NUCLEAR AMRC news

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New nuclear ambitions

William Cook Cast Products joins the Nuclear AMRC as UK sets 24GW target

CATAPULT
High Value Manufacturing

Rolls-Royce SMR looks for pre-production suppliers

Rolls-Royce SMR is looking for manufacturing equipment suppliers to support pre-production development of its small modular reactor.

Manufacturing engineers Murray Page and Simon Wakefield shared pre-production development plans during a webinar hosted by the Nuclear AMRC in April. Around 120 delegates including Fit For Nuclear companies and Nuclear AMRC industrial members joined the call.

Initial manufacturing development is focused on the heavy pressure vessels for the reactor. The Rolls-Royce SMR is based on established Gen III+ pressurised water reactor technology, similar to that used at Sizewell B and under construction at Hinkley Point C, so manufacturing the vessels to nuclear standards shouldn't present any fundamental challenges. The difference is the scale – all SMR components and modules are designed to be transported by road – and the requirement for multiple vessels to be produced to a regular schedule.

"The key is to make more of them quicker than has ever been done before," Page told the webinar.

As a first step to full-scale production, Rolls-Royce SMR will work with the Nuclear AMRC and other partners to produce two advanced manufacturing prototypes.

One prototype will be a representative-scaled heavy pressure vessel, of around six metre length, 2.5 metre diameter, and 27 tonne mass. The other will be a full-scale vessel closure head, of around 4.5 metre diameter and 40 tonne mass. Both will be produced from forgings to be provided by Sheffield Forgemasters, and fully welded and clad to nuclear quality standards.

Producing the prototypes will depend on more than 70 items of manufacturing equipment, in areas including submerged arc welding, electroslag strip cladding, gas tungsten arc welding and cladding, heat treatment, heavy machining, inspection and non-destructive evaluation. The large-scale fabrications will also require a variety of handling, tooling and lifting equipment, as well as work access platforms.

"We're looking to the UK supply chain to see if most of that equipment can be provided to us," Sean Murphy, Nuclear AMRC strategic relationship manager, told the webinar.

The Nuclear AMRC will host the integrated pre-production proving facility at its Rotherham research factory, and equipment can be provided as an in-kind contribution to industrial membership, Murphy noted.

The prototype development programme will also draw on the specialist expertise of other organisations on and around the Advanced Manufacturing Park, including the University of Sheffield AMRC, welding technology group TWI, and fixturing specialist MetLase.

The processes developed in the pre-production phase will then be transferred to a new heavy vessel factory, at a location to be announced later this year.

Rolls-Royce SMR is also proposing to build another two new factories for civil and system modules – the entire plant is being designed as a number of modular sub-assemblies which will be manufactured in factories, then transported to site for rapid assembly inside a weatherproof canopy. Pre-production development of mechanical, electrical and plumbing modules will begin around 18 months after the start of the heavy vessel programme.

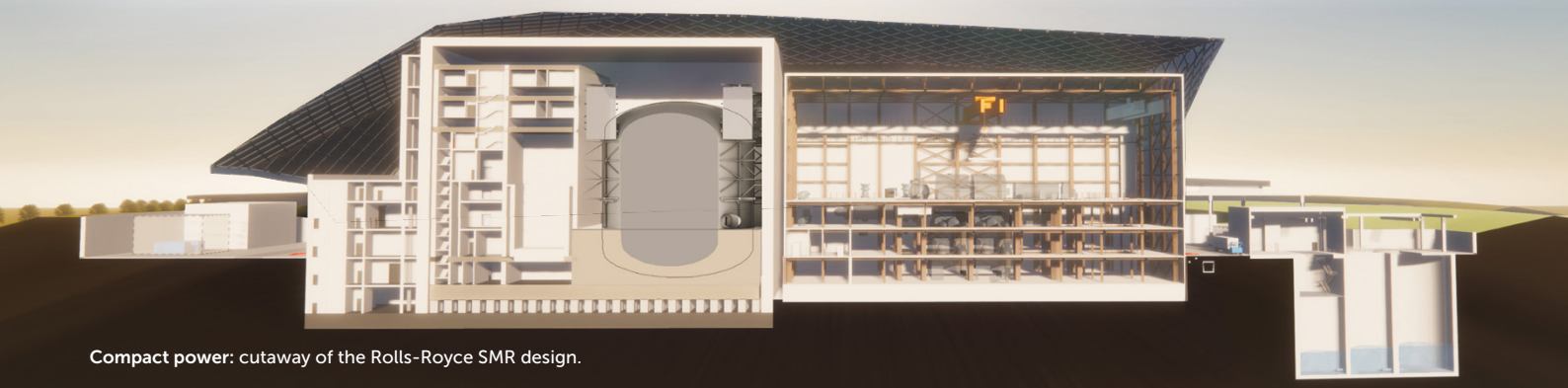
The pre-production programme is supported by £210 million of government funding from the Industrial Strategy Challenge Fund, and private investment from Rolls-Royce Group, BNF Resources UK, Exelon Generation and the Qatar Investment Authority.

Alongside the start of the manufacturing development programme, the Rolls-Royce SMR entered the UK's generic design assessment (GDA) process in April.

Managed by the Office for Nuclear Regulation (ONR) and Environment Agency with Natural Resources Wales, the GDA is intended to support the construction of a number of new nuclear power stations by approving a standard reactor design which can be built in different locations by different developers.

Rolls-Royce SMR is aiming to complete step two of the GDA by mid-2024. With continuing government support and firm orders, the first 470MW unit could be providing power to the grid before the end of the decade.

To find out more about supplying the vessel pre-production development programme, contact: **sean.murphy@namrc.co.uk**



Compact power: cutaway of the Rolls-Royce SMR design.

Steel city: casting at William Cook's Sheffield base.

William Cook signs up for nuclear opportunities

William Cook Cast Products, the UK's largest steel casting group, has joined the Nuclear AMRC to develop its capabilities for the nuclear sector and other low-carbon energy markets.

William Cook Cast Products supplies high-specification cast steel components to all segments of the energy sector – from offshore drilling, to renewable power generation, to nuclear waste storage – as well as for demanding markets such as rail and defence. Part of the William Cook Group, the company has been casting steel in Sheffield since 1883.

William Cook Cast Products' new tier two membership of the Nuclear AMRC will help the company develop its technical and business capabilities for the nuclear sector, and build new relationships with the centre's network of members and partner companies working across the nuclear new build, reactor development and decommissioning markets.

"Membership of the Nuclear AMRC will help us link up with more businesses in this sector," says Chris Seymour, group managing director at William Cook. "We have recently brought in heavy machining capability to the group and are currently in the middle of a £1.5 million investment in a new high-energy radiography facility. These investments together with membership of the Nuclear AMRC are part of our strategy to increase our footprint in the nuclear market.

"We want to be seen to be a trusted supplier of high-integrity castings into this safety-critical market, which is part of an industry key to helping the world achieve its net-zero climate targets."

The company will work with the centre's engineers and research partners through collaborative R&D projects to improve the design and manufacturability of complex steel castings, and work towards achieving additional standard qualifications to allow it to produce certified safety-critical components for nuclear facilities.

