



SERVICES PROFILE

With our attention to safety and execution detail, modern fleet of equipment, experienced personnel and engineering capabilities we provide our clients the most efficient turnaround and maintenance programs, nitrogen when you need it, proven specialty chemicals, and a full range of pre-commissioning and commissioning services.

What others call specialization, we call standard.





Company Profile

To be the leaders in the energy industry by providing quality and excellence in our services, backed up by solid and innovative engineering.



HEALTH, SAFETY, AND ENVIRONMENT

The most critical mission in all of FourQuest Energy's operations, and for all our employees, is to achieve the highest possible standard of health, safety, and environmental performance. We create value for our clients by conducting our operations in a manner that promotes safe work practices and avoids risk to our employees, our clients, and the environment.



PERSONNEL

At FourQuest Energy, we are focused on our clients' needs; having committed and motivated employees is integral to meeting those needs. A thorough understanding of our customers, their processes, and problems is the key to our accurate and thoughtful problem solving; we have industry leading in-house technical resources. We take pride in providing safe, high-quality and value added services to the energy industry.

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Engineering Services



Everything we do in the field, we engineer first.

We know that each of our clients face their own unique set of challenges and that their needs can best be met by providing thoughtful and innovative engineering solutions.

FourQuest Energy's engineering team is proven to be one of the most knowledgeable and respected groups in the pre-commissioning and industrial cleaning business. We have engineered and managed numerous projects around the world. Our engineers join the clients team at the front end of the project to define the required scope and responsibility matrix and then develop procedures and operations packages for field execution. This can be extended to the construction contractor either in the bid or construction phase and during maintenance and turnarounds.

DETAILED PROCEDURES ADDRESS

- Scope of work
- Marked up drawings
- Step by step methodologies
- Risk assessments (HAZOPs)
- Equipment list
- Quality documentation
- Management of change process (MOC)

Simulation Programs



We engineer and determine all parameters, conditions and factors during our design.

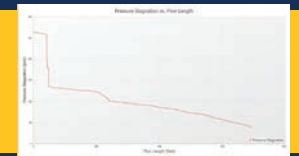
Our calculations, simulations and recommendations are based on solid scientific and engineering principles. Our simulation programs provide our clients with an added level of confidence. Some examples of these include:

STEAM BLOWING PIPING SIMULATION

Developing and modeling the correct temporary piping for your steam blows is critical to ensure the correct cleaning force is achieved while minimizing water consumption and noise pollution.



Temporary Piping Modeling



Pressure Stagnation as a Function of Pipe Length

PIGGING SIMULATOR

Prior to conducting pig runs, our simulation software will calculate the require packing pressure necessary for smooth pig progression by taking into account pipeline elevation.



Nitrogen Services



Your first call nitrogen service provider. 24-hour support with supply available in industrial locations (Edmonton, Fort McMurray and Grande Prairie).

Nitrogen, a naturally occurring inert gas, is one of the primary products of the oil and gas industry, and can safely be used for a wide range of services including: oxygen and LEL, freeing, drying, heating, accelerated cool downs on vessels, pipe freezing, pressure testing, and leak testing.

In addition to being inert, nitrogen has several ideal properties: it is nonreactive, nontoxic, and noncorrosive. Application temperatures for nitrogen gas range from -196°C to $+400^{\circ}\text{C}$ at pressures starting from atmospheric up to 10,000 psi. Nitrogen services can be delivered to the clients' site in a variety of methods: as a cryogenic liquid, in compressed dry gas bottles, or filtered from the atmosphere at site using a nitrogen membrane unit. Our engineers will work with your team to determine the best application method for your goals.

APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Purging and displacement (LEL and oxygen freeing)
- > Hot nitrogen services and catalyst regeneration
- > Nitrogen/helium and sonic leak detection
- > Accelerated cool-downs
- > Pneumatic testing
- > Nitrogen membrane units
- > Nitrogen drying and preservation
- > Nitrogen freeze plug isolations (pipe freezing)
- > Liquid pipeline displacement



Nitrogen Bulker

Upstream/ Downhole



High Rate Nitrogen Pumper

Nitrogen is applied in many upstream services, the most common being displacement/stimulation and hydrostatic column reduction.

