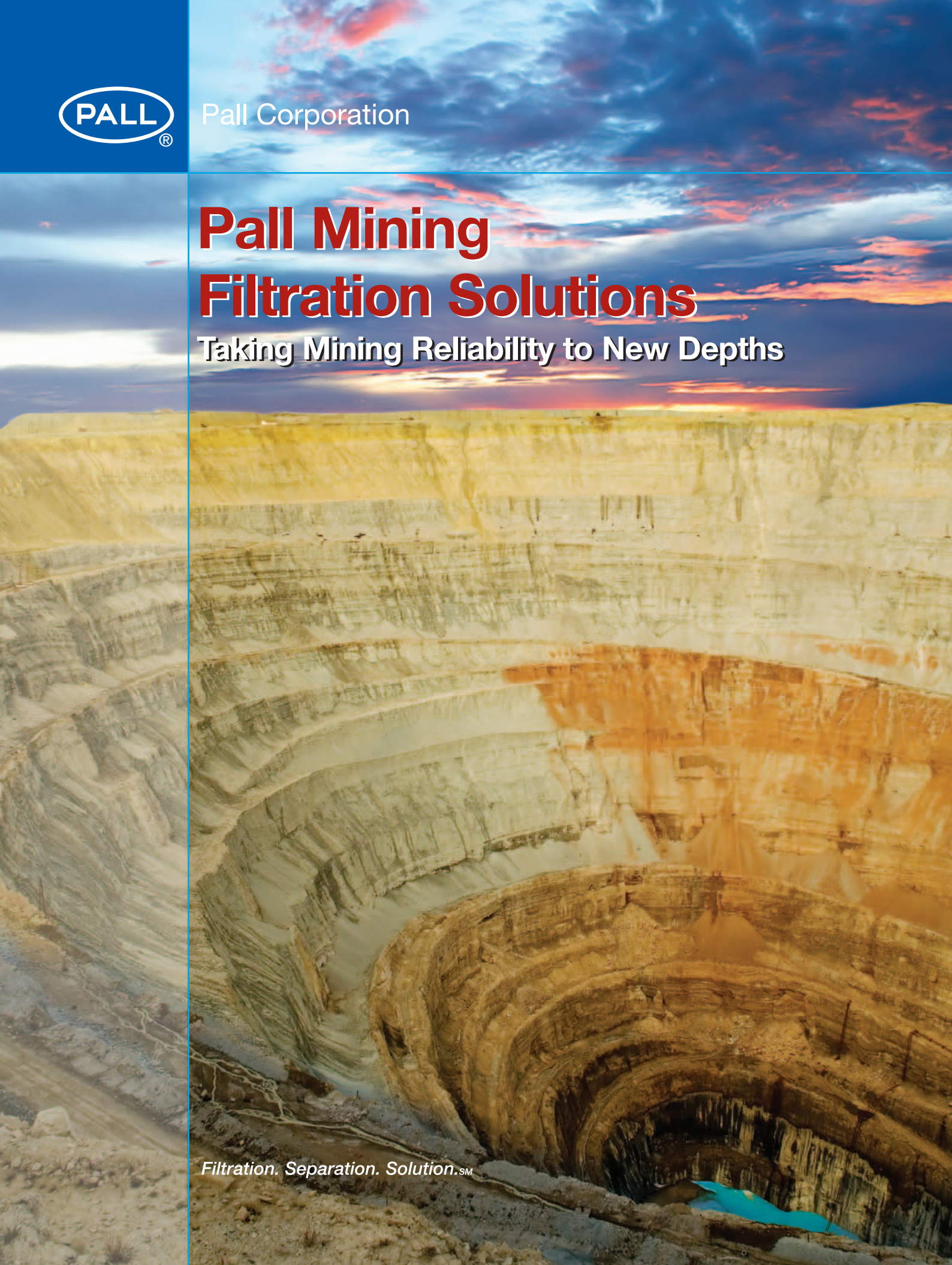
Pall Corporation

Pall Mining Filtration Solutions

Taking Mining Reliability to New Depths



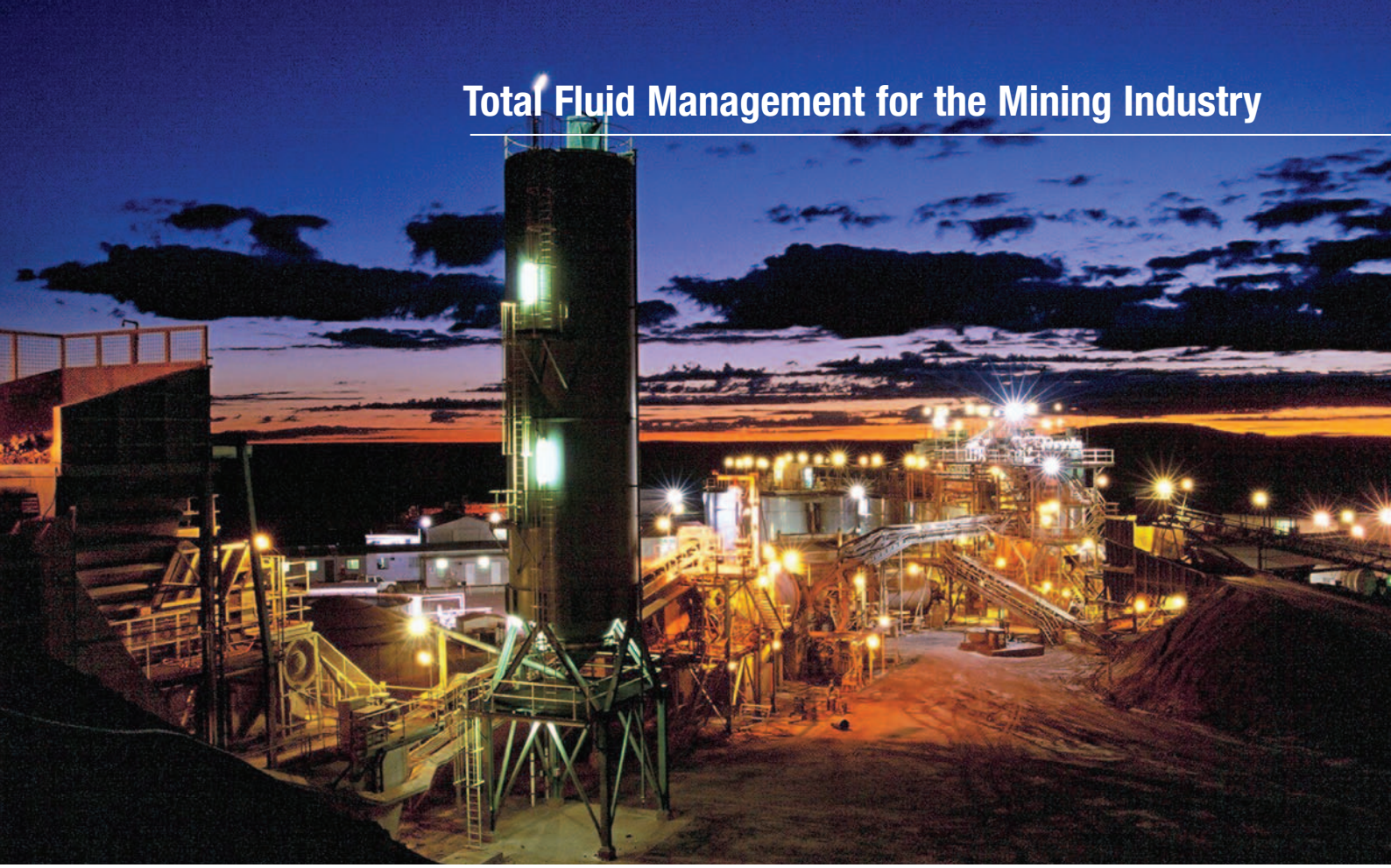
*Filtration. Separation. Solution.*SM

Providing the Mining industry with filtration & separations solutions for more than 50 years

Mining in all its various forms is a tough and competitive business where profitability depends on maximizing productivity. The cost-effective maintenance of mining systems, especially high-performance hydraulic systems, benefits the bottom line while also reducing risk. Today's sophisticated mining systems and machines demand the most advanced technologies, and Pall offers solutions based on root cause analysis, not just quick fixes.

Pall Corporation has grown to be the largest and most diverse filtration, separation, and purification company in the world. We successfully conduct business around the globe, and offer an extensive range of products and technical expertise. Pall offers advanced filtration solutions for the removal of contaminants from hydraulic fluids, lubrication systems, and water and waste streams, as well as diesel fuel systems within the mining industry. We have been a dependable source of filters and media designed to ensure outstanding reliability, long service life, and maximum efficiency for your mining operation.

