



**WATER JET CUTTING AND CLEANING**

[www.bhrgroup.com](http://www.bhrgroup.com)

## DECONTAMINATION, DECOMMISSIONING, DISPOSAL

Abrasive water jet cutting delivers a range of benefits over mechanical and other cutting systems. This cold cutting technique is ideal for decontamination, decommissioning and work in explosive and hazardous environments where heat would have a detrimental effect.

BHR's water jetting systems are used in a wide range of specialist applications where cold, precise cutting and cleaning with minimal secondary contamination, is critical. We provide specialised high pressure water-abrasive products, develop new or improved products for sale or licence, and provide after sales support, maintenance and repair services to the energy, defence, security and fire and rescue sectors.

Our products are used for a wide range of applications, including:

- Cutting steel, concrete and composite structures
- Neutralising and safely removing (by scouring) contaminated surfaces
- Remote manipulation and cutting in confined, unstable or hazardous environments
- Live munitions inactivation
- Where people, time and other resources are critical to operational success

Whatever the industry, the challenges involved in safe, controlled and precise cutting in hazardous environments call for specialist design, development and delivery of appropriate products – provided by the world's leading fluid engineering experts.



## CAPABILITIES

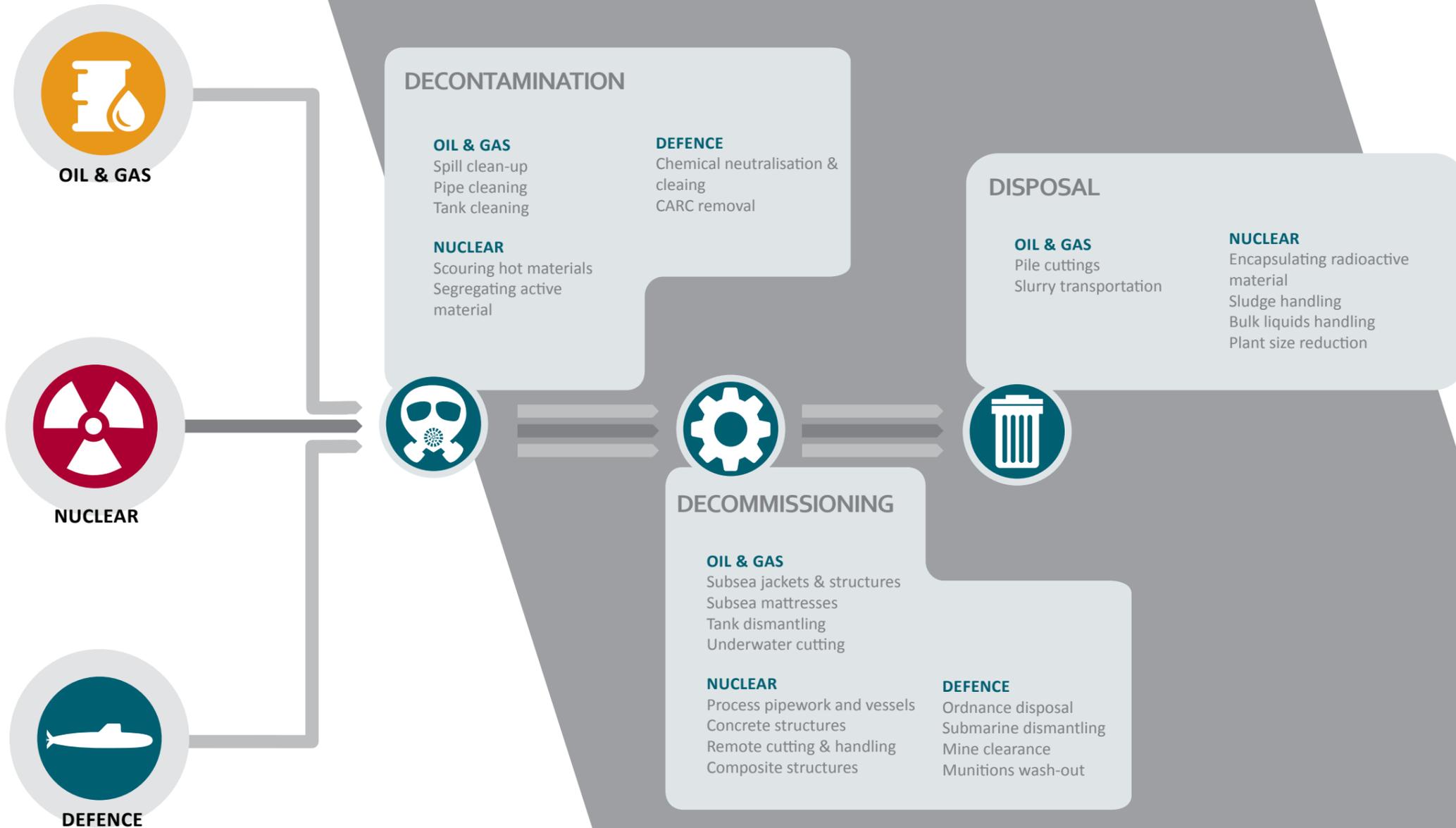
For over 40 years BHR Group has designed, built and sold or licenced specialist high pressure cold-cutting and cleaning abrasive water jetting products. Using proprietary suspension slurry technology the modular design of the OSPREY cutting system can be adapted to meet specific applications that are difficult-to-access or hazardous to people and the environment.

