengthen its existing collaboration with NNL and develop a strategic alliance on R&D. This will enable EDF to tap into NNL's scientific experience and excellence. EDF Energy will also expand its collaboration with NNL to include research, education and training for nuclear energy with a particular focus on the new build programme.



NNL Joins World Nuclear Association

NNL has become a member of the prestigious World Nuclear Association (WNA). With over 180 members in more than 35 countries, the WNA is the global trade association for the nuclear industry. Membership makes great sense for NNL as business is increasing in frequency with customers and research partners from outside the UK.

The Government's Nuclear Industrial Strategy made it clear that there is desire at the highest levels nationally for NNL to take a leading role on behalf of the UK in dealings with the worldwide nuclear industry. Membership of WNA is a central part of achieving this aim. NNL will work closely with colleagues in WNA to take plans forward in a number of different markets - both mature nuclear nations and those considering nuclear energy for the first time.



Working Safely Training Accolade



NNL has received National Skills Academy for Nuclear (NSA Nuclear) endorsement for its IOSH accredited 'Working Safely' e-learning course. To achieve the endorsement, the course had to meet Cogent industry standards and had to be supported by suitably qualified tutors.

The training was jointly developed by the NNL People Services and EHS&Q teams. It will be incorporated into the National Nuclear Skills Passport scheme led by NSA Nuclear. This means the training will be formally recognised by industry employers participating in the scheme. This excellent news means that 'Working Safely' will stand proudly alongside NNL's 'Security Awareness' training modules already included in the Passport.

The 'Working Safely' course has already been successfully delivered inside NNL and work is underway to convert the content into a product to be marketed commercially and sold via NSA Nuclear's new Online Learning Portal. The course is already mandatory for those NNL people not holding a higher level health and safety related qualification, such as IOSH Managing Safely.

Signature Success

By operating a successful Internal Research and Development (IR&D) programme, NNL is harnessing its own scientific and technical creativity. The programme is self-funded by NNL and leads to continuous improvement and the expansion of products and services for new and existing customers.



IR&D funding enables NNL to maintain its leading position in UK research. The overall programme features two strands: Entrepreneurial and Signature IR&D. Entrepreneurial work looks to develop new products and services while the Signature programme examines the projects that will enhance NNL's technical reputation and develop new capability. Signature work also looks to create opportunities for revenue growth and give NNL access to larger collaborative projects, such as research council programmes in collaboration with Universities.

NNL has also introduced a Strategic R&D self-funded programme area that complements Entrepreneurial and Signature research. The initial general themes for Strategic R&D will cover future nuclear energy and the fuel cycle.

More recently, NNL has showcased Signature Research by running two separate seminars before invited audiences. Seminar objectives included technical exchange between NNL and the University research community, knowledge sharing and improved awareness of the current impact of Signature R&D and its future direction.

The seminars featured question and answer panel sessions and technical networking opportunities. Poster viewings were led by Signature research supported students and provided an ideal opportunity for them to showcase their work.

The first seminar featured the 'Nuclear Energy' Signature programme. This has amalgamated two separate areas – 'Reactors and Fuels' and 'Spent Fuel and Nuclear

Materials'. Senior Technical Lead on 'Nuclear Energy' is Zara Hodgson. The second seminar featured the 'Immobilisation, Storage and Disposal' Signature programme. Anthony Banford is Senior Technical Lead on the programme.

Both seminars were well attended and received strong and positive feedback.



MP Jamie's Stunning Visit



NNL has hosted a very valuable and positive visit from Copeland MP Jamie Reed at the Central Laboratory. Jamie is very supportive of NNL and enjoyed a tour of the significant investments being made in the facility.

Phase 2 of the Central Laboratory covers the purpose designed laboratories that will undertake research and development on plutonium and will also support waste programmes on the Sellafield site. Work on Phase 2 is well underway. Early stage commissioning work on Phase 3 high active cells is progressing well.

After his visit, which also included a meeting with NNL Managing Director Paul Howarth, Jamie took to the twitter social media site and tweeted: "@UKNNL Utterly stunning yet again" to his 14,000 followers.

Taking Down the Tower

Installed in the NNL Preston Laboratory, the Uranium Commissioning Facility (UCF) tower rig has provided close and valuable support to the Sellafield Mox Plant (SMP) and other programmes.

Following the announcement by Government to close SMP it was decided to decommission and remove the UCF tower and associated facilities. NNL was successful in bidding for the work with the Preston Laboratory Engineering Team chosen as contractor. The work package includes design, installation and decommissioning and is funded by the Nuclear Decommissioning Authority (NDA).

The work has been carried out very efficiently by the Engineering Team over two separate phases and will be completed later this year. The valuable experience gained in dealing with the rig will support NNL's contribution to SMP decommissioning.

The UCF Tower was commissioned in 1996 and represented a full scale replica of the powder processing section of the SMP plant. The rig also featured supporting powder handling and pellet pressing facilities. UCF has performed many trials on powders and residues for design and process verification.

As well as supporting SMP, the rig also provided services on behalf of the Springfields Oxide Fuels Complex and Enriched Uranium Residues Recovery Plant (EURRP) and nuclear fuel plant in Japan. The tower was designed to enable mock ups, tests and trials to be carried out on active simulants with results made available for transfer to full scale operations.



Post operational clean out has taken place and decommissioning is very close to completion. Decontamination of the material removed from the tower is still ongoing but expected to be finished by September. All contaminated equipment is cleaned to disposable levels and relevant material returned to the nuclear fuel cycle. Full knowledge management is underway to make the most of shared expertise and learning with SMP operators Sellafield Ltd. This will support ongoing SMP decommissioning.