Total Fluid Management for the Mining Industry



The Pall Total Fluid Management (TFM) program is specially designed for each of our mining customers and offers a comprehensive package of specially selected filtration and separation equipment, diagnostic, consulting, and on-site support services to yield the highest process efficiency at the lowest cost.

We conduct a detailed analysis of your filtration processes and offer each mine operator a unique TFM program designed with input from you, specifically for your business. The package provides filtration products and diagnostic, consulting, and on-site support services tailored especially for the mining industry.

In addition to TFM, Pall offers a variety of services for all phases of mining operations, including fluid sampling, and analysis. These services are provided locally, with intensive, broad-based assistance from Pall's worldwide technical support network. With offices in 30 countries, our staff of engineers and scientists is comprised of technical experts who can help determine how Pall products and technologies can best be applied to meet your business challenges and objectives.

The Benefits of Total Fluid Management

- Reduces operating costs while increasing process efficiency
- Gives you access to an extensive, multidisciplinary team of experts including reliability engineers, physicists, chemists, biochemists, microbiologists, and design engineers
- As Pall handles your mine's fluid systems, you can put your resources where they are most needed

Meeting your Challenges

Pall offers a wide variety of disposable and backwashable filter products to meet all your mining filtration needs. Pall filters are engineered and manufactured to meet stringent quality requirements and are thoroughly tested before leaving our manufacturing plants. When you choose Pall, you can be confident that you're getting high-quality, dependable, and value-added filtration and separations solutions that have set the standard in the mining industry for more than 50 years.

Our filtration products for mining applications include:

- Pall **Ultipleat® SRT** filter housings and elements
- Pall **Ultipor® III** filter housings and elements
- Pall **Aria™** filtration systems
- Pall **Ultipleat®** High Flow filters
- Pall **PhaseSep®** and **AquaSep®** coalescers
- Pall **Lucid®** separator
- More than 160 different types of process-style cartridges

These products offer the following benefits:

- High efficiency (99.9%) for process-style, hydraulic, and lubrication-style elements, for reliable, repeatable performance
- Long service life
- Matrix bonding to prevent media migration
- Positive sealing to eliminate fluid bypass

Take Advantage of Pall Technology

Pall has provided hydraulic filtration solutions for more than 50 years in both hard rock and coal underground and surface mines. In fact, Pall hydraulic filters are standard fit in many OEM mining systems.

Proven and time-tested in mines around the world, Pall products can consistently produce cost-saving results in your mining hydraulics, lubrication, and other fluid systems—from longwall shearers, SAG & Ball mills to continuous miners, pumping stations, roof bolters, mobile supports, conveyors, haul truck fleets, rope shovels, hydraulic shovels, draglines, and mobile material handling.

The Products

Diesel fuel contamination by both water and particulate is a key contributor to many engine and fuel system-related failures in mining vehicles today.

Particle Filtration

Pall Ultipleat® High Flow filters provide mining customers with the most advanced and cost-effective product for controlling bulk diesel fuel particulate contamination. Utilizing our unique crescent-shaped pleat geometry combined with a large diameter and Pall's proprietary media, just one six-inch diameter Ultipleat High Flow filter element can handle up to 500gpm/ 1900lpm. This benefits our mining customers by allowing them to use significantly fewer elements and smaller housings for high flow rate bulk diesel fuel applications. You can now achieve the cleanliness levels that today's modern MEUI and common rail diesel injection systems demand, in a system that is 2-to-4 times smaller than conventional depth or pleated filter technologies.

Coalescers

Entrained water within diesel fuel is highly detrimental to a diesel engine fuel system. Conventional coalescer systems experience difficulty in removing water from diesel fuels containing high concentrations of surfactants because they lower the interfacial tension between water and the continuous phase fluid. The presence of surfactants also leads to disarming of the coalescer. Pall's AquaSep Plus and PhaseSep coalescers are designed for efficient separation of water from diesel fuels, even those with low IFT.

