NATIONAL NUCLEAR LABORATORY

innovate

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NNL in Key Industry Strategy Role

Government has published its Nuclear Industrial Strategy setting out the details behind a shared commitment between Government and industry. The announcement was enthusiastically awaited and was welcomed as a major boost for nuclear R&D in the UK and NNL's burgeoning role as a true national laboratory.

The Strategy, which takes a long-term approach to the opportunities for economic growth and job creation from the nuclear industry across the whole nuclear fuel cycle, also acknowledges the key role of R&D in making the most of these opportunities. It features the Government's responses to both the 2011 report from the House of Lords on the UK's nuclear R&D capabilities and the recommendations made by the Ad-Hoc Nuclear Research and Development (R&D) Advisory Board, chaired by Government Chief Scientist Sir John Beddington.

Sir John's Board led work on a review of the existing R&D landscape in the UK and the creation of a nuclear R&D roadmap and industrial vision statement. NNL supported the work of the Advisory Board and its sub-groups, working closely to advise all three of the main programmes of work.

NNL also contributed to the International Sub Group of the Advisory Board, which was chaired by Managing Director Paul Howarth. The Sub Group prepared profiles of R&D programmes in a selected group of nations and compared them to the UK, forming the basis of a set of recommendations to the Advisory Board about future direction for the UK.

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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Strategy Role

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Key Outcomes

The Strategy was published in late March and accepted the recommendation of the Advisory Board that the UK should move to establish a national programme of civil nuclear R&D and Government should invest in facilities to support the programme and the wider industry.

Central to the Strategy's recommendations was the clear need to have a strong UK National Laboratory for the nuclear sector. This news was very well received by NNL and was seen as a positive recognition of the company's performance across all aspects of the business in recent years.

It means that in addition to important baseload contract work for customers, NNL will become more involved in advising Government on nuclear matters and participate fully in defining and delivering strategic nuclear research. Key outcomes for NNL include:

• Leadership and Mission

NNL will revert to being a conventional Government-owned company when its current management contract with the Serco/Battelle/University of Manchester (SBM) group concludes (scheduled for 2014).

To link with the wider Nuclear Industrial Strategy, the NNL mission will be restated to provide greater emphasis on supporting programmes across the nuclear sector, including decommissioning, future fuel cycles, new build, maintenance and support to lifetime extension. NNL will also, of course, continue to win and deliver commercial work for customers - old and new – to time, cost and quality as the main part of its business.

• Nuclear R&D Co-ordination Role

NNL will take on responsibility for hosting the new Nuclear Innovation Research Office (NIRO). NIRO will develop and take forward the work of the newly created Nuclear Innovation Research Advisory Board (NIRAB). This is an important step towards implementing a UK national programme for nuclear fission R&D.

• National Nuclear Users Facility

Government will invest £15M in equipment and access to NNL facilities and others located at the Culham Centre for Fusion Energy (CCFE) and the Dalton Cumbrian Facility. This will facilitate active research for academia, national laboratories and industry. The Users Facility complements the UK's membership of the international Jules Horowitz Reactor project in France that was also announced in March, with NNL leading on behalf of Government (see Page 5).

• NNL Facility Investments

The comprehensive refurbishment of the NNL Windscale Laboratory (handling and inspection facility) is underway and continuing while commissioning work on the Central Laboratory plutonium laboratories (Phase 2) is moving ahead. A key outcome of the Strategy was that NNL should continue to work with Government and the Nuclear Decommissioning Authority (NDA) to conclude an assessment within the next year about commissioning the high active cells (Phase 3) in the Central Laboratory.

• Retention of Capability

NNL carries a national remit to help safeguard the UK's strategic nuclear skills. It is unique in having the skills and experience available to apply across the full technology requirements of the nuclear fuel cycle. This will continue as Government recognises the need to retain and grow capability, skills and expertise in all areas including fuel manufacturing, advanced reactor systems, reprocessing and advanced fuel cycles.

• Academia and Industry

NNL will focus on maintaining the strategic alliances and links that the SBM partners have helped develop. Over the next few months the breadth and nature of new strategic alliances with academia, other National Laboratories and with industry will be evaluated and formalised.

National R&D Programme

The Nuclear Industrial Strategy coupled with the recommendations from Sir John Beddington's Advisory Board means the UK has taken a big step forward towards implementing a national R&D programme. NNL's front line role in nuclear R&D is a reflection of the good work delivered by the business in the past few years.

NNL is becoming even further embedded as a national laboratory in terms of how it supports Government via advice on strategic decisions and leadership on key strands of activity. The renewed focus on investment in UK nuclear facilities is particularly welcome along with a strong recognition for the export potential of the UK nuclear offering as a whole.

The UK is clearly determined to return to the international 'top table' of nuclear research collaboration and NNL will be at the centre of this resurgence operating with a clear focus on safety, quality, technical excellence and innovation.

Q&A

with Prof Graham Fairhall, NNL's Chief Science and Technology Officer

What do we mean by 'UK National Programmes'?

There are a number of UK National Programmes across key areas of the nuclear sector. These include keeping existing nuclear reactors operating and extending their lifetimes. Looking to the future, national programmes will also support low carbon energy requirements covering the new nuclear build programme and, for the long term, future reactor systems and their associated fuel cycles.

In addition, there are also programmes to manage public sector civil nuclear liabilities and assets, the estate looked after by the NDA. This includes decommissioning, clean-up and ensuring that nuclear materials such as plutonium are safely managed. There is also the long-term management of nuclear waste, supporting work on geological disposal.

A separate and increasingly important programme covers security and international safeguards. Nuclear security relates to the prevention of theft, sabotage, unauthorised access involving nuclear material and other radioactive substances. Safeguards is the international regime preventing diversion of nuclear materials and the spread of nuclear weapons.

A key outcome from Sir John Beddington's ad hoc Nuclear Research and Development (R&D) Advisory Board was the recommendation to establish a national programme covering longer-term nuclear energy R&D. Sir John also called for Government to invest in facilities to support the programme and the wider industry.

What will NNL's role be in supporting these National Programmes?

NNL will play a central role across the range of national programme areas. Where there are existing national programmes, NNL will work closely with customers and stakeholders to support them in co-ordinating and providing essential R&D. Where there is no existing national programme, for example future reactor systems including fuel development and reprocessing, NNL will play a key role to shape the programme and assist Government in making the business case for funding. It will do this working directly with Government and also through its leadership of the Nuclear Innovation Research Office (NIRO).

How will NNL balance National Programmes with commercial work for customers?

Both our commercial services and products for customers and developing work on national programmes are extremely and equally important to the future of NNL. We are very pleased that the Government has recognised that we have an important revised remit to be a true national laboratory supporting both Government and the nuclear industry.