Benefits to NNL from the work include an overall enhancement of engineering and decommissioning experience and expertise. The experience has facilitated a look ahead to the next generation of R&D Fuel development projects including new national programmes such as the Nuclear Fuels Centre of Excellence (NFCE). The new NFCE will work with fuel manufacturers and others to play a leading role in the optimisation of current fuel designs and the development of advanced fuels for new reactor systems.

Sector Supreme

NNL is celebrating an eighth win in eleven years in the annual Royal Society for the Prevention of Accidents (RoSPA) Sector Awards. The announcement that we've been selected as the winner in the R&D Sector Category for 2014 is recognition that our approach to safety management is excellent and improving across a wide range of indicators.

The award is a tremendous achievement and reflects the application of good practice. It is great recognition for everyone who works for NNL. While we've been 'Highly Commended' in each of the past two years, it's tremendous news to have again been honoured at the highest level by RoSPA.

The award is all the more important in the nuclear industry where safety is always of paramount importance. Sector Awards are the pinnacle of RoSPA's recognition of truly excellent companies. To have any chance of winning, a company must provide evidence

across a range of good safety practices. In making its decision, RoSPA examined NNL's total approach to safety in all of its forms.

This has been a collective effort to return NNL to the pinnacle of health and safety performance in a very competitive sector. The challenge remains to maintain and consistently improve safety performance levels.



NNL and Nuclear AMRC Sign MOU



In a visionary development, NNL and the Nuclear Advanced Manufacturing Research Centre (AMRC) have signed a Memorandum of Understanding (MOU) to work together on relevant areas of nuclear research and policy.

The new MOU recognises the vital and complementary roles played by the two organisations and confirms their collaboration to ensure that research and development activities across NNL and the Nuclear AMRC are mutually visible and complementary.

Nuclear AMRC works with manufacturers to improve capabilities and performance among the civil nuclear supply chain and helps them compete for work at home and worldwide. It's backed by industry leaders and Government and managed by the University of Sheffield.

NNL and Nuclear AMRC will also collaborate closely in the key area of nuclear skills development, with a strong emphasis on subject matter

experts. They will work alongside the National Skills Academy Nuclear in the manufacturing sector.

It's recognised in the agreement that both NNL and the Nuclear AMRC have access to a wide range of state-of-the-art facilities and equipment. Both agree that facilities may be made mutually available including to third parties, subject to appropriate conditions such as security clearance being met. Finally, the organisations will work together on policy matters, where it's considered relevant to do so.

Commenting at the signing, NNL Managing Director Paul Howarth said: "We both recognise the enormous potential that exists for our two organisations to work closely together to progress the overall

agenda of research in the nuclear sector. I'm delighted to sign this MOU, which will help to formalise that recognition into a series of specific areas where our complementary skills, experience and facilities can be brought together to work more effectively."

Mike Tynan, Chief Executive of the Nuclear AMRC added: "NNL is a world leader in the field of nuclear research with thousands of man-years of experience in the industry. I'm delighted that Nuclear AMRC will work in close collaboration with the NNL team. Together we will play a key role in the continued development of civil nuclear power as a safe, reliable and valued provider of energy for the good of mankind."



Sarah Makes a Splash

Taking part in open water swimming in aid of a good cause was too much for Sarah May to resist. Sarah from the Preston Laboratory completed a mile long swim in Lake Windermere in an impressive 46 minutes.

The Great Swim Series is the UK's biggest exhibition of open water swimming. The swims are staged in clean and safe lakes, lochs and docklands nationwide.

Sarah described the water temperature for the June event as a "balmy 15 degrees".

"I'm pretty pleased with my time even though it wasn't my best, but it was really busy," she said.

Sarah was swimming on behalf of the Space Centre at Ashton-on-Ribble near Preston. The facility provides a multi-sensory room that's available to anyone with special needs. It features a large, soft-padded environment and is an exciting area for users with specialist lighting and equipment.

In recognition of Sarah's achievement, NNL also made a donation to the Space Centre.

NNL in DISTINCTIVE Collaboration



A multi-million pound four-year research programme is combining the expertise of the nuclear industry with ten top Universities to focus on some of the key challenges of the UK's nuclear legacy and help build the next generation of nuclear experts.

NNL, the Nuclear Decommissioning Authority (NDA) and Sellafield Ltd are collaborating with the Engineering and Physical Sciences Research Council (EPSRC) and a consortium of UK universities on 30 separate projects focused on four themes:

- AGR, Magnox and exotic spent fuel
- Plutonium oxide and fuel residues
- Legacy ponds and silos wastes
- Infrastructure characterisation, restoration and preservation

The programme has an overall value of £8-9 million and is underpinned by a £4.9 million grant from the EPSRC. It will be carried out under the name 'DISTINCTIVE' - Decommissioning,

Immobilisation and Storage solutions for Nuclear waste Inventories.

DISTINCTIVE follows an earlier successful programme known as 'DIAMOND'. The EPSRC grant will be supplemented by additional financial and in-kind support from NNL, NDA, Sellafield Ltd and the Universities. The work will include technology development, the building of fundamental knowledge and the development of the next generation of subject matter experts.

Those working on the projects will include a mixture of PhDs and Post-Doctoral Research Assistants (PDRAs). Each project will have an industrial supervisor from either NNL or Sellafield Ltd.

The consortium of Universities is led by Leeds and includes Birmingham, Bristol, Imperial, Lancaster, Loughborough, Manchester, Sheffield, Strathclyde and Central Lancashire.

NNL will make facilities available in the Central Laboratory at Sellafield to support several strands of the work. Chief Science and Technology Officer Graham Fairhall said: "This is great news and we are grateful to EPSRC for their substantial support. Having ten of the UK's leading Universities working collaboratively with industry in this important area makes this a very significant programme."