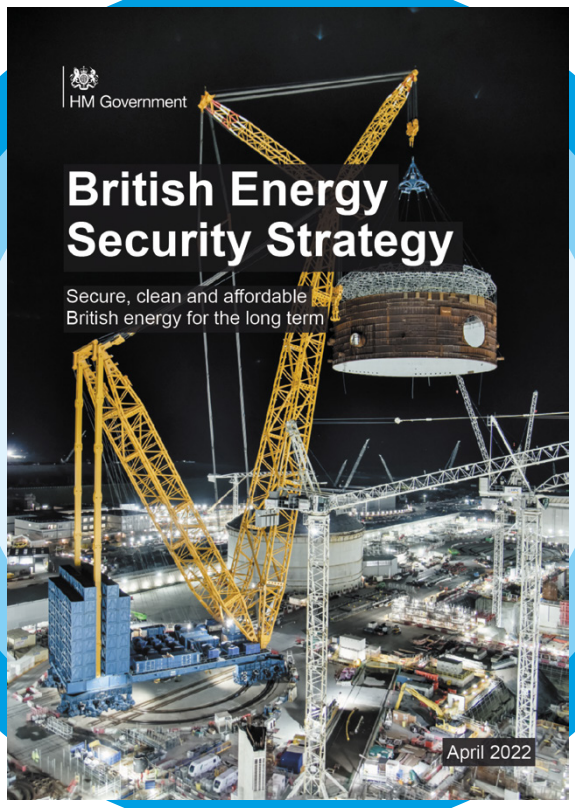
"I'm delighted to welcome William Cook into the Nuclear AMRC's membership community, consisting of large-scale development companies, nuclear specialist organisations and supply chain companies," says Sean Murphy, strategic relationship manager for the centre. "The potential opportunities for UK manufacturers within the nuclear supply chain have rarely looked better, so this is a good time to engage with Nuclear AMRC. We look forward to investigating R&D and process improvement projects together."

William Cook Cast Products already works with the Nuclear AMRC's sister centres at the University of Sheffield. It became a member of the AMRC in 2016 to collaborate on casting R&D, and has worked with the AMRC Training Centre on apprentice training.

www.william-cook.co.uk

UK targets 24GW of nuclear

The UK government has set an ambition of 24GW of nuclear capacity by 2050 as part of its new energy security strategy.



The new target represents up to 25 per cent of the UK's projected electricity demand. The government says it will progress up to eight projects as soon as possible this decade, including Sizewell C in Suffolk and Wylfa in Anglesey.

EDF's Sizewell C is intended to be a near-replica of Hinkley Point C, currently under construction in Somerset, with two Framatome EPRs producing 3.2GW of reliable low-carbon electricity.

"Building more new nuclear will reduce Britain's dependence on overseas gas and keep energy prices stable, creating thousands of jobs while we're doing it," commented Simone Rossi, EDF's UK CEO.

"The fastest way to get more nuclear in Britain is get on with the next two units at Sizewell C. It's a copy of Hinkley Point C, the design is approved and ready to go, and British manufacturers are experts in how to build it. Building more of the same design is the best way to bring down costs and develop a strong UK supply chain."

In April, EDF announced plans to extend the life of its Sizewell B power station by at least 20 years, which will allow the 1.2GW plant to contribute to the 2050 target. EDF will work with partners including Westinghouse, Framatome, Jacobs and General Electric on the preliminary life extension programme, with a final investment decision expected by 2024.

The energy security strategy was also welcomed by Westinghouse and Bechtel, who are proposing to build at least two AP1000 reactors at Wylfa.

"A Wylfa AP1000 project will create thousands of highly skilled jobs in the North, promote strategic transatlantic collaboration, and contribute significantly to the nation's energy security and decarbonisation targets," said Mike Waite, director of new plant market development at Westinghouse. "Leveraging support from the government's Future Nuclear Enabling Fund, two AP1000 reactors at Wylfa and 2.3GW on the bars – enough to power the whole of Wales – can be deployed faster than any other technology currently under consideration."

Investment for these multi-billion pound projects could be unlocked by a new financing model approved by Parliament in late March. The Regulated Asset Base (RAB) aims to reduce the cost of capital by adding a small surcharge to consumer bills while the new power plants are being built, generating revenue for the private sector investors.

Under the previous financing model used for Hinkley Point C, investors received no payback until the new plant was operational, with the contract for difference mechanism providing a guaranteed price for each megawatt-hour of electricity.

According to government modelling, RAB will reduce lifetime costs for each nuclear project by around £30 billion.

Tom Greatrex, chief executive of the Nuclear Industry Association, called RAB an important part of cutting financing costs and getting on with building new nuclear plant. "It sends a clear message to investors that Britain backs nuclear as a green technology vital to our future energy system," he said.

The government aims to progress at least one project – most likely Sizewell C – to final investment decision by the end of

this Parliament in 2024, and two in the next Parliament. Subject to technology readiness, the 2024–29 phase may include a small modular reactor (SMR) project.

"The Rolls-Royce SMR remains the fastest route to market for new nuclear deployment in the UK, and we welcome this government's clear commitment to turbocharging nuclear deployment," said Tom Samson, CEO of Rolls-Royce SMR. "By providing an early commitment and working in series, Rolls-Royce SMRs will be able to contribute to the bold vision set out by the prime minister for energy security and decarbonisation."

A new government body, Great British Nuclear, will be set up to bring forward new projects, backed by "substantial" funding. The government's 2021 spending review included up to £1.7 billion of funding to support approval of at least one project this Parliament.

The government proposes to work with nuclear regulators to look at streamlining the consenting and licensing process for new nuclear power stations, including potential harmonisation on international regulation.

The strategy confirmed plans to launch the £120 million Future Nuclear Enabling Fund. Originally announced in last year's Net Zero Strategy, the fund is intended to lower barriers to entry for new reactor designs.

The British energy security strategy also outlines plans to accelerate the deployment of wind, solar and hydrogen, while supporting the continuing production of domestic oil and gas. The proposals could see 95 per cent of UK electricity generation being low carbon by 2030, including up to 50GW of offshore wind capacity.

www.gov.uk/government/publications/british-energy-security-strategy

Executive **view**

A step in the **right direction**

The new energy security strategy's targets for building new nuclear capacity are a welcome step in the right direction, and should help get the UK new build programme back on track.

The latest report from the IPCC emphasised the urgent need to decarbonise our energy system by deploying a host of technologies, and it's increasingly clear that nuclear has to play a significant part in the energy mix over the coming decades. Recent crises in the energy market have also highlighted the importance of moving away from imported fossil fuels towards secure, sustainable and affordable alternatives.

The nuclear new build programme has struggled to get moving over the past decade, and the fact that the previous generation of AGR power stations are now ceasing operation means that we're losing reliable low-carbon generation capacity just when we need it most.

The barriers to new build haven't been technological – they've come from the costs and risks of securing upfront financing for these multi-billion pound long-term infrastructure projects. The RAB financing model, a financial commitment from government, and the introduction of more easily financed small modular reactors should remove some of the blockers and make nuclear a much more attractive place for institutional investors.

Nuclear remains the only source of proven, reliable low-carbon power generation which operates around the clock, whatever the weather. The new target of 24GW by 2050, up to 25 per cent of total generation, should be a minimum baseline. We can go further with nuclear to provide a truly sustainable and secure energy mix. Modelling by the Energy Systems Catapult has shown that the optimal pathway to net zero emissions includes up to 50 per cent of nuclear by 2050 – that's potentially up to 40GW of capacity.

An intensive nuclear build programme will stretch the capabilities and capacity of the UK supply chain, but industry is ready to step up. We've already worked with hundreds of UK manufacturers to help them prepare for the opportunities and meet the needs of nuclear projects, and we're working with Rolls-Royce SMR and other developers to make sure that new reactor technologies can be manufactured in the most cost-effective way with as much UK content as possible.

New nuclear power can bring the biggest economic benefits to the UK of any energy technology. And those benefits will be felt nationwide – around 90 per cent of jobs in the industry are based outside London and the South East, and the average value of jobs in nuclear is around twice the national average.

Andrew Storer, CEO

Heat exchanger innovation for advanced fusion

Nuclear AMRC researchers have contributed to the early development of a new kind of heat exchanger for advanced fusion reactors.

Several fusion power plant developers propose to use liquid lithium as the primary coolant, with molten salt as a secondary coolant to avoid the risk of tritium permeating into a water coolant. Because of the extremely corrosive nature of both liquid metals and molten salts, designing a heat exchanger to transfer energy between the two presents a string of challenges.