Displacement/stimulation services range from well displacements to fracturing or acid stimulations. While being used in fracturing services, nitrogen is typically used to assist in carrying the sand and fluid into formation, as well as providing energy during flow back operations to remove the fluid from the well. The same is true for nitrified acid or chemical treatments in which nitrogen is used to aid in formation penetration, and to help spent acid or stimulation chemistry flow back to the surface.

In hydrostatic reduction services, nitrogen is used to lighten the column weight to prevent formation damage, as can happen in underbalanced drilling, nitrified cementing, or freeing differentially stuck drill pipes. It can also be used to assist in lifting produced fluids to the surface of the well.

APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Well cleanouts
- > Gas lift
- > Stuck drill pipe
- > Underbalanced drilling
- > Nitrified fluid injection
- > Well integrity testing
- > Fracturing applications
- > Coil tubing operations
- > Pressure testing
- > Well displacement
- > Well injection testing
- > Foamed cement operations

Industrial Services



Our industrial cleaning services team provide critical services for daily maintenance, turnarounds and outages at your facility.

We use a modern fleet of pressure and vacuum equipment to remove hazardous, non-hazardous, wet and dry materials. With a professional and dedicated engineering department, and research and development team, we're committed to constantly growing and evolving our solutions to provide innovative, cost-effective service, backed up by sound engineering.

Our equipment lineup features modern vacuum trucks, steam and high-pressure trucks, water and sour sealed units, and chemical cleaning trucks capable of many applications.

Vacuum & Septic Services

FourQuest provides modern vacuum trucks which are suitable for your onsite, day-to-day operations such as fluid transfers, spill clean ups, rig work, septic services and all your vacuum needs.

All units are equipped with modern safety advancements – back up cameras and alarm as an extra precaution. These industry leading units have exceptional vacuum recovery which gives them the capability of loading all industry products. This is to provide you, the client, with the most advanced, safety designed equipment for any of your service work.

FQE also has dedicated units specific for removing septic waste to prevent your on-site waste facilities from breach.



Vac Truck

Pressure and Vacuum



Water Truck



Steam Truck

Water Services

Our state-of-the-art water trucks are used for a variety of applications from supplying potable and non-potable water to hydrotesting fluids or watering roads and melting ice. The water truck units come equipped with a stainless-steel tank, adapters and fittings to allow universal application.

Sour Seal units are available for applications that require the transport of sour materials. These units provide an environmentally sound method of loading fluids without venting harmful fumes into the atmosphere by using a built in scrubber. Specialized units are devoted to providing potable water to ensure your camp or business is fully stocked with drinking water.

Steam Services

Our steam trucks are used to steam and hot-wash equipment, conveyor components, buildings, equipment trays and tank/vessel internals. Our experience and attention to safe work practice gives our clients the results they are looking for.

Standard steaming units contain a 980,000 BTU boiler combined with a pressure hose reel unit. The trucks are typically used for steaming of smaller lines but can also serve as high pressure wash for demanding jobs.

INDUSTRIAL CLEANING SERVICES

- > Wet and dry vacuum services
- > Hazardous and non-hazardous waste disposal
- > High pressure washing
- > Water transport
- > Hydro testing
- > Sewer flushing
- > Ice melting
- > Transport of sour materials

High Pressure Mechanical Cleaning



Fouling components and rust gradually form during operational processes that will eventually require removal. Our high-pressure washing equipment is designed for various industrial applications that will leave equipment surfaces free of deposits and rust.

Our high-pressure pumps are rated for 15,000 psig with capabilities ranging up to 40,000 psig when used with engineered adapter settings. Each pump can be used interchangeably with adaptable parts such as dump guns and rotating nozzles to address all cleaning requirements.

New Generation Tube Lancing Equipment

While old generation tube lancing heavily relies on manual labor to clean tubes one at a time, FQE employs second-generation high-pressure lancing technology (XLTC) which provides a number of benefits:

- > Multi-Tube Cleaning Capabilities: to increase productivity and reduce duration;
- > Remote Controlled Technology: allowing for operators to clean the tubes from a location that is not in the line of fire for safer execution;
- > Flex Tubing: which allows the lance to easily navigate complex tubes such as U-bends;
- > Versatile Equipment Assembly: the TLX can be used in conjunction with pumps at different pressure settings and sizes to address varying tube diameters, configurations and deposit characteristics.

APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Spool and piping hydromilling
- > Heat exchanger tube lancing
- > Heat exchanger bundle blasting
- > Tray cleaning
- > Tank internal washing

Tank Cleaning

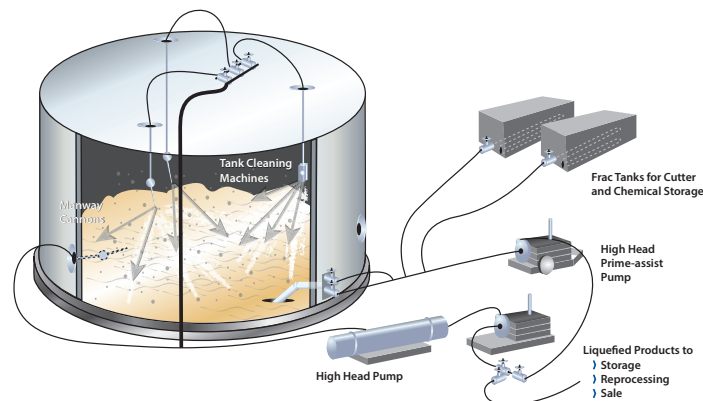
FourQuest Energy delivers a tank cleaning methodology that's tailor-made to each vessel or tank - changing the industry standard as well as enhanced mechanical cleaning.

All sizes of tanks and storage vessels can be cleaned with our customized, and engineered approach. With our expert knowledge in confined space and non-entry cleaning, FourQuest Energy ensures your tanks are safely cleaned on time and on budget.

FourQuest Energy's proprietary tank cleaning process enables tank cleaning in a chemical closed loop environment. First, we custom engineer a solution that liquefies the sludge deposits in your tank that would normally be removed mechanically. Then we apply the selective chemical solution with a cutter stock and extract the content using an engineered circulation process. Lastly, the tank is degassed chemically, resulting in a superior level of surface and air cleanliness. And it can all be done without the entry of people.

BENEFITS OF NON-ENTRY TANK CLEANING

- Slashing Disposal Costs: With our chemical tank cleaning process, organic solids are dissolved inside the tank, letting you avoid expensive hazardous waste disposal expenses.
- Shortened Cleaning Duration: Faster scheduling means less down time so that your plant can get back to operational capacity.
- Recycle Hydrocarbon Product: Rather than creating waste for disposal, recycle it using our specialized solvent cutter. Take this opportunity to generate revenue rather than creating costs.
- Environmental Performance: Our advanced chemical tank cleaning process also minimizes waste, leaving only insoluble, non-hazardous materials for disposal.
- Safety Performance: Our chemical tank cleaning methodology reduces or eliminates the requirement of personnel to enter the tank; work is performed in a closed loop system.



Chemical Cleaning



Chemical cleaning is applicable to a wide range of applications from new construction to ongoing maintenance activities.

Post operations equipment may accumulate sludge or suffer significant corrosion during use which can result in fluid obstruction, affecting heat transfer ability, high concentrations of contaminants such as LELs or H₂S and more. FourQuest utilizes our low Pressure Chemical Cleaning Trucks in numerous applications with a combination of our selective chemistries and engineered programs to meet all of your challenges.

CHEMICAL CLEANING METHODS:

- > The fill and soak method
- > Fill and circulate method
- > Cascading cleaning method
- > Two phase flow cleaning method
- > Slug flow cleaning method
- > Vapour phase method
- > Boiler boil outs
- > Foam cleaning method
- > Nozzle cleaning method

CASE STUDY

Chemical Cleaning Of Canadian High Asphaltenic Bitumen at a SAGD Oil Sands Facility

- > Plant fully decontaminated of bitumen residue
- > \$350,000 saved by eliminating cutter stock requirement
- > Reduced mechanical cleaning costs and timelines by over 50%



Chemical Products

DEGASSING

FQE LEL-Vapor

FQE LEL-Vapor will preferentially absorb aliphatic, aromatic, and naphthenic hydrocarbons via a proprietary encapsulation process that safely and effectively removes these problematic LEL's from vapor spaces and equipment surfaces.

ASPHALTENE CONTROL

FQE Solvent-H+ PATENTED

FQE Solvent-H+ offers unsurpassed performance in dissolving and preventing solid hydrocarbon deposits that are found in heat exchangers, vacuum tower bottoms, coker fractionator bottoms, oil storage tanks, and other hydrocarbon processing equipment.

