



BHR Group

EXPERTS IN FLUID ENGINEERING

**ENERGY & POWER
CAPABILITY STATEMENT**

www.bhrgroup.com



EFFICIENCY, RELIABILITY, SUSTAINABILITY

The search for exploitable hydrocarbon reserves is driving exploration and production further off-shore, into harsher environments, making the challenges in designing, deploying and operating subsea facilities and platforms more complex.

At the same time, interest in renewable and sustainable energy plants is reaching a high point. The result? A renewed focus on the technologies that help to reduce or mitigate carbon dioxide emissions. Clean energy initiatives and optimisation of existing processes are stimulating existing and new players to consider new decarbonisation and efficiency measures.

Nuclear energy is experiencing a renewed wave of activity with an upsurge of interest in next-generation nuclear plants, whilst continuing to address the challenges around the decommissioning of older plants.

Whether conventional, sustainable or nuclear, the common challenges facing the Energy & Power sector today call for specialist design, development and validation services in all aspects of fluid engineering – provided by the world's leading engineering experts.

When BHR was established by the UK Government as a Research Association over 65 years ago, we were set the goal of being those experts, providing innovative technologies, design and support across all industries. Today, as an independent engineering consultancy, we continue to challenge ourselves to be the people you trust in fluid engineering.



CUSTOMER NEEDS

As problems in design, validation and optimisation continue to impact on the industry – resulting in lengthy project times and costly delays – the importance of engineers experienced in fluid engineering, hydrodynamics and computational simulation on the profitability and safety of Energy & Power operations cannot be overstated.

Experienced engineers who understand the problems associated with energy generation, transportation and conversion are in short supply – and finding the right skill fit is a constant challenge for both small start-up companies and seasoned multinationals alike.

Similarly, the lack of specialist equipment can result in a time-consuming search for qualified, dependable partners with extensive test facilities.

Bringing this expertise in-house may not be the most cost-effective option, as solutions to some of the more intractable problems may require a fresh insight. But, by working as an extension to your team, the knowledge and a wealth of experience of our world-renowned industrial experts can provide practical and effective solutions to your problems.

By working in collaboration, BHR Group provide the leading edge knowledge and technology you require. By delivering and implementing sustainable solutions, you save both time and money – the key drivers in any business.



ENERGY & POWER



OIL & GAS



RENEWABLE SOURCES



POWER GENERATION



NUCLEAR



CONCEPT GENERATION



THEORETICAL OVERVIEW

Technical review
IP review



INNOVATION MANAGEMENT



FEASIBILITY STUDIES

Design evaluation
Technical feasibility studies

DESIGN AND DEVELOPMENT



COMPUTATIONAL SIMULATION

Computational fluid dynamics
Pressure surge analysis



PROCESS DEVELOPMENT

Mixing - liquid/liquid
Mixing - liquid/gas
Mixing - gas phase
Thermal management
Rheology, slurry and bulk solids handling



PHYSICAL DESIGN AND MODELLING

Physical modelling
Hydraulic modelling



TESTING AND VALIDATION



COMPONENT TESTING

Fatigue testing
Pressure testing
Seal testing
Pump testing
Wear testing
Thermal testing
Valve testing



SYSTEM TESTING

Flow testing
System validation
Rheological testing

OPTIMISATION



DESIGN
OPTIMISATION



PROCESS
OPTIMISATION



CAPABILITIES

BHR Group's multi-disciplinary teams provide an integrated engineering approach to fluid system design and build, testing and verification, optimisation and scenario-planning. Our computational modelling and simulation expertise is complemented by our scaled physical modelling. Our experimental work, on-site testing and evaluation allows us to validate and calibrate our results.

BHR offers its dedicated and bespoke test rigs for impartial qualification testing and the wealth of our technical expertise for novel product development. We have a range of test facilities that can physically replicate the range of on-site working and environmental conditions which we use in the modelling and understanding of flow assurance, thermal management, fluid power, wave action, high pressure and high temperature requirements for Energy & Power operations in a controlled laboratory environment.

All this is augmented with computer aided design tools that simulate the physical and chemical behaviour of fluids in pipelines, processing and fluids handling equipment.

UTILISING A MULTI-DISCIPLINARY TEAM OF EXPERIENCED CHARTERED ENGINEERS AND DEDICATED PROJECT MANAGERS WE PROVIDE SOLUTIONS IN:

- Process optimisation
- Physical modelling of hydraulic structures
- Mathematical modelling (including CFD & FEA)
- Pressure surge analysis
- Hydraulic analysis and design of fluid power systems
- Testing of components
- Mixing technology
- Sludge pumping & processing
- Site audits & testing
- Field measurements & troubleshooting
- Research & development



EXPERIENCE

BHR Group is an independent technology organisation providing engineering consultancy, industrial research and product development services based on its core expertise in fluid engineering. We apply over 60 years of know-how to develop or improve innovative designs and validate and optimise processes for the benefit of the Energy & Power sectors around the world.