Researchers from engineering consultancy IDOM led a pre-conceptual study to determine the most promising form of heat exchanger for such reactors. The study, funded by UKAEA and supported by First Light Fusion, also considered initial material evaluation and new approaches to leak detection and other safety features.

The researchers identified a compact plate-type heat exchanger as the most promising type, established the main design requirements and constraints, and proposed an initial design and potential material choices.

Nuclear AMRC senior research engineer Pablo Gordillo, metallurgist James Connell and chief technology officer Steve Jones were called in to provide expert advice on material selection and the manufacturability of the design concept. The team considered issues including liquid metal corrosion mechanisms, material selection, and sealing and joining techniques including ceramic-metal bonding.

"A manufacturability study makes sense at this early stage of development, as it avoids making concept designs that current technology is unable to manufacture," notes Gordillo.

The team have published their initial study in the journal *Fusion Engineering and Design*. Further work is required to evolve the design, develop thermal-hydraulic modelling, and fully understand corrosion in the plate material.

doi.org/10.1016/j.fusengdes.2022.113106

Electron beam revolution for Forgemasters

Sheffield Forgemasters has announced a breakthrough in the industrialisation of local-vacuum electron beam welding for thick-section materials.

As part of a collaborative research project funded by the BEIS Energy Innovation Programme, the company joined two 200mm thick, three-meter diameter vessel sections in nuclear grade steel. The weld was completed in 140 minutes in a single pass – using conventional techniques, it would take months with repeated rounds of welding, testing and heat treatment.

The local-vacuum technology developed by project partner Cambridge Vacuum Engineering removes the need for a vacuum chamber large enough to contain the entire fabrication.

Forgemasters, a founding member of the Nuclear AMRC, is now preparing to fabricate a full-scale nuclear pressure vessel consisting of four shells and a head.

The project was supported by the Nuclear AMRC, The Welding Institute, Arc Energy Resources, and the Universities of Cambridge and Manchester, and built on research completed as part of the Inform project led by the Nuclear AMRC.

www.sheffieldforgemasters.com

Single pass: researchers with the 200mm-thick welded sections.

Weld inspection breakthrough

to optimise productivity and sustainability

A new technology to identify weld defects in minutes can save time and cost in high-integrity fabrications for nuclear new build projects and other quality-critical applications.

The technology was developed by the Awesim (Automated Welding Equipment System Inspection and Monitoring) consortium, led by Cavendish Nuclear and drawing on the Nuclear AMRC's expertise in real-time weld monitoring.

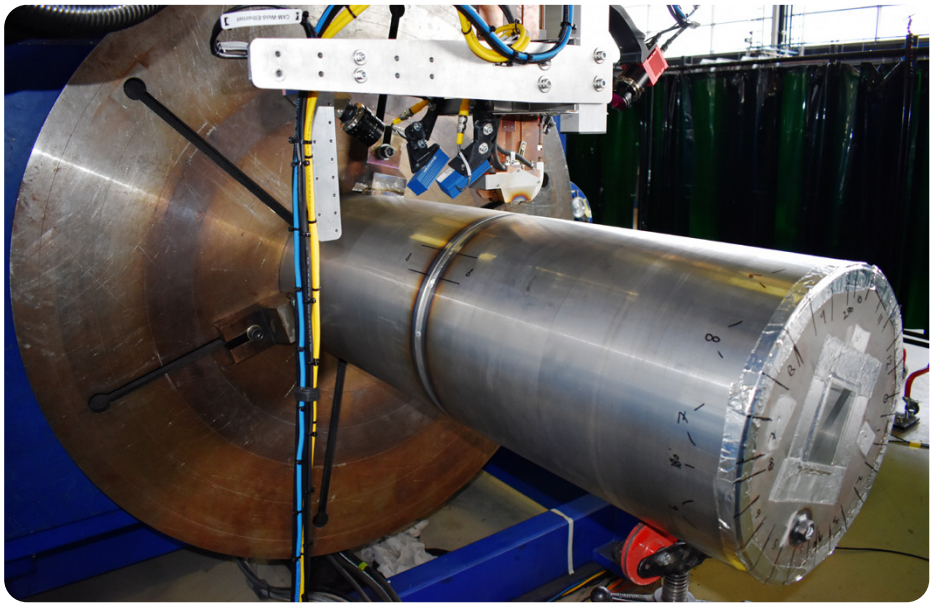
The Awesim technology promises to be a game-changer for fusion welding, as it enables real-time detection of defects as they occur. It will yield greater schedule certainty, and take hours out of the welding process. It can also help to significantly reduce the incidence of abortive welds, increase productivity, and improve sustainability by reducing energy and material consumption.

The Awesim system gathers and analyses high-resolution data from a variety of different sensors which interrogate the fusion welding process in real time – including acoustic sensors, cameras, laser profiling and phased array ultrasound. These give operators an immediate indication of the presence of any welding defects.

"The impact of this disruptive technology in the field of high-integrity fabrication is expected to be significant," says Tony Burnett, head of innovation and technology at Cavendish Nuclear.

"Our Awesim technology is capable of reducing the time taken between forming a fusion weld, and knowing it is free from defects, from several hours to minutes. Closing the time taken for feedback between welding and non-destructive weld inspection to such short durations enables significant productivity and sustainability improvements, provides greater schedule certainty, so saving time and money while maintaining quality."

As part of the Awesim consortium, the Nuclear AMRC developed, tested and demonstrated the hardware and software for the welding defect sensor system. This included the development of various sensors, algorithm development and interface design, with a focus on building confidence in predicting the formation of weld defects in near-real time.



Awesim proof: the technology demonstrator at the Nuclear AMRC.

"The system displays the information directly to the operator, allowing them to make near-real time interventions," explains programme manager James Leatherland. "Predicting the formulation of weld defects and enabling early intervention, particularly in thick section joining, can allow organisations to avoid costly rework and maintain delivery."

Awesim is the latest in a series of projects at the Nuclear AMRC to develop innovative technologies for predicting weld defects, and builds on the success of the Simple project which ran over 2018–19.

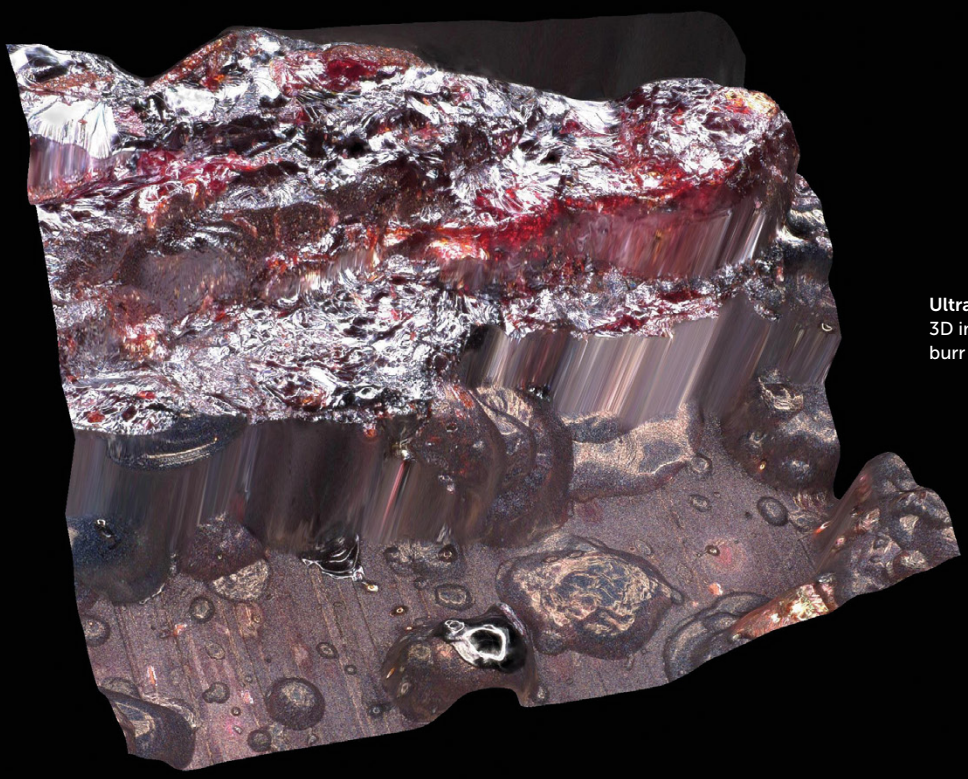
The Awesim consortium led by Cavendish included the Nuclear AMRC, Doosan Babcock, the University of Strathclyde's Advanced Nuclear Research Centre, Peak NDT, Babcock International Group and Frazer-Nash Consultancy. Partners have filed patents on the technology, and are now working towards a commercial launch of the Awesim technology.