We will continue to deliver commercial work for customers as well as play a core role supporting the UK Nuclear Industrial Strategy and nationally important R&D programmes. Much of our commercial work will also have a natural join with national programmes. I must emphasise that our additional work on national programmes will not affect NNL's commitment to our commercial customers.

What is NIRO, how will it work and what happens next?

NIRO will be set up to operate from within NNL reporting to me, as the Chief Science and Technology Officer and is separate from our Business Directorates. NIRO has an important role to provide co-ordination across civil nuclear R&D programmes funded by Government or its agencies.

A specific role will be to develop the case for future R&D programmes covering longer term nuclear energy and to act as the technical authority for this national programme area.

Are you optimistic for the future of nuclear R&D in the UK?

Yes, nuclear R&D has moved up the Government's agenda over the past couple of years and we have seen some very significant and positive reviews via the House of Lords Science and Technology Select Committee and Sir John Beddington's R&D Advisory Board.

We now need to support the UK Nuclear Industrial Strategy aspirations to convert that enthusiasm into real action and map out priorities and funding going forward.

NNL Trains Iraqi Scientists

A group of scientists and engineers from Iraq visited NNL facilities at Preston and Cumbria as the final part of a two-year training programme. The training covers dismantling, decommissioning and decontamination of nuclear facilities built in Iraq during the Saddam Hussein regime.

The week-long visit to the north-west of England was the culmination of the programme carried out on behalf of the European Commission by NNL and Italy's Insubria Centre for International Security. The training was designed to safely speed up the nuclear clean-up operation in Iraq and to retrain scientists for careers focused on nuclear decommissioning and waste management.

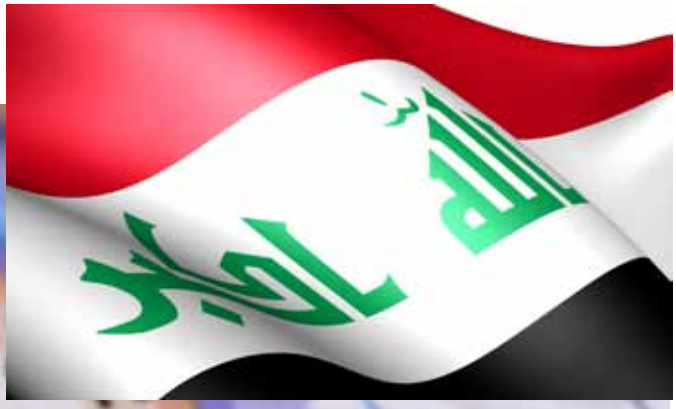
The visiting scientists and engineers had considerable nuclear awareness and experience in their fields. Over the two years of the programme, they have spent time with experts from the UK and Italy learning about best practice in waste management and site clean-up.

The prorgramme included topics such as laboratory management and quality assurance, decontamination methods, waste minimisation and management practices, determining suitable disposal site locations, hazard and safety assessment, waste characterisation methods and decommissioning.

The delegation was able to sample UK expertise at first hand, visiting the NNL facility on the Springfields site near Preston, the National Low Level Waste Repository in West Cumbria, waste management plants on the Sellafield site, NNL's flagship Central Laboratory at Sellafield and the company's Non-active rig hall at Workington.

Dr Emad Shamsaldin, Director of the Radioactive Waste Management Directorate in the Iraqi Ministry of Science and Technology, said: "The visit has been very valuable to us. It has allowed our people to see new ideas which they can adapt to the work they will be doing in Iraq and increases their confidence in what can be done to remediate nuclear sites."

Research Technologist Olivia Thompson led on NNL based elements of the training throughout the two years. She said: "This visit has been a long time in the planning and I'm delighted it has proved to be so useful to our visitors. I'm proud to have been involved in such a worthwhile project, and of the team which has made the visit, and the whole project, such a success."



NNL Leads for UK on Research Reactor

A pledge by the UK and France to work closely on research and development has been underlined by a £12.5M funding commitment to the Jules Horowitz research reactor.

NNL has welcomed the news and is particularly pleased to be asked to lead the UK's involvement in this important work, which is an early example of the Government's Nuclear Industrial Strategy being put into practice.

The majority of materials test reactors around the world, including Halden in Norway which the UK has used successfully for many years, are starting to show signs of age.

The Jules Horowitz Reactor (JHR) is under construction at the Cadarache site in France and will feature state-of-the-art materials test capability. The new facility aims to underpin the international community's test reactor requirements well into the future.

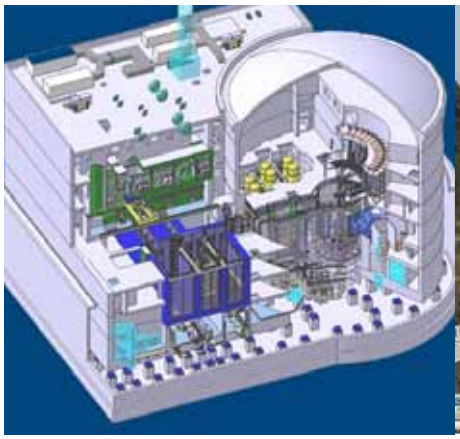
At the signing ceremony in London, NNL MD, Paul Howarth said: "This announcement is great news for the UK. As we look towards the role that nuclear power can play in the UK's energy future it's vitally important that we are engaged in major international collaborations like this one.

"I'm delighted that NNL has been asked to lead the UK participation in the project. This is an important step towards returning the UK to the international 'top table' in the arena of civil nuclear R&D".

Having access to facilities that will provide information on how nuclear fuel and other materials behave in a nuclear reactor is an essential part of any advanced fuel or reactor development programme.

Both regulators and utilities view such test facilities as vital in terms of providing underpinning safety research, operational data and computer code validation data for a relatively low cost.

Construction work on the JHR is expected to be completed in 2016 and the project will be operated as an international collaboration making sure that benefits are delivered in a cost-effective way.



Winning the Pinkerton Prize

Each year the Nuclear Institute awards the prestigious 'Pinkerton Prize' to the authors of the best paper to feature in their Nuclear Future magazine during the previous 12 months.

We are delighted to report that the latest Pinkerton Prize was awarded to the authors of an NNL paper: 'Encapsulation Options for Decommissioning Waste'. The joint authors were Mike Angus, Charlie Scales and Steve Palethorpe.

Commenting on their memorable recognition Mike said: "I was thrilled to hear that this paper had been selected as the best one of the year by the Nuclear Institute's judging panel.

"It's recognition of the breadth of capability within NNL, since I was able to obtain input to this paper from five colleagues with specific expertise in immobilisation topics in addition to the contributions from Steve and Charlie - a real team effort."