MULTEQ Comes Home

A key customer to the NNL Reactor Operations Support Business, the Electric Power Research Institute (EPRI) conducts research, development and demonstration to support the generation, delivery and use of electricity.

NNL has hosted the high profile annual meeting of the EPRI MULTEQ Database Committee at its Harwell facility. MULTEQ is part of the Chemworks Tools suite of software developed by EPRI for evaluating chemistry in a nuclear power plant.

The MULTEQ model calculates the composition of aqueous solutions at temperatures up to 335° centigrade using an extensive database of thermodynamic equilibrium constants. These include dissolved species, vapours and precipitates.

The database is tailored to the needs of power plant operators and includes alloy corrosion products such as iron, nickel and chromium oxides as well as pH- and redox control chemicals such as boric acid, lithium hydroxide, ammonia, hydrazine and volatile amines and potential additives or impurities such as zinc, lead, copper and silicon.

To ensure that the predictions of the model are as reliable as possible, MULTEQ is subject to ongoing review by the Database Committee. Although contact is maintained regularly, the committee meets formally once a year to discuss the future development needs of the model and database. Assessments and approvals for new or modified entries are also proposed by members.

Since NNL's Shirley Dickinson became a member in 2008, the annual meetings have been held at EPRI's offices in Charlotte, North Carolina and Palo Alto, California; the University of Guelph, near Toronto; EDF's site in Les Renardières, near Paris, and Dominion Engineering's office in Reston, Virginia.

The UK's turn to host the three-day meeting was eagerly anticipated.

This provided an opportunity for NNL to discuss other relevant work with committee members and for researchers at Birmingham University to present their work on magnetite solubility. This work is jointly supported by NNL and Rolls Royce.

NNL NETS Moon Man

If you know your American space history, then the name Fred Haise will be familiar to you. Fred was the command module pilot for the Apollo 13 mission to the Moon in 1970. The lunar landing had to be aborted after an oxygen tank exploded in the command module. This resulted in a heroic battle by the crew and mission control to return the craft safely to Earth.



Fred visited the NNL exhibition stand at the Nuclear and Emerging Technologies for Space (NETS 2014) conference in Mississippi, USA. 'NETS' is the key annual international conference covering all aspects of nuclear power in space, from small batteries right through to large mega-watt capacity reactors. 'NETS' serves as a major communications network and forum for professionals and students working in nuclear technology for space.

NNL is currently working with the European Space Agency (ESA) to demonstrate the feasibility of using the nuclear material americium in a Radioactive Thermoelectric Generator (RTG) or space battery to

power future generations of European led space missions. Flow sheet work is currently being undertaken by NNL to produce pellets that could potentially be used in final batteries.

NNL authored and co-authored four technical papers at 'NETS' covering current work on space batteries and nuclear electric propulsion. There was a lot of interest at the conference in European progress being made towards creating its own space battery. NNL provided an exhibition stand complete with a full sized model of the proposed americium powered space battery.

Fred Haise discussed the European

approach to powering future space missions with NNL delegates along with our role in providing fuel for these missions. Apollo 13 was the seventh manned mission in the US space programme and the third intended to land on the Moon. Fred was part of a three man crew alongside Jim Lovell and Jack Swigert.

Apollo 13 and other similar missions carried a plutonium 238 fuelled space battery to power science equipment to be used on the Moon. One of Fred's planned roles would have been to load the plutonium core into the device. Now aged 80, Fred showed a keen interest in the progress NNL and ESA are making.

Adrian, Politics and Innovus

Innovus is an initiative created in Cumbria to build on the region's rich heritage of innovation. This is achieved by providing support and funding to help small to medium sized businesses transform high tech ideas into marketable products.

NNL runs Innovus alongside the University of Manchester's Dalton Nuclear Institute. NNL's Adrian Davis-Johnston is Programme and Engagement Manager at Innovus and he used his connections with high level politics to boost awareness and support for the programme.

A relatively brief conversation between Adrian and Chancellor

George Osborne has led to a full scale NNL and Innovus briefing for Carlisle MP John Stevenson. Adrian and colleague Eileen Turner met with John to discuss NNL, its role in Cumbria in terms of stimulating growth and the work it does via Innovus. John has undertaken to update the Chancellor about NNL and Innovus at the earliest opportunity. Contents of the brief were also shared with colleagues in the Department of Energy and Climate Change (DECC), the Shareholder Executive and the Department for Business, Innovation and Skills (BIS).



Innovus looks to create wealth in Cumbria through technology development and commercialisation by bringing together the critical mass of funding, world-class facilities and expert technical and business support. The key driver in everything Innovus does is the creation of jobs and income for the Cumbrian economy, whether through increased turnover, licensing or the creation of new enterprises.



NNL and NuSAM



NNL has participated in the First Working Group meeting of the International Atomic Energy Agency (IAEA) Co-ordinated Research Programme (CRP) on Nuclear Security Assessment Methodologies (NuSAM). The Working Group was attended by 23 delegates, representing the Czech Republic, Egypt, Hungary, India, Japan, Korea, Pakistan, Sweden, the UK and the United States.

The group was a balanced collection of contributors from regulators, operators, Government laboratories and IAEA consultants. Through its Signature internal research and development programme, NNL will participate in the three year CRP aimed at developing risk or performance based assessment methodology for the security of nuclear and radiological sites, facilities and materials.

This aligns with the UK regulatory approach for civil licensed facilities. Participation places NNL at the forefront of the preparation of international guidance for various types of facilities. The CRP will develop IAEA guidance to support operators with the application of performance-based approaches.

