Buyers' Guide To The UK Nuclear Industry FY2023

Capabilities for the Japanese Nuclear Market

GREAT
BRITAIN & NORTHERN IRELAND

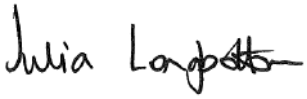
Introducing the Buyers' Guide To The UK Nuclear Industry FY2023

Welcome to this Buyers' Guide, introducing the capabilities of UK civil nuclear companies. The UK and Japan have a long and proud history of partnership in civil nuclear – from Japan's first, UK-designed gas-cooled reactor, through decades of Japanese spent fuel reprocessing in the UK; we have worked together on plans to build Japanese reactors in the UK, and on ongoing collaborations to tackle some of the major and unique challenges of nuclear decommissioning in both countries. The future for our partnership in civil nuclear looks bright, with our decommissioning relationship going from strength to strength and Japanese participation in the UK's High Temperature Gas Reactor (HTGR) demonstration programme.

This Buyers' Guide describes the technologies and capabilities of some of the UK's many highly skilled nuclear companies. All the companies in this guide are either already active in Japan or are interested in working here.

I hope you will find this useful to your business, and that this information highlighting potential partnerships can contribute to further deepening our ties in this mutually beneficial relationship.

Julia Longbottom,
British Ambassador to Japan



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The UK Civil Nuclear Industry

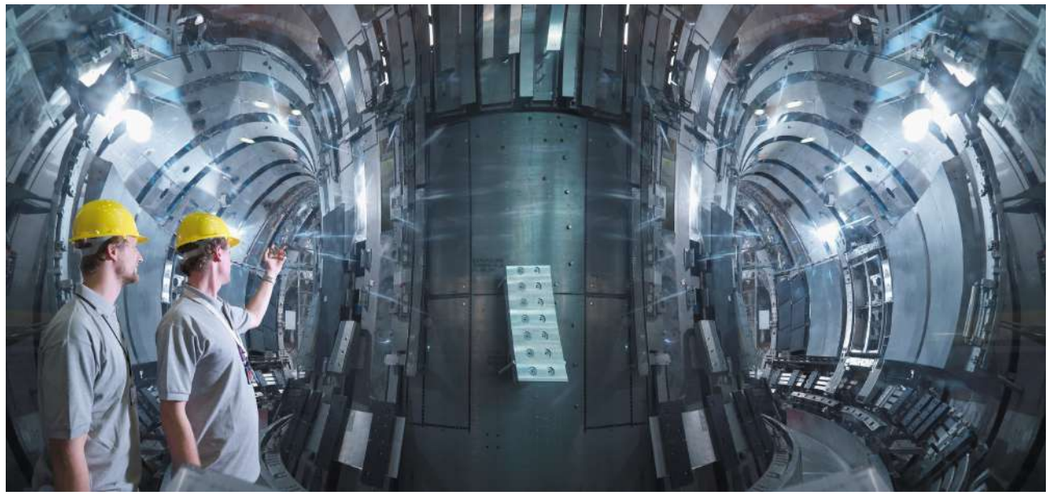
History

The UK has been involved in the civil nuclear industry since its inception, with the world's first commercial nuclear power station starting up in the UK in 1956. The UK operating reactor fleet has included 26 Magnox gas-cooled reactors, all now in decommissioning, 14 Advanced Gas-Cooled Reactors (AGRs) and 1 Pressurised Water Reactor (PWR). 8 AGRs and the PWR are still in operation, operated by EDF ENERGY. Two further PWRs are currently under construction.

The British nuclear industry has covered almost every aspect of the fuel cycle. UK sites can carry out conversion, enrichment and fuel fabrication and have many decades of experience in spent fuel reprocessing. Research into the nuclear fuel cycle and advanced reactor types has seen multiple research reactors constructed, including Fast Breeder Reactors, a Steam Generating Heavy Water Reactor, a High Temperature Gas Reactor and fusion plants.

The breadth and age of nuclear facilities in the UK has given rise to a major nuclear decommissioning industry. The UK manages numerous complex sites with a combination of ongoing operations and decommissioning, with an annual spend of over £3 billion. The extensive challenges of cleaning up the UK's nuclear legacy has given British companies world-leading expertise in decommissioning.

Today, the UK has ambitious plans to expand nuclear generation, including in large-scale reactors, Small Modular Reactors, High Temperature Gas Reactors and fusion.



New Build & Advanced Nuclear

The UK sees nuclear playing an important part in achieving decarbonisation and energy security. In the UK Ten Point Plan, the Net Zero Strategy and Energy Security Strategy, nuclear has a central role, with four main pillars:

Large Scale Reactors: construction of two EPRs at Hinkley Point C, which together will provide 7% of the UK's electricity needs. Intention to bring another GW-scale project to Final Investment Decision by the end of this parliament. In the recent Energy Security Strategy, nuclear's role was further strengthened, with an ambition for 24GW of new nuclear by 2050 between GW-scale and SMRs.

Small Modular Reactors: the UK government is investing up to £210 million into the UK SMR project, alongside significant private sector investment. ROLLS ROYCE aims to have the first reactors in operation by around 2030.

Advanced Modular Reactors: investigating AMRs for decarbonisation of hard-to-abate sectors, utilising the very high temperatures these reactors can achieve. Recently selected HTGR technology for its AMR demonstration programme, which includes Japanese involvement.

Fusion: plans to demonstrate the commercial viability of fusion by 2040 through the Spherical Tokamak for Energy Production (STEP), alongside a vibrant private industry start-up culture of alternative fusion approaches and fusion-adjacent technologies.

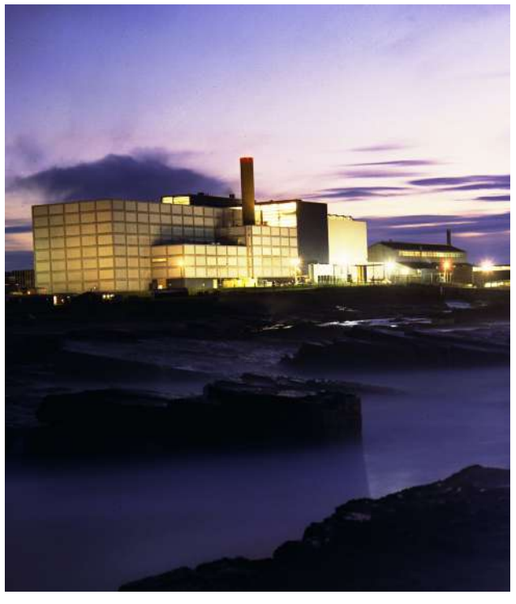
Decommissioning

The UK's civil nuclear legacy is managed by the Nuclear Decommissioning Authority (NDA), a Non-Departmental Public Body set up by the Energy Act 2004. The NDA Group includes a wide range of sites covering the whole of the fuel cycle, and NDA's subsidiaries and their supply chains have developed world-leading capabilities in nuclear decommissioning. The NDA is the strategic authority that oversees decommissioning. NDA subsidiaries operate most of its seventeen sites and are the site licencees, responsible for delivering the decommissioning mission on the site safely and effectively. A majority of the actual decommissioning work is then contracted out to the supply chain by the NDA subsidiaries.

The NDA manages its sites and services through five subsidiaries:

SELLAFIELD LIMITED: the Sellafield site is one of the most complex environmental remediation projects in Europe. The site was host to the world's first commercial power station, Calder Hall, and has spent many decades carrying out reprocessing of spent nuclear fuel, including from Japan. Sellafield finally ended reprocessing operations in 2022. The site contains a number of high hazard areas and many significant decommissioning challenges, including complex retrievals, requiring innovative technological solutions. Today the site has a wide range of functions, including decommissioning, spent fuel management and management of a wide range of radioactive wastes.

DOUNREAY SITE RESTORATION LIMITED: the Dounreay site hosted the UK's research into fast reactors. It contained two fast reactors and various associated facilities including reprocessing capability. The site includes a number of high hazard areas including the shaft and silo, a unique retrieval and decommissioning challenge. DSRL will soon be brought into MAGNOX LIMITED.



MAGNOX LIMITED: MAGNOX LTD looks after decommissioning of 22 Magnox reactors across 10 sites. All reactors have now been defueled, significantly reducing the hazard on the sites. Originally intended for a strategy of deferred decommissioning, MAGNOX LTD is now investigating the benefits of accelerating the decommissioning process, with Trawsfynydd as the Lead and Learn site.

MAGNOX LTD also manages the decommissioning of the Harwell and Winfrith sites, where a number of the UK's research reactors were located.

Once the current fleet of UK AGRs shutdown and finish defueling operations, they will be handed over to the NDA for decommissioning and also be managed by MAGNOX LTD.

NUCLEAR WASTE SERVICES (NWS): NWS carries out the NDA's radioactive waste management services. As well as expertise and advice on technical aspects and strategy for radioactive waste, their services include operation of the Low Level Waste Repository, the disposal site where the UK's Low Level Waste (including waste from outside of the NDA Group) is disposed of. NWS also leads the development and site selection process for the UK Geological Disposal Facility.

NUCLEAR TRANSPORT SOLUTIONS (NTS): NTS are experts in nuclear transportation, bringing together long experience of safely transporting nuclear material by road, rail and sea. This includes operation of PACIFIC NUCLEAR TRANSPORT LIMITED, which has completed many shipments of the highest complexity and security classification to and from Japan. INTERNATIONAL NUCLEAR SERVICES JAPAN, the Japanese subsidiary of NTS, supports delivery of NDA Group interests in Japan.

Capenhurst and Springfields: The NDA also own decommissioning liabilities at the front-end Capenhurst and Springfields sites, which today carry out commercial enrichment and fuel manufacture and are operated by URENCO LIMITED and WESTINGHOUSE ELECTRIC COMPANY respectively. URENCO and WESTINGHOUSE subsidiaries URENCO NUCLEAR STEWARDSHIP and SPRINGFIELDS FUELS LIMITED carry out decommissioning activities and uranic material handling on behalf of the NDA on these sites.

Competences Matrix

	Page	Building and Construction	Commissioning	Decommissioning / Decontamination	Engineering / Technical Services/ Maintenance	Engineering & Design Services	Nuclear Consultancy Services	Nuclear Fuel Supply	On-Site Erection/ Fabrication	Operation and Site Management	Planning and Licensing	Plant & Equipment (Electrical / Mechanical / Chemical / I&C / Etc.)	Project Management	Research	Trade Services	Waste Management and Disposal / Recycling	Others
ALLSPEEDS LTD	10			O		O						O					O
BEP SURFACE TECHNOLOGIES LTD	12			O			O					O		O		O	
BOURNE NUCLEAR LTD	14	O	O	O	O	O			O	O		O	O				O
CAVENDISH NUCLEAR LTD	16		O	O	O	O	O		O	O	O	O	O	O			
CONNEXUS ENGINEERING LTD	18				O	O	O						O				O
CREATEC LTD	20			O			O							O		O	
DBD INTERNATIONAL	22			O		O	O						O				O
FIRMA ENGINEERING LTD	24			O	O	O	O					O	O	O			
FORTH ENGINEERING LTD	26		O	O	O	O			O	O		O	O	O	O		
GALSON SCIENCES LTD	28						O							O			
GLEEDS ENERGY LTD	30	O		O			O			O			O				O
INNOVATIVE PHYSICS LTD	32			O	O	O	O							O			
JACOBS	34	O	O	O	O	O	O		O	O	O	O	O	O		O	O
JAMES FISHER NUCLEAR LTD	36	O	O	O	O	O	O		O			O	O	O		O	O
JAMES WALKER	38			O		O						O					
KUKA SYSTEMS UK LTD	40			O	O	O	O										
LANGFIELDS LTD	42			O		O			O			O					O
LUCIDEON LTD	44						O							O		O	
MI-GSO / PCUBED	46						O						O				
MORSON PROJECTS LTD	48			O	O	O	O						O				
MOTT MacDONALD JAPAN K.K.	50			O	O	O	O				O		O			O	
NATIONAL NUCLEAR LABORATORY LTD	52			O		O	O				O			O		O	
NATIONAL PHYSICAL LABORATORY LTD	54		O	O	O		O							O		O	O
NEOS NUCLEAR LTD	56			O	O	O	O						O			O	
PACTEC EPS LTD	58						O									O	
RAWWATER APPLIED TECHNOLOGY LTD	60			O	O	O								O			
SCX SPECIAL PROJECTS LTD	62		O	O	O	O						O	O				
SHADOW ROBOT COMPANY	64			O	O		O							O		O	
SPRINGFIELDS FUELS LTD	66	O	O	O	O	O	O	O	O	O	O	O	O	O		O	
STEEL DYNAMICS LTD	68				O	O							O				O
STRUCTURE VISION LTD	70			O		O								O		O	
URENCO NUCLEAR STEWARDSHIP	72						O									O	
VEOLIA NUCLEAR SOLUTIONS LTD	74			O		O	O			O						O	

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Nuclear competencies

Decommissioning/Decontamination

Engineering & Design Services

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Others

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Company Outline

ALLSPEEDS is the sole manufacturer of Webtool hydraulic ROV cutters and systems, Tangye lifting jacks and hydrostatic test pumps, Millingford sucker rod pumps, Kopp variable speed drives and Blake Hydram water pumps.

With over 150 years' experience in the design and manufacture of hydraulic and mechanical equipment, we have gained a global reputation for quality across a wide range of hydraulic products for industries including Oil & Gas, Subsea, Offshore, Nuclear Decommissioning, Aerospace, Construction and Military. All product research, design, testing, development and manufacturing are performed at our facilities and head office in Accrington, Lancashire, UK.

RCV215 cutting device, without and with frame

Pole-mounted decommissioning cutter

Nuclear Capabilities

Webtool guillotine croppers use a cold cutting process. The hydraulically powered tool comprises of a jaw containing a blade and an anvil.