"The Awesim project has demonstrated the power of collaboration in innovation between the academic and industrial partners in projects enabled by the judicious application of government funding, to make a real tangible impact in bringing new, potentially disruptive technology to the market," says Bert Holt, director of nuclear lifetime programmes at Doosan Babcock.

"The extent of the application of the patented Awesim technology to nuclear new build projects in the UK and internationally is expected to be great. However, its use in other industry sectors involving high-integrity welding, such as the defence and process industries, is likely to be even more significant."

The Awesim project was part-funded by £1.35 million from BEIS through the Advanced Manufacturing and Materials Phase 2b call of the Energy Innovation Programme. Industrial partners provided a further £726,000 of support.

The Awesim consortium was highly commended in *The Engineer* magazine's Collaborate to Innovate awards for 2021.



Ultra-high resolution: 3D image of a machining burr from the VXH-7000.

A closer view of **tool wear**

New shopfloor microscopes are giving Nuclear AMRC researchers a closer view of tool wear incurred during machining trials.

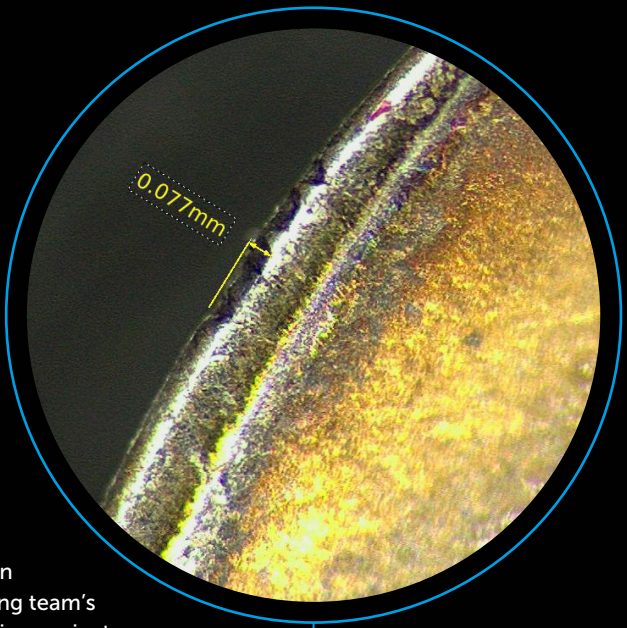
The centre's machining technologies group have acquired three Omni 3 digital microscopes from Ash Vision to support their research into machinability and advanced coolants.

Tool life is a key factor in machinability studies, and understanding the causes and effects of tool damage is essential to optimising cutting processes. Nuclear AMRC researchers are also leading research into supercritical carbon dioxide coolant and minimum quantity lubrication (MQL) techniques, which can increase cutting speeds and reduce tool wear while avoiding the need for large volumes of conventional oil coolant.

With optical magnification of up to 658x and an intuitive workflow, the new microscopes allow the team to rapidly assess tool damage and surface finish while working at the machine.

"Faster alignment, increased throughput and faster inspection have improved the manufacturing team's productivity in essential machining project trials," says Adam Blenkiron, sustainability technical lead. "The Omni 3 package is perfect for working on the shopfloor at the Nuclear AMRC, or for working with manufacturers at their facilities."

The team have also acquired a Keyence VXH-7000 4K ultra-high accuracy microscope, capable of producing three-dimensional digital images at up to 6,000x magnification with an impressive depth of focus. Located in the Nuclear AMRC's laboratory just off the shopfloor, the VXH allows the team to capture high-resolution images and collect data for inspection and failure analysis.



Rapid assessment: tool wear from coolant trials, seen through an Omni 3 microscope.

Modules team move to **Birchwood Park**

The Nuclear AMRC's modular manufacturing research group is moving to a new home hosted by member company Jacobs at one of the UK's biggest nuclear industry clusters.

Jacobs is providing engineering testing, workshop and office space at its Birchwood Park facility, near Warrington, as part of its membership of the Nuclear AMRC.

Modular manufacturing involves fabricating large-scale complex systems in factories under controlled conditions, then transporting them to site for final installation and assembly.

Previously based in Birkenhead, the Nuclear AMRC modules group is adapting techniques used in shipbuilding, aerospace and other sectors for use across the nuclear sector. The team are tackling challenges in modular design and manufacturing for new reactors of all sizes, as well as the challenges of decommissioning and waste management.

"Being able to work so closely with Jacobs, with its many years of experience across the nuclear sector, will bring major benefits to the Nuclear AMRC," says Andrew Storer, CEO of the centre.

"The new facility will allow us to build on the capabilities we developed at our pilot modularisation facility in Birkenhead, and provide increased support throughout the modular design process. Our engineers and researchers will work with industrial partners to develop new capabilities for the construction, operations and maintenance of modular reactor systems, and explore how modular principles can be delivered to support the next generation of power plants for both fission and fusion."

The Nuclear AMRC modules facility offers a growing selection of specialised machining, joining and assembly equipment to develop and prove modular manufacturing techniques for nuclear applications, including additive manufacturing and visualisation technologies to support modular design.

The Nuclear AMRC will work closely with Jacobs' materials and structural integrity teams and facilities at Birchwood Park to help prove the machining and joining technologies being developed at its other facilities, and make sure that components produced in new materials or by innovative manufacturing processes can perform under the extreme conditions experienced within a reactor system.

North-west cluster: Birchwood Park, near Warrington.

Jacobs joined the Nuclear AMRC as a tier one member in August 2021 to help drive innovation in advanced nuclear technologies. With operations in more than 50 countries, Jacobs provides a full spectrum of professional services including consulting, technical, scientific and project delivery for the public and private sector.

"Hosting and assisting Nuclear AMRC's modular manufacturing research group will help us to remain at the forefront of the development of new reactors and new techniques for nuclear decommissioning, enabling us to better serve our clients," says Martin Hinton, energy security and technology vice president at Jacobs.

The Nuclear AMRC is also working with Jacobs through a manufacturing support services framework with UKAEA to support the Spherical Tokamak for Energy Production (STEP) fusion programme. The framework scope covers joining and forming technologies, machining feasibility, pressurised vessel design and manufacture, assessment and guidance on design for manufacture, and non-destructive evaluation technologies.

Jacobs operates 12,000m^2 of laboratories and test rigs at Birchwood Park, the UK's largest independent complex of its kind serving the nuclear sector, employing more than 700 technical experts and practitioners with world-class expertise in materials, chemistry and structural integrity, and advanced capability in robotics and remote operations.

Birchwood near Warrington is one of the UK's largest clusters of the nuclear industry, with Jacobs as the largest tenant. Other tenants include Sellafield Ltd, Rolls-Royce, NNL, Cavendish Nuclear, SNC-Lavalin, Orano, Nuvia and a wide range of SMEs.

"Being part of one of the UK's largest nuclear hubs is going to be crucial for the Nuclear AMRC, especially our supply chain programmes," Storer notes. "Birchwood Park is the place to be for the nuclear supply chain, as the only major hub for the sector that's independent of any one organisation or technology."

www.birchwoodpark.co.uk

Groundbreaking developments at Nuclear AMRC Midlands

Construction has begun on the new home for Nuclear AMRC Midlands, a £15 million research facility at Infinity Park Derby.