The cutting systems are capable of cutting through virtually any known material and do so in a highly controlled and heat-free way making them ideal for decommissioning, refurbishment and maintenance work in hazardous and explosive environments or where heat would have a detrimental effect on the material being cut.

The OSPREY systems are built for field deployable operations in either man portable or containerised form, and can be supplied with a variety of cutting head manipulators, and can be mounted on frames, vehicles or ROVs, allowing remote control operation over long distances, where required.

Our products feature:

- High cutting power of virtually all materials
- Low water consumption - reducing waste treatment
- Millimetre precision - allowing cutting near to hazardous structures
- Low reaction force - allowing use on ROVs and human operators
- Remote deployment up to 1km
- Operation in explosive environments
- Lightweight mobile units



## APPLICATIONS

With the ability to deliver cold, coherent, fine-beam jetting, BHR's abrasive cutting systems are ideal for a wide-range of uses:

- **Oil & Gas:** Manual and remotely operated cutting systems for decommissioning steel and concrete structures, tanks and pipelines, offshore and onshore.
- **Nuclear:** Manual and remotely operated cutting and scouring systems for decommissioning steel and concrete structures and tanks.
- **Defence:** Remotely operated cutting systems for Explosive Ordnance Decommissioning (EOD) and nuclear submarine decommissioning.
- **Fire and Rescue:** Manual and remotely operated cutting systems for civil road traffic accident rescue and scouring systems for decontamination due to chemical spillages.
- **Disaster Response:** Manual cutting systems for emergency and disaster rescue from complex and unstable building and structures.
- **Security:** Cutting systems for clandestine surveillance and hostage rescue, and scouring systems for post-CBRN decontamination.

We provide specialised high pressure water-abrasive products, develop new or improved products for sale or licence, and provide after sales support, maintenance and repair services.

## PRODUCTS

- **OSPREY** – we sell, manufacture and service this family of modular cutting systems.
- **AWCS - EOD** cold cutting system sold by ABP, we manufacture and service (survey and repair under PDS contract) ACE the water jet cutting components of this system.
- **ACE lite** – we sell, manufacture and service a cut-down version of the MOD approved AWCS cutting system.
- **BackPack** – portable OSPREY cutting system for use in confined spaces and complex cutting operations.
- **HydroMill** – water jet cleaning system for surface preparation, surface removal, scouring and decontamination.
- **Crawler/ATV/robot/ROV** can be used to mount all of our cutting heads and the BackPack and HydroMill products.