Operation is straightforward - position the metal section in the jaw, and activate the tool. Our blades are not given to deflection or breakage and once the material is positioned in the cropper it cannot slip out as a result of the cropping action. A further advantage is our unique optional remote anvil and blade changing.

Unlike other cutting methods where there is a risk of the item flexing during cutting and either trapping or snapping the blade, closing the guillotine's anvil locks the component to be cut in position, ensuring the cut is completed successfully every time.

The steel channels mentioned in the Sellafield case study are a good example of realising significant time savings. Each steel channel was cut within 2-3 minutes.

Our cutters have been used for various decommissioning projects, ranging from small diameter tube, to large steel channel and I-beam and with customers in the UK and USA, have a solid track record within the nuclear industry.

Main Nuclear Experience

Webtool has supplied croppers to SELLAFIELD LTD for the removal of steel infrastructure from de-canning bays previously used to store spent fuel rods and operational waste. The tooling package has significantly reduced the time and complexity of cutting steel sections during decommissioning operations.

In total 12 de-canning bays adjacent to the main Pile Fuel Storage Pond are being decommissioned. The practicalities of cutting the steelwork as a series of multiple steel sections both above and below the water ruled out conventional cutting methods. Webtool supplied a guillotine cropper ideal for nuclear decommissioning capable of slicing through steel channels measuring up to 203 x 102mm (8" x 4").

For another decommissioning project where the levels of radiation precluded human intervention, the guillotine blade had to be replaceable using remote manipulation. In this case, a cradle was fabricated allowing the blade and anvil to be removed by manipulating two quick release toggles and tilting the tool.

BEP SURFACE TECHNOLOGIES LTD

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Nuclear competencies

Decommissioning/Decontamination

Nuclear Consultancy Service

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Research

Waste Management and Disposal/ Recycling

Contact them in Japan

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Company Outline

Generally, we are electroplating and precision grinding engineers. We electroplate copper, nickel & chrome and then machine to drawing size. Typically, we handle up to 20 tonne components with accuracies of 5 microns TIR. Everything we do is cylindrical. We have some of the largest plating tanks in the UK. Our range of customers covers most sectors from packaging, defence, oil & gas, water, nuclear, paper, rotating power equipment and machine tools.

We do have a star product - a copper shell cooling roll, which we manufacture and refurbish for the world's leading laminator.

The rest of our work is refurbishing rolls, pistons, shafts, rotors etc. by plating the worn diameters usually with nickel and then chrome plating to give a hard-wearing property to the journals.

Copper coated high level waste containers

Nuclear Capabilities

In the nuclear field, we are world experts in the copper coating used for the high-level waste containers. We currently work with the Canadian nuclear industry (NWMO) on their Mk II canister design.

The copper coating is there for corrosion protection, and we have developed techniques and process to produce coatings that meet the Scandinavian KBS- 3 canister specification, i.e. oxygen content <5 parts per million, for example. We have manufactured full size canisters to the required specification and are in the process of producing a "lower assembly" which comprises a seamless 3mm coating over the combined canister body and one of the hemi ends.

Copper coated samples have been manufactured for NUMO (via NWMO) to test the friction stir welding techniques of the copper coated canister samples.

We have smaller scale lab tanks to be able to carry out research & testing. With the support of waste management organisations we hope to optimise the copper coating process.

Main Nuclear Experience

All for NWMO

- Manufactured copper coated steel samples for experimental testing – 2016/17
- More samples and 5 x full size canister bodies – 2020/2021
- Full costing to build a plant to electroplate Canada's nuclear canister requirement – 2021
- Project underway for more samples and plate a "lower assembly" 2022/2023

BOURNE NUCLEAR LTD

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Nuclear competencies

Building and Construction

Commissioning

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

On-site Erection/Fabrication

Operation and Site Management

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Project Management

Others

Contact them in Japan

British Embassy in Tokyo

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Company Outline

The BOURNE GROUP have been trading for over 75 years and offer a complete service from design through to installation. We are one of the UK's largest privately owned construction companies. Within the group, four specific business units are formed, each one specialising in core sectors of the construction industry.

BOURNE PARKING – Tier 1 car park contractor supplying a design and build, turnkey service to clients around the UK.

BOURNE STEEL - Tier 2 large multi-storey steel structures, decking, cladding, blast glazing, design, detailing, fabrication, and installation.

BOURNE SPECIAL PROJECTS – Tier 2 – specialising in steel and decking projects to the rail sectors.

BOURNE NUCLEAR – Tier 2 formed to focus on the exacting requirements of the nuclear sector. Drawing on 75 years of experience in specialist sectors across the construction industry. We sit in a unique position that we are in four key sectors and can naturally cross pollinate our learning to support our clients in realising their goals.

Support Structure for nuclear equipment

Sellafield Modular Unit

Nuclear Capabilities

BOURNE NUCLEAR LTD offers a wide range of services supported by its in-house design, BIM compliant modelling (3D Software), manufacturing and compliance departments, producing the very best in class 1 EXC 4 steelwork.

Our reputation for safety, quality, supply chain management, material traceability, and compliance are well known throughout our stakeholders.

Collaboration and early engagement are key in successfully delivering the product, and equally important are the lifetime quality records (LTQR)

Our services include:

- Design (including blast)
- Detailing (build from print acceptable)
- BIM compliant
- Fabrication (25 welders + 30T cranes + CNC profilers to 100mm thick materials)
- Carbon steelwork EXC 2 ,3 ,4
- Modular frames and production lines
- Heavy and light machining – stainless steel, duplex etc.
- Material handling units (plug and play)
- Vessels and pipework, design, fabrication and install
- Installation teams
- Project management teams
- SPOC – Single point of contact

Main Nuclear Experience

Model, supply, manufacture and install of a Reactor Tank Support Structure

- Critical material selection & control
- EXC 4 – QC1 -Traceability Management for all components via our ITPs
- Heavy machining of a 4m2 – 70mm carbon steel plate
- Proof loading
- Full SPOC (single point of contact) project management support
- Installation of structure, tank, pipework provided

Construction – Tri lobe (ROLLS ROYCE)

Manufacture, trial assembly, cleaning, painting and installation of a carbon & stainless-steel complex bed assembly for a reactor vessel supported on a heavy, carbon steel rigid structure.

- 3D modelling
- EXC 4 – QC1 fabrication
- Comprehensive ITPs and Lifetime quality records
- Risk assessment and methodology development
- Installation on site in a controlled environment

Integration – Sellafield Modular Units

Supply of six secure, fully welded carbon steel skeleton framed units complete with a fully welded steel cladded envelope

- 3D model design
- Fabrication & assembly lines
- Critical inspection regime
- Delivered complete with doors, floors, venting equipment.

CAVENDISH NUCLEAR LTD

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Nuclear competencies

- Commissioning
- Decommissioning/Decontamination
- Engineering/Technical Services/ Maintenance
- Engineering & Design Services
- Nuclear Consultancy Services
- On-site Erection/Fabrication
- Operation and Site Management
- Planning and Licensing
- Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)
- Project Management
- Research

Company Outline

CAVENDISH NUCLEAR is a nuclear support services company that provides innovative, strategic and technical advice to the areas of decommissioning, waste and fuels management, radiological characterisation, hazard management and all aspects of nuclear equipment design and supply.

We have over 50 years' nuclear experience working in the UK and overseas since our original involvement as OEM designer and supplier to the first generation Magnox reactors in UK and Japan, and now with a strong base of highly skilled and experienced engineering and technical staff who have undertaken Tier 1, Tier 2 and Tier 3 delivery roles across the project lifecycle.

We provide a complete design and supply lifecycle, from concept through to fully justified detailed designs, manufacture, assembly testing and installation.

Pile Fuel Cladding Silo - Waste bunker retrieval project

Berkeley Vaults - Waste bunker retrieval project

Nuclear Capabilities

Nuclear Design Services

CAVENDISH NUCLEAR has one of the UK's largest nuclear design houses, with over 50 years' experience in equipment manufacture for nuclear markets. We can provide a complete design life cycle, from concept through to fully justified, detailed design.

Decommissioning

Our size and experience in the complete decommissioning of nuclear facilities allows us to provide a fully integrated solution that can be delivered in-house. Safety and quality are paramount through all aspects of our decommissioning work.

Waste Management and Characterisation

We are a world leader in the safe management of radioactive fuel and waste, with proven capabilities in waste and component handling, transportation and storage.

New Build

With the largest nuclear-capable workforce of any UK contractor and a proven supply chain capability, we have an exceptional track record in concept design, engineering and delivery of major civil nuclear facilities. We also offer environmental and liabilities consultancy, training, and engineering support across the new build process.

Radiological and Nuclear Security

We provide integrated, cutting-edge detection and measurement solutions for the civil and security nuclear markets and through-life support to our own instruments and those of other vendors.

Main Nuclear Experience

Pile Fuel Cladding Silo, Sellafield, UK. 2011 - 2021

CAVENDISH scope:

- Project management design & engineering
- Manufacturing assembly
- Works testing, install and commissioning

CAVENDISH achievements:

- The project was completed 3 years ahead of schedule with savings in excess of £400m compared to the previous scheme.

Berkeley Vaults Waste Retrieval, Berkeley Power Station, UK. 2011 - 2021

CAVENDISH scope:

- Programme & project management
- Optioneering & design services
- Design & installation of retrievals equipment
- Inactive commissioning
- Operator training

CAVENDISH achievements:

- Concept Design to completion of Active Commissioning in just over four years.
- Maximised use of commercially available equipment and a modular build strategy, reducing onsite construction phase and project duration.
- A project which successfully retrieved, processed and packaged waste from the Berkeley vaults, representing a significant landmark for MAGNOX LTD and the NDA.

CONNEXUS ENGINEERING LTD

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Nuclear competencies

Engineering / Technical Services / Maintenance

Engineering & Design Services

Nuclear Consultancy Services

Project Management

Others

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Company Outline

CONNEXUS provides engineering, project management, and commercial management services, specialising in delivering multicultural projects.

CONNEXUS is Latin for 'link together', reflecting our ethos to provide the essential bridge between parties delivering multicultural projects.

Through our global experience of projects across many nations, languages, and technical specialities, we recognise that solving complex engineering issues in a multicultural or international environment can bring about unique, often overlooked or misunderstood challenges.

These challenges are unique, due to diverse cultural, engineering, language and working approaches that exist in multicultural teams, and can be difficult to recognise and overcome, due to their intangible nature.

We excel in these multicultural, complex engineering projects, providing catalytic support and expertise to facilitate the smooth delivery of the project.

Nuclear Capabilities

Our specialists utilise expertise gained from numerous nuclear engineering projects, particularly between Japan and UK, to provide the following services:

- Technical Interpretation – facilitating the exchange and knowledge transfer of engineering, technical, tactical and strategic expertise, together with the associated philosophies, between parties within an international engineering project.
- Technical Coordination - supporting the delivery of complex multinational engineering and technical tasks, understanding the challenges in a multicultural setting, and assisting to overcome the challenges. This includes bringing together the relevant parties, facilitating the development of a common approach and direction for resolving issues, and monitoring progress to ensure the parties remain aligned.
- Project Management – supporting and managing the delivery of international engineering projects, underpinned by an in-depth understanding of the challenges associated with multicultural engineering activities.
- International Business Advice – assisting clients and/or suppliers with the development and delivery of strategic and tactical approaches to identify, secure and receive/provide cross-border support.

Main Nuclear Experience

Our experience of supporting the Japanese nuclear industry is illustrated by the following examples:

We supported a Japanese nuclear client with Technical Interpretation and Coordination on a project delivered by a joint team of Japanese and UK suppliers. This included identifying lessons learnt from earlier phases, risks to the delivery of future phases, considering the management of suppliers, roles and responsibilities, and multicultural challenges.

We provided our full range of services to a Japanese client for the introduction of its nuclear technology to the UK. This included assisting to understand and satisfy the UK regulations, developing and managing a team of UK-based suppliers to support the client.

We supported a Japanese client to better understand its nuclear technology procured from the UK, providing Technical Interpretation and Coordination. We also assisted the client to liaise with the UK supplier to seek additional information and support to operate the technology.

CREATEC LTD

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Nuclear competencies

Decommissioning/Decontamination

Nuclear Consultancy Services

Research

Waste Management and Disposal/ Recycling

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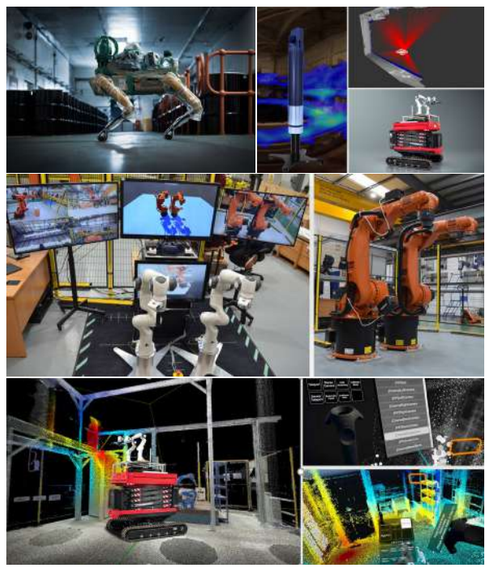
Company Outline

CREATEC is an Applied Research and Technology organisation with core capabilities in Imaging/ Sensing, Artificial Intelligence, Robotics and Radiometrics. CREATEC has patented technology associated with unique capability to map radiation in 3D using a range of tools and software processing.

CREATEC was founded in 2010 and was one of the first responders to assist at Fukushima with radiation mapping services and more recently robotics.