Our heritage provides you with the exceptional advantage of access to a diverse range of engineering services. And our combination of engineering skills and investment in key technologies gives us a unique capability to help you to solve your fluid engineering problems.

Our approach is to work in close co-operation with you or your clients to understand your specific and individual needs, so that we can provide solutions that are both technologically sound and commercially viable.

Alongside access to some of the industry's leading practitioners, factors such as availability, reliability and procedural integrity are paramount to your choice of partner – and these are fundamental to the service we provide. BHR Group believes that a deadline is a commitment – on time and on budget, with no compromise in quality.

Within the sphere of fluid engineering our experiences are truly diverse with projects ranging from the modelling of multiphase systems, HPHT seal testing, validation and study of downhole pumping and separation processes, nuclear waste modelling and pressure surge analysis.

SOME OF OUR CLIENTS:

- 2H Offshore Engineering
- ACKtiv Nuclear
- Alstom
- Baker Hughes
- BNFL
- BP
- British Energy
- Carbon Trust
- Cameron
- Dounreay Site Restoration Ltd
- Edison Light and Power
- ExxonMobil
- GE
- Haliburton
- Heerema
- James Walker & Co
- Pipeline Research Ltd
- Schlumberger
- Sellafield Ltd
- Shell Exploration & Production Co.
- Statoil
- Trelleborg Offshore UK
- Total
- VerdErg Renewables Ltd

TEAM WORLD-CLASS ENGINEERING EXPERIENCE

BHR Group's Energy & Power team provides core expertise in hydraulics and process technology underpinning asset management, resource planning, cost reduction and legislative compliance.



MARK FAIRHURST
Technical Director

Mark's expertise in fluid power technologies drives his insight across the entire sector, with particular emphasis in systems design, contamination control, product development and testing.

His association with the Energy & Power sector started with the development of cutting systems for hazardous environments – offshore, petrochemical plants and decommissioning nuclear facilities. Recent projects have included down-hole equipment, wellhead injection and control valves, multi-phase flowmeters and LNG unloading systems. He has also performed simulations and physical modelling of FPSO cooling systems.

His experience with renewable energy projects ranges from feasibility studies to field deployable prototypes.

Our knowledge and technology base is continually enhanced through research, development and industry funded PhD projects consolidated by practical site experience.



CARL WORDSWORTH
Senior Consultant

Carl is a highly qualified oil and gas product development engineer, with 17 years experience in fluids research and development, project management and product development.

He spent 10 years developing compact in-line cyclonic technology for numerous separation duties for the oil and gas industry. Personally responsible for the design, development and testing of a two stage oil-water separator, he oversaw the project from a small scale concept study, to testing a 3,500bpd system offshore in Norway and finally developing the full scale 25,000bpd unit.

Carl has presented at numerous conferences around the world and has published several papers regarding oil-water separation technology. He is the holder of several patents and patent applications regarding separation technologies for the oil and gas industry.



EMILY HO
Senior Consultant

Emily's 20 years of experience encompasses thermodynamics, fluid mechanics, heat transfer, process engineering, fluid sealing and material science. Emily has applied her know-how working with high pressure extreme temperature testing of inflammable fluids, toxic gases, bioethanol, steam, process chemicals and cryogenic fluids.

These skills ensure her consultancy work in finite element modelling of elastomer seals in valves and actuators, gaskets in fuel cell stacks, nuclear fuel transport flasks, gas transmission systems and hose, cable and polymer liner integrity studies is keenly regarded and authoritative.

Emily has been a member of the IMechE oil, gas and chemical committee since 2003. She has published over 30 technical papers, proceedings and articles, including the definitive Research Report RR485 for the Health and Safety Executive, UK (HSE), advising the oil and gas industry in the use of elastomeric seals for rapid gas decompression applications in high-pressure service.



GEOFF ROBINSON
Senior Consultant

An accomplished biopolymer scientist, rheologist, and inventor, Geoff is the author and co-author of over twenty papers published in biopolymer and oilfield journals worldwide.

He has initiated and coordinated research and development projects in the areas of solids suspension, low shear rate and drag reduction in straight and coiled tubing, focusing on ways to avoid or reduce rig down time.

Geoff's other areas of interest include the study of processes behind the formation (and inhibition) of hydrates, together with the development of new experimental techniques to study viscous bituminous oils, heavy oils and tar sands.

Geoff is the holder of seven U.S. patents and is a regular speaker at national and international conferences and meetings on innovations in drilling, fracturing, cementing and clean out fluid technologies.

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TAKE THE NEXT STEP

Every situation is different. BHR Group would like to help solve your fluid engineering problems. Call us for a pre-consultancy discussion with one of our experienced industry specialists. We can support you in defining what we can achieve when working together in partnership.