## 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 design, develop, validate and optimise processes for the benefit of a wide-range of industries and clients around the world.

Our heritage provides you with the exceptional advantage of access to a diverse range of engineering services and skills. Our combination of engineering expertise and investment in key technologies gives us a unique capability to provide specialised high pressure water-abrasive products, develop new or improved products for sale or licence, and provide after sales support, maintenance and repair services.

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

### TRACK RECORD:

- Conoco Viking 36" diameter leg piles
- Shell Fulmar SALM buoy, 60-150mm thick, UKNS
- Ukraine SS20 silo decom
- Humanitarian de-mining, Cambodia
- AWES UK military EOD, Afghanistan
- De-railed chlorine freight wagon recovery, Sweden
- Winfrith Magnox fuel rod tube disposal, UK
- Crude oil tanker repair, Singapore
- Munition disposal including MU 20mm canon shell, 84mm mortar bomb, HE shell 100mm, 1000 lb bomb

## TEAM WORLD-CLASS ENGINEERING EXPERIENCE

BHR Group's Water Jet cutting team provides core expertise in design, development and field deployment and operation of our high pressure and water jet cutting products and services.



**MARK FAIRHURST**  
Technical Director

Mark's professional career started 35 years ago in high pressure water with the development of a patented Abrasive Water Jet Cutting system. His expertise was broadened to the fluid power industry working on the development of standards relating to oil hydraulic contamination, filtration and pressure impulse/fatigue.

He has designed, built and operated a varied array of HP/HT test rigs for water, superheated steam, oil, fuels, combustible gasses and LNG and is regularly consulted on a broad range of projects such as troubleshooting in the aerospace and marine industries, safety critical system designs in the defence and offshore industries and contamination sensitive systems in the food and beverage industry

He is presently the Vice-Chairman the product testing committee of the BPPA/BSI, and the Chairman of the Technical Advisory committee of the Water Jet Technology Conference.



**PAUL FULLER**  
Senior Project Manager

Paul joined BHR Group in 1988 and is primarily focussed in projects involving high pressure engineering. Heavily involved with BHR's innovative DIAJET® water-jet cutting system, he has commissioned, trained and utilised his mechanical engineering skills in such diverse projects as dismantling SS20 rocket motors, nuclear silo decommissioning and contract cold-cutting both on and off-shore.

Paul has recently project managed a broad range of critical system projects for clients in the Defence, Nuclear and Oil & Gas sectors and undertakes witnessed type approval testing of clients' products. He is a member of IMechE and is qualified under NEBOSH Health & Safety guidelines.



**CRAIG KNIGHT**  
Senior Consultant

Craig has nine years experience of fluid engineering projects in Engineered Systems in defence and aerospace. He has worked on the full spectrum of activities around product design, development and qualification of systems including: hydraulic energy converters, high pressure abrasive water jetting systems used for surface decontamination and firefighting, pressure fatigue testing of aerospace equipment and HP/HT flow testing with of single and multiphase incompressible and compressible fluids.

Craig is a chartered engineer with the IMechE.



**EMILY HO**  
Senior Consultant

Emily is an expert in thermodynamics, fluid mechanics, heat transfer, process engineering, fluid sealing and material science. Her work involves compressible and incompressible fluids at high pressures and extreme temperatures.

During her career, Emily has consulted on a wide spectrum of applications including fluid sealing for heavy duty diesel engines, hydraulic flood barriers and transmissions, gaskets for fuel cells, flow analyses for boiler tubes in nuclear power stations, supersonic steam injection and nozzle design for starch hydrolysis by enzymic reactions.

She is presently a member of the Fluid Sealing working group in the ISO Fluid Power Systems and Components Technical Committee.

Our knowledge and technology base is continually enhanced through research, development and industry funded PhD projects consolidated by practical site experience. BHR Group also participate in major industrial consortia.

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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.