When it opens its doors next year, the new building will expand the Nuclear AMRC's capabilities in areas including digital engineering, controls and instrumentation, and equipment qualification, and help more companies in the Midlands and beyond to win work in nuclear and other high-value low-carbon sectors.

The building will be one of the first on Infinity Park Derby, a major industrial development located close to Rolls-Royce's Sinfin campus and within 20 minutes' drive of Toyota, Alstom and JCB. The new facility is part-funded by £9 million of funding from the D2N2 Local Enterprise Partnership.

"The new Nuclear AMRC Midlands facility will play a vital role in helping manufacturers seize the opportunities and tackle the challenges of the national transition to net zero emissions," says Andrew Storer, CEO of the Nuclear AMRC. "We will work closely with companies of all sizes to help them join the supply chains for technologies such as small modular reactors, fusion power, and clean hydrogen generation."

Steelwork for the 4,300m^2 building will start to go up in late May, with fitting out in the autumn, and handover to the Nuclear AMRC in early 2023.

Sustainable innovation

In keeping with its mission of helping industry to decarbonise, the new building has been designed for sustainability. With construction materials selected for energy efficiency and low environmental impact, and landscape improvements including a small lake and wildflower meadows, it is targeting a "very good" rating under the BREEAM building assessment scheme.

It includes an open-plan workshop of around 2,000m^2, with a two-metre thick floor, ten-metre ceilings and 50-tonne cranes to allow work on large fabrications and assemblies.

Laboratory facilities include dedicated space for 3D printing and rapid prototyping, virtual reality and visualisation, and equipment qualification.

The new building will also offer meeting and office space for around 130 people.

Grand plans: Andrew Storer with Matt King of construction group Stepnell and Tom Goshawk of D2N2.

It will initially host 35–40 Nuclear AMRC researchers and support staff, doubling the size of the pilot team working from interim facilities in Infinity Park's iHub building.

"As the first High Value Manufacturing Catapult facility in the East Midlands, we will continue to work closely with local industry, academic and government partners to deliver sustainable growth for decades to come," says Storer.

"The coming years will see increasing investment into clean energy and low-carbon technologies, and the region is well placed to capitalise on the opportunity thanks to its wealth of experience, innovation and engineering expertise. We have already helped dozens of Midlands-based manufacturers to develop their capabilities for the nuclear sector, and want to work with even more to support their ambitions."

The new centre will support at least 35 collaborative research and development projects within its first five years, drawing on public and private investment to tackle industry challenges in high-value sectors such as aerospace, automotive and rail as well as low-carbon energy technologies. The team will work with at least 50 smaller companies in the Derbyshire and Nottinghamshire area, to help them develop their capabilities for new market opportunities.

The building will also be home to the University of Derby's Institute of Innovation in Sustainable Engineering, which specialises in design, manufacturing, product lifecycle management and application of new and smart materials.

New capabilities

While plans for the new full-scale research centre have been taking shape, the Nuclear AMRC team have developed an impressive array of new capabilities from the two iHub workshops they've occupied since early 2019. All are now available for commercial or collaborative research, and will be transferred to the new building next year.

The larger workshop is a flexible incubator for new manufacturing technologies, with a series of reconfigurable manufacturing bays where advanced physical and digital equipment can be configured to explore a range of technologies and processes. The second workshop focuses on controls and instrumentation (C&I) research to tackle challenges in areas such as digital sensor development, industrial control systems and automation.

Things to come: the new Nuclear AMRC Midlands facility.

Pride of place goes to a specially designed seismic shaker table, one of the most powerful available for R&D in the UK. The C&I team will use the hydraulic single-axis table to test and qualify electronic devices, electrical sub-systems and mechanical components to ensure they can survive challenging in-service conditions as well as potential earthquakes affecting a nuclear site. The table can take components of up to 100kg, with acceleration of up to 35G on smaller loads.

The team are now carrying out an initial project, funded by the High Value Manufacturing Catapult, to develop their capabilities for seismic qualification of components to RCC-E and IEEE 344 standards. They will then work with companies on equipment qualification projects.

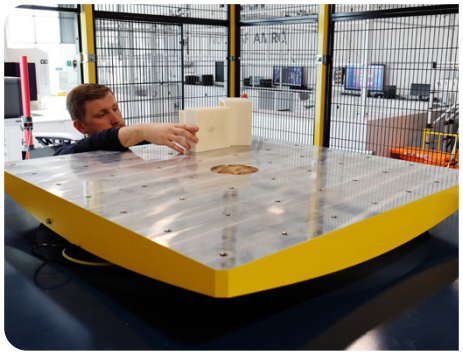
The C&I workshop also has a smaller electrodynamic shaker table for vibration and shock testing of electrical systems to international standards.

The digital environments team are meanwhile installing and testing a variety of virtual and augmented reality technologies, including Microsoft Hololens 2 headsets and an Optitrack motion tracking cell, to support work in factory layout and optimisation, product design, and digital twin development.

To turn ideas into reality, the workshops host a range of additive manufacturing platforms, including specialist systems for 3D printing electronics, and rapid prototyping of complex parts in a range of polymers and metals. The team can rapidly test innovative ideas by moving from a first idea through to a prototype within a day, and help smaller companies to test their ideas or trial 3D printing.

iHub is also home to the Husky robotic ground vehicle (see last issue), which the C&I team are now using to develop technologies for detecting hazardous buried waste at nuclear decommissioning sites. Technical lead Dr Ali Imam Sunny and senior technician Jack Powell recently took the Husky to Lakes College in Cumbria for field tests to find simulated items buried in the college grounds, and to discuss their work with engineering students.

To promote technology education and knowledge-sharing, the new Nuclear AMRC Midlands will include dedicated space for engaging with local schools and colleges, and for showcasing the innovative work of the centre and its partners.



Heavy vibes: the new seismic shaker table.

Future vision: researcher Noel Padgaonkar works with a virtual reality headset.

F4N
Fit For Nuclear

CMP sprints for green energy opportunities

Within a year, Newcastle-based CMP Products has secured both Fit For Nuclear and Fit For Offshore Renewables status to help expand its presence in key low-carbon sectors. Francisco Dominguez, director of quality, health & safety and environment, talks about the company's journey.

CMP Products is a leading manufacturer of cable glands, cable cleats and associated accessories. We have achieved F4N status in just three months, and F4OR status in 10 months – processes which are expected to take 18-24 months per programme.

We achieved F4N granted status first in April 2021. The company underwent a number of audits and assessments, carried out by our industrial advisor Nigel Goodrich. These focused on areas such as process excellence, covering the likes of quality, strategy and leadership, as well as health and safety, environmental sustainability, and research and development.

From these audits and assessments, an action list was created. Some areas were earmarked for improvement such as our knowledge of the nuclear industry. To tackle this, we developed a bespoke in-house training programme and delivered it to staff across key areas in the business.

Alongside this, we developed a nuclear safety policy communicated it to all employees working in the organisation, as well as interested parties.

A strong integrated management system (IMS), driven by an engaged leadership team, allowed us to progress through the process quickly, as a lot of the criteria for both the audits and assessments was covered in the IMS. This was reflected in the F4N on-site systems audit, where we scored 99.5 per cent.