NNL's Jeremy Edwards (pictured above) was appointed by both the IAEA Programme co-ordinator and the meeting Chair (from the US Nuclear Regulatory Commission) as Chair for the Medical Irradiator Facility Case Study group. This will be the first study completed meaning it will attract particular early interest.

Two further case study groups were set up to cover transportation (chaired by a representative from Sweden) and a hypothetical nuclear power plant (chaired by the Czech Republic). Future studies will include a Low Enriched Uranium (LEU) fuel fabrication facility and a waste storage site. Other members of the NNL team cited in the research proposal were Chris Holmes (Nuclear Security, Safeguards, and Non-Proliferation), Norman Bird (Security Assurance and GIS) and Robert Rodger (Business Manager).

The establishment of closer links with the IAEA is very relevant for the NNL Nuclear Security area. Participation in this CRP has already led to dialogue on wider areas of the IAEA Security programmes that NNL could help support, using skills available from across the business.



Delivering Training in Central Europe

NNL has been closely involved in a high profile European nuclear training initiative led by the Foreign and Commonwealth Office (FCO). A new course has been developed as part of a refocusing of FCO expertise in countries, regions and languages.



By creating an 'Expertise Fund', FCO has supported the development of the introductory course covering the commercial nuclear industry. The course was delivered by NNL in Slovenia on behalf of the Central European Network (CEN). It was aimed at overseas based FCO energy attaches and UK Trade and Investment (UKTI) sector leads in the commercial nuclear industry.

The CEN project focuses on developing global education in partner countries including Slovenia, Austria, Hungary and Slovakia. The course was developed to meet the needs of policy and to support UKTI personnel involved in the CEN regional civil nuclear High Value Opportunities (HVO) programme. This is currently ranked in the Global Top 20 of high value business opportunities for the UK.

The course was held at the British Embassy in Ljubljana and also the Krsko nuclear power plant also in Slovenia. Content was designed to provide a foundation to be applied easily by anyone who needs to work on nuclear issues without prior knowledge or experience of the industry. It takes the user through the life cycle of a nuclear project and discusses terminology.

An electronic version of the course was also compiled to provide instantaneous assistance to users working on nuclear commercial matters.





NNL People: Richard Williamson

With the nuclear industry resurgent in the UK, NNL is committed to producing better, more cost-effective and faster technology. Efficiently operating facilities are fundamental to the delivery of successful services for customers and other stakeholders. NNL has access to some of the most advanced nuclear facilities in the world and operating them to their fullest potential is a real contributor to success.

At Sellafield, NNL operates the Central Laboratory, the most modern nuclear technology research facility in the world. Located a few miles north of the Sellafield site is the NNL non-radioactive test rig facility at Workington. The man responsible for managing and getting the best out of the Central Laboratory is Richard Williamson. Laboratory Manager Richard has recently moved across from a similar role leading the team at Workington.

“It’s the job of the facilities team at all of our sites to make sure we operate efficiently and safely,” said Richard. “We take great pride in providing the means for our technical people to deliver high value research and the best results possible.”

Flagship Facility

As NNL’s main facility, the Central Laboratory has the potential to become the best nuclear technology research resource in the world.

“A fully functional Central Laboratory will be right at the core of NNL’s and the UK’s nuclear technology capability,” said Richard. “The facility is key to delivering work for customers and implementing the Government’s Nuclear Industrial Strategy and national programmes. The Central Laboratory will also underpin NNL’s closer collaborative working with academic and nuclear industry organisations.

“We have two major investment streams ongoing,” added Richard. “The alpha laboratories (Phase 2) and high active cells (Phase 3) are currently being commissioned. Successful completion on these projects is of primary importance for the Facilities and Project teams.”

Once completed, the alpha laboratories will carry out mixed oxide fuel development and general plutonium related work. The labs are essentially a series of small-scale pilot plants providing support to existing manufacturing at Sellafield and enabling new research and development to be carried out.

The high active cells provide modular and reusable access to five separate shielded working areas that are designed to be fully interchangeable. Activities will include decontamination development on real plant materials and research into immobilisation techniques using retrieved high and medium active wastes.

Richard said: “Phases 2 and 3 will complement the suite of active and non-active laboratories and rig hall that we’re already operating. It’s a huge challenge for all of us but one I’m confident we can deliver with the resources and commitment we have in the Facilities team.”

Richard arrived in the Central Laboratory at the tail end of a successful major building remedial works programme, which has seen a large scale replacement of roof areas and improvements to drainage systems. The building has also benefitted from the removal and resealing of large areas of wall cladding and glazing.

Workington, Preston and Windscale

Prior to his move to the Central Laboratory, Richard was Laboratory Manager at NNL's Workington facility. Located off the Sellafield site, NNL Workington is a non-radioactive engineering and rig testing facility. The work supports the safe and effective operation of remediation and decommissioning activities at Sellafield.

"I had a very enjoyable two and a half years at Workington," said Richard. "I worked with an excellent team that constantly raised their game. We were delighted to be announced as winners of the 2013 NNL Team of the Year IMPACT Award.

"The award was particularly satisfying as it was voted for by colleagues and internal NNL customers. It recognised the team's willingness to go the extra mile. This often meant working beyond normal hours, being available for late shifts, answering call outs, working during holidays and always operating in a flexible manner."

The team ensured that operations were safely maintained during periods of disruption especially during an extensive office refurbishment programme and demolition of a redundant stack in 2013.

Richard also enjoyed individual success right at the end of his time at Workington when he won the Individual IMPACT Award for Leader of the Year. "It was a great surprise and I was delighted," he said. "It was a brilliant way to round off such a good experience working with the

team at Workington. I'm leaving a really strong group and I know they'll go from strength to strength."