Exploring Organic Waste Treatment

In a new collaboration, NNL has linked with organic destruction experts Arvia on a project to treat oils and solvents contaminated with radiation.

Funding has been granted by the Government-backed Technology Strategy Board, which is the UK's innovation agency. The initiative is also supported by the NDA. The project uses Arvia's proven technology to destroy oils and solvents located at the Sellafield site, which are contaminated with high levels of alpha radiation.

NNL and Arvia have been working together to examine how their distinct sets of capabilities could be brought together to deliver a project of real benefit to the nuclear industry. The partners will continue to work together to test the proven Arvia process on wastes which have no current disposal route.

Key decision makers at Sellafield Ltd have already shown interest in the project as they look to safely undertake decommissioning and nuclear waste management.

Debbie Keighley, Head of Technical Capability at Sellafield Ltd said: "Plutonium contaminated oils and solvents are stored on the Sellafield site and are not currently treatable using conventional techniques. The process therefore offers significant potential benefits for our industry."

Estimates suggest that successful project completion of the project could lead significant cost savings for Sellafield Ltd and NDA, which owns the Sellafield site.

Barney Whyte, NNL Business Leader for Waste and Residue Processing was similarly pleased at the collaboration: "This project will help pave the way to solving a wealth of waste problems here in the UK and further afield," he said.

"Our goal is to assist in the development of solutions to some of the most pressing concerns for the nuclear industry and in undertaking this project we hope to move closer to solving this particular issue."

Of the 230,000 tonnes of intermediate level nuclear waste in the UK, around 5% is organic. The challenge is not only confined to the UK nuclear market. Around the globe, there are significant volumes of waste organics that have gone untreated due to the lack of suitable cost effective treatment options.

Martin Keighley, CEO of Arvia is excited by the potential of the venture. He said: "This project will enable us to establish our technology's capabilities to solve a major problem for the nuclear industry. I'd like to thank the Technology Strategy Board, NDA and NNL for their support in assisting us to make this project a reality."

arvia
ORGANICS DESTRUCTION

Foratom Visit

Cutting edge work being undertaken by NNL to support the European space programme was top of the agenda during a visit to Sellafield by the Director General of FORATOM.

Jean-Pol Poncelet leads Brussels based FORATOM, which plays a key role as the industry trade association promoting the use of nuclear energy in Europe. M Poncelet was accompanied at NNL by Richard Ivens, FORATOM's Government Affairs Director.

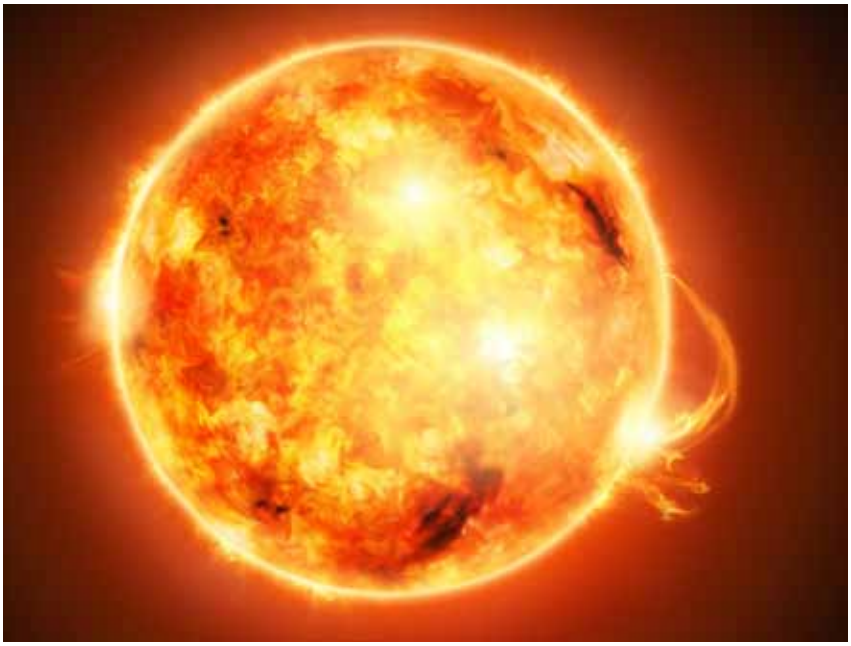
The high profile visit was hosted by NNL MD Paul Howarth and included a tour of the Central Laboratory facilities. The FORATOM party were interested to hear about the breadth of NNL's activities especially the work being carried out to support power applications for space exploration. NNL is involved in the development of a Radioactive Thermoelectric Generator (RTG) or 'space battery' to power future generations of European led space missions.

FORATOM

This is of particular interest to M Poncelet, who was previously Strategy Director for the European Space Agency. Additional discussions focused on how NNL can best engage with European R&D funding. Feedback following the visit was very positive.

Harnessing Cosmic Energy

Located at the centre of the Solar System, the Sun is vital to life on Earth and provides its primary source of energy. A project led by NNL in collaboration with the University of Glasgow is harnessing the cosmic energy of the Sun to address waste management challenges on the Sellafield site.

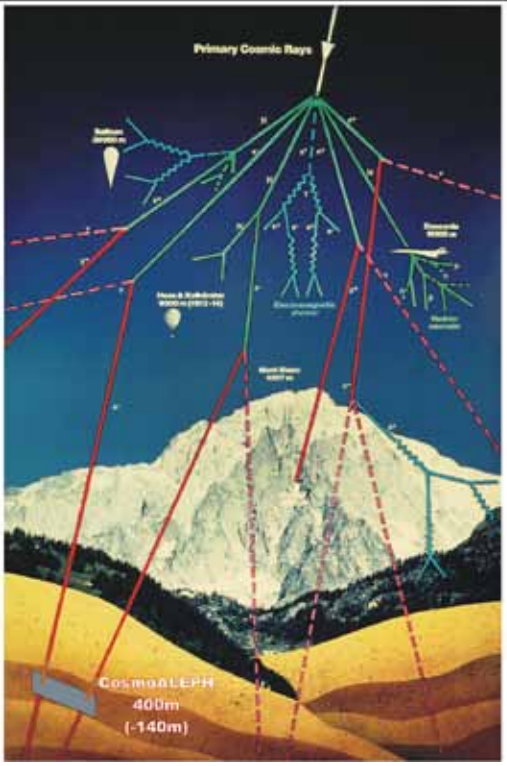


Cosmic ray 'muons' pass easily through matter usually without any effect. However, some denser materials cause these muons to react and scatter. This scattering effect can be used to identify dense materials with high atomic numbers such as uranium and lead.