NORM DECONTAMINATION

FQE NORM-Clear PATENTED

FQE NORM-Clear is used in the removal of NORM contamination found in vessels, tanks, and process pipework.

Through our years of experience using a range of chemical providers, we have determined FQE® Chemicals to be the superior provider in the market.

FQE Chemicals' core chemistries specialize in degassing and decontamination, which address LEL's, H₂S, pyrophoric scale, naturally occurring radioactive material (NORM), heavy hydrocarbons, grease, and odours.

For heavy industrial applications, such as oil sands, heavy oil processing, refining and petrochemical facilities, our chemical products and processes often replace more expensive mechanical methodologies for projects like vessel, tank, and heat exchanger cleaning. Applications may vary from large-scale plant maintenance work to very minor issues such as odour control.

Our customized approach and superior research and development:

- > Slashes operating, maintenance and environmental costs
- > Saves time and builds a more efficient facility
- > Delivers peace of mind on critical projects
- > Provides guaranteed support from dedicated and accountable experts

TYPES OF CHEMISTRIES

- > Degassing chemicals
- > Hydrogen sulfide and iron sulfide
- > Asphaltene and wax dispersants
- > NORM decontamination
- > Degreasing products
- > Specialty detergents/cleaners
- > Passivation and chelation products



Pre-Commissioning & Commissioning Services

Our pre-commissioning and commissioning service suite provides for the cleaning, testing, and maintenance of process and pipeline systems.

These services include the removal of debris, mill scale, hydro test fluid and any other contaminants left behind during the construction phase. Our services are paired with detailed engineering procedures tailored specifically for each client's individual needs.

These procedures ensure all services are executed efficiently, which results in significant cost savings and schedule enhancements.

PRE-COMMISSIONING AND COMMISSIONING SERVICES:

- > Engineering
- > Steam blowing
- > Air blowing
- > Chemical cleaning
- > Glycol flushing and chlorination
- > Oil flushing
- > Fluid heating
- > Fluid pumping
- > Filtration
- > Hydromilling
- > Pipeline pigging and testing

Oil Flushing

FourQuest Energy utilizes proven proprietary flushing skids (FS), which are self-contained, self-sufficient units that include an onboard pump, heater, mixing tank, reverse flow manifold, and filtration system to capture insoluble matter.

Flushing of hydraulic and lubrication oil systems is used to ensure that new rotating and hydraulic equipment will start up and operate as designed, significantly reducing the potential for premature failure.

Maintenance and downtime on equipment can be minimized by performing an effective system cleaning during commissioning and following periodic maintenance and repair services. Any facility that has a low tolerance for system failures will find this service to be a pillar in their preventative maintenance program. Contaminants such as water, rust, loose scale, weld slag, sand, dirt, and oils are removed from the system with a proper preoperational cleaning, reducing the wear, scoring, and damage bearings, control valves, instrumentation, and critical operating systems are subjected to.



FS (4000L/min)

APPLICATIONS WITHIN THE ENERGY INDUSTRY:

- > Cleaning of hydraulic control systems (e.g., systems controlling large isolation valves on coker drums and jacking systems for offshore equipment)
- > Rotating equipment lubrication oil system cleaning (e.g., steam turbines, large pumps, and gas turbine systems)

Steam Blowing



Steam Silencer

For pre-commissioning, a FourQuest Energy designed continuous low-pressure steam blow technique is the leading accepted practice for cleaning steam system circuits.

Pipe is fabricated under hot working conditions, which leads to a heavy oxide layer forming on its surfaces. This layer is known as mill scale and must be removed from critical systems before putting them into service.

Over time, FourQuest enhancements have been made to plant start-up techniques to perform engineered steam blows which remove mill scale. During a steam blow, the piping is blown with sufficient boiler pressure to ensure that enough dynamic pressure will be experienced in the pipe to provide adequate cleaning. Typically, boiler pressures used in steam blowing provide a dynamic pressure throughout the piping that is at least 20% higher than would be experienced in normal operating conditions ($CFR \geq 1.2$).

Any potentially damaging particles will be blown out of the piping prior to plant operation reducing unplanned risk at start-up.

APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Removal of residual post-construction debris
- > Unseating mill-scale magnetite layer deposits and welding slag through thermal pipe shocking
- > Purging high, medium, and low pressure steam lines leading to end users, such as well pad injection points, steam traps, etc.
- > Commissioning of steam supply and distribution piping, including lines originating from traditional boiler and OTSG systems
- > Cleaning of critical system piping leading to crucial components, such as steam turbine generators on co-generation units
- > Precautionary maintenance on older steam systems where contamination is suspected for major critical repairs have been conducted

Air Blowing

Engineered air blowing is a predictable method to remove construction debris, loose rust, liquids, and other contaminants from process piping.

Every air blow application is engineered for the individual system being cleaned. The engineered approach provides numerous benefits for our clients, including time effective execution by sequencing the blows, thorough cleaning guaranteed by achieving an optimal cleaning force of at least 1.5 (CFR > 1.5), and safe field execution through applying the best industry practices.

Compressed air can be used for system dehydrating and dewatering. Compressor spreads can provide large volumes of -60°C dew point air, which, combined with foam pigs and brush pigs can clean and dry pipelines to a very high standard. This service can be used in conjunction with air blowing.



APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Removal of construction debris and velocity cleaning
- > Pre-heating, heating, and cooling of process vessels, reactors, and systems
- > De-watering and drying
- > Pigging and drying pipelines
- > Pipeline pre-packing
- > Pneumatic pressure testing
- > Leak testing
- > Pre-tensioning pipelines

Fluid Pumping

One of the basic equipment requirements in all sectors of the energy industry is the use of pumping services to circulate or transport fluids into or through systems, vessels, pipelines, or wells.

FourQuest Energy is an industry leader in fluid transport solutions. Pumping services can be used to provide removal of debris from pipelines and new build facilities by exceeding the cleaning force ratio and abrading debris and scale from the internal surfaces of the vessel and pipe walls. The debris-laden fluid can then be filtered and re-injected to remove additional debris.

Other applications include high-pressure water injection into under-pressured formations to enhance oil recovery, water disposal, and injecting large volumes of water into pipelines, process units, or storage vessels for hydrostatic testing.



Hydrostatic Testing



Pumping and Filtration Spread

APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Tank hydrostatic testing
- > Flushing of vessels and piping
- > Hydrostatic testing
- > Standby services
- > Startup fluid transfer

Filtration

FourQuest Energy provides a large range of fluid filtration services, from ensuring particulate is filtered out of testing water to providing reverse osmosis filtration for boiler feed water.



Replacing Filters

Bag filtration is an economical filtration method consisting of three components: a pressure vessel, micron-rated filter bags, and a filter bag retainer basket. Filter bags vary from 1 micron absolute to 100 micron nominal, depending on client request specification. The filter bags are highly efficient at 99% for absolute filter bags and above 80% for nominal bags.

Our reverse osmosis skid provides a high-quality water purification solution. It is commonly used in plants for demineralizing water for boiler feed water applications. We provide boiler feed quality water before a permanent treatment plant is operational, which helps to kick start the operation of the plant's water treatment facilities.

FourQuest's coalescing filters are specifically designed for removal of emulsified water from hydrocarbons. Mechanical coalescers employ filter media to make droplets coalesce. This technology is ideal for separating hydrocarbons from water and vice versa. If required, we can perform microscope analysis to ensure filtration results meet specific cleanliness standards (ISO 4406 or NAS 1638).



Filtration Spread

APPLICATIONS WITHIN THE ENERGY INDUSTRY

- Providing filtration for glycol start-up and circulation
- Meeting requirements for product cleanliness
- Maintaining cleanliness of water for testing
- Demineralizing water for boiler feed water applications
- Oil removal from produced water

Fluid Heating

Fluid heating and pumping services ensure proper circulation and transport of fluids into systems, vessels, and pipelines.



8,000,000 BTU/hr Fired Heating Unit

The FourQuest Energy fired heating units are coupled with a shell and tube heat exchanger using glycol as a heating medium. This allows us to heat corrosive and severe chemicals and liquids without any worry. The unit is specifically designed to safely heat most liquids. Our fired heating units have a thermal output of 8,000,000 BTU/hr and a maximum flow rate capacity of 500 L/min at 150 psig discharge pressure.