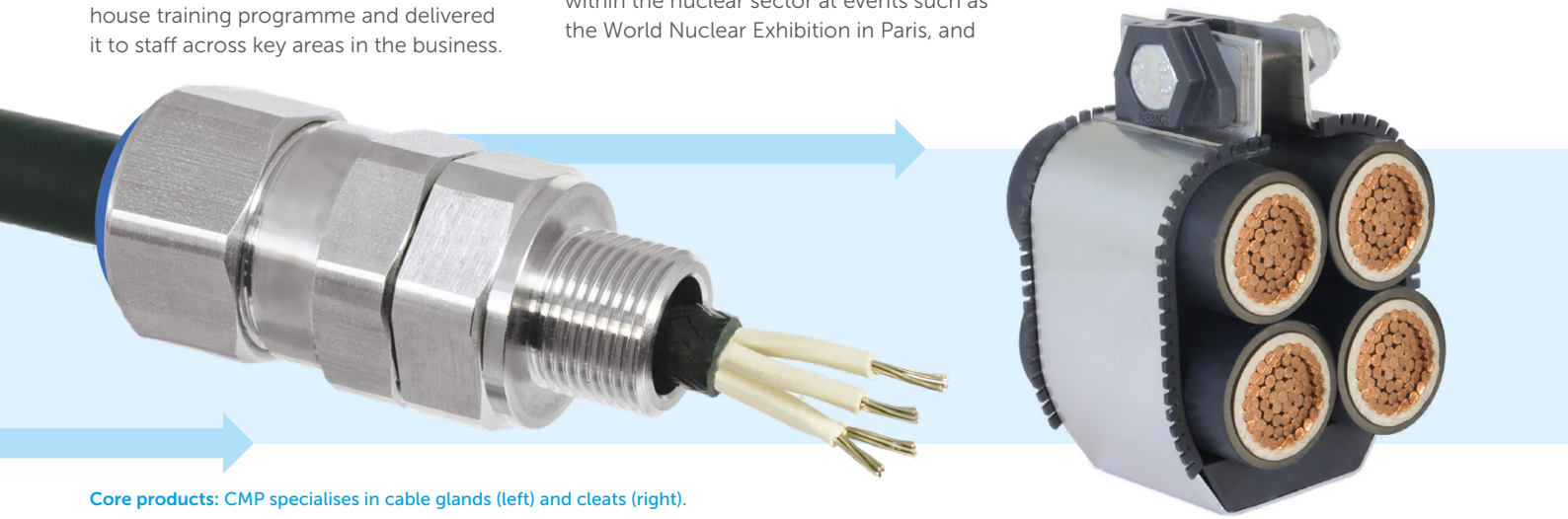
The successful completion of the F4N programme helped us pass extensive supplier approval audits carried out by MEH Alliance for the Hinkley Point C project, to which we are supplying a combination of cable glands and cable cleats.

We have since increased our presence within the nuclear sector at events such as the World Nuclear Exhibition in Paris, and the Nuclear Manufacturing Summit held by the Nuclear AMRC in Rotherham.

Expanding offshore

Not long after achieving F4N granted status, CMP embarked on the F4OR programme as we were also looking to expand our presence within the offshore renewable market sector. Having already taken part in the F4N programme, the initial process was very similar and ultimately prepared us well for the F4OR programme.

Similarly to the F4N programme, we were subjected to business excellence audits and assessments with Nigel Goodrich. We were able to demonstrate the high level of process excellence in the organisation, and completed this stage of the programme by June 2021.



Core products: CMP specialises in cable glands (left) and cleats (right).

CMP was then introduced to our F4OR sector-specific advisor, John Best. Working on contract from business consultancy Opergy, John gave us great support and encouragement throughout the second stage of the F4OR programme and the sector-specific assessments.

The assessments identified that CMP had more experience of supply and were much more familiar with the nuclear sector, but had less knowledge and experience of the offshore renewable sector. We embarked on the F4OR cohort journey to help develop our understanding of the sector, which involved 15 workshop modules. These modules covered areas such as a general overview of offshore renewables sector, HSEQ, supply chain, contracting, innovation and marketing. One module the team found particularly engaging was the virtual tour of the 7MW Levenmouth wind turbine.

Throughout the F4OR programme, we worked to increase our presence within the offshore renewables sector, attending events and visiting the ORE Catapult in Blyth. We presented at the Offshore Wind North East event in October 2021, focusing on multiphysics finite element analysis and how this can simulate the effects of short circuit currents in cable installations to save cost and time on future projects.

Benefits and opportunities

As a result of the F4N and F4OR programs, we have developed a nuclear-safety culture, increased our knowledge as a company of both nuclear and offshore renewables industries, and increased connections in the offshore renewables sector.

Offshore trust: the CMP team visit the Offshore Renewable Energy Catapult.

We hope the programmes will increase our project wins within the nuclear and offshore renewables sectors, as the granted status demonstrates that we are truly fit for these demanding markets.

We are currently developing our sales and marketing strategy to identify global opportunities within nuclear and offshore renewables, using the knowledge gained as part of the F4N and F4OR programmes.

There is a clear need for our company to effectively manage the transition from a previous emphasis on the oil and gas industry, as green energy is important to reducing climate change.

We are committed to supplying greener energy projects, and have developed our own net-zero strategy, committing to achieving net-zero emissions by 2040. We are currently working towards being certified to the ISO 15001:2018 for energy management systems which is planned to be achieved by August 2022.

www.cmp-products.com

> As an industrial advisor, I am always keen to dig beyond how a company sees itself to how it really is, to understand that change is embedded, and that all contribute to that change.
>
> With CMP Products, I met a passionate workforce, typified by Francisco Dominguez. I identified some gaps in what they did, but what surprised me was how quickly they embraced any gaps, and worked to close them.
>
> It is worth mentioning that Francisco is a Six Sigma black belt, and has trained many in CMP Products to Six Sigma green belt level. Many have also completed the NSAN Triple Bar training.
>
> – **Nigel Goodrich**, Nuclear AMRC industrial advisor

F4N
Fit For Nuclear

GadCap gets fit to build on its nuclear history

Specialist cable manufacturer GadCap Technical Solutions is building on its long history of supplying the nuclear industry after being granted Fit For Nuclear.

Based in Washington, Tyne and Wear, GadCap began in the 1950s as part of BICC Cables, supplying a range of fire performance cables. Its experience with mineral insulated cables led to supplying thermocouples and fuelling ropes for the Magnox nuclear sites, and extended into gadolinium burnable poison (BP) cables to absorb excess neutrons for the AGR fleet from the early 1980s to today.

The company went through several changes over the years, culminating in a management buyout in 2019 led by operations director Michael Baker and technical director Paul Seccombe.

"When the seller, a large US multinational company, decided that its manufacturing operation for nuclear, power generation and aerospace was non-core for them, both myself and Paul felt we could continue with the strong business ties to which customers were accustomed," recalls Baker. "We realised that although now becoming an SME, for the business to be successful the blue-chip clients we were dealing with such as GE, Siemens, Westinghouse, Rolls-Royce and Pratt & Whitney would require the same commitment and business approach as they had previously known."

Now employing just 10 people, GadCap continued with activities such as lean enterprise, a process-driven strategy, and a strong environmental, health and safety culture. As the firm regained its financial footing after the buyout, the team started to look at new opportunities – and with the UK's AGR fleet now entering decommissioning, they knew they needed to explore new avenues to replace that revenue.

"With the longstanding history of supplying into the nuclear industry, it was felt the F4N programme could be the business improvement driver we needed to kick us on to the next level," Baker says. "F4N would offer us best practices, helping us develop and sustain operations, and ultimately aiding us to open into new territories and markets as per our strategic vision."

Thanks to the firm's strong corporate mentality background and understanding of nuclear business drivers, the journey to achieving F4N status took only nine months. "It was a matter of continuing with the strong programmes we already had in place, but then reintroducing the minor few that we had ceased running," notes Baker.

With support from Nuclear AMRC industrial advisor Nigel Goodrich, GadCap's development programme focused on areas such as training and employee communication.

"We felt we always had a good close working relationship with the employees, having daily contact with them through Gemba walks, regular team meetings and ad hoc conversations, but the recommendation to issue an employee engagement survey highlighted some areas that the workforce felt we could improve on," says technical director Paul Seccombe.

"The survey itself revealed that whilst people were mainly 'very satisfied' or 'satisfied' in many aspects, we could improve on training opportunities and more enhanced employee wellbeing. We revisited the training and development programme and, with employee involvement, have established a comprehensive programme looking at individuals' requirements on a three-year rolling basis."