This means that the technique has significant potential for imaging large or dense objects that are outside of the scope of conventional methods such as X-rays. The NNL led Muon Tomography project is investigating the feasibility of developing a full-scale industrial imaging system that can be deployed at Sellafield.

If successful, this has the potential for site operators Sellafield Ltd to be able to image the internal contents of Intermediate level Waste (ILW) containers. Once fully developed, the technology could also be applied to other areas of the nuclear industry.

Cosmic Rays



Sellafield Ltd has supported and invested in the muon project from the beginning and an initial feasibility study that has move through to the demonstration stage and proof that the technology is viable and can be developed further.

The collaboration between NNL and the University of Glasgow is a multi-phased project, which is now in Phase 2. Phase 1 featured the design, construction and commissioning of a fully operational small-scale prototype detector system. This validated results of an earlier feasibility study and delivered some very promising image results.

Phase 2 of the project will address the practical challenges of deploying technological solutions in operational industrial environments. This includes transferring the detector technology from a lab-based environment to one which can handle deployment in industrial facilities. Components need to be made robust to enable them to be used for extended periods.

Building on experience from the muon tomography project, NNL is also undertaking a feasibility project to investigate an innovative and cutting-edge technology which utilises a compact source of high energy X-rays. This technique produces high resolution images of the internal contents of containers which cannot be achieved using traditional techniques.

This imaging system is complementary to muon tomography and will potentially allow a clearer identification of a separate range of less dense materials.

NNL Continues to Develop USDoE Links

NNL has continued its growing relationship with the US Department of Energy (USDoE) via two recent high profile visits to Sellafield.

Deputy Assistant Secretary Dr John Kelly came to the Central Laboratory for a tour of facilities and discussions. John has responsibility for nuclear reactor technologies in USDoE. His extensive remit includes support to Small Modular Reactor (SMR) technologies, participation in the international Generation IV programme, reactor concepts, fuel cycle R&D as well as the US space batteries Radioactive Thermoelectric Generator (RTG) programme.

NNL has been working with John's team at USDoE on RTG developments over the past few years. Team members have visited the UK on several occasions and were keen to have John visit while in Europe en-route to a meeting at the IAEA in Vienna.

He met with NNL Chief Science and Technology Officer Graham Fairhall, Strategic Business Development Director Huw Morgan and senior team members Tom Rice and Tim Tinsley. John received an update on NNL's work on the European Space Agency (ESA) project to demonstrate the feasibility of using the nuclear material americium in an RTG.

He was also briefed on other work being carried out by NNL. John updated the NNL team on USDoE technology development programmes including SMR and the Generation IV initiative.

Prior to taking up his role at USDoE, John worked at the Sandia National Laboratory in Albuquerque, USA for many years. Recent conferences covering Nuclear Emerging Technologies for Space (NETS) have been held in Albuquerque and a team from NNL has visited for discussions on RTG safety analysis.

Sandia carries out all of the launch safety evaluation for US RTG launches. NNL has been working to facilitate technical exchanges with the USA and ESA in support of the European space battery programme

NNL also welcomed another senior-level USDoE delegation to Sellafield. Representatives from the Office of Environmental Management (EM) arrived led by Associated Principal Deputy Assistant Secretary Alice Williams.

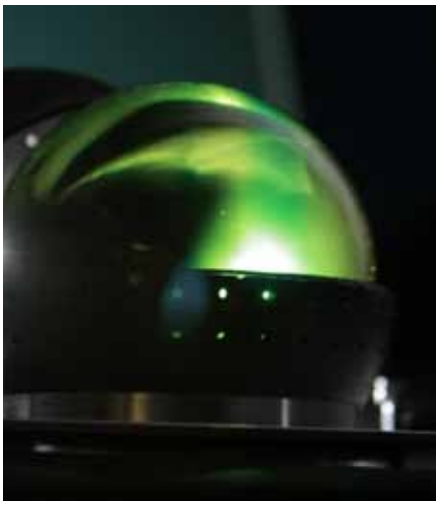
The visit was hosted by the NDA and the party toured the Sellafield site before stopping off at NNL's Central and Workington Laboratories. They also saw the NNL Vitrification Test Rig, a full scale replica of the process used in the Sellafield Waste Vitrification Plant (WVP) process.

The visit was a great success and has certainly helped in promoting further potential collaborations between NNL and the USDoE. Alice Williams said: "The tours of the NNL facilities at Sellafield and Workington were very interesting and informative and I was particularly impressed with the new active laboratory and Vitrification Test Facility.

"The importance of these active and mock up facilities was made very clear and has given us the opportunity to consider how mock-ups and large scale demonstration projects may be of benefit to the Office of Environmental Management clean up programme."

Top: Alice Williams, USDOE at NNL's Workington Laboratory

EDF ENERGY



Bottom: NNL's RadBall continues to impress customers

New Deal with EDF Energy

Delivering commercial work for customers, old and new, to time, cost and quality remains a clear and top priority for NNL.

Over the past few years, relationships with customers have improved significantly and this includes key customer EDF Energy. NNL currently supports EDF Energy in keeping existing nuclear reactors operating safely and efficiently.

NNL is delighted to have concluded a new framework agreement with EDF Energy's parent company, EDF in France, for new work covering a potential five years. The deal is part of the EDF CIDEN Project and covers the dismantling operation for nine nuclear power plants located around France.

More specifically, the work will include radiological and physical chemistry analysis for radioactive and non-radioactive samples. It will cover technical testing and analysis services, gamma spectrometry, measurement of radionuclides and detailed spectrometry.

All work will be carried out by the NNL Measurement and Analysis team at the Preston Laboratory.

Welcoming the news, Business Leader for Measurement and Analysis Services Darren Lee said: "This is great news for us and is a good example of our commitment to building relationships and services for a valued existing customer.

"We've won through on two separate lots covering high and low activity work. We'll be working through the detail and our excellent team are preparing to deliver this work in our Preston Laboratory."

The NNL bid process was led by Senior Technical Manager Colin Harvey, who is based at NNL Stonehouse. Colin provided the bulk of information for the pre qualification report and invitation to tender. He received very welcome support from two NNL colleagues who are native French speakers - Gwenaelle Le Gurun and Nathalie Galais who translated the proposal documents into French.

Fukushima Trialling RadBall

NNL has announced that a commercial arrangement has been put in place with Hitachi-GE Nuclear Energy Ltd. (HGNE) relating to the use of NNL's 'RadBall' technology at TEPCO's Fukushima Daiichi site in Japan.

The announcement was made as a group of NNL scientists visited the Fukushima site. Included in the visit were Kathryn Lennox and Lorien Howarth - two among very few female experts from outside Japan to visit Fukushima since the earthquake and tsunami in March 2011.