Before his spell at Workington, Richard also enjoyed 18 months as Laboratory Manager at NNL Preston. "It does look like I've been on a full tour of all of NNL's facilities," he said. "I was originally asked to go to Preston for six months but stayed longer."

Towards the end of his time at Preston, Richard had met Mandy, the future Mrs Williamson and was looking to locate back to Cumbria. "I returned north to work in the Windscale Laboratory at Sellafield as Safety Case Delivery Manager," he said.

This took him back to his roots as he had started his nuclear career at Windscale working for AEA Technology in 2002. His early experience was as a Production Manager involved in the machining of materials. It was in this period that he transferred to NNL in 2003 following the AEAT research facility acquisition. He then became Operations Project Engineer before progressing further becoming Production and then Operations Manager. Each role led to a greater variety of line management experience and more varied challenges.

This led to his departure for the Preston Laboratory in 2009 where for the first time he took on the responsibility for managing a multi-disciplined team covering maintenance, operations, production and operations support.

"I've had a varied and challenging career with NNL," he said. "And I know there's plenty more to come in my new role."

Family, Interests and Early Experience

Born in Cockermouth, Richard lives in his home town with wife Mandy and two year old daughter Orla. "It's a great place to live," he said. "I like the outdoors and indulge in the odd round of golf and still play football although I'm classed as a veteran

(over 35) these days. I'm told I've got a good 'engine' so I still play in central midfield. The engine does need more maintenance than it used to though."

He gained a Mechanical Engineering degree at the University of Leeds in 1998 and originally started work at James Walker Ltd in Cockermouth followed by Cheshire Engraving Services Ltd. "This was great early experience," he said. "It gave me an insight into how managers lead and interact with their workforce and helped my understanding of engineering and the manufacturing business."

Bright Future

Looking ahead, Richard is excited about his role at the Central Laboratory. "We've just completed the latest Long Term Periodic Review (LTPR)," he said. "We're waiting for the Office for Nuclear Regulation (ONR) to come back to us. This is quite a major milestone for the facility as the LTPR only takes place every ten years.

"With Phases 2 and 3 underway and potential transfers into the building it's a busy and important time in the development of the Central Laboratory.

"Collaborative work will increase too and we should see increasing numbers of academics and people from other parts of the industry working in the facility. It's my job to make sure that the Facilities team continues to provide the right levels of support to everything that's going on."



NNL in 'Your Life' Launch



Creating new opportunities in the nuclear sector is a major part of an industry-led campaign launched by Chancellor George Osborne. 'Your Life' has been created to inspire more young people to study mathematics and physics. NNL was proud to attend the campaign launch at the Science Museum in London.

George Osborne spoke at the event and was joined by Education Minister Elizabeth Truss and MP Sir Peter Luff along with representatives from the recently formed UK Chapter for Women in Nuclear (WiN).

NNL Environmental Services Technologist Olivia Thompson is a member of the UK Chapter's Executive alongside Presidents Miranda Kirschel (Atkins) and Rebecca Holyhead (Price Waterhouse Coopers). Other Executive members represent Government and various commercial companies.

The 'Your Life' launch was supported by over 80 companies and NNL delegates included Fuel Cycle Services Director Fiona Rayment, Head of Legal Claire Hindle, Waste Management Technology Business Leader Myrian Wood and Olivia.

Industry has pledged to do more to highlight the career opportunities open to those studying STEM subjects and is committing to create over 2,000 new entry level positions

including apprenticeships, graduate or paid work experience posts.

'Your Life' brings together business, educators, civil society and Government to show how science and maths can lead to exciting and successful careers. It also aims to grow the number of women in science, technology and engineering roles. The campaign will run for 12 months.



Honour for Dominic

There was great news at the start of this year when NNL Research Fellow Dominic Rhodes was awarded an MBE in the New Year's Honours list.

This means Dominic has become a Member of the Order of the British Empire and the award is in recognition of his services to science. He has worked in the nuclear sector for almost 20 years, currently in the powders and slurries field for NNL. Over the years he has led many projects for NNL customers, particularly at Sellafield, where his work has supported virtually every major plant on site.

Dominic is also passionate about innovation and has helped to bring forward many technology concepts. He also plays a very prominent hands-on role as NNL Corporate Social Responsibility Manager.

He leads outreach activities and works with schools and other bodies in West Cumbria and throughout the UK. He has led NNL's work with The Smallpeice Trust, running a series of residential courses to help inspire young people into developing their interest in science and technology subjects.

Winning the MBE has become something of a family tradition with Dominic's father also achieving the same honour some years ago. This was in recognition of his work as chief flying instructor at the RAF Test Pilots' School. Dominic collected his MBE at Buckingham Palace from the Prince of Wales in March.

Congratulations to Dominic on this tremendous and well-deserved achievement.





Roping at the Farm

Possessing rare skills can be a real asset and the NNL Plant Inspection Team features not one but two level one rope access technicians. Paul Coates and Tracey Binks are both qualified with the Industrial Rope Access Association (IRATA).

Paul and Tracey's talents led to the team being asked to use rope access techniques to inspect facilities at the Sellafield non-active tank farm. The facility supplies all of the major reagents that support operations across the entire site including reprocessing, waste and effluent treatment plants. Its function is essential and fundamental to the site.

The four stainless steel nitric acid tanks require thickness testing to certify their continued safe use. Full access to carry out testing is not

possible via a mobile elevated work platform and to use scaffolding is extremely expensive and would interfere with ongoing refurbishment work in the area. Rope access was the answer to the challenge.

The IRATA scheme requires that all rope access work is overseen by a qualified supervisor. This led to the NNL Plant Inspection Team working in partnership with the Kaefer C&D rope access company that rigged up and supervised.