Employees now have more responsibility and ownership of their areas, and are actively running their own kaizen workshops; performing all risk and COSHH assessments; and gaining formal qualifications in lean, health & safety, and supply chain management. The management also created an on-site gymnasium and games room to support staff wellbeing.

Team effort: GadCap focused on training and wellbeing for all staff.

"We recognise the F4N status as being one that can help us continue with our company improvement programme, not only in being able to supply quality products and services, but to meet with stringent controls combined with robust management systems and a strong safety culture," says Seccombe. "With the longevity we have in supplying the nuclear sector, we feel we are well placed to deliver on those requirements."

Nuclear typically accounts for around 35 per cent of GadCap's turnover, with other revenue coming from products including specialised sensors for the power generation and aerospace sectors.

"GadCap sees nuclear as a large part of its continuing operation, not only utilising the knowledge of product that we currently supply, but also in other applications using captive capacitance probes and the supporting capabilities we have such as laser welding and CNC machining," Seccombe notes. "We believe we can be a key reliable supplier for the increasing demands in existing and future fuel generation the sector requires."

gadcap.co.uk

John joins the F4N team

After eight years in the Nuclear AMRC's arc welding team, John Hilton has moved to the Fit For Nuclear programme as the newest industrial advisor. *Nuclear AMRC News* asked him about his career arc.

I first got a taste for engineering at 15 years of age, during the construction of Killingholme A power station where I would spend many weekends with my father who was the site manager. This spurred me on to undertake a five-year apprenticeship when I turned 18, with a focus on welding. Working on the Humber bank gave me a wide range of opportunities working on various sites covering the steelmaking process, power generation, petrochemical, pharmaceutical and chemical industries.

After many years of contracting and travelling the length and breadth of the UK, I decided to grow roots. I joined a heat exchanger manufacturing company close to home as a welder, soon progressing up to welding foreman. I undertook several courses on project management and lean manufacturing, and was able to implement this on the shopfloor, reducing manufacturing lead times and increasing quality while reducing cost.

An exciting opportunity then arose to join Rolls-Royce as their welding coordinator for the civil nuclear market. I was responsible for overseeing welding trials for Rolls-Royce as part of the Civil Nuclear Sharing in Growth programme at the Nuclear AMRC. I was then placed in charge of the welding apprentices, where I developed a training school and took 14 apprentices through their NVQ.

Eight years ago, I joined the Nuclear AMRC as a senior welding technician before being promoted to arc welding technician lead. I held a multitude of responsibilities which helped me to gain knowledge and experience in the nuclear manufacturing sector, and broadened my knowledge in lean manufacturing techniques. The role also helped me to expand my skills in management, being responsible for the arc welding department, the technicians and the equipment, and working closely with project managers to ensure work was delivered on time and to budget.

I worked closely with the F4N industrial advisors, visiting supply chain companies to promote the Nuclear AMRC's joining capabilities. This gave me an insight into the supply chain requirements, and how we were able to help them win work in the nuclear sector. I thoroughly enjoyed this part of my work, and I am looking forward to expanding upon this in my new role. I hope to invite more supply chain companies to our facility to give them a greater insight and understanding of our capabilities, and how we can help them achieve their goals.

The F4N programme looks for companies that want to win work in nuclear and are passionate about improving processes. With the recent government announcement of 24GW of nuclear power by 2050, there are exciting opportunities for the supply chain. And with the UKAEA Fusion Technology Facility now operating close by the Nuclear AMRC in Rotherham, it will be interesting to understand how their supply chain needs can be met and how they differ from those in traditional civil nuclear.

I will be particularly interested in fabrication companies which have welding expertise. Although I have taken off the welding helmet for a change in career, welding is in my blood – when I see a blue light, I am like a moth to a flame!

Working across multiple sectors, health and safety has always been top of the agenda in everything I have done. I strongly believe that any supply chain company should have a strong and robust health and safety culture as an over-riding priority, led by visible senior leadership, with everyone taking responsibility. This is something I will be closely looking for in any company I work with.

I am very excited to start this new chapter in my career, and I look forward to meeting companies on the F4N journey, and to play a part in their success in winning work in the nuclear sector.

john.hilton@namrc.co.uk

F4N
Fit For Nuclear

Congratulations to the latest companies to be granted Fit For Nuclear

These companies have benchmarked their performance against the standards demanded by the nuclear industry's top tiers, and driven business improvements.

Mech-Tool Engineering is a leading global supplier of systems to protect people and equipment from fire, blast and heat hazards across the energy sector.
mechtool.co.uk

SL Engineering manufactures rigid tube assemblies and precision-machined components for demanding industry applications.
www.sl-engineering.co.uk

Congratulations also to **Beran Instruments**, **Spincraft ETG**, **Tribosonics** and **Woodcock & Wilson** on being regranted F4N.

For details of all F4N-granted companies: **namrc.co.uk/services/f4n/companies**

Fit For Offshore Renewables (F4OR)

is a collaboration between the Offshore Renewable Energy Catapult and the Nuclear AMRC, based on the proven Fit For Nuclear model of supplier development. Following a series of regional programmes, the first national F4OR pilot was launched in January with support from the Offshore Wind Growth Partnership.

F4OR
Fit For Offshore Renewables

Congratulations to the latest companies to be granted F4OR.

Armultra provides a range of engineering services including fabrication, offshore construction and decommissioning.
www.armultra.co.uk

CMP Products designs and manufactures cable glands, cleats and associated products for harsh industrial environments.
www.cmp-products.com

Dron & Dickson specialises in the design, supply and maintenance of hazardous area electrical equipment.
www.drondickson.com

InterMoor provides life-of-field mooring solutions across all marine environments
intermoor.com

Lintott Control Systems specialises in the design, manufacture and aftercare of water treatment systems and electrical control panels.
www.lintottcs.co.uk

MacLean International Group distributes industrial and hazardous area electrical products, industrial and safety equipment and valves.
www.dnow.com/maclean

Osbit supplies tailored equipment and engineering services for challenging offshore projects.
www.osbit.com

PPI Engineering specialises in the design and support of rotating electrical machines and associated equipment.
www.ppi-engineering.com

Sealand Projects provides engineering, project management and consultancy services for the ocean economy.
www.sealand-projects.com

Smulders Projects UK produces and assembles foundations for offshore wind farms.
www.smulders.com/en/smulders-projects-uk

Southampton Marine Services is a marine engineering services provider operating from eight sites across southern England.
www.sms-marine.co.uk

To find out more about F4OR: **ore.catapult.org.uk/f4or**

Delkia secures major Sellafield contract

Cumbria-based engineering and technology firm Delkia has landed one of the first major packages of work from a multi-billion pound decommissioning programme.

Delkia, which was granted Fit For Nuclear in late 2021, has won a turnkey design, build and test package for the Sellafield Product and Residue Store Retreatment Plant. The ancillary systems will include a combination of electrical, instrumentation and fluid control systems.

The work is part of the Programme and Project Partner framework for Sellafield, which involves five lead partners – Sellafield Ltd, Morgan Sindall, Doosan Babcock, KBR and Jacobs – delivering major capital projects at the UK's largest decommissioning site.

"Delkia demonstrated its breadth of expertise, facilities and personnel to deliver this critical package," commented Richard Etheridge, senior project manager at Morgan Sindall. "More importantly, they showed core collaborative behaviours which aligned with our own, leading to their successful bid. We look forward to working with this local company."

The project has an estimated value of £2.3 million, and will be delivered through Delkia's facilities at Egremont, West Cumbria.

"The team have done a fantastic job in the nuclear industry and are now really positioned to take on much larger and more complex packages to support critical infrastructure projects like this," says Delkia's nuclear relationship manager, Mark Sisson. "The project really excites the team and is core to our skills and past delivery."