The events of 2 years ago left nuclear reactors at Fukushima badly damaged and a substantial amount of radioactive material was dispersed within the reactor systems and beyond, creating a complex cleanup challenge.

NNL's RadBall technology is based on the use of a radiation-sensitive material to analyse the extent and location of radioactive contamination within confined spaces. It has been selected for potential use in mapping the radiation levels in reactors and will help identify the locations of major contamination hot-spots.

RadBall technology, which has been developed and tested over the past several years is small and does not require any external power supply. This makes RadBall well suited for use in a challenging environment.

The potential application of RadBall to the Fukushima cleanup effort was first highlighted during a visit and seminar - organised by UK Trade and Investment - for UK nuclear companies in October 2011. The event was held at the British Embassy in Tokyo.

Commenting on the news of the new commercial arrangement with HNGE and TEPCO, NNL MD Paul Howarth said: "The cleanup of the Fukushima Daiichi site is one of the major challenges facing the global nuclear industry at present.

"I'm delighted that this NNL technology looks set to be considered as part of the solution to that challenge. We are looking forward to working with HGNE and TEPCO to better understand the details of the site and to help them to evaluate the capabilities of RadBall."

LaserSnake 2 Cuts Hazards

A new and exciting partnership has seen NNL collaborating in a R&D project worth £8 million.

'LaserSnake2' will develop lasers and robot carriers to create safe, cost efficient cutting tools for high hazard confined spaces.

The project is led by OC Robotics and funded by the Technology Strategy Board, the Department of Energy and Climate Change (DECC) and the NDA.

The UK Government is adding its support by contributing around £5.8 million to the project consortium with the remainder industry funded. The project shares some of the £31 million funding announced by the UK Department for Business, Innovation and Skills that is supporting the development of the nuclear supply chain.

NNL has access to some of the most advanced nuclear research facilities in the world and will initially establish a demonstration laser cutter at the Workington Laboratory. The facility provides a non-radioactive engineering and rig testing service for customers.

Future development work will see NNL deploy a robotic arm mounted laser cutter in a radiation environment in the Windscale Laboratory located on the Sellafield site.

NNL Business Leader for Post Irradiation Examination, Alan Grant said: "The LaserSnake2 technology has solid potential both inside and outside of the nuclear sector. It will come into its own in applications requiring work to be carried out in confined spaces. Areas outside of nuclear include oil and gas, construction and other sectors such as aerospace."

Research will focus on the underlying technical challenges including software control, electronics, process development and onsite demonstrations. Success will be measured both in terms of progress towards developing a tool kit for the nuclear sector and the non-nuclear markets.

NNL and OC Robotics are joined by partners Laser Optical Engineering (LOE), TWI and ULO Optics. OC Robotics provides expertise in snake-arm robots and has been working with customers across many sectors. LOE has a history of successfully developing novel laser beam shaping solutions. TWI has a world class reputation for laser processing and welding systems development and ULO has a long history of developing beam delivery heads and optics.

Chris Heading Strategy

Chris Moore has been appointed NNL Strategy Director following the retirement of Andy Elsden.

Joining from Westinghouse, Chris has extensive operational, commercial and strategic experience from his career in the nuclear industry, which also includes British Nuclear Fuels plc. With Westinghouse, his most recent role was Customer Project Director.

Speaking about his new appointment, Chris said: "I'm very pleased to be joining NNL at what is an exciting time for the organisation.

"The recent announcements from UK Government place NNL clearly at the heart of both the UK's future plans for nuclear R&D and also the nuclear offering on the international stage. I'm looking forward to helping to define and implement that new role."

MD Paul Howarth added: "I'm delighted to welcome Chris to NNL and I'm looking forward to working with him.

"He is the latest in a series of well known and respected industry figures to join us, which speaks volumes for the reputation and future prospects of our business."

In the Media

NNL has again attracted considerable interest from the media with coverage in the nuclear and national papers. We like to think this is a sign of our renewed profile, that we are doing things right and presenting opinions that people find interesting. Just in case you missed out, selected highlights of our media coverage are:

Good Times – NNL's Business Insight

NNL and the nuclear industry featured strongly in an edition of the 'Business Insight' regional supplement published earlier this year. The special edition focused on Britain's Energy Coast and its supporting cast of companies.

Business Insight is published in The Times newspaper and reaches out to business in the north of England. It covers stories making news in the commercial world.

A NNL focused article by James Hardy was headlined 'New-age nuclear challenges call on lab expertise'. The piece covered the past decline in nuclear research and development and current resurgence as a result of the success of NNL and recommendations made by the House of Lords R&D review and Beddington Advisory Group.

Paul in the Mix in FT

Commenting on new reactor build worldwide, Sylvia Pfeifer published a piece in the Financial Times headlined 'Nuclear industry must compete on cost in future energy mix'.

She highlighted the challenge facing nuclear in securing a long-term role in the provision of the world's energy. For the industry, NNL MD Paul Howarth is quoted in the following extract taken from the article:

Professor Paul Howarth, managing director at the National Nuclear Laboratory in the UK, believes it is critical that the industry goes ahead as planned with building a third generation reactor system like the Areva EPR earmarked for the UK.

"It is a case of keeping the faith with standard reactor designs so that we can get from first-of-a-kind costs – which can be high – to the nth-of-a-kind costs," he says.

"Then there would be much greater certainty about what the cost of nuclear is and we could then see fleets being built."

Huw on Masterclass Panel

As a prominent business leader in the area, NNL's Huw Morgan joined a high profile panel earlier this year to discuss and share ideas about the future of West Cumbria and its aspirations as Britain's Energy Coast.

Huw is NNL's Strategic Business Development Director and is based at the Central Laboratory. He participated in the panel discussion with other prominent local business leaders and elected representatives at the Energus facility at Lillyhall near Workington.

This was the latest in a series of forums and masterclasses led by The Times newspaper in collaboration with West Cumbria's Centre for Leadership Performance and Britain's Energy Coast. The Times followed up the event with publication of its Business Insight regional supplement focusing on West Cumbria and the Energy Coast.

Among others joining Huw on the panel were Elaine Woodburn, leader of Copeland Borough Council and Rory O'Neill, Sellafield Ltd Executive Director of Stakeholder Relations.

Britain's Energy Coast is a dynamic one-stop-shop for economic development in the region and the Centre for Leadership Performance is an initiative that aims to strengthen leadership capability across the private, public and civic sectors.

RadBall Scores on TV

NNL's radiation mapping technology 'RadBall' has featured on the Reuters TV service.