CREATEC's head office is in West Cumbria, UK (close to the Sellafield site). CREATEC has offices in Oxford, UK and a company in Tokyo, Japan. CREATEC also has a Joint Venture company in Norway. Collaboration with like-minded organisations and flexibility in business model make CREATEC an ideal partner for organisations wanting to deploy CREATEC technology. CREATEC has won the Queen's Award for Enterprise twice for International Trade and Innovation.



Examples of CREATEC's Projects

Nuclear Capabilities

At CREATEC, we make technology happen. We're the team behind some of the world's most advanced applications of emerging sensor technology, robotics, and software. By collaborating with both academia and industry, we are uniquely able to uncover, shape and bring to life innovative ideas to solve real-world problems. CREATEC operates primarily at Technology Readiness Levels (TRL) 4-8. Typically, TRL 9 requires an industrial partner to develop a fit-for-market product. CREATEC has on occasion taken this step, self-funding for example the N-Visage™ range of gamma radiation mapping hardware and software.

CREATEC has a track record of industry firsts including deploying on site autonomous drones (UAV) in a nuclear radiation contaminated area and open platform robotics systems integration.

Our main products and services are:

- Research, development, and consultancy in the fields of sensing, radiometrics and robotics
- Systems and Software Integration of sensors and robotics
- Ready to use radiometric instruments and software
- Ready to use robotics and sensing technologies

Main Nuclear Experience

Riser - Remote Intelligent Survey System for Radiation

- Autonomous indoor navigation and real time radiation mapping for drones, allowing radiometric data gathering in inaccessible areas. Deployed at Fukushima Daiichi power station through 2017.

Fuel Finder – World Leading Radiation Imaging in Extreme Environments

- Developed in collaboration with MHI under IRID project from 2017 until present, Fuel Finder is a first of a kind radiation sensor for extremely high dose environments. Developed to be deployed in the Pressure Containment Vessel (PCV) at Fukushima Daiichi Unit 2.

NND – CREATEC part of a Consortium Delivering DX Software in Norway

- 12 year project commenced in 2022 for the design, development, and maintenance of an integrated software system to support a fully digital approach to reactor decommissioning and waste management.

E2A – End-to-End robotic nuclear decommissioning demonstration (bare cell to waste sorted and boxed)

- A system in which a toolkit of robotics modules can be controlled through a single interface and reconfigured to solve many decommissioning challenges. Original development and deployment in 2018-2020 and now employed on 3 live projects.

DBD INTERNATIONAL

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Nuclear competencies

Decommissioning/Decontamination

Engineering & Design Services

Nuclear Consultancy Service

Project Management

Others

Contact them in Japan

British Embassy in Tokyo

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1 Ichibancho
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Company Outline

DBD INTERNATIONAL is a professional engineering and advisory company specializing in working with clients in highly complex and regulated industries. We provide specialist engineering, project management, and consultancy services which reduce risk, add value and facilitate positive change to our customers' engineering, construction, decommissioning and waste management projects. The primary reason for the establishment of DBD was to assist nuclear sites in making better decisions.

- **Engineering:** We provide nuclear engineering expertise to de-risk projects by ensuring that relevant experience is applied throughout the complete project lifecycle, from concept to handover.
- **Optimisation:** We bring together and maximise the potential of existing data and processes to operate and deliver better in support of major programs and projects.
- **Safety & Assurance:** Our Safety and Assurance services are focused on mitigating risks and helping to transform behaviours in a nuclear environment.

Nuclear Capabilities

Nuclear Engineering
We enhance this by the creation and application of digital tools to model facility operations, to bring benefits in cost and performance.

Mission Optimisation
We integrate schedule, cost, resourcing and risk analysis data to provide enabling outputs, which give stakeholders a clear visualization of the mission and insights for critical decisions that bring maximum added value.

Safety and Assurance
We support our clients to find pragmatic solutions which achieve a balance of proportionality in nuclear safety, assurance & environmental projects.

Our capabilities include:

- Hazard Identification
- Safety Case Development
- Design/Design Change Control Safety Justification
- Hazard Analyses (HAZANs)
- Criticality Assessments
- Shielding Assessments
- Human Factors Assessments
- Internal/External Hazards Assessments
- Probabilistic Safety Assessments
- Emergency Planning and Response
- Nuclear Site Licensing & Regulatory Support
- Nuclear Safety Management
- Independent Nuclear Safety Peer

Main Nuclear Experience

We have previously provided support to TEPCO, HITACHI, and JNFL.

Examples include:

- A series of Concept design projects
- Support in sourcing critical spares/ power fluidics
- Decision Analysis studies using D2O process to support topics such as fuel recovery from damaged reactors
- Post-Fukushima resilience analysis, applying our work from Sellafield to look at beyond design basis resilience
- Post-Fukushima application of UK safety analysis techniques/ALARP to transfer learning from UK to Japan
- Collaborative working on Generic Design Assessment including secondment

Decommissioning
Safe and cost effective clean-up of some of the world's most demanding nuclear legacies. Operating in both UK Nuclear decommissioning Authority (NDA) and US, Department of Energy (DoE) estates, DBD brings pragmatic and innovative solutions to complex problems.

Defence
DBD work at the forefront of the Defence sector, to help our clients mitigate risk and find stable and secure engineered solutions to long term challenges.

Energy
Working in both fission and fusion nuclear sectors, DBD's work spans political, research technology organisations to find solutions which close the gaps in bringing low carbon energy to all.

FIRMA ENGINEERING LTD

www.firma-engineering.com

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Technical Director

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Nuclear competencies

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Nuclear Consultancy Service

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Project Management

Research

Contact them in Japan

British Embassy in Tokyo

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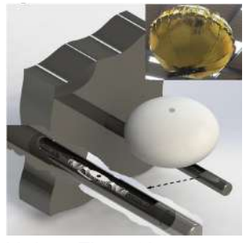
Company Outline

FIRMA ENGINEERING LTD is a professional Mechanical Engineering consultancy, formed in 2013 by three experienced consultants, to address the increasing requirement for high integrity detailed structural design & analysis within heavily regulated industries such as nuclear and aerospace.

We create realistic 'working' technical solutions that are commercially viable for our clients. We specialize in unique bespoke challenges that require a high degree of engineering lateral thinking and technical creativity.

We have a 'hands on' approach to Research, Development, and Innovation. We deliver high integrity detailed structural design and analysis on time and within budget. We offer a flexible and open relationship to our clients at all times.

We embrace a strong quality management philosophy and have been ISO 9001:2015 certified since March 2015.



Lighter Than Air Surveillance Drone

Sort Segregate Condition & Consolidation

Nuclear Capabilities

FIRMA ENGINEERING's main capabilities are split into two parts; Engineering & Design Consultancy & FIRMA Product Development.

1) Engineering & Design Consultancy:

Design: Conceptual, Front End Engineering Design (FEED) Studies, Optimisation / Simplification, Risk Evaluation, 2D Drawings, 3D Solid Models, Verification, Design Reviews, Manufacturing Support.

Analysis: Load Path Analysis, Static Hand Calculation, Finite Element Analysis / Verification, Fatigue Analysis, Crack Growth / Damage Tolerance, Peer Review / Analysis Checking, BS EN 1090 Proof via Structural Calculations, Bespoke Analysis Tool Creation.

Engineering Management: Project Management, Risk Management

Our design and analysis are supported by the latest industry standard software:

Nastran, Patran & MSC Apex
Solidworks Simulation
Solidworks, Auto Cad Inventor & Fusion360
MathCAD, MS Excel & VBA

2) FIRMA Product Development:

Research and Prototyping: Concepting through to turnkey, 3D Printing, (Rapid Prototyping)

FIRMA develops its own products to support the nuclear decommissioning industry. FIRMA's most significant achievement to date is its development of the FIRMArm. This product has been created to provide a low cost mechanically operated remote access arm which can be deployed though a 150mm port into a highly contaminated nuclear cell. FIRMA has spent two years developing this product which has undergone live operation at Sellafield in Sept 2022.

Main Nuclear Experience

FIRMA ENGINEERING LTD has provided consultancy support on a broad basis, from simple lifting equipment through to complex tooling & remote access equipment. The following are some key projects:

2015: Sort Segregate Condition & Consolidation (SSCC) for First-Generation Magnox Storage Pond (FGMSP) Sellafield. FIRMA provided VEOLIA NUCLEAR SOLUTIONS (VNS) with a Gantry Frame design & structural certification within 9 months.

2016: Deployable, Lighter Than Air Surveillance Drone – INNOVATE UK project to prove concept of deployment of drone into a Nuclear Cell via 150mm port.

2017: MHI Boom for fuel debris removal at Fukushima Daiichi. FIRMA provided VNS with consultancy on manufacturing methods, element tests & design optimisation of Boom Links & Telescopic Arm.

2020: Flexible Interchangeable Reconfigurable Mechanical (FIRMArm) developed by FIRMA to address the need for a low-cost, robust mechanical deployment arm for inspection & maintenance of highly contaminated nuclear cells.

FORTH ENGINEERING LTD

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Nuclear competencies

Commissioning

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

On-site Erection/Fabrication

Operation and Site Management

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Project Management

Research

Trade Services

Contact them in Japan

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Company Outline

FORTH is an advanced-technology engineering solutions provider to the nuclear industry. Specialising in technical innovation, we have designed and developed a unique range of ROVs, radiation tolerant cameras and remote tooling which are used throughout the industry.

FORTH provide R&D, assembly, test, installation, commissioning and maintenance of bespoke solutions for the nuclear and offshore decommissioning, nuclear new build, renewable energy and many more industries. We have the capability for the provision of Mechanical and Control Electrical & Instrumentation (CE&I) design & manufacture of systems and instrumentation panels, fabrication, machining and mechanical assembly.

We aim to establish FORTH as the supplier of choice for the provision of unique engineering solutions, manufactured products and M&E services, recognised for consistently adding value, and delivering excellence.

ROV Solution

Petal grab for larger debris

Nuclear Capabilities

FORTH's capabilities include:

- Mechanical and Remote Handling Systems
- ROVs
- Rapid Prototyping
- Design
- Mechanical & Electrical Engineering & Site Services
- Project Management
- CE&I Control Systems
- Trials, Training & Simulation
- 3 Test Rig Halls
- Research & Development
- Specialist Lighting & Cameras
- Visual & Inspection Characterisation
- Storage Facilities

Deep Recovery Facility – 12,100 ft^2 building with 10 tonne crane and 5.8 meter clearance under hook with pond.

Mechanical & Electrical Services – Our team can deliver mechanical & electrical installation projects of all sizes and complexities, ensuring the exact client specification and quality requirements are met. Our extensive range of capabilities includes mechanical installation, pipework, HVAC, compressed gas, plant, machinery, tooling and electrical services. At FORTH, quality is paramount in all we do.

We are able to provide the full range of mechanical and electrical services including:

- Design
- Installation
- Refit and refurbishment
- Maintenance and testing

Our services include project management, design, procurement, installation, testing, commissioning and maintenance of Mechanical and Electrical systems.

Main Nuclear Experience

Example 1:

The Client required the design, manufacture & supply of a solution capable of receiving nuclear material from a sort tray and depositing it within a defined container. We devised an effective solution in a short time. The solution was a robotic arm capable of handling the fuel rod fragments.

Example 2:

The Client had an issue with debris-strewn residual sludge fluid inside underground tanks. The sludge was to be removed from the tanks using a mechanical solution. Access to each tank was possible through a 1.5m by 4.5m aperture. Using our experience in nuclear ROV technology, we devised an ROV solution capable of entering and navigating the tanks to gather and remove the sludge.

Example 3:

The Client had a leak from a sump in a Redundant Settling Tank area. We were tasked with designing a solution that would be capable of removing 15m^3 of sludge and 15m^3 of solid waste, along with producing, testing & deploying the solution. The solution provided was tooling to size reduce the solids and retrieval of sludge.

GALSON SCIENCES LTD

www.galson-sciences.co.uk

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Nuclear competencies

Nuclear Consultancy Service

Research

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Company Outline

GALSON SCIENCES LTD (GSL), established in 1992, provides radioactive waste management solutions to clients across UK, Europe, Asia and North America. Our consultancy services cover all aspects of the radioactive waste lifecycle, including inventory analysis, waste treatment, packaging, storage, transport and disposal. GSL has expertise in preparing near surface and geological disposal safety cases for all kinds of radioactive waste, environmental safety cases for decommissioning, research on pre-disposal management options for "problematic" radioactive wastes, criticality safety assessment and lifecycle cost assessment.

EGIS, an international group in the construction, engineering and mobility services sectors, acquired a majority shareholding in GSL in 2021, and plays a major role in the design of Evolutionary Power Reactors and the international programme for experimental nuclear fusion research.

End state of Magnox reactors Graphite civil and research sites

- AdobeStock

Near surface LLW engineered disposal facility at Dounreay Center of fast reactor United Kingdom
- ©DSLR, NDA research DSRL,

Nuclear Capabilities

- Radioactive Waste Management, including strategic analysis, inventory audits, option studies and advice on all aspects of radioactive waste management
- Environmental Risk and Impact Assessment, developing Environmental Safety Cases to support decommissioning and licensing of radioactive waste disposal facilities
- Criticality Safety Assessment, covering the transport and disposal of radioactive materials. GSL is an active member of the UK Working Party on Criticality
- Disposability Assessment for existing wastes and new build reactor designs
- Monitoring Programmes for surface, near-surface and underground (geological) radioactive waste disposal facilities
- Options Assessment, including decision analysis, options studies and Best Available Techniques (BAT) assessments for nuclear decommissioning and waste management programmes
- Nuclear Regulation, including analysis of a wide range of practices, policies, technology and experience in the regulation of safety and management of environmental risks
- Geoscientific Investigations and Site Characterisation, including geological modelling
- Nuclear Safety Studies
- Stakeholder Engagement support, particularly for potentially contentious developments

Main Nuclear Experience

MAGNOX LTD (UK): Jul 2016–ongoing.
Supporting decommissioning of the Magnox Trawsfynydd site in Nuclear Site License condition and radioactive substances regulation compliance

ONDRAF/NIRAS (Belgium): Apr 2015 – Dec 2021.
Provided support to key technical areas of the geological disposal programme, including cost assessment, safety assessment, requirements management, option studies, synthesis reports, technical illustration and peer review. GSL was also responsible for integrating and coordinating the work of other contractors, ensuring quality and consistency of outputs

JAEA (Japan): 2011 – 2013.
Supported the development and maintenance of the Geological Modelling Analysis and Simulation Software, approaches, advice, and review of JAEA's modelling assisting the interaction between modelling and site characterisation and developing support documentation

EGIS GROUP are also providing nuclear design and engineering services for new nuclear build projects in the UK.