All four tanks were successfully inspected over a weekend to fit in

with operational requirements. Using rope access meant that good quality thickness tests of every tank plate were taken and visual inspections of all welds were performed. The team confirmed that the tanks remain in good condition and are not subject to internal corrosion.

The work was completed safely and by using rope access the NNL team saved the customer, Sellafield Ltd, a considerable amount of money when compared to using a scaffold platform.

Hot 100 for Jon

Being recognised as a member of the UK's 100 leading practising scientists is a great honour. Jon Lloyd received the accolade recently from the Science Council. Jon spends half of his time working with NNL and the other half with the University of Manchester.

He arrived at NNL via the developing partnership with the University and having secured a prestigious industrial fellowship grant from the Royal Society. With NNL, he is part of the Modelling and Environmental Management capability and works on the interactions between microbial communities and radioactive materials in engineered and natural environments.

In other words, he examines the options available for managing contaminated land and the long term geological disposal of nuclear waste. At the University, Jon is Professor of Geomicrobiology and Director of Research at the School of Earth, Atmospheric and Environmental Sciences.

The Geomicrobiology group's work contributes to the understanding of the role that micro-organisms play or have played in key geological processes. Microbes can be used to change the chemistry of radioactive waste materials.

In the Science Council's 100 leading practising scientists list, Jon was cited



in the 'Developer/Translational' category. He was recognised for his work at the interface between biology and geology, including research funded by the prestigious Royal Society industrial fellowship

Congratulations to Jon on making his new entry on to the ultimate scientist list.



Keith's Update from Japan



Usually based at the British Embassy in Tokyo, Keith Franklin made a short but productive visit back to the UK recently. Keith is currently on secondment from NNL to the Embassy. Prior to his departure for Japan he was a Business Leader specialising in services to UK reactor operations.

During his time back in the UK, Keith visited NNL Warrington and Sellafield and presented a lecture to former colleagues on the current status of the nuclear industry in Japan and the support provided by the UK at Fukushima Dai-ichi. As 1st Secretary (Nuclear) at the Embassy, Keith remains closely involved in co-ordinating the input of UK nuclear expertise into recovery operations at the Fukushima plant.

He has worked to lift the profile of the UK nuclear sector in Japan. Keith has used personal experience gained from a previous stint at the Tokai Mura facility north of Tokyo to engage with key decision-makers and influencers in business, Government and academia in Japan.

His contribution has supported the formation of a new Japanese regulatory process and also the creation of advisory positions for UK based experts on key committees. There have also been business opportunities identified for UK companies with the potential for more in the future.

Keith relocated to Japan in 2011 for an initial three month period but his level of contribution led to this stay being initially extended until September of this year. However, his continued success means he will now remain at the Embassy until at least March 2015.

IMPACT Awards 2014

This year's **NNL IMPACT Awards** dinner and ceremony has taken place at the Museum of Science and Industry in Manchester. NNL colleagues nominate NNL colleagues in the awards, which mark exceptional individual and team-based contributions.

Over 300 nominations were received for the Team, Leader, Individual, Corporate Responsibility, Safety Champion and Personal Development IMPACT Awards. Many people received more than one vote and over 30 separate teams were nominated. Separate awards, chosen by an expert panel, were made for innovation.

The Awards dinner and ceremony was introduced by NNL Chairman Richard Maudslay and hosted by Managing Director Paul Howarth and other members of the Executive team. The speaker was Steph McGovern, the well-known business presenter from breakfast TV.

Congratulations to the 2014 winners:

TEAM OF THE YEAR

Preston Laboratory AGR Oxidised Pins Team

EXCEPTIONAL LEADER OF THE YEAR

Richard Williamson

INDIVIDUALS OF THE YEAR

Quality

Daniel Shepherd

Value

Paul Bleakley

Service

Michael Brogden

Growth

Robert Burrows

CORPORATE RESPONSIBILITY

Eileen Turner

BOB GRIEVE SAFETY CHAMPION

Robert Bell

NORMAN BREWER PERSONAL DEVELOPMENT

Lynsey Rome

INTERNAL RESEARCH AND DEVELOPMENT

(chosen by expert panel)

Ingenuity

Steven Stanley (Microfluidic Device for Radiochemical Separations)

Most Promising New Innovation

Matthew Barker (Developments in Post Irradiation Examination (PIE) Techniques)

Howard's Simply the BEST

Presentation of the NNL BEST Award took place recently at the NNL Technical Conference. The award celebrates the Best External Scientific or Technical (BEST) paper published externally.



Many Congratulations to Howard Sims who won for his paper 'Hydrogen Yields from the Surface of Plutonium Oxide'. Howard presented his paper to conference and received The Lawrence Medal from Chief Science and Technology Officer Graham Fairhall. This is the second time the medal has been presented and is named in honour of former NNL Managing Director Mike Lawrence.

There were 14 submissions for the Award this year. Each paper was assessed by a short listing committee consisting of the NNL Chief Technologists, Chief Engineer and

Laboratory Research Fellow. A shortlist of six was drawn up based on technical and scientific content, coherency of argument, innovation and impact of the science.

The six finalists were Mike Carrott, Colin Gregson, Martin Metcalfe, Paul Ramsey, Howard Sims and Guy Whillock. The judging panel was chaired by Graham Fairhall, with Eann Patterson from Liverpool University adding independent expertise. Also involved were NNL Senior Research Fellows Joe Small, Colin English and Kevin Hesketh.



New Fellows Boost Technical Strength

Technical excellence and capability is fundamental to NNL as it continues to improve services to customers and supports UK national programmes implemented as part of the Government's Nuclear Industrial Strategy.