Delkia secured more than £3.5 million worth of contracts in Q4 of 2021, with further contracts through to 2025 across UK nuclear and defence programmes.

www.delkia.co.uk

TSP sees bright future under new ownership

Longstanding nuclear supplier TSP Engineering says it has secured its future after being acquired by Cumbria-based engineering group GMET.

TSP was previously owned by Chinese-owned Jingye following its 2020 purchase of British Steel. CEO John Coughlan will continue in his role alongside his current management team, and also join the board of GMET Engineering.

With around 20,000m² of factory space in Workington, TSP is an established supplier of waste containers and other decommissioning fabrications, and is now targeting opportunities in advanced modular reactors. Last year, the firm renewed its membership of the Nuclear AMRC to support its ambitions in advanced reactor development.

Coughlan says the change in ownership gives TSP Engineering greater independence and the required security to support its customers in the advanced nuclear and defence sectors. To meet its growth plans, the firm now plans to increase headcount to 1,000 people, with recruitment across all engineering disciplines.

Room for growth: inside TSP's Workington factory.

TSP has recently collaborated with the Nuclear AMRC on research into green machining technologies and weld radiography. It was first granted Fit For Nuclear in 2013, and took part in the Civil Nuclear Sharing in Growth programme over 2013–17.

www.tsp-engineering.co.uk

Call for action on CCUS supply chain

Urgent action is needed to increase UK content in the emerging carbon capture sector, according to a new report published by the Nuclear AMRC.

The new CCUS supply chain intervention strategy was published in early March on behalf of the CCUS Council, the government-backed group for engaging and steering the UK's carbon capture, usage and storage (CCUS) sector.

The report, led by the Nuclear AMRC as part of the High Value Manufacturing Catapult, concludes that there is a significant opportunity to increase UK manufactured content in the CCUS sector, contributing to economic growth and creating export opportunities while helping to achieve the UK's transition to net zero greenhouse gas emissions. It draws on existing market research, and adds new analysis on the UK manufacturing supply chain's capability and readiness to support this rapidly growing market.

With targeted development, UK manufacturers can supply all parts of a carbon capture plant. However, the UK needs to act quickly to establish its capability, competence and capacity in domestic projects to drive down costs and compete in the much larger global market.

To ensure the supply chain is ready to support CCUS deployment to meet government targets for 2035 and beyond, the report recommends the establishment of a Fit For CCUS (F4CCUS) programme. Based on the Nuclear AMRC's established Fit For Nuclear and Fit For Offshore Renewables programmes, F4CCUS would strategically develop existing manufacturing businesses to match to CCUS sector requirements.

"If we are to exploit domestic and international opportunities, we must act now to ensure the UK supply chain is fit and ready to deliver for the national developments," said Andrew Storer, CEO of the Nuclear AMRC. "We really hope the results can inspire a coherent overall approach to CCUS supply chain initiatives, ensuring the UK delivers CCUS to help achieve net zero and provide significant economic impact in key regions in the UK."

The Nuclear AMRC is launching a pilot F4CCUS programme, as well as a Fit For Hydrogen (F4H2) pilot, in May as part of its work with the Zero Carbon Humber Partnership. The pilot programmes will help up to 20 companies from across the UK prepare for opportunities with Hydrogen to Humber Saltend, the world's largest hydrogen production project.

The CCUS report is the first key output of the council's supply chain working group, chaired by Dame Judith Hackett.

"This report clearly shows the scale of opportunity for UK manufacturing in the supply chain for CCUS, but if we are to make the most of it, we must act quickly to raise awareness and build capability and capacity," Hackett commented. "We need clear signals from government to create confidence, and this can be done by backing the proposal to establish a Fit For CCUS programme."

The report was welcomed by government and CCUS bodies.

Energy and Climate Change Minister Greg Hands said: "I welcome this report which outlines the opportunities presented by CCUS technologies for supply chain companies, creating economic growth and export potential, while helping achieve the UK's commitment to net zero."

James Smith, co-chair of the CCUS Council, said: "We need an ambitious vision for a low-carbon industrial revolution, creating tens of thousands of skilled, satisfying and well-paid jobs throughout the UK. Time is of the essence to grasp this unique chance to be world leaders in crucial low-carbon technologies."

Ruth Herbert, CEO of the CCSA trade association, added: "The UK has unique advantages, skills and expertise – in both CCUS and hydrogen – and as the first CCUS clusters move ahead, there is not a moment to lose if the UK supply chain is to capture its share of this vital net-zero industry."

To read the full report, go to: **namrc.co.uk/industry/ccus-supply-chain-report**

Skills awards recognise **apprentice excellence**

The UK nuclear industry came to Manchester in late March to celebrate excellence in skills for nuclear.

The 14th UK Nuclear Skills Awards, organised by NSAN and Cogent Skills, showcased the success and achievement of individuals and companies across the sector.

The Nuclear AMRC sponsored the Advanced Apprentice of the Year award, which was won by Kerry Jackson from the National Nuclear Laboratory. Jackson recently completed a scientific apprenticeship, and was also named overall UK Nuclear Apprentice of the Year.

Other winners included Megan Robertson from Sellafield, Intermediate Apprentice of the Year; Lloyd Woodhouse from Westinghouse, Higher & Degree Apprentice of the Year; James Dewar from NNL, Graduate of the Year; Sandra Scambler from Westinghouse, ED&I Inspirational Role Model Award; and Andrew Crabtree of the Get Into Nuclear website, STEM Ambassador of the Year.

The President's Award, given in recognition of an individual's exceptional commitment to the nuclear industry, went to David Boath of Jacobs. The company award for Best Employer & Provider Partnership was won by Bury-based steel engineering group William Hare and Alliance Learning for their work on apprenticeships.

Awards night: Dug Harrison, Nuclear AMRC; Nikita Broatch, Gen2; Kerry Jackson, NNL; Keiron Hersnip, NNL; and Chris Hollins, host.

"The UK Nuclear Skills Awards highlight the exceptional quality of people of all levels who are committed to careers in the nuclear sector," commented Jo Tipa, managing director of NSAN. "The evening also shines a light on the vital work done by companies and training and education professionals working in and with the nuclear industry across the UK."

www.nsan.co.uk

Diary namrc.co.uk/news/events

AMP Technology Exhibition

25 May, Rotherham

The Nu-Tech Engineering & Technology Solutions Exhibition comes to South Yorkshire's Advanced Manufacturing Park (AMP) in collaboration with the Nuclear AMRC. The event will bring together engineers, technologists and researchers with an array of suppliers.

www.technologyexhibitions.co.uk/AMPEvent

EIC Energy Exports Conference

14–15 June, Aberdeen

Identify opportunities in international nuclear and other energy sectors at this supply chain conference and exhibition, supported by the Nuclear AMRC.

www.the-eic.com/Events/EEC2022

NIA Decom 2022 & NDA Supply Chain Event

20–21 July, Telford

The Nuclear Industry Association hosts its Decom 2022 conference at Telford's International Centre. The following day, the Nuclear Decommissioning Authority's supply chain event returns at the same venue, with all the usual networking opportunities.

namrc.co.uk/events/nda-supply-chain-2022

Save the date for the **Nuclear Manufacturing Summit 2022**, 16–17 November.

Work **with us**

The Nuclear AMRC is here to support manufacturing companies, from SMEs to global giants, which are seriously interested in winning business in the nuclear sector.
If we can help your company, we want to hear from you.

We help manufacturers through **supply chain development** and **innovation**.

We can work with you to raise your quality, capability and cost competitiveness to meet the needs of the global nuclear industry.

And we can develop world-leading manufacturing processes and technologies. We have the production-scale facilities and the manufacturing expertise to help you improve cycle time, reduce lead time, improve quality and reduce costs.

Our capabilities and services are open to all UK manufacturers. We provide a responsive service to help you solve your manufacturing challenges and win new work.

We also offer full membership, giving you access to our generic projects and the opportunity to determine our core research.

To find out more about how we can help you win work, contact the Nuclear AMRC business development team:
business@namrc.co.uk

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