GLEEDS ENERGY LTD

gb.gleeds.com/sectors/energy-and-infrastructure/energy-and-renewables/

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Nuclear competencies

Building and Construction
Decommissioning/Decontamination
Nuclear Consultancy Service
Operation and Site Management
Project Management
Others

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Company Outline

As one of the world's leading and independent management and construction consultants, GLEEDS has 130 years' experience in the build environment. We specialize in providing expert advice and management services throughout the project life cycle.

With over 1,800 people based in 71 offices worldwide and an unrivalled international project portfolio, we are at the forefront of providing consultancy services that consistently deliver results. We have the scale, strength and expertise to successfully manage complex projects and ensure our clients and the communities in which they operate benefit financially, economically and socially.

As experts within the energy sector, we bring a unique understanding of cost and capital, tailoring our service to suit your needs; from short-term consultancy, to a fully managed service. From concept through to completion, we know how to protect investment in an energy project.

Operating Sites

Sellafield Sites Limited (UK)

New Build

EDF Hinkley Point & Sizewell C (France and UK)

Decommissioning

General Decommissioning (UK & Canada)

Nuclear Waste Services (UK)

Nuclear Capabilities

Strategy & Investment Proposals
We integrate with our clients and build tailored strategies for procurement, contracting and project delivery. We then design project governance structures and processes to ensure effective decision making.

Market Engagement & Procurement
We act as our client's representative and implement robust procurement processes across all sectors. Our evaluation criteria give confidence at contract award that agreements will deliver a safe, quality product to time and cost.

Contract & Commercial Management
We administer client's contracts with rigour, ensuring a safe execution, on time and cost, whilst proactively managing and mitigating risk.

P3M and Project Controls
From estimating and benchmarking, through scheduling and cost control, our experts combine control with the latest technology and proprietary tools.

Data Analytics & Digital Apps
Studies show an increase in revenue, sales and profits in those companies that use data driven tools to make real time business decisions. We capture data, consolidate it, and then use it to create powerful interactive dashboards that enable informed decision-making in real time.

Stakeholder Management, Governance & Assurance
We develop and manage plans that foster good relationships, build trust, and ensure clear and transparent communication. We also operate in a governance and assurance role across our client's organizations or projects.

Main Nuclear Experience

Nuclear New Build - Horizon NP, EDF, Hinkley Point C, Sizewell C (2013-current)
Appointed as the lead commercial and cost consultant to establishing route to funding, business case planning, cost, commercial and contract management.

UK's Nuclear Benchmark Cost Model - Business, Energy & Industrial Strategy, BEIS (2019-20)
BEIS appointed GLEEDS to develop the UK's nuclear model for benchmarking the estimated costs associated with Nuclear Power Plants.

Decommissioning - SELLAFIELD SITES LTD. (1989-current)
GLEEDS have worked continuously with Sellafield on the decommissioning of the nuclear site for 32 years. Activities have included procurement planning, contract strategies, coordinating market engagement, commercial/cost auditing, validation and assurance.

Low Level Waste - NUCLEAR WASTE SERVICES (2021-current)
GLEEDS have been appointed to develop a set of strategic cost norms that can be applied across the NDA Group for strategic Make/Buy and waste management routing decisions.

INNOVATIVE PHYSICS LTD

www.inphys.com

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Nuclear competencies

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Nuclear Consultancy Services

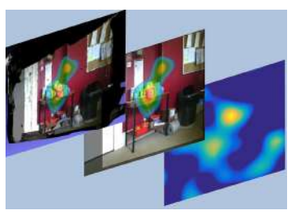
Research

Company Outline

INNOVATIVE PHYSICS LTD (IPL) is an award-winning science company specialising in evolving a wide range of patented sensor technology, imaging, AI, and pattern recognition in the nuclear, homeland security and medical sectors. The company works with foreign governments and business leaders worldwide. It has been involved in many significant, wide-ranging projects, from developing products and systems, aiding nuclear decontamination, and identifying security risks at airports to developing techniques that will help speed up the detection of cancer.

IPL offers leading edge technologies to help customers and collaborators solve complex problems and develop enhanced leading edge products based on innovative sensor solutions. Founded in 2008, IPL entered the nuclear market by initially creating handheld radiation dosimeters. IPL has since developed an extensive portfolio of products and technologies, which include its range of gamma cameras.

Mini Gamma Camera with SmartSpot™ software



LIDAR 3D Imaging

Advanced Semiconductor Neutron Detector

Nuclear Capabilities

INNOVATIVE PHYSICS LTD (IPL) developed a series of novel sensor technologies and techniques, including gamma and neutron detector heads using solid-state technology to enable a wide range of application needs. Every aspect of the technology has been designed for working in harsh environments – including high technology in harsh nuclear environments. Recent developments include work in Fukushima Dai-ichi decommissioning which could potentially be used for a variety of needs inside Nuclear Power Plants.

Specific technologies include imaging systems for gamma environments, neutron detection and monitoring systems, techniques for optimising systems to meet critical needs.

IPL has a portfolio of radiation detection equipment, including dose meters, radioisotope identifiers and gamma-ray imaging systems that allow end-users to locate radioactive hotspots swiftly, leading to workers being in a hazardous situation for less time, limiting their radiation doses and saving money. The gamma cameras are highly sensitive and, therefore, are one of the quickest gamma imaging cameras, detecting hotspots within minutes and identifying multiple hotspots of radioactivity.

Main Nuclear Experience

INNOVATIVE PHYSICS LTD has supplied Japan with handheld survey meters for over a decade. Since the Fukushima Dai-ichi disaster in 2011, IPL began working closely with its partners, and in June 2012, identified a market requirement for a gamma imaging system that could visually locate radioactive hotspots above background levels detected at varying distances as accurately and quickly as possible. IPL now have a wide range of gamma camera systems with different specifications to suit customer needs.

Following on from its successes with its gamma camera, IPL has developed cutting-edge neutron detector technology to monitor the neutron flux within the Fukushima Dai-ichi reactor buildings during decommissioning.

IPL has developed imaging tools in Canada that merge real-time video/ point cloud/isotopic data in radioactive waste sorting.

In China, IPL has developed a 3D tool for identifying radiological waste and debris in pipelines, providing the waste's location, type and style.

JACOBS

www.jacobs.com

Jacobs

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Nuclear competencies

- Building and Construction
- Commissioning
- Decommissioning/Decontamination
- Engineering/Technical Services/ Maintenance
- Engineering & Design Services
- Nuclear Consultancy Service
- On-site Erection/Fabrication
- Operation and Site Management
- Planning and Licensing
- Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)
- Project Management
- Research
- Waste Management and Disposal/ Recycling
- Others

Contact them in Japan

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Company Outline

At JACOBS, we're challenging today and reinventing tomorrow, solving problems, building resilient environments, and supporting cutting-edge science and manufacturing to inspire positive change.

JACOBS' nuclear business evolved from the UK's original equipment manufacturer to a leading solutions provider with a global footprint. We employ over 5,000 nuclear professionals and have access to over 50,000 technical and engineering staff. This enables partnering with our customers in their strategies for energy transition, data enabled solutions and cyber security. We are a £1.5bn/year nuclear business, of which £1.2bn/year is decommissioning and waste management, with the experience and capability in working across Tiers 1-4.

We work in partnership with our customers, local authorities, and stakeholders to move beyond decommissioning into regeneration solutions to ensure that local communities prosper in the future.

Legacy brands now incorporated into JACOBS

Nuclear Capabilities

JACOBS deliver large decommissioning projects across the globe; throughout the UK, Europe, USA and Japan. We act as an integrator and a partner alongside our clients to ensure safe and efficient delivery. In this way we are able to develop a deep understanding of our customers' issues and desired outcomes and therefore apply our knowledge and experience to implement the best solutions possible.

JACOBS nuclear decommissioning and integrated waste management capabilities include:

- Programme and project management, including the development of Long-Term Plans and Waste Strategies
- Design and manufacture of waste retrieval systems, including robotics.
- Safety and consultancy, including safety and environmental impact risk assessments and national waste disposal policy
- Waste treatment technologies, including graphite and ion-exchange resins
- Research and Development laboratories and radiochemical analysis services
- Test facilities, including commissioning and testing prior to onsite implementation
- Use of data-enabled digital technologies, including 3D visualisation of complex environments
- Dismantling and decommissioning of reactor and legacy facilities

As we continue to work closely with our customers we are keen to focus on regeneration projects to ensure that decommissioning is not seen as the end of a nuclear site's life, but instead a new beginning.

Main Nuclear Experience

UK - top solutions provider to the NDA.

Sellafield: Over 60-year relationship, largest supplier of engineering & technical services.

Europe - support customers across a range of projects.

1. Ignalina: Led the Project Management Unit, onsite training, technology transfer, build of waste treatment & storage facilities.
2. Jaslovske Bohunice: Decontamination of the primary circuit, dismantling of the reactor core & primary & secondary systems.

Japan - long-term involvement in Japan spans over 50 years.

1. Fukushima Daiichi, TEPCO:
   - Programme Management Partner.
   - Development of decommissioning & waste management Long Term Plan.
   - Engineering studies & design of robotic systems for debris & waste removal.
2. Monju and Fugen, JAEA:
   - Technical reviews & development of decommissioning & waste management plans.
   - Feasibility studies on the removal & treatment of Monju sodium in the UK.

North America - Tier 1 & 2 nuclear services providers to the US DoE, delivering safe, innovative solutions.

JAMES FISHER NUCLEAR LTD

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Nuclear competencies

Building and Construction

Commissioning

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Nuclear Consultancy Services

On-site Erection/Fabrication

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Project Management

Research

Waste Management and Disposal/ Recycling

Others

Contact them in Japan

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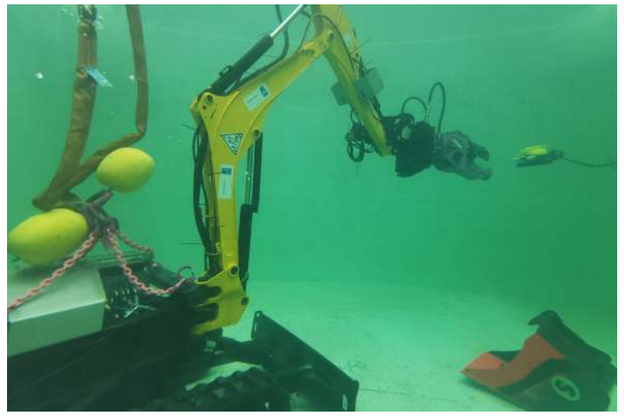
Company Outline

For nearly 40 years JAMES FISHER NUCLEAR (JFN) has been at the forefront of the UK nuclear legacy clean-up, pioneering safe and cost-effective solutions on the industry's highest profiled decommissioning projects.



Nuclear Capabilities

Reactor segmentation
Unparalleled experience in design and development of reactor segmentation solutions.

Manipulators & remote handling
Excellence in remote handling systems, manipulators and robotics.

ROVs
Submersible, aerial and land based ROVs for a range of challenging surroundings.

Decommissioning solutions
Turn-key systems for applications within nuclear environments.

Main Nuclear Experience

JAEA
ROV development work for JAEA for potential deployment at their HAS facility situated at Tokai.

MAGNOX LTD
Lead on Magnox's Steam Generating Heavy Water Reactor (SGHWR) project; largest UK reactor segmentation challenge to date.

SELLAFIELD LTD
Framework specialist remote handling partner providing a quick, efficient and cost effective solutions to challenges faced across the whole of the Pile Fuel Storage Pond (PFSP) decommissioning programme.

Development and testing of long reach tooling and water jet cutting technology to support decommissioning of the Pile Fuel Cladding Silo (PFCS) at Sellafield.

JAMES WALKER

www.jameswalker.biz/our-solutions/our-products/elastomers/materials-for-nuclear-applications

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Nuclear competencies

Decommissioning/Decontamination

Engineering & Design Services

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

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Company Outline

JAMES WALKER's work started in 1882, when few other companies had applied engineering science to the design and manufacture of sealing products.

The result was the innovative and greatly admired Lion Brand. This product line proved vital to the success of a new generation of high-efficiency steam engines that powered mankind into the 20th Century.

Solving challenges through a combination of materials science and application engineering remains one of the foundation stones of our business to this day.

Our partnerships with operators and equipment manufacturers has proved highly productive, such as our development of rapid gas decompression (RGD) resistant grades of elastomer that withstand the harshest of subsea duties, and sealing solutions that extended the maintenance-free working life of equipment, and enable operators to work more efficiently in hostile environments.

Nuclear Flask

Nuclear Capabilities

Based on our unrivalled experience, we precisely match materials, product design and component manufacturing methods to meet customers' exact specifications and operational requirements.

With over 40 years of service to the nuclear sector, our materials and products are used across a broad range of applications including:

- Fuel processing and handling
- Power generation
- Waste processing
- Transportation and storage

Supplying only the highest integrity materials and specialised fluid sealing products to the nuclear industry, our capabilities are firmly based on our knowledge of the processes involved and their highly specialised sealing requirements, plus the need for exacting quality control and assurance regimes.