NNL Senior and Laboratory Fellows work collectively to develop and promote technical capability in their own areas, across the business and externally. Senior and Laboratory Fellows are focused on leadership and the strengthening of technical capability. NNL is pleased to announce the appointment of two new Laboratory Fellowships covering:

• Nuclear Regulation - Colette Grundy

Colette brings professional experience as a nuclear regulator to her new role as Laboratory Research Fellow in Nuclear Regulation. She received personal endorsement in the role from the UK Office for Nuclear Regulation (ONR) and Environment Agency (EA). She has also worked with international regulators from the USA and Europe.

She is currently providing regulatory expertise to project 'MEGAHIT'. NNL's involvement in the MEGA HIT consortium is as a direct result of space battery work being carried out for the European Space Agency (ESA). Colette is a Chartered Chemist and a Fellow of the Royal Society of Chemistry. She is also a mentor for the Royal Society of Chemistry NNL accreditation scheme and acts as a mentor for the NNL Technical Graduate and Emerging Talent programmes.

• Geological Characterisation - Nick Smith

New Laboratory Research Fellow Nick Smith is a Royal Society Industry Fellow and Visiting Professor at the University of Manchester. With NNL he is a Senior Research Technologist and Technical Lead in Geology, GIS and Remote Laser Sensing. Nick is a nationally and internationally recognised expert in Geological Characterisation and GIS in NNL's Environmental Services Team.

He also has honorary and visiting appointments at Liverpool and Liverpool John Moores Universities. Nick is a Chartered Geologist and Fellow of the Geological Society and is a member of the European Federation of Geologists.

Collette and Nick join NNL's already strong cohort of Laboratory Fellows:

- Steve Graham - Engineering Modelling
- Deborah Hill - Criticality Safety
- Jonathan Hyde - Nuclear Materials
- Luke O'Brien - Effluent Technology

Securing the Future

As part of its nationally strategic role, NNL contributes towards the retention and growth of capability, skills and expertise across the nuclear fuel cycle. There is a commitment in NNL to attracting the brightest and best people in to the business. This includes the recruitment of younger people as apprentices and graduates.

To recognise the achievements of NNL apprentices, this year's Apprentice of the Year ceremony has taken place. NNL works with young people supporting them as they progress through their apprenticeships. 2014 is the fourth year of the apprentice awards that have consistently grown in competitiveness and value.

Apprentice numbers in NNL have steadily increased over the past few years and this is reflected in the number of award nominations received this year. Nine apprentices were nominated in the business, scientific and engineering categories. Winners were:

BUSINESS APPRENTICESHIP - NATALIE WHITE - PEOPLE SERVICES

Natalie has excelled in all areas of her development and has managed a significant recruitment process for graduates. She demonstrated commitment to her own development by accelerating her academic learning and was accepted on to a HND course a year earlier than normally expected. Ryan Clubley and Charlotte Fee, both from the Procurement team, were runners-up.

SCIENTIFIC APPRENTICESHIP - ALEX GREGORY - WASTE RESIDUES AND PROCESSES TEAM

Alex is a second year apprentice. He has readily adapted to different work projects in the residues assessments and measurement and analysis areas. Alex is already improving his understanding of often complex scientific principles and delivering on them. He was commended for his positive attitude, drive and energy. Alex has fitted in well into a high performing team where

turnaround of work is vital. Catherine Campbell, Adam Bragg and Kerry Burns were runners-up.

ENGINEERING APPRENTICESHIP - ROBERT COOK - CURRENTLY WORKING IN THE WINDSCALE LABORATORY

Robert is in the third Year of his apprenticeship and has made a very promising start to his career, demonstrating the capability to go on to be a professional engineer. It was noted that he always completes his work to high standards and on time. Away from work, he's involved in sport, giving up his own time to coach youth hockey at Keswick. He also takes a weekly trip south for training with the Lancaster first team. Luisa McGregor was runner up in this category despite being a scientific apprentice. This was because of her work with the NNL Facilities group.

All of the nominees attended the ceremony with their line managers with each winner receiving a certificate and vouchers as a reward.

OVERALL WINNER

From the three category winners, only one could then be named as NNL Apprentice of the Year. Many congratulations to **Alex Gregory** on his well-deserved award and he's now the proud owner of the coveted trophy.

The judges highlighted Alex taking personal responsibility for a key scientific process during his training while also being proactive in managing his own development by seeking feedback from senior management. This, coupled with external activities around STEM, means Alex is heading towards becoming a well-rounded contributor.



Up to the Challenge

For a number of successful years, NNL has participated with Workington based Gen2 to provide a working environment and long term opportunities for many young people. Gen2 is a joint venture company formed as an apprentice engineering and technology training provider.

Apprentice numbers in NNL have steadily increased over the past few years across the sites. The achievements of NNL apprentices were recently recognised in the NNL Apprentice of the Year ceremony in Lancaster (see page 16).

NNL works alongside Gen2 in Cumbria to deliver the best possible apprentice training in the region. Engineering apprentices Declan McAvoy and Mark Laird have taken part in the Gen2 apprentice challenge launched around Cumbria as part of National Apprentice Week.



Declan McAvoy

Working with a fellow apprentice from the Gen2 scheme, Declan's apprentice challenge objective was to design and manufacture a demonstration piece that showcased the skills they had developed during training. The pair had ten days to complete the task. They began by creating a demonstration piece using computer aided design. It was decided to build a 'Can Crusher' to reduce volumes of used cans for more environmentally friendly disposal. The majority of parts for the device could be easily sourced from Gen2.