A Reuters crew visited the NNL Preston Laboratory to record a news item inspired by recent RadBall publicity. The small and compact unit requires no power supply and is supporting the clean-up operation at the Fukushima Daiichi site in Japan. This is the latest external recognition for RadBall. The technology has featured previously on the BBC and ITV and in various online and print media.

NNL People: Kayleigh's An All Round Winner

Winning awards is becoming something of a habit for Kayleigh Ennis. Another memorable year has seen Kayleigh add the 2012 NNL Apprentice of the Year title to her GENII Scientific Apprentice of the Year award for 2010/11.

Her success led to her becoming NNL's nomination for the Regional Nuclear Apprentice of the Year competition run by the National Skills Academy for Nuclear (NSAN). The ceremony took place in Manchester and Kayleigh was in the medals again reaching the final three before narrowly losing out on the top prize.

Kayleigh completed her NNL apprenticeship in September last year having covered an intense three years that has included a wide variety of on the job experience and training. She now works in the Measurement and Analysis team, where she has continued to develop her experience and skills.

During her apprenticeship, Kayleigh was keen to improve her qualifications. She attended college each week gaining a NVQ Level 3 in Laboratory and Associated Technical Activities (LATA) eight months ahead of schedule and a HNC in Applied Chemistry. She also obtained a key skills level 2 qualification in the application of number, communication and information technology alongside employment rights and responsibilities.

Kayleigh is planning to begin a degree in applied science on a part time basis in September. She is also passing on her enthusiasm and experience to the next generation of school leavers having become an ambassador for Science, Technology, Engineering and Mathematics (STEM) subjects. As a STEM ambassador, Kayleigh visits local schools and also participates in activity days.

Tireless Fundraiser

Despite a hectic few years at work, Kayleigh has also managed to squeeze in some charity fundraising for a cause very close to her heart. Along with her family and friends, she has raised over £18,000 (and still rising) to buy new life-saving equipment for West Cumberland Hospital's Intensive Care Unit. NNL also added to the total by donating a very welcome £1,000.

The fundraising campaign was started to fulfil a pledge made by Kayleigh's dad Tony when he returned from a stay in the intensive care unit at the end of 2011.

Tony wanted to thank the staff in the unit in some way for the life-saving work they did for him and for others. Sadly, Tony died in March last year but Kayleigh, her family and a host of her dad's friends were determined to carry on with the campaign and raise the cash in his memory.

Kayleigh and her group of enthusiastic fundraisers have worked hard to plan and complete multiple fund-raising events. They swam a mile along cold canals in the Great Salford Swim, completed a sky-dive from 14,500 feet, organised a charity event in Whitehaven attended by 300 people, hosted a race night and prize bingo and finally undertook some bag-packing in a local supermarket.

A 150-mile bike race was completed by 30 of Tony's family and friends before his nephew Paul Morgan and wife Claire ran the Great North Run.

Kayleigh said: "I can't speak highly enough about the professionalism, care and hard work of the team at the intensive care unit. We all wanted to carry out Dad's wishes and it's been good to focus on something so worthwhile. The sky-dive was pretty scary but gave me a real sense of achievement."

Everyone at NNL is extremely proud of Kayleigh's achievements at work and with her fundraising. Congratulations to her and best wishes for continued success in the future.

Appreciating and Recognising Contribution

2013 IMPACT Awards

Declared a great success, the NNL IMPACT Awards dinner and presentations took place at the University of Manchester's Sackville Street Building during April.

The celebration of the IMPACT Awards is an annual event and this year's glittering ceremony was introduced by Chairman Richard Maudslay and hosted by MD Paul Howarth. The occasion included winners and their partners and a group of those making winning nominations.

This has been the second year of the IMPACT Awards and they mark exceptional individual and team based contributions right across NNL irrespective of role or grade. The vast majority of the nominations for the IMPACT Awards had been made by NNL people for NNL people. This year featured a very impressive voting turnout at each of the sites and the winners were spread right across the business.

IMPACT Awards are the perfect way of showing how much people who go the extra mile are appreciated. Hundreds of voting forms were completed with 182 people nominated. From these, the judges managed to pick the overall winners. This year, a brand new Best External Scientific or Technical (BEST) Award was introduced to celebrate contributions to papers published externally. The BEST Award winner received The Lawrence Medal named in honour of former NNL Managing Director, Mike Lawrence.

Trophies were also presented for each individual winner and for the winning team of the year.

Lifetime Achievement

The IMPACT Awards ceremony featured the second presentation of the NNL Lifetime Achievement Award. This is given to exceptional people who have continuously delivered beyond expectations year after year.

The award was made to retiring NNL Strategy Director Andy Elsden. Having begun his career in the 1970s with BNFL, Andy has had a distinguished career having been involved in a wide range of technical, engineering and strategy roles both at home and abroad.

Since 2004, he has been leading on strategy for NNL. His role has seen him become very influential in defining the options for nuclear research and technology. He worked closely with Government and other stakeholders to define the importance of R&D and the role of a fully developed national lab.

Distinguished Guests

In addition to the winners, partners and nominators, the event featured a sprinkling of special guests from Government, key NNL customers and other nuclear bodies.

Guest speaker for the evening was Caroline Shaw CBE, Chief Executive of the Christie NHS Foundation Trust. Her presence at the ceremony highlighted some of the parallels between The Christie and NNL. Although NNL cannot claim to be saving lives on a daily basis, it is aligned with The Christie in being a unique, state-of-the art organisation driving through transformation.

Roll of Honour - Winners

- Team of the Year
  Workington Laboratory Facilities Team
- Exceptional Leader of the Year
  Jim Dockerty
- Individual of the Year (Quality)
  Katie Bell
- Individual of the Year (Value)
  Anna Booth (pictured below)
- Individual of the Year (Service)
  Natalie Chapples
- Individual of the Year (Growth)
  Myrian Wood
- Individual of the Year (Special Award)
  Olivia Thompson
- Corporate Responsibility
  Robert Alford
- Bob Grieve Safety Champion
  Sarah Peck
- Norman Brewer Personal Development
  Stuart Dickinson
- Innovation - Ingenuity
  David Norcross
  Bob Lewin
- Innovation - Most Promising New Innovation
  Martin Metcalfe
  Nassia Tzelepi
- BEST Award
  Mark Sarsfield

RSC | Advancing the Chemical Sciences

New Chemists

Recruitment, development and retention of high quality scientists and engineers is a key driver for NNL as it becomes more embedded as a true national laboratory employing the most talented people.

Developing skills is especially important as NNL builds on its support to programmes across the sector. Government has recognised the essential need in developing capability, skills and expertise.

NNL is committed to customers and other stakeholders and is developing its people via robust accreditation agreements in place with the leading professional institutes.