We are at the forefront of development and application of high performance elastomers. In addition to working with industry standard materials and customers' own proprietary materials, our materials technology centre is continually working on new formulations to meet customer specific operational parameters and to advance our own product ranges.

The result is materials for sealing related products that work efficiently and for longer at extremes of temperature and pressure, with improved resistance to chemicals, abrasion, or ionising radiation.

Main Nuclear Experience

JAMES WALKER supported the principal contractor in designing and validating the sealing systems for a waste container, involving:

- Analysed service life of sealing materials in radiation
- Analysed container lid profile (flatness, surface finish, materials) and specified seal housing design and material
- Physical trials of container lid and seal performance using remote condition monitoring of fasteners
- Development of design and specification documentation for the operator
- Commercialisation and large scale production of containment sealing components for the principal contractor

Development of proprietary nuclear materials for extended service life
JAMES WALKER have 40+ years' experience developing materials which have been proven to achieve extended service in ionising radiation, which has been facilitated by close collaboration with nuclear power and decommissioning operators globally.

KUKA SYSTEMS UK LTD

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Nuclear competencies

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Nuclear Consultancy Services

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Chiyoda-ku, Tokyo 102-8381

Company Outline

KUKA UK specialise in Robot Automation Systems for the nuclear decommissioning industry with experience gained over the past 15 years.

The KUKA competence centre for nuclear applications is based at our facility in the UK where all nuclear projects for KUKA are completed. We offer full design, build, test and installation of our systems, supported by training and full nuclear level document support.

KUKA nuclear robot cells have now been active on UK sites for a number of years and have proved successful in operation.

Robot Swabbing application. Robot completes swabbing of the cell. Swab is analysed for compliance with cleanliness standard.

Robot waste sorting application. Pick, placing, size reduction and categorisation of waste

Nuclear Capabilities

KUKA have over the last 15 years delivered many solutions to the nuclear industry at sites such as Trawsfynndd, Hunterston, Bradwell, Hinkley Point, Winfrith, Dounreay, and Sellafield. Equipment has also been provided to businesses such as the Remote Handling Group, RACE, UKAEA for evaluation and independent development of solutions.

The belief at KUKA is that the use of commercial off the shelf (COTS) equipment can safely be included within the toolkit of the Site License Contractors in the efficient decommissioning of legacy nuclear sites.

Our offer is based upon delivering cells using the same KUKA robots often found in automotive factories and the like, so there is a strong installed base of machines built in serial production.

A few small modifications are made to the robot to suit the radioactive environment, but these are basically the same robots that BMW, Mercedes, VW etc. buy. KUKA builds over 50,000 robots per year and the products offered are therefore a well-developed product.

There are several solutions available to contractors to consider in the development of a scheme over the years and KUKA robots are just one option. KUKA have been involved in supporting those optioneering and HAZOP studies over 15 years. During this time KUKA have worked to support companies such as CAVENDISH, BALFOUR BEATTY, JACOBS and COSTAIN, to name just a few.

Main Nuclear Experience

1: CAVENDISH NUCLEAR
End customer Sellafield site

Year of manufacture 2019

Pile Fuel Cladding Silo Retrievals (PFCSR) Early Retrievals stage.

KUKA KR150 3700 K Ultra for swabbing and nut removal / insertion operations. Turnkey automation system.

2: CAVENDISH NUCLEAR
End customer Sellafield site

Year of manufacture 2021

Pile Fuel Cladding Silo Retrievals (PFCSR) Full Retrievals stage.

KUKA KR150 3700 K Ultra for swabbing and nut removal / insertion operations. Turnkey automation system.

3: Box Encapsulation Plant
Area 200 and Area 300 robot cells

Multi Robot cell for waste sorting, packing, bolting and swabbing. Turnkey automation system.

This project is currently in progress at KUKA.

LANGFIELDS LTD

www.langfields.com

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Nuclear competencies

Decommissioning/Decontamination

Engineering & Design Services

On-site Erection/Fabrication

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Others

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Company Outline

Our dedication to the latest fabrication and welding techniques belies a history which stretches back to the 1800s, when the company was involved in the production of mild steel, copper and brass components. Years of steady growth and development has led to extensive involvement with the forming and joining of sophisticated metals and today, LANGFIELDS are one of the UK's leading fabricators of pressure containment equipment using Nickel Alloys, Duplex Stainless Steel, Stainless Steel and Titanium ranges of materials.

From shop fabrication to site installation LANGFIELDS is devoted to providing industry leading solutions. At LANGFIELDS we understand our customer needs, to be flexible, to meet constrained schedules whilst achieving the highest levels of quality. We are the reliable partner of choice for your fabrication requirements. LANGFIELDS can provide a full design service for pressure equipment and process pipework, capable of producing designs from concept and site survey, or from customers drawings, fully compliant with applicable codes & standards and assessed against PED requirements where required.

Backface Welding – ST40 – Critical project for Sellafield

Tokamak reactor vessel for UK's first commercial nuclear fusion project

Exchanger

Nuclear Capabilities

LANGFIELDS have a long history of working with Sellafield in the UK (approximately 40 years). We are one of the UK's premier fabrication businesses and are one of the key businesses that Sellafield turns to – especially around complex welding issues. We have a 10 year framework agreement for the fabrication of high integrity vessels and tanks for Sellafield and are currently executing a number of key projects. We have undertaken critical welding scopes of work onsite at Dounreay and have developed a fully automated welding and inspection system called TANICS (in conjunction with JACOBS) to weld and inspect containers of highly irradiated nuclear fuel

With Right First Time welding levels among the highest in the UK and client accolades for the accuracy and timeliness of its Lifetime Records (LTRs) LANGFIELDS demonstrate a real understanding of nuclear quality requirements and display an authentic nuclear safety culture which drives high performance and continuous improvement. LANGFIELDS have been awarded the prestigious Supplier Assist Award from SELLAFIELD LTD. The award was presented to LANGFIELDS by the Head of Inspection Services after a rigorous audit process and we are now one of a handful of companies in the UK to have been presented the certificate.

Main Nuclear Experience

Our nuclear experience is long and varied and includes landmark projects for SELLAFIELD LTD; ROLLS ROYCE; BAE SYSTEMS, TOKAMAK ENERGY and DOUNREAY, amongst others.

We have undertaken fabrication of tanks, pressure vessels, heat exchangers, condenser units and critical pipework scopes of work for major projects as well as high profile site welding scopes for key projects.

After our experience at Dounreay in 2018 and the site welding of the UFC containers we have developed (in conjunction with JACOBS) a fully automated welding and inspection system for the in-cell welding of irradiated fuel containers. TANICS (The Automated Nuclear Irradiated Container Solution) is currently undergoing trials in the UK and can be used in the site retrieval of highly irradiated nuclear fuel.

We are one of the UK's 'go to' fabrication companies for nuclear welding.

LUCIDEON LTD

www.lucideon.com/energy/nuclear

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Nuclear competencies

Nuclear Consultancy Services

Research

Waste Management and Disposal/ Recycling

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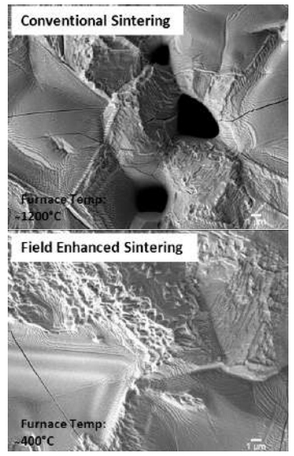
Company Outline

LUCIDEON is a world leading materials development and commercialization organization located in Stoke-on-Trent, UK, with extensive experience across a variety of materials systems. LUCIDEON employs a wide range of chemists, materials scientists, and engineers to take a well-rounded and holistic approach to materials consulting, research, and development. LUCIDEON's capabilities in the nuclear sector have arisen from its ceramic routes where it began assessing and testing glass and ceramic samples for the United Kingdom's sites at Sellafield. LUCIDEON's team of highly qualified scientists are supported by our pilot plants for performing trials at scale, along with a sophisticated testing laboratory to undertake material performance testing, validation, and characterization.

Geopolymer blocks

Oil, powders and finished product in metal containers



SEM image of FES vs conventional sintering

Nuclear Capabilities

Strategy & Investment Proposals

- LUCIDEON are experts in Flash Sintering, a rapid, low energy technique for processing challenging ceramic materials and is the only facility in the world to have the capability for Flash Sintering technology development and demonstration at the manufacturing scale. We are innovating and commercializing this technology for many sectors including the production of nuclear fuels and plutonium disposition.
- Geopolymers are an innovative solution to address global problematic waste streams and are an alternative to traditional Portland cement-based encapsulation (OPC). We incorporate naturally occurring and processed raw materials and may make use of foundation industry wastes, such as metallurgical slags or fly ash. Geopolymer is a proven technology that enhances the volume of waste encapsulated within the matrix when compared to OPC. LUCIDEON has 10+ years' experience developing Geopolymer materials for applications including construction, nuclear waste encapsulation and even high performing geopolymer derived ceramics (ceramic matrix composite).
- LUCIDEON is a world authority supporting ongoing programmes around the world undertaking crack growth and initiation testing. Our primary capability includes the evaluation of SCC growth behavior of primary water materials (BWR & PWR). This includes understanding effects of K, material condition, and water chemistry.

Main Nuclear Experience

Alkali activated cement solidification (Geopolymerisation) of 3000 litre tanks of contaminated salt water, 2014
The work was conducted in the UK but for TEPCO in Japan and was to determine if geopolymers could solidify contaminated seawater on a large scale, the project proved that it was possible.

Advanced Fuel Cycle Programme (AFCP), started in 2020
LUCIDEON, in a partnership with NNL, has pioneered the development of flash sintering technology for the nuclear industry. The first application of flash sintering is applied to nuclear fuels. AFCP allows LUCIDEON to further scale up flash sintering within a specialist manufacturing environment.

Geopolymerisation of wastes since 2015
LUCIDEON has worked with the NNL and NUVIA on separate projects developing formulations that improve the loading rate of wastes including exchange media, graphite, oils and magnesium hydroxide (Mg(OH)2) into geopolymers. Loading rates of >50% have been achieved.

MI-GSO | PCUBED

www.migso-pcubed.com/blog/pmo-project-delivery

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Nuclear competencies

Nuclear Consultancy Service
Project Management

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Company Outline

Since its creation in France in 1991, MI-GSO has pioneered the field of Project Management consulting and PMO as a Service. Originally, MI-GSO innovated by transposing project management best practices from aeronautics and defence into the European automotive and energy industries. In 2003, MI-GSO joined the ALTEN Group, aiming to build a global company capable of supporting its customers in any industry and anywhere in the world. In 2013, PCUBED joined the MI-GSO journey bringing business transformation capabilities and a footprint in North America, the UK, Australia and South East Asia.

MI-GSO | PCUBED is a unique consulting company combining its unmatched scale, global reach, and end-to-end PM / PMO value-adding range of services. We support R&D, IT and Transformation projects for our industrial, public sector and financial services customers who rely on us.

Nuclear Capabilities

- LEAN INNOVATION - Blending the latest approaches in lean and agile to **streamline** value delivery
- PROGRAMME & PROJECT MANAGEMENT - **Integrate** people, process, and tools to deliver real-time decision-making
- PROGRAMME RECOVERY – **Enacting** effective project and programme management
- CHANGE MANAGEMENT - Solutions to help ensure your people are on board to **adopt** the change at hand
- BUSINESS AGILITY - Implementing new ways of working in a simple effective manner to **accelerate** delivery

We have become the trusted delivery partner of the most recognisable brands in Aeronautics, Defence, Automotive, Transport, Financial Services, Energy/ Nuclear as well as Government organisations, helping them convert their big ideas into reality.

We are a global team of committed experts driven by excellence, creativity and pragmatism. Our consultants have carried out thousands of engagements centred on delivering their programmes successfully. Our unique ability is both to advise on how to implement major projects and business transformation initiatives; and to provide the people, tools and technology to follow through on those recommendations. By accessing programme management consulting, implementation and PMO operations from the same partner, our clients can ensure that early insights are fully retained, communication and coordination is optimised, and every new challenge along the way is navigated with agility.

Main Nuclear Experience

LEAN IMPROVEMENT PROGRAMME

Our client, a key player in the global nuclear decommissioning industry, was looking to transform their business productivity and organisational efficiency. The focus was set on strengthening their design to manufacture value stream, improving project delivery performance, controlling costs and enhancing their international delivery capabilities.

MI-GSO|PCUBED were asked to design and lead the improvement initiatives, by deploying a lean innovation framework, leveraging a data-driven and people centric approach.

Through a series of workshops, we worked with the client to identify key failure modes and the root causes for the issues

We leveraged the client team's knowledge to identify the most impactful improvement initiatives

Focus was placed on addressing the root causes, not the symptoms, to achieve rapid value realisation

63% reduction in end-to-end process times

38% increase in drawing quality

250+ hours of training delivered

300 questionnaires completed

MORSON PROJECTS LTD

www.morson-projects.co.uk/markets/nuclear/

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Nuclear competencies

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Nuclear Consultancy Services

Project Management

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Company Outline

MORSON PROJECTS (MPL) are a reputable multi-disciplinary engineering consultancy with over 40 years' experience across the UK and overseas. Our highly qualified engineering teams deliver capability and experience across numerous engineering disciplines, enabling the provision of complete end-to-end project management, design and delivery services to our valued long-term client partnerships. We support our clients across five key sectors: Aerospace & Defence; Nuclear; Power & Renewable Energy; Industrial & Process and Infrastructure & Transportation.