Our 38,000,000 BTU frac water heaters are dual fired – diesel or natural gas – trailer mounted, fully enclosed units. These units are capable of heating water up to 38°C in a single pass at a flow rate of 500GPM, with a maximum flow rate of 850GPM at 50 psi (inlet pressure). The dual burners included on each unit meet all NFPA combustion system requirements and are equipped with safety shutdowns. Burners are digitally controlled to ensure adequate water temperatures are being achieved.

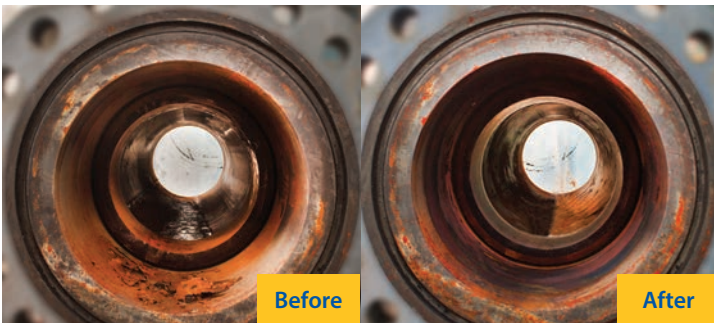


38,000,000 MBTU Frac Water Heater Unit

APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Chemical cleaning fluid heating
- > Warming of water for plant start-up and process water heating
- > Tailings pond thawing and snow melting
- > Maintaining temperature on storage tanks for testing
- > Heating fracturing fluids

Hydro-milling



Cleaning nozzle and protection hose setup

Hydro-milling, also known as water jetting, retro-jetting or hydro-jetting, is an efficient method of cleaning industrial piping through the implementation of high-pressure water nozzles and jets.

Newly installed process piping typically contains foreign debris. These residual deposits can compromise system reliability and lead to premature system degradation and failure during plant operation. In order to help preserve the long-term integrity of these process piping systems, hydro-milling can be used to remove all undesirable foreign contaminants and particulate matter.

Hydro-milling has been proven as an effective means of removing both large and fine debris from piping surfaces, including post-construction debris, by-products that result during fabrication, and operation-derived deposits, which are comprised of welding slag, mill-scale, loose rust, and mineral sediment.

BENEFITS OF HYDRO-MILLING

- > Reduced commissioning (i.e., steam blows) durations on boiler feedwater and steam systems
- > High degree of cleanliness on non-critical and critical systems
- > Can be completed in a variety of conditions, including subzero climates
- > Removes both fine and large particles
- > Lower water requirements compared to conventional water flushes
- > Water recycling capability with minimal waste disposal requirements
- > Reduced costs associated with time and scheduling

Pipeline Pigging and Testing

Pigging is completed to maintain efficiency and provide actionable insight to avoid potential problems on existing pipelines. It is often applied to remove new construction debris and assist during hydrostatic testing by dewatering and drying the pipeline.

Upon completion of piping construction, the line is required to be tested beyond its required operational pressure. This testing can be completed pneumatically with air or nitrogen, or it can be completed with fluids such as water, glycol, or a water/methanol mixture.

FourQuest Energy is not only capable of completing all forms of testing, but also has the global experience to complete testing from design to infield completion. For every test conducted, we provide an engineered test procedure to be executed, as well as engineering support throughout.

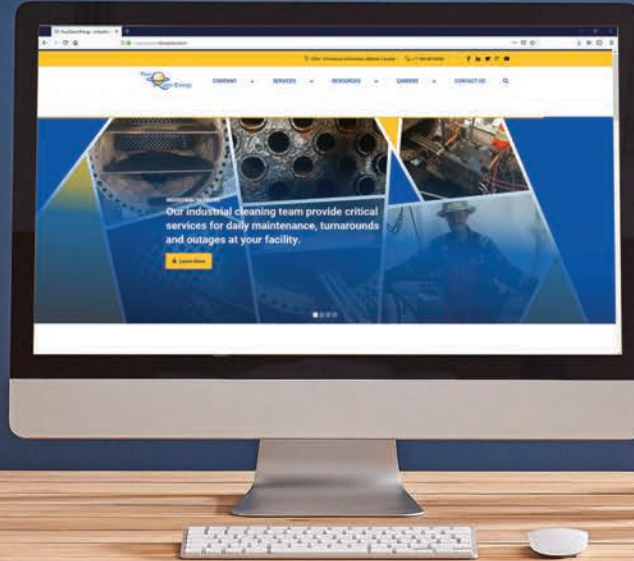


APPLICATIONS WITHIN THE ENERGY INDUSTRY

- > Pipeline pre-commissioning
- > Pipeline maintenance
- > Boiler maintenance
- > Line dewatering
- > Line drying
- > Separating mediums in a pipeline