After testing the pressure required to crush cans efficiently, Declan and his colleague constructed a mock up circuit on a pneumatic rig at the Energus facility in Workington. They also designed a container box and crushing case to fit around the circuit. Testing and design of the demonstration piece took four days.

For safety reasons, the pneumatic circuit was placed inside the box. The construction of the Can Crusher took six days and won the award for the best demonstration piece at the local National Apprentice Week event. Following on from the competition, they added more safety features prior to the Apprentice Challenge Final, which also took place at Energus.



Mark Laird

Working in a team of six, Mark's task was to design, research, construct and present a visual demonstration piece for children and young adults aged between eight and 18. This included mechanical and electrical design, welding, fabrication and pipe fitting and the final product had to demonstrate the diversity of apprentice trades. The team began by brainstorming ideas and came up with the idea of a Beam Engine.

Computer aided design was used to present a virtual engine and Mark spent time developing ideas into a product that worked on screen. Then the team began production. This process included the machining of main components although the equipment used could not cut out all of the shapes as they were too big and had to be redesigned. Other components were produced by lathe at the Gen2 facility.

The base plate was cut out and holes drilled to enable components to be bolted in. The team had to make sure that the alignment was correct for the belt to drive the gear. With all the parts assembled, the team were delighted when the engine ran as designed. The Beam Engine was entered into the competition at the Apprentice Challenge Final at Energus.

Of the pieces in the competition, the beam engine won first prize overall. The team had an enjoyable day demonstrating the model to visitors.

NNL Support Inspires Seascale Scouts



Support from NNL has contributed to a group of Scouts attending the National Scout and Guide Camp. The Seascale Scouts, their leaders and a huge pile of camping equipment embarked to Campdowne International Scout and Guide Camp in Orpington, Kent.

The trip enabled the Scouts to try their hand at a wide variety of activities including abseiling, archery, canoeing, aerial trekking and circus skills. A real highlight was the opportunity to take the ultimate leap of faith from a high platform to grab a trapeze bar. The Scouts were able to test their nerve and co-ordination before being safely lowered to the ground.

The camp gave the Scouts a glimpse of life away from home and they were able to meet Scouts from other countries such as New Zealand, Australia, Korea, Ghana, Holland, Sweden and Belgium. The Seascale Scouts hosted a group from Egypt and established an international link that should last and last.

A good time was had by all. This made the logistical issues of

transporting 27 people with enough equipment for 45 down to Kent worthwhile. As well as accepting funding from NNL and other contributors, the Scouts raised extra cash via a sponsored swim, clothing collections and other activities. Leaders were proud of the Seascale Scouts as they participated in challenging activities and finished joint second in the camp 'Ready Steady Cook' competition.

NNL's Awards Triumph



This year, Sellafield Ltd has set up a new awards scheme to showcase the very best performers within its supply chain. The Sellafield Ltd Supplier Awards take place twice yearly giving supply chain partners the opportunity to demonstrate their quality and performance.

The awards run in March and September and NNL has been successful the first time of asking as part of the Enabling Innovation Framework (EIF) team. Alongside a group of collaborative partners in the EIF, NNL won in the 'Best Supply Chain Collaboration' award category.

The Sellafield Ltd EIF is a relatively new contracting mechanism. NNL collaborates with North West Projects, React, Merebrook, DBD, NSG, Nukem Technologies, Nuclear Technologies and West Lakes Engineering in the

team. The framework arrangements enable each of the suppliers to demonstrate best practice, value for money and the intelligent and innovative application of existing and new technologies.

The ultimate aim is to deliver better decommissioning and waste management services for Sellafield Ltd. Once a programme of work is identified, the EIF works together to decide which of the partners has the right skills and experience to deliver the work. If more than one company has the right package then there is a

discussion to agree who should lead and who should support. Working together, a proposal is then provided and once agreed Sellafield Ltd places a contract on each individual company.

NNL's involvement in EIF tasks has been managed by David Ross and Jason Dean of the Decision Science team. David's role has since handed over to John-Patrick Richardson. Congratulations to everyone involved.

NNL in Freezing Collaboration



It's been announced that NNL has signed a new agreement to work more closely with two leading freezing technology specialists.

NNL with Studsvik UK Ltd and FriGeo AB of Sweden are leaders in the development and application of freezing technology. The three collaborators will work together in a number of areas of common interest including the application of specialist freezing technology on UK and US nuclear sites.

There will also be further development of existing freezing technology to solve challenges including sampling, removal (dredging) and drying (de-watering) of sludge and associated wet material by means of freezing. This is anticipated to help to solve challenges especially in the decommissioning area.

The collaboration reflects that NNL, Studsvik and FriGeo each have technology, skills, experience, capabilities and resources that can be maximised by working more closely together.

A technology demonstration day will be held at NNL Workington in September. Interested companies or individuals can observe the technology in a controlled environment. This event will highlight value and the potential for near-term application.

PHAROS Laboratory Launch

NNL has collaborated with the University of Manchester to launch the new PHAROS (PHoton Analysis by Remote Observation Suite) Laboratory.

The facility forms the centrepiece of the collaboration between the NNL Environmental Characterisation Team and the University's Laser Processing Research Centre (LPRC).

The launch of PHAROS took place at The University's Photon Science Institute. Research at the laboratory is currently focused on the development of laser-based characterisation instrumentation techniques. The launch was attended by key guests from The University of Manchester and NNL and by VIP visitors from Sellafield Ltd.

Demonstrations of some of the laboratory's equipment were given during the event. Featured speakers were NNL Chief Technologist Mike Angus and Co-Director of The University of Manchester's Dalton Nuclear Institute Professor, Melissa Denecke.



innovate

NATIONAL NUCLEAR LABORATORY



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



NNL operates at six locations in the UK:

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

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