Our team offers a vast range of multi-disciplinary solutions to these sectors through three long-established brands: MORSON PROJECTS; Ematics and Waldeck. MORSON PROJECTS have more than 30 years' experience within the UK's nuclear industry and have developed an extensive footprint and a reputation for the delivery of resource and project management solutions.

Nuclear Capabilities

MORSON PROJECTS have more than 30 years' experience within the UK nuclear industry. MORSON PROJECTS has developed an extensive footprint and a reputation for the delivery of resource and project management solutions.

MORSON PROJECTS has over 200 project engineering and design personnel directly engaged on work for the Nuclear sector. We provide professional services to the sector specifically for engineering, design and supply packages of work. Our senior engineers are very experienced in providing this service and adopting a flexible approach which allows for an immediate response to any new requirements.

Our SQEP resource, including management and directorate, can boast over 3,000-man years of direct and indirect service to the nuclear industry.

Our Nuclear team work with clients across the sector to provide them with the following services:

- Asset Care & Technical Documentation
- Civil, Structural & Architectural
- Control, Electrical & Instrumentation
- Decommissioning
- Industrial Communication & Networking
- Industrial Cyber Security
- Installation & Commissioning
- Panel Build
- Piping & Vessel Design
- Plant Design
- Primary & Secondary Engineering
- Process Engineering
- Project & Programme Management
- SCADA & PLC Control Systems
- Software Development
- Tooling Design & Manufacture

Main Nuclear Experience

DOUNREAY

MORSON PROJECTS currently hold a Decommissioning Operatives Framework with DOUNREAY SITE RESTORATION LTD.

The range of services we provide as part of the Framework include:

- Managed service for the provision of decommissioning operatives
- Decommissioning front end optioneering
- Turnkey supply to undertake decommissioning work packages with a defined scopes

CAVENDISH NUCLEAR

MORSON PROJECTS were appointed by CAVENDISH NUCLEAR to carry out a Reliability Centred Maintenance (RCM) Review on pre-identified sub-systems.

Our team were responsible for:

- Carrying out a Reliability Centred Maintenance (RCM) review process of the identified sub-systems
- Producing the Master Equipment List (MEL) and all necessary documentation for the upload of asset data to the SL Computerised Maintenance Management System (CMMS) database, Movex
- Producing Operation & Maintenance (O&M) manuals – volumes A, B, C & D

MOTT MACDONALD JAPAN K.K.

www.mottmac.com/energy/nuclear-power

MOTT MACDONALD

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Nuclear competencies

Decommissioning/Decontamination

Engineering/Technical Services / Maintenance

Engineering & Design Services

Nuclear Consultancy Services

Planning and Licensing

Project Management

Waste Management and Disposal/ Recycling

Company Outline

MOTT MacDONALD is a global design, engineering, management, advisory and development consultancy. Our multidisciplinary teams use their skills to deliver engineering projects within the nuclear industry. We have worked in all the UK's nuclear facilities and overseas in countries such as Japan, USA, Belgium, France and Germany. Over the last 60 years we have completed projects for clients across the nuclear sector including new build and decommissioning programmes. Our programme and project management colleagues provide PM and PMO services and procurement support across the nuclear industry. We support our clients in managing and developing conceptual engineering solutions and provide end-user focused designs and solutions that cover every aspect of nuclear engineering to deliver world-class safety, environmental, technical and security performance.

UK HP1000 Generic Design Assessment

Site selection and development

Development consent order

Nuclear Capabilities

We have experts in a number of selected disciplines including:

Civil & Structural design for nuclear facilities
Including: Specialist structures; Concrete & structural steel design; Heavy foundations design; Marine structures; Seismic design & advanced structural analysis; Geotechnical design; Infrastructure design and integration; Technical and performance specifications; Building services

Advanced Analysis
Including: SSI Analysis; Nonlinear dynamic analysis; Aircraft impact analysis; Blast analysis

Nuclear Architecture
Including: Concept design development; Detailed design; Technical and performance specifications; Space management and coordination

Safety Case
Including: Safety justification report; Hazard Identification (HAZID); Probabilistic risk assessment (PRA); Hazard and operability studies (HAZOP); Preconstruction safety report (PCSR); Pre-commissioning safety report (PCmSR); Preoperational safety report (POSR)

Shielding and Radiological Protection
Including: Characterisation; Radiochemistry; Radiation protection; Radioactive waste management; Shielding Study

Project and Commercial Advisory
Including: Project, programme and portfolio management; Commercial management; Risk management; Organisational transformation

Main Nuclear Experience

Reactor Design and Justification
Scope includes structural design, seismic analysis and drawings of structures. Our role includes responsibility for 3D FE soil structure interaction analysis, structure-soil-structure interaction analysis, stress analysis, complete structural design and production of CS&A detailed design drawings.

Design to Support Decommissioning
Concept studies through to detail design, providing through-life design and safety case support. We provide assistance in scope definition, acquisition strategies and technical support for procurement, construction, installation and commissioning activities. Including nuclear ventilation design, CS&A design, and building services.

Radioactive Waste and Environmental Support
Development of radioactive waste treatment solutions with integrated environmental and planning assessments. Including assessment of waste arisings, solution identification and justification, implementation programme development and regulator engagement support.

NATIONAL NUCLEAR LABORATORY LTD

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Nuclear competencies

Decommissioning/Decontamination

Engineering & Design Services

Nuclear Consultancy Service

Planning and Licensing

Research

Waste Management and Disposal/ Recycling

Contact them in Japan

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Company Outline

As the UK's national laboratory for nuclear fission, the NATIONAL NUCLEAR LABORATORY (NNL) is leveraging the UK's rich nuclear heritage to harness nuclear science to help solve issues of critical national importance. With our roots in the research arm of BRITISH NUCLEAR FUELS LTD (BNFL), we combine the decades of expertise of sector veterans, whose science has been at the forefront of nuclear technology over the past 30 years, with an emerging generation of talented scientists, engineers and professionals.

NNL is Government owned but operationally independent. We have helped to sustain the UK's nuclear skills and operational capacity and built our reputation both as a successful commercial organisation and a strategic national asset.

Investing in scientific research and unleashing innovation is fundamental to our work as a national laboratory; allowing us to serve our customers, our partners and our nation better.

NNL's laser test facility

Robot Remote Working at Workington

Nuclear Capabilities

We are custodians of a unique set of facilities and capabilities that enable groundbreaking nuclear research and development. We collaborate with those in academia, government and industry and grant access to our specialist facilities for the benefit of UK and global teams.

We channel our work into four strategic areas:

Clean Energy: Without nuclear, the UK would not meet its net zero goals on time. NNL is recognised for our research and development expertise in reactors, fuel cycles and clean energy applications.

Health & Nuclear Medicine: NNL has years of experience in processing radioisotopes; we want to restore the capability the UK had until the 1990s and produce and develop world-leading cancer treatments

Environmental Restoration: NNL has experience and expertise in the control, management and removal of the hazardous materials of the past in order to restore the environment for future generations. We have longstanding customer partnerships with the Nuclear Decommissioning Authority and SELLAFIELD LTD and we are proud to work with the global nuclear community sharing best practice.

Security and Non-Proliferation: NNL has decades of experience managing national infrastructure capable of handling some of the most challenging nuclear material in the world. NNL is building our capability to be at the global forefront of advice and best practice to support the global deployment of new nuclear technologies.

Main Nuclear Experience

NNL has provided successful methods and technologies at the UK's decommissioning sites and using this experience can help to:

- Develop strategies for challenging decommissioning problems such as dealing with difficult wastes in storage areas such as waste silos, ponds and other facilities
- Provide a wide range of waste processing methods to deal with different types of radioactive wastes
- Provide innovative ways of categorising and classifying wastes to reduce the burden of dealing with such material
- Develop innovative approaches to the characterisation of radioactive wastes including sampling and analysis
- Provide proven remote inspection techniques to access problematic areas of nuclear plants
- Design, develop and deploy remote handling solutions into hazardous nuclear environments
- Develop digital twin technology to save costs on waste and decommissioning projects
- Develop and deploy laser technology for decontamination and size reduction operations

NATIONAL PHYSICAL LABORATORY LTD

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Nuclear competencies

Commissioning

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Nuclear Consultancy Services

Research

Waste Management and Disposal/ Recycling

Others

Contact them in Japan

British Embassy in Tokyo

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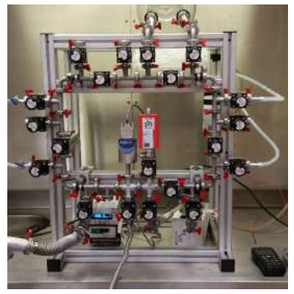
Company Outline

NPL was founded 1902 and is the UK's National Measurement Institute, developing and maintaining primary measurement standards, as well as offering verification, validation and characterisation support, new measurement methods and standards for academic and industrial end users. NPL have 800 scientists and 400 laboratories across 30 science groups. Group capabilities can be combined to provide standards and solve challenges in the Civil Nuclear Energy and Medical sectors. This broad capability is particularly useful for the nuclear industry in validating new technology, characterising materials and meeting decommissioning and monitoring challenges (www.npl.co.uk/products-services). NPL work internationally providing measurement services and consultancy support. NPL is an independent and trusted scientific authority and has multiple historic scientific achievements, across 120 years (www.npl.co.uk/history).

Bath for Neutron source characterization



Radioactive gas monitor calibration

Radiochemistry suite for radionuclide preparation

Nuclear Capabilities

NPL Decommissioning - provides traceable measurement techniques including nuclear waste characterisation, radiochemistry, radioactive gas counting, corrosion measurements and modelling, temperature, humidity measurements, containment materials microstructure and performance, measurement method development and data uncertainty.

NPL Neutrons – The manganese bath is the primary standard for measuring the number of neutrons from sealed radionuclide neutron sources.

NPL Dosimetry - NPL hosts world-leading facilities for measuring the neutron emission rate from radionuclide sources and for performing fluence and dose equivalent calibrations with monoenergetic neutrons, thermal neutrons, and broad energy range neutrons from radionuclide sources or a simulated workplace field.

Instrument Calibration - Services include characterisation and calibration of neutron detecting devices, personal and area dosemeters, measurement of radionuclide neutron source emission rates / anisotropy, field measurements of neutron spectra and dose equivalent quantities.

Radiation Hardness – NPL can provide radiation hardness testing support for equipment and materials.

NPL Medical Physics – provide primary standards for radionuclides and measurement advice for sites using radionuclide calibrators and ionisation chambers. NPL can also offer radiochemistry research for novel matrices or pharmaceuticals and performs nuclear data measurements.

Main Nuclear Experience

Core Damage Detection
NPL performed tests simulating AGR brick damage. Using Instron machine, a reciprocating wire brush with an interference fit to the graphite fuel bricks, simulating 'charging' and 'discharging' of a fuel stringer. The high resolution of NPL's Instron load cell, allowed EDF to identify the effect on the load trace of small graphite fragments.

Understanding stored nuclear material
The High Accuracy Inspection System, using NPL digital image correlation technology, can monitor the integrity and conditions of materials through sophisticated image analysis. It can be deployed in hard-to-monitor and hazardous environments, including underwater.

Reliable temperature measurement of nuclear packages
NPL performed uncertainty analysis of the temperature measurement chain. To determine individual contributions, theoretical calculations (modelling reflected thermal radiation), experimental measurements, e.g. thermocouple contact resistance were used.

NEOS NUCLEAR LTD

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Nuclear competencies

Commissioning

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Nuclear Consultancy Services

Project Management

Waste Management/Recycling

Contact them in Japan

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Company Outline

NEOS NUCLEAR LIMITED is wholly owned by NEOS INTERNATIONAL LIMITED.

The site was established in 1993 by BRITISH NUCLEAR FUELS LTD (BNFL) to supply high integrity stainless steel drums and stillages to Sellafield in support of plant operations and ILW storage.

A dedicated supplier of volume 'build to print' with design capabilities, of stainless steel products & fabrications to the nuclear industry. Products include 500 liter drum variants, 3m^3 boxes and drums, stillages, transportation packages, reactor components, 3m^3 Skip Liners, nuclear containments (gloveboxes & Process Cabinets) and one-off bespoke fabrications

Accreditations to: ISO 9001 - Quality Management Systems, ISO 14001 - Environmental Management, ISO 45001

- Occupational Health & Safety, ISO 3834:2
- Quality requirements in welding, ISO 3834:2
- Quality requirements in welding, BS EN1090:2
- CE marking of structural steel.

Magnox Hunterston 3m^3 Box

Dounreay 500L Drum

Magnox Temporary Storage Vessel Stillage

Nuclear Capabilities

- Expert knowledge in working with all grades of Stainless steel
- NEOS Nuclear has a 46,000 sq. ft site based outside Chester in NW England, with over 28 years' experience of producing 'nuclear product' & 'hazardous waste' containers including Containment Systems for the Nuclear Industry
- Experienced in developing Nuclear standard components to meet specific client requirements
- Highly skilled workforce that include qualified welders and CNC machinists
- Dedicated drum component forming equipment including 600 Tonne hydraulic press and Irle flange rolling machine
- Semi and fully automated MAG/TIG welding processes
- Robotic MAG welding cell for 3m^3 Box and Drum manufacture
- Extensive CNC machining capabilities including Soraluce 5-axis CNC milling centre, MAZAK vertical turning lathe and MAZAK Integrex
- Non Destructive Testing (NDT) techniques with fully qualified personnel
- Stainless Steel drum and box surface finishing processes including wet blasting and dry blasting
- Dimensional inspection equipment including CMM & ROMER measuring arm
- Products manufactured include: Stillages & Drums, 500L Drums, Containers, 3m^3 Boxes & Skip Liners, Gloveboxes, Process / Wash cabinets, Transport Containers and Overpack Drums (S/Steel & Carbon).
- In-house testing capabilities to client requirements including load, hydrostatic, leak, drop, pressure, radiometric shielding and Betatron techniques.