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CASE STUDIES

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INSIGHTS BLOG

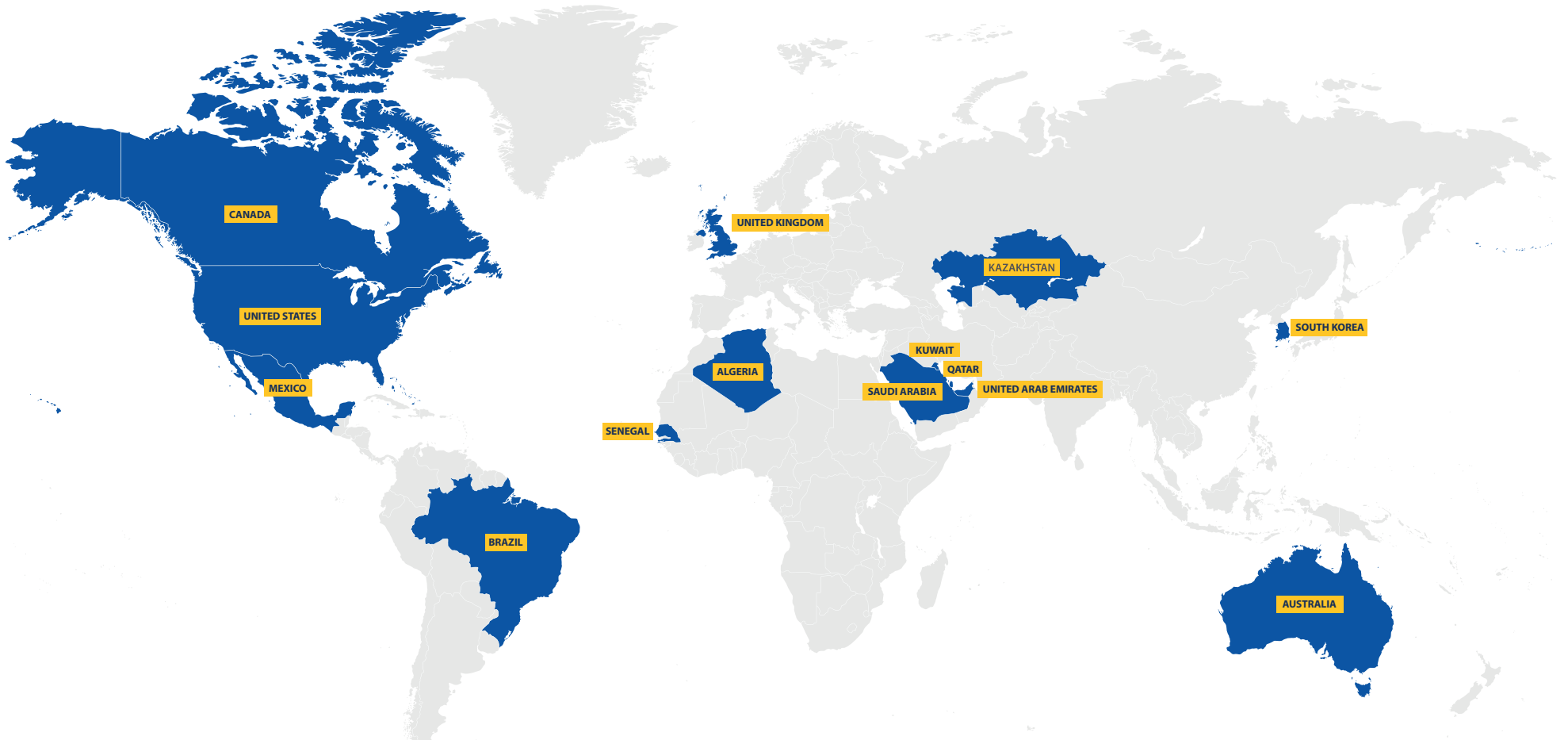
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