One of those bodies is the Royal Society of Chemistry (RSC). Graduates in chemistry and the chemical science are developing their careers with NNL through experience and by achieving qualifications with the RSC.

Congratulations to the following NNL people for gaining their Chartered Chemist status recently:

Liam Abrahamsen
Jonathan Austin
Chris Broan
Jonathan Dodds
Tracey Taylor

Mike Returns

We were delighted to welcome our former Managing Director Mike Lawrence when he visited the Central Laboratory during a trip to Europe.

Mike took over as NNL MD in April 2009 in charge of the new Executive team from the SBM partnership. He retired from NNL and returned to his home in the USA at the end of 2010.

Arriving from Battelle, Mike used his 40 years of nuclear industry experience to great effect and began the transformation of NNL before handing over the reins to his successor Paul Howarth.

Mike enjoyed a buffet with ex colleagues. After visiting the UK, Mike's trip took him into Europe and in particular a trip to the Normandy Beaches in Northern France that saw the allied landings on D-Day during World War II.

Adrian in Politics Podcast

NNL External Relations Director, Adrian Bull has taken to the airwaves in a podcast interview with leading political news website politics.co.uk.

Themed 'Britain's Energy Crossroads' the podcast explores the issues around major decisions being made by politicians to determine the nature of the UK's energy mix for much of the next century.

The politics.co.uk website is a leading commentator on political news in the UK and is popular among MPs and the public attracting over 150,000 visitors each month.

Adrian was joined by Energy Minister Michael Fallon and David Harrison from Ernst and Young who is an oil and gas veteran. The group was made up by Nick Molho, Head of Energy Policy at WWF-UK and David Green from the Isle of Wight Ecolsland project.

The finished podcast also features contributions from Dan Byles MP, a supporter of shale gas and Tim Yeo, the former chair of the Commons' Energy and Climate Change Committee.

The podcast (and others) can be downloaded from the politics.co.uk website.

NNL at Innovus Launch

NNL played a key role in the launch of an exciting new Cumbria based technology development programme.

Cumbria became a hotbed for innovation as business delegates, academics, industry specialists and local school children came together to attend the launch of Innovus at the Energus facility near Workington.

Innovus is a brand new Cumbria based technology development programme focused on taking bright ideas in the field of technology and making them a commercial success. NNL is a key delivery partner for Innovus, which has been created as a result of funding through Britain's Energy Coast and the NDA.

The programme has determined plans to encourage and support innovative technologies in Cumbria. The successful commercialisation of innovations is reliant on connecting a 'bright idea' with a 'real need' in the marketplace and Innovus aims to support this process from start to finish.

It will offer connections to market demand, access to world class facilities, funding, technical skills and business support through NNL alongside the University of Manchester.

Running in parallel with the main conference, teams of local school pupils were invited to take part in the 'Innovus Challenge'. Enthusiasm was the main ingredient as pupils competed against one another to complete a series of 24 tough interactive challenges, which were specially organised for the day.

There was a rare opportunity for the children to have a go on some of the world's most cutting edge technological advancements, like the Brokk Simulator, which involved students constructing a virtual building and Aquaball, an underwater robotics innovation.

Sheila Rae, NNL Technology Commercialisation Manager, took part in the launch and said: "We're delighted at how well the Innovus programme was received and we're looking forward to working with businesses from across the county to support their development and commercialisation of new technologies.

"It was great to hear from our guest speakers about how transferrable the skills which we have in the county are into other sectors and it bodes well for the future of technology in Cumbria."

Kevin Warren, Commercial Director at The University of Manchester's Dalton Nuclear Institute said: "Innovus has evolved from a shared belief at the University and NNL that Cumbria has a unique research and development capability and the opportunity to use technology as a driver for significant economic growth.

"I was particularly pleased with the number of school and university

students at the launch as they will be the innovators of the future and will be able to access more high-tech opportunities in Cumbria as a result of Innovus."

Many of the challenges at the event were borne out of ideas from research students or businesses and have gone on to solve 'real' business issues and needs within the marketplace - Innovus aims to support innovations just like these. It also has long term aspirations and aims to encourage and support innovation among the young people of Cumbria, to ensure a long term pipeline of talent and opportunity.

The Innovus launch was definitely not your average conference. It combined details of the how the programme will work and what it has to offer and featured some interesting examples of how technology innovation can solve business problems and help growth and diversity.

NNL and Skills Academy in High Level Deal

Nuclear R&D has moved up Government's list of priorities in recent times. There's a real recognition of the importance of retention and growth of skills and expertise across the nuclear fuel cycle.

Since becoming established in 2008, NNL's remit has included the safeguarding of the UK's strategic nuclear skills. NNL has worked in partnership with the National Skills Academy Nuclear to develop strategies to retain and grow skills.

In an exciting new development, the National Skills Academy and NNL have committed to working collaboratively on the development of high level skills to support future R&D capability for the nuclear sector.

The new agreement builds on existing strong relations and is cemented by the signing of a Memorandum of Understanding (MoU). The new MoU formally marks the collaboration to ensure a more streamlined approach to 'Subject Matter Expert' development.

The recently published 'Nuclear Energy R&D Roadmap: Future Pathways' by Government described the availability of skilled R&D personnel and subject matter experts as a critical issue.

This is critical not only for the experience required to build robust safety cases for nuclear operating plant, but also to provide the leadership and expertise necessary to implement longer-term R&D. NNL is currently operating a compact subject matter expert development model with Sellafield Limited. The National Skills Academy Nuclear will support in the standardisation of the model and will help build it into a formal programme.

Paul Howarth, Managing Director, NNL and Jean Llewellyn, CEO, National Skills Academy Nuclear signing the agreement

Alongside industrial experience, the development of subject matter experts also requires post-doctoral study with higher education institutions like The University of Manchester and its Dalton Nuclear Institute.

This helps to provide an environment that bridges academia, national laboratories and industry.

NNL Fuel Cycle Solutions Director Dr Fiona Rayment said: "Among the many thousands of skilled people playing vital roles in our industry, I'd say there are 100 or more subject matter experts who each possess virtually irreplaceable levels of knowledge in their specialist fields, often accumulated over decades.

"These people are the 'gurus' of their particular technical areas and it's vital that we develop tailored programmes to help them to transfer their skill and insight to the next generation. I'm delighted that NNL will be leading this activity, working closely with the National Skills Academy Nuclear."

Jean Llewellyn OBE, CEO National Skills Academy Nuclear added "It is well reported that one of the major skills issues facing the nuclear industry in the UK is the ageing workforce, with over half expected to retire in the next ten years.

"With subject matter experts requiring 10 to 15 years training, it's vital that a strategic approach commences with urgency. To effectively address this area, the collaboration between NSA Nuclear, NNL, industry and academia is required."