Main Nuclear Experiences

Example 1	Machining of 3m^3 Trawsfynydd Boxes
Client	MAGNOX LTD
Contract Title	Supply of Stainless Steel 3m^3 Boxes for Storage of Solid ILW
Country	United Kingdom
Contract dates	07/12/17 – 12/05/21

Example 2	Fabrication and Finish Machining of 500L Dounreay Drums
Client	DOUNREAY SITE RESTORATION LIMITED
Contract Title	Supply of Stainless Steel 500L Waste Drum PFR Raffinate
Country	United Kingdom
Contract dates	2017 - 2020

Example 3	Fabrication & Machining of Chapelcross Stillages
Client	MAGNOX LTD
Contract Title	Manufacture & Delivery of Stillages
Country	United Kingdom
Contract dates	11/07/19 to current

PACTEC EPS LTD

www.pacteceps.co.uk

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Nuclear competencies

Nuclear Consultancy Services

Waste Management and Disposal/ Recycling

Contact them in Japan

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Company Outline

PACTEC EPS LTD, a UK company with a USA sister company, have been designing and manufacturing innovative flexible containment packaging solutions primarily for radioactive Low-Level Waste (LLW) for over 20 years, gaining unrivalled knowledge and experience of materials, design and manufacturing techniques, bringing together our nuclear expertise with our nuclear professionals to ensure we provide fit for purpose solutions for regular and unique decommissioning challenges.

Our innovative flexible packaging solutions are utilized across the UK NDA nuclear sites and worldwide, providing improved cost-effective and fit for purpose containment packaging solutions.

Sellafield
Primary containment for ILW removed from legacy storage ponds

Sellafield
Removal of Magnox fuel containers in PacTec packging

Nuclear Capabilities

Our packaging solutions include Type IP-1, IP-2 and IP-3 containment packages all tested and certified compliant with IAEA regulatory transport regulations SS-R-6. This includes substantiation documentation provided by the Package Design Safety Report (PDSR) documentation, i.e. Certificates of Approval, Design Safety Reports etc.

In addition to our 'standard' packages, we design and manufacture individual specialist containment packages for unique decommissioning solutions utilising our nuclear decommissioning expertise, working closely with site project teams. Solutions include providing the primary containment of ILW items to facilitate the removal from legacy and storage ponds.

Main Nuclear Experience

Example 1:
We introduced flexible packaging for LLW to the UK that provided the main mechanism to divert large volumes of VLLW & LLW to UK licenced landfill disposal sites. This has provided savings to the UK in excess of £300m to date. The solution was also a key factor associated with the cancellation of the requirement to construct new LLW concrete vaults, providing savings to the UK of billions of pounds.

Example 2:
At the Sellafield complex we worked closely with the decommissioning project teams to use our unique packaging designs as an innovative solution for the primary containment packaging for large ILW pieces of equipment removed from legacy ponds. This accelerated the removal of ILW equipment, and the decommissioning and reduction of the risk and hazards associated with the legacy ponds.

Example 3:
Sellafield decommissioning of the Pile chimney (1957 fire). Design of a unique containment package for each concrete block that was cut from the chimney.

RAWWATER APPLIED TECHNOLOGY LTD

www.rawwater.com

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Nuclear competencies

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Research

Contact them in Japan

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Company Outline

RAWWATER is an SME in the northwest of England, whose history lies in oil & gas plugging & abandonment.

For the past 5 years, RAWWATER has been developing a new leak and defect sealing technology called M3. Short for Molten Metal Manipulation, M3 uses low-melting-point bismuth-based alloys and specially developed application techniques to provide in-service, reversible repairs.

Application is by a tailored solution or by one of RAWWATER's developing technologies: M3Spray or M3CollarCast. M3Spray is an instant 'leak extinguisher' alloy spray, where deployment is either done manually or remotely via a deployment arm or robot.

M3CollarCast involves applying a specially designed collar around the repair site (typically a leaking joint or pipe) and injecting alloy into the collar. After cooling, the collar can be removed for reuse.

M3CollarCast is compatible with gas, low-leak-rate liquid leaks and defects. M3Spray is compatible with a range of liquid leaks and defects.

M3CollarCast sealing a flanged connection
(collar on rear pipe, collar removed on front pipe)

M3Spray sealing a water leak from a mild steel pipe

Nuclear Capabilities

- Providing a leak-sealing service within current operational boundaries
- Testing M3's capabilities against sealing scenarios not currently within operational parameters
- Developing bespoke sealing solutions
- Licensing of technologies
- Training personnel in use of M3 technologies and technical support

Main Nuclear Experience

TEPCO
RAWWATER, via NNL, has been working with both SELLAFIELD LTD and TEPCO to develop sealing solutions tailored to their needs.

RAWWATER's MD previously worked in the nuclear industry for 10 years. This included working closely with the Japanese nuclear decommissioning companies.

While the M3 technology has yet to be actively deployed on a nuclear site, a range of non-nuclear deployments and demonstrations have proved its suitability and deployability.

SCX SPECIAL PROJECTS LTD

www.scx.co.uk/sectors/nuclear-defence/

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S9 1GA United Kingdom

Nuclear competencies

Commissioning

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Project Management

Contact them in Japan

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Company Outline

SCX are experts in the design and build of mechanical handling systems for both nuclear decommissioning and power generation. We blend industry-proven components with bespoke mechanical, electric and hydraulic engineering to deliver an integrated solution, tailored to our customers' specific needs.

Since 1991, SCX's experienced team has delivered unique engineering solutions from our facilities in Sheffield (UK) to solve mechanical handling challenges faced by all sectors of industry.

In 2019, SCX achieved global renown for its work on the world-first dividing retractable football pitch at Tottenham Hotspur. In the same year, we completed a second retractable roof at Wimbledon, the home of tennis.

The company holds a number of internationally recognised accreditations and trade registrations, including: ISO 9001; ISO 18001; ISO45001; Cyber Essentials Plus; Achilles UVDB; LEEA; Safecontractor; JOSCAR; Fit4Nuclear; RoSPA Gold.

Sellafield PFSP cantilevered crane

Extending mast & manipulator waste retrieval system

Nuclear Capabilities

Whether operating in radioactive environments, handling hazardous materials, or manipulating valuable equipment, SCX's mechanical handling solutions deliver the highest levels of reliability, performance, integrity, safety, and recoverability.

To solve a mechanical handling challenge, SCX works with customers from initial concept to ongoing service and maintenance. Our customers can choose a full end-to-end service, or select the most appropriate area of expertise to deliver their requirements.

SCX's capabilities in nuclear mechanical handling cover:

- Front end engineering design (FEED)
- Detail engineering design
  - Mechanical
  - Electrical (EC&I)
  - Hydraulic
  - Safety (SCX has in-house TUV-certified engineers)
- Project management & quality assurance
- Manufacture & fabrication
- Assembly & test
- Installation & commissioning
- Maintenance, repair & overhaul (MRO)

SCX works to the most rigorous standards of design and build, including: ISO 12100 Design Risk Assessment; ISO 13849 Machinery Safety; IEC 61508 Functional Safety; and JSP 467 / JSP 482 Munitions Handling & Explosives Regulations.

Our first nuclear crane, commissioned in 1997, handled high-active waste skips for the decommissioning of the Magnox power station at Berkeley. 25 years later, SCX has delivered handling solutions to dozens of nuclear licensed sites, including SELLAFIELD LTD, DOUNREAY, MAGNOX LTD, URENCO, Ministry of Defence, AWE, and at ESS in Sweden.

Main Nuclear Experience

SELLAFIELD:

- Enhanced crane systems, including a cantilevered bridge to reach hard-to-access parts of the PFSP, and anti-collision systems
- Bespoke hoist, mast, and manipulator handling solutions to retrieve ILW from FGMSP
- Latching cranes for BEP
- Current: A mini-Goliath crane to deploy hydraulic waste retrieval grabs into RST

DOUNREAY:

- Semi-automated crane handling 500-litre drums of ILW in the drum store
- Chain hoist waste retrieval platform for the Shaft
- Current: A multi-crane solution for Shaft & Silo waste sorting and packaging

URENCO:

- High-integrity, high-safety remotely controlled 'Goliath' raft cranes with sophisticated rotating/latching grapples and fully segregated nuclear protection systems
- Current: 8x motorised under-the-hook grapple upgrades for off-centre loads

MAGNOX:

- High-integrity handling solution for an ILW import/export facility at Berkeley
- Remote control cranes with swappable tooling for MILWEP at Berkeley and Hinkley
- Current: 60t MILWEP crane for Winfrith

SHADOW ROBOT COMPANY

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Nuclear competencies

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Nuclear Consultancy Service

Research

Waste Management and Disposal/ Recycling

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Company Outline

Britain's longest-running robot company building next-generation robot hands and systems. SHADOW is best known for its Dexterous Hand, the world's most advanced robot hand, reproducing, as closely as possible, the kinematics and dexterity of a human hand. The company is also a pioneer in the fast-developing fields of teleoperation and telepresence with their Tactile Telerobot, where the SHADOW HAND is combined with sensors and controlled via a haptic glove for touch feedback. SHADOW's technology is designed to take human operators out of harmful situations – such as nuclear decommissioning and bomb disposal.

Shadow Dexterous Hand

Nuclear Capabilities

SHADOW has been working with partners in UK Nuclear to understand how highly dexterous robot hands can be applied for teleoperation in nuclear.

The Dexterous Hand replicates all the movements of the human hand, allowing it to substitute for humans in places where dexterity is needed.

Main Nuclear Experience

Primarily characterizing SHADOW technologies to understand domains where they might be applicable and routes to application

SPRINGFIELDS FUELS LTD

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Nuclear competencies

Building and Construction

Commissioning

Decommissioning/Decontamination

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Nuclear Consultancy Service

Nuclear Fuel Supply

On-site Erection/Fabrication

Operation and Site Management

Planning and Licensing

Plant & Equipment (Electrical/ Mechanical/Chemical/I&C/Etc.)

Project Management

Research

Waste Management and Disposal/ Recycling

Company Outline

SPRINGFIELDS FUELS LTD (SFL), part of WESTINGHOUSE ELECTRIC COMPANY LLC, is one of the most advanced nuclear fuel manufacturing facilities in the world and has been in operation since 1946. The site processes several thousand tons of uranium a year, manufactures fuel for nuclear reactors worldwide and supplies products and services to over 140 reactors in 15 countries.

SFL also leads the way in the treatment of uranium bearing residues with a diverse range of capabilities to process hundreds of residue types including metal.

Uranic contaminated metal decontamination

UF_6 cylinder decontamination and disposal

UF_6 Cylinder washing facility

Nuclear Capabilities

Fuel related:

1. Production of LWR fuel types, uranium powders, granules and pellets.
2. Defabrication of un-irradiated fuel assembles, fuel rods and fuel pellets with uranium being recovered for re-use in the fuel cycle.

Uranium decontamination/recovery capabilities:

1. Decontamination of uranic contaminated metal as well as soft wastes: PPE etc.
2. Purification of uranic powders
3. Treatment of complex uranic contaminated material such as ash, sludge and oil

UF6 cylinder services:

1. Washing out the uranium heel, servicing & storage of 30B cylinders
2. Decontamination and disposal of all types of UF6 cylinders

Additional services for complex projects:

1. Waste management including consultancy, characterisation and testing
2. Programme and Project management of complex nuclear projects
3. Engineering design, Waste management

Wider WESTINGHOUSE capabilities:

1. Transport and logistics
2. Reactor decommissioning (currently decommissioning 15 reactors)
3. Engineering Services for operating plants
4. Supply of equipment for operating plants
5. Supply of fuel bearing components (RCCA (PWR), CRB (BWR), plugging devices
6. Supply of fuel components and material such as: zirconium products (sheets, bars), SS material (nozzles), alloy 718 (grid strap, leaf springs)
7. Advanced fuel products (TRITON 11, RFA-2, etc.)

Main Nuclear Experience

UF_6 Cylinder decontamination and disposal
In 2021 entered into a contract to decontaminate and dispose of 272 30B cylinders owned by a UK customer. 129 cylinders have been disposed of to date and >90% of metal from these cylinders has been recycled so far.

Uranic contaminated metal decontamination
Have been decontaminating uranic contaminated metal on behalf of a Japanese customer since 2017. 217.2 tonnes of metal has been processed to date.

UF_6 Cylinder Washing Facility
Since 2007 SFL has been washing and recertifying 30B cylinders to support production of AGR fuel for EDF-ENERGY. Approximately 500 cylinders per annum have been washed in this time.

STEEL DYNAMICS LTD

www.steel-dynamics.co.uk/nuclear

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Nuclear competencies

Engineering/Technical Services/ Maintenance

Engineering & Design Services

Project Management

Others

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Company Outline

STEEL DYNAMICS LTD is the UK's leading Stainless Steel Stockholder and Processor strategically located throughout the UK. Boasting over 200 years of combined experience, we supply a range of mainstream Stainless Steel profiles to complex supply chains.

We started trading in 2012 and have grown into a £55m+ turnover group business integrated into both Nuclear New Build & Decommissioning programmes.

We work collaboratively with our business partners delivering the most cost-effective solution for each programme utilising Total Service Concept (TSC), a structured, systematic approach that guarantees to streamline, removing cost and waste from your supply chain allowing you to focus on your core competences.

Our Mission: To relentlessly work together to reduce our customer's costs enabling UK manufacturing to flourish.

Nuclear Capabilities

Among others, we provide the following capacities while applying our TSC management:

Processing:

- Water jet – 14m*4m*200mm Dual gantry multi-head, hypersonic pumps
- Laser – 8m*3m*30mm, 12kw
- CNC-Machining – 4m*2m*1m
- Hi-Def Plasma 10m*3m
- Press Brake – 3m*160 tonnes
- FARO Laser Tracker
- De-coiling of sheet & plate up to 8mm thick*2m wide*30 tonnes per coil
- Cold drawing of Stainless Steel/Nickel Alloys in round, flat, square & hexagon from 90mm down to 10mm

Stockholding:

- Stainless steel sheet & plate from <1mm to 170mm
- Stainless steel round bar <10mm to 250mm dia
- Brass, Copper, Bronze, Aluminium, in sheet, plate bar and section
- Etc

Nuclear safety is at the heart of our business demonstrated by attaining the critical Nuclear accreditation ISO 19443.

Accreditations:

- ISO 19443
- ISO 9001
- ISO 14001
- AS 9100 Rev D
- ISO 45001
- EN 1090 EXC 4

Main Nuclear Experience

Sellafield 63 Can Racks – Value £4m+

- Management of stainless steel stock and added-value processing
- Total Service Concept (TSC) applied
- Material scrap removed 17%+
- > 3 weeks reduced lead-time

Nuclear Decommissioning Glovebox Programme – Value £500k+

- Managing cost of quality, material supply from mill to customer
- Water jet cutting of stainless steel plate 4m*2m*25mm
- Value stream maps supply chain via TSC
- Reduced 24.7% metal & 3-4 weeks lead-time

Nuclear Container Programme £1m+ – Window Frame Section Flange

- Managing material from mill to point of use
- Reduced 3-4 weeks of lead-time
- Reduced nearly 25% of metal needs
- Value stream map of client's process
- Cost down/flange -> £1,488 = 38.1%

Hinkley Point C IRWST Channels Total Service Concept TSC Solution – Value £1m+

- Value stream map of planned process
- Bespoke de-coiled plate 6m*1.5m*6mm, laser cut to required finished size
- Reduced 22% of material
- Reduced > 3 weeks lead-time

Hinkley Point C Lifting Lugs for Sub-Sea Manifold – Value £3m+

- Managing stainless steel plates from mill to point of use
- Value stream map of client's process
- Managing 100% of risk to point of use
- Reduced 22% of metal & 3-4 weeks of lead-time

STRUCTURE VISION LTD

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Nuclear competencies

Decommissioning/Decontamination

Engineering & Design Services

Research

Waste Management and Disposal/ Recycling

Contact them in Japan

British Embassy in Tokyo

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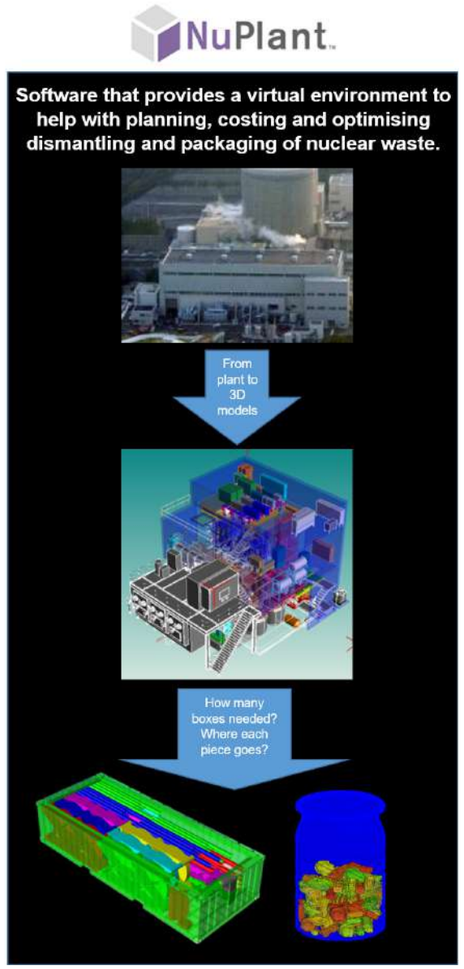
Company Outline

Established in 2003 as a spinout of University of Leeds (UK), STRUCTURE VISION LTD (SVL) is a small software/consultancy company specialising in the modelling of packing of arbitrary shapes in containers for the purpose of estimating/maximising packing efficiency. Its potential application for nuclear dismantling and packaging was recognised early on, and model development has been heavily influenced by requirements of nuclear decommissioning.



NuPlant

Nuclear Capabilities

Strategy & Investment Proposals
The company has two main software products: DigiPac Suite and NuPlant.

DigiPac
DigiPac is for general use and also contains modules for simulating structure-property relationships (e.g., heat transfer, flow, etc. through and within the packing structure).

NuPlant
NuPlant is a derivative of DigiPac, specifically designed for nuclear decommissioning. Its main intended use is scheduling/planning the packaging of solid nuclear waste items in containers for transportation, storage or disposal. It takes digitised (real) objects as input, usually in the form of point cloud from laser scanning, volumetric data from X-ray CT scans or converted from CAD designs. It outputs position and orientation of each individual object for remotely controlled or autonomous robots to act on to achieve an optimal packing.

Main Nuclear Experience

Example 1: consultancy project for BNFL (2005) – predicted packing efficiency of swarf of fuel elements in agreement with reality. Sample swarf pieces were CT scanned.

Example 2: consultancy for LLWR (2009) – optimised cutting/packing of 12 racks into 2 half-height ISO containers. 2D CAD drawing was converted to 3D CAD, then to volumetric data format for input. Weight balancing and grouting requirements also taken into account.

Example 3: involvement in a NDA/ InnovateUK sponsored project being carried out by an industry-led consortium (2022) – to demonstrate an autonomous robotic system able to sort, segregate and pack a pre-defined set of nuclear waste items. Point cloud from laser scanning is used for input; genetic algorithm based scheduler is used to optimise packing order; stability and accessibility are taken into account.

URENCO NUCLEAR STEWARDSHIP

www.urenco.com/global-operations/urenco-nuclear-stewardship

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Nuclear competencies

Nuclear Consultancy Service

Waste Management and Disposal/ Recycling

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Company Outline

At URENCO NUCLEAR STEWARDSHIP, we have a leading role in providing responsible stewardship of nuclear materials through waste management, long term storage and decommissioning services. We are a wholly-owned subsidiary of URENCO, who have been a crucial part of the global nuclear industry for over 50 years.

Our workforce has demonstrable experience of providing end-of-lifecycle management solutions for the nuclear industry, developed through many years of decommissioning the UK's nuclear legacies on the Capenhurst Nuclear Licensed Site, and through ongoing operational waste management for our sister companies, URENCO UK and URENCO CHEMPLANTS. Our workforce have specialist management skills and expertise within the nuclear sector in:

- Waste management and waste services;
- Storage of radiological materials;
- Radiological asset care;
- Decommissioning and land remediation;
- Engineering support.

Capenhurst Works Licensed Site

Nuclear Capabilities

In the UK, we offer a variety of waste management solutions across the full waste lifecycle.

Our current offer overseas focuses upon our radioactive metallic treatment services. We provide metallic waste treatment services including:

- Receipt of drummed material & non-containerised items
- Interim & buffer storage on our sizeable holdings
- Sorting, segregation & batching
- Size reduction
- Preliminary decontamination
- Additional wet decontamination
- Secondary waste characterisation & management
- Recycling & disposal
- Additional capability is planned for metal melting by 2024.

Supplementary expert support services can include:

- Cross-border regulatory support
- Primary waste characterisation support
- Packaging & transport planning
- Waste loading plan production
- Quality assurance

Currently, we can accept the following, subject to regulatory permission: Steel, iron, aluminium, lead, brass, bronze, copper, nickel alloy, cables

- Drummed or non-containerised items
- <4GBq/te for all alpha-emitting radionuclides
- <12 Bq/te for all beta/gamma-emitting radionuclides

We offer the opportunity for customers to discuss with us their needs so we can support in developing an appropriate, efficient and effective solution to your requirements.

Main Nuclear Experience

We have built on historical capability to treat and recycle radioactively contaminated metals, including successfully cleaning 381te of metallic waste for safe disposal in 2021, where 350te was free released through surface decontamination and monitoring protocols as part of Nuclear Decommissioning Authority (NDA) decommissioning. We have since won a position to deliver these services across the UK on the NUCLEAR WASTE SERVICES metallic treatment framework. The following is just one example from projects run by us on behalf of the NDA at the Capenhurst Site.

Structural steel cleaning trials: By trialling and implementing various cleaning techniques, we were able to clean and monitor hundreds of tonnes of steel to allow its disposal as Out of Scope, as opposed to it being consigned as very low level waste. Initial characterisation works prior to the cleaning trials provided key information to enable our Suitably Qualified and Experienced Personnel Radiological Protection Advisors to produce an appropriate safe system of work, including a radiological protection risk assessment. We have a robust system for the production of Safe System of Work with a programmed approach to key waste management tasks, leading ultimately to accelerated delivery. We prioritised resources internally such as health physics monitors and technical support to ensure mobilisation was achieved at an accelerated rate.

VEOLIA NUCLEAR SOLUTIONS LTD

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Nuclear competencies

Decommissioning/Decontamination

Engineering & Design Services

Nuclear Consultancy Services

Operation and Site Management

Waste Management and Disposal/ Recycling

Contact them in Japan

KURION JAPAN

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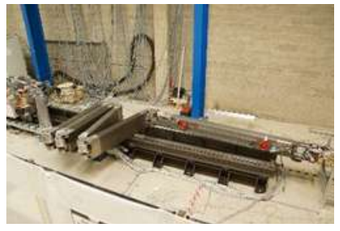
Company Outline

VEOLIA NUCLEAR SOLUTIONS (VNS) offers a comprehensive range of technologies and services for facility management, decommissioning, and the treatment of radioactive waste, all nurtured by our nuclear experts and backed by thousands of VEOLIA staff worldwide.

VNS is helping to clean up significant environmental threats globally by providing bespoke technologies and services for the most challenging environmental clean-up and Decommissioning & Dismantling (D&D) projects.

VNS has a track record of providing innovative solutions in key sectors including nuclear decommissioning and nuclear fusion.



Fukushima Unit 2 Robotic boom reaching over 20 metres to investigate fuel debris

Cutaway of Geomelt Vitrification container

Fukushima Unit 2 DexterTM remote maintenance system in the boom containment cell.

Nuclear Capabilities

Technology

VEOLIA NUCLEAR SOLUTIONS specialises in innovative technologies such as Dexter™, presenting our clients with a complete, integrated solution for their complex decommissioning projects.

Our technology covers:

- Remote Handling/Robotics
- Waste Treatment (Solid and Effluent)
- Nuclear Measurement & Characterization

Waste Management

Decommissioning and remediation create large volumes of nuclear waste, which must be handled and treated in a highly specialised manner. VNS waste management provides services and technologies such as Geomelt® offering complete solutions throughout the waste lifecycle.

Our waste management includes:

- Sort and Segregation
- Waste Treatment
- Radioactive Material Processing
- Decontamination and Asset Recovery
- Disposal Site Management

On-Site Services

Aging legacy facilities present challenges and liabilities associated with radiological, contamination and accessibility limitations. VNS provides project management, engineering and analytical services, as well as technology solutions to aid in these critical clean-up endeavours.

Our on-site services include:

- Facility Services & Legacy Waste Management
- Decommissioning and Dismantling
- Nuclear Facilities Remediation
- Laboratory Operations
- Operations and Maintenance

Main Nuclear Experiences

Japan

VNS was one of the first responders following the Japan earthquake and tsunami at the Fukushima Daiichi Nuclear Power Station. VNS processed over 115 million gallons of contaminated water and removed 10 million curies of cesium. In addition, VNS has supplied a multitude of remote handling solutions to inspect, repair, sample and ultimately retrieve fuel debris from the damaged Fukushima reactors.

United Kingdom

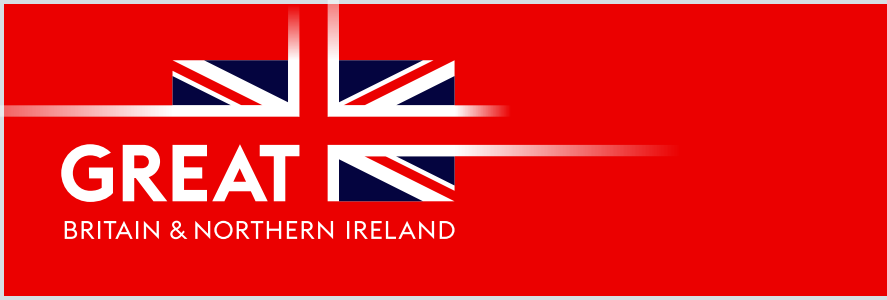
VNS provides technology solutions for the Nuclear Decommissioning Authority (NDA) clean-up mission throughout the UK. This includes providing remote handling and waste management solutions to Sellafield, Dounreay and various Magnox sites.

USA

VNS provides support to the environmental clean-up mission for the U.S. Department of Energy (DOE). VNS manages some of the most high profile clean-up initiatives in the DOE complex including disposal site management, waste processing facilities and the management of decommissioning activities throughout the complex. In addition, VNS has deployed two Geomelt® In-Container Vitrification systems to process sodium bearing wastes, the first proven thermal waste treatment technology for LLW of its kind.

France

VNS provides onsite management and waste disposal services to the CEA and ANDRA in France. In addition VNS provides technology solutions that include waste treatment capabilities for effluent and thermal treatment as well as nuclear measurement services.



Department for International Trade

The UK's Department for International Trade (DIT) helps businesses export, drives inward and outward investment, negotiates market access and trade deals, and champions free trade.

We are an international economic department, responsible for:

- supporting and encouraging UK businesses to drive sustainable international growth
- ensuring the UK remains a leading destination for international investment
- opening markets, moulding the trade environment with new and existing partners which is free and fair
- using trade and investment to underpin the government's agenda for a Global Britain and its ambitions for prosperity, stability and security worldwide.

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