The National Skills Academy NUCLEAR

NNL Science Highlights Capability

An exciting new scientific journal has been launched by NNL.

'NNL Science' presents a selection of peer reviewed scientific articles completed over the last year. A variety of areas are covered, including science support for customers and our own self-funded Signature Research programme.

Chief Science and Technology Officer, Graham Fairhall said: "NNL Science illustrates the breadth and relevance of the Laboratory's work against the grand nuclear challenges of our age.

"I'm proud of the hard work and levels of expertise we have within our business. This first edition of what I expect to be a successful series of journals shows why NNL is rightly perceived to be at the forefront of nuclear science and technology in the UK."

Each edition of NNL Science will highlight a key area. This first edition includes a number of papers on graphite science. NNL Science can be viewed and downloaded on the NNL website at www.nnl.co.uk/science.

BEST Man Mark

This year's NNL IMPACT Awards ceremony featured the presentation of a brand new prize – the Best External Scientific or Technical (BEST) Award. This year's inaugural winner was NNL Research Fellow Mark Sarsfield.

The new award celebrates peer-reviewed NNL papers published in scientific journals and the winner also receives the Lawrence Medal, named in honour of former NNL Managing Director, Mike Lawrence.

Mike played a leading role in making the cultural shifts that have put science at the heart of NNL and laid the foundations for the BEST Award. First launched last November, BEST is part of a wider initiative that aims to:

- Promote and recognise technical talent in NNL
- Provide an environment in which technical excellence can flourish
- Advance NNL's scientific achievements externally

The response to the BEST Award call for nominations was excellent. 27 publications from 2012 with NNL scientists as a principal author were submitted. Covering a broad range of science, subject matter ranged from characterising atomic-scale structure through to the development of space batteries.

Each was judged against technical and scientific content, coherency of argument, innovation and impact of the science. The high level advisory panel of experts scrutinising articles included NNL Chief Technologists. Entries were reduced down to a shortlist of six.

Graham Fairhall convened a judging panel to pick a winner. This consisted of fellow Executive Director Fiona Rayment, Senior Fellows (technical leaders) and external contributor Professor Eann Patterson from Liverpool University.

Following extensive reviews of the six contenders, Mark was declared this year's winner for his paper 'Raman spectroscopy of plutonium dioxide and related materials', which was published in the Journal of Nuclear Materials.

Mark's paper examined Raman spectroscopy as a technique for the analysis of plutonium dioxide powder within an alpha active glovebox. The groundwork illustrated in Mark's paper may provide a benchmark for the identification of chemical changes that could occur during experiments to support the safety case for longer term storage of plutonium.

Mark said: "I'm very honoured to receive The Lawrence Medal and would like to thank my collaborators at NNL and the Atomic Weapons Establishment for their input to the project. I'm also grateful for the financial support from the NDA and the NNL internal research and development programme."

Mike Lawrence was on hand to present The Lawrence Medal to Mark during his recent trip to Europe.

Cake Baking, Raising Hell, Racing and Rallying

NNL is baking and it's nothing to do with the summer weather!

A series of cake bakes have taken place, all in aid of good causes. A recent sale of excellent cakes and related produce provided welcome funds for the Royal National Lifeboat Institute (RNLI) at St Bees village adjacent to the Sellafield site. The sale raised £175, which was match-funded by NNL. There has been match funding from NNL in the majority of charitable ventures undertaken by the cake bakers.

RNLI is the charity that saves lives at sea and provides an on call 24-hour lifeboat search and rescue service and seasonal lifeguards. The cheque was presented to RNLI by CR Champion Dominic Rhodes who recommended the charity. Dominic and daughter Caris were treated to a ride in the lifeboat.

NNL cake bakes, co-ordinated by the determined Vikki Brett, have gone from strength to strength and have featured a welcome surge in the numbers contributing, particularly male bakers. So far, the bakes have raised over £3,000 with the cash directed at local charities in West Cumbria and nominated by Central Laboratory residents.

There was even a festive NNL Cake Bake off competition at Christmas with a number of 'celebrity' judges appointed for the grand tasting, including Acting Facilities Director Keith Johnson and Sales Manager Phill Bearman. The jury also included constructive input and the opinions of experienced cake consumers Brenda and Ann, the Central Laboratory cleaners. Cake bakers went on to support the CFM Cash for Kids Christmas present appeal that also included the donation of gifts for local children.

A brave group from NNL participated in 'Hell on the Harbour Side'. This event provides a unique test of strength and stamina as teams run, walk and crawl their way around Whitehaven harbour and the surrounding area. It's designed by former military personnel as a test of strength and stamina and uses natural and manufactured obstacles that include 'Steps of Doom', 'Lugg Muncher', 'Insandity' and the dreaded 'Cobble Hobble'.

The cake bakers turned up in force at the 'Hell' for their monthly session in support of the Great North Air Ambulance and raised £158, which NNL again match funded. NNL participants in the 'Hell' prepared professionally and in style by tasting cakes.

Fundraisers also to their places in the Cancer Research UK Race for Life event in Carlisle in early July. Race for Life is uniting women across the country in the fight against cancer and the events cover 5,000 and 10,000 metres.

A family team from NNL took part in the race and a number of cake bakes were also held to raise funds for Cancer Research. Colleagues report that the considerable challenge this year was to encourage the children to actually run the race without too much moaning and complaining.

Cancer Research has a real resonance with NNL as a Sellafield based colleague was undergoing breast cancer treatment last year but was determined to take part in the race. NNL supported her by entering a number of teams throughout the UK and it inspired the ongoing programme of cake bakes.

The intrepid and determined cake bakers are taking a well earned break over the summer holidays but will reconvene to put together a new strategy and list of charities to support. Plans are already underway for another Christmas special in 2013 and 'Chuddyball 14' next May.

Chuddyball is a car rally that travels up and down the UK starting and ending in West Cumbria. Participants travel 2,000 miles in four days first heading north to John O' Groats then south along the east coast to Brighton. They take in Land's End and Newquay in Cornwall before pointing themselves north and travelling back to Cumbria.

The rules are that the car must be worth less than £500, while each team has to raise at least £100. Fancy dress for both the car and occupants is mandatory!

Charities supported by cake bakes:

- Race for Life Cancer
- Special Care Baby Unit at West Cumberland Hospital
- McMillan Big Coffee Morning
- The North West Variety Club
- Mission Christmas CFM Cash for Kids
- Hospice at Home West Cumbria
- Wasdale Mountain Rescue Team
- The Complementary Care Unit at Muncaster
- Red Heart Day (instead of Red Nose Day)
- RNLI St Bees
- Great North Air Ambulance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