Pall's AquaSep coalescers are capable of removing entrained water to a level of below 15 ppmv over a wide range of conditions:

- **Inlet water concentration as high as 3% water by volume (30,000 ppmv)**
- **Interfacial tension as low as 3.0 dyne/cm**

Large Diesel Engine Fuel injector with blocked injector nozzels caused by fuel contamination

Pall Ultipleat High Flow Elements

Hydraulics & Lubrication

The Products

Pall's broad range of filter elements and housings makes your customized filtration solution possible. We provide innovative disposable filter elements in a wide range of micron removal ratings. Pall filters are developed, designed, and manufactured under the strictest quality controls and have been industry-tested to provide exceptional performance, reliability, and consistency.

Pall offers the following technologies for mining hydraulics & lubrication applications:

- Pall Ultipleat® SRT filter housings and elements
- Pall Ultipor® III filter housings and elements
- Pall Ultipleat® High Flow filters for water-based hydraulic fluids as found in Longwall applications

Ultipleat SRT and Ultipor III filter elements are manufactured using inert, inorganic fibers securely bonded into a fixed, tapered pore structure.

All Pall filter housings are available in high-pressure, low-pressure and in-tank return line configurations to suit almost any application with pressure capabilities up to 420 Bar in the high-pressure variants. Most of the housings produced by Pall are also available "aluminum-free," making them highly suited to underground coal mining applications.

The Applications

The applications within the mining industry are varied in both complexity and range. Pall offers proven solutions in all facets of mining hydraulic and lubrication systems to meet customer demands. Some of these applications include:

Mobile Equipment

- Haul trucks
- Graders
- Wheel loaders
- Rope shovel gearboxes
- Hydraulic shovels and excavators
- Dragline gearboxes
- Blast hole drill rigs
- Exploration drill rigs
- Dozers
- Road headers
- Continuous miners
- Stage loaders
- Roof bolters
- Mobile material handling

Fixed Plant

- Conveyor gearboxes
- Ball mill lubrication systems
- SAG & AG mill lubrication systems
- Cone & gyratory crushers
- Jaw crushers
- Pump gearboxes
- Compressors

The Products

Pall offers the purification and monitoring systems you need for efficient water detection and removal from hydraulic and lubrication oils.

Purifiers

Reliability of systems and the life of system components and fluids are extended by minimizing fluid oxidation, maintaining lubricity properties and reducing aeration. Corrosion within the fluid system can also be controlled by reducing the formation of acids formed in some fluid degradation processes.

Because of the design of the Pall fluid conditioning purifier, a wide range of opportunities for savings is provided through:

- Extension of fluid service life
- Improved productivity
- Purification of stored bulk contaminated fluids
- Reduced fluid changes
- Less frequent fluid disposal
- Minimized corrosion within fluid systems
- Increased equipment reliability

Water Sensors

The early detection of water contamination can now be done in real time with Pall Water Sensors.

The Pall WS08 series water sensor provides precise and reliable measurement of water content in mining lubrication and hydraulic oils. It is ideal for in-line monitoring of moisture in mining ball mills and AG & SAG mill lubrication return lines to detect seal failures. These new sensors from Pall can further enhance predictive maintenance within your mine.

Specifically designed for harsh industrial environments such as the mining industry, the WS08 Water Sensor features a modular housing concept, “plug-and-play” connectivity, simple on-site adjustment and calibration, and interchangeable sensor options.

Pall HNP006 Purifier

Pall WS08 Water Sensor

Pall Ultipleat SRT Housing Elements

Mine Water treatment

Dreamstime Stock Photography

The Products

You can rely on Pall water treatment technologies for successful purification of raw water and reuse of water within your mine.

Mine water treatment is the most recent addition to Pall's Mining TFM program. We provide highly effective and cost-efficient filtration products for the treatment of:

- Raw water from lakes, rivers, and streams for plant use
- Drinking water
- Wastewater within your plant
- Water from mine dewatering

The quality of water within any mining operation is critical to the operation of your mine, the environment, and the health of your mine personnel. Pall Aria™ water treatment systems consistently provide high-quality effluent regardless of the water source.

Pall Aria systems, which incorporate Microza* hollow-fiber microfiltration membranes, offer the following benefits:

- Fully automatic
- Regenerable (automated)
- Remotely monitored
- Superior control of bacteria and particulate silica and metallics

The Pall Aria microfiltration system was the first to receive a "full system" certification in accordance with ANSI/NSF 61 specifications. The systems are approved for potable water supply from rivers, lakes, and streams for a wide variety of water sources and seasonal variations.

The systems remove chlorine-resistant giardia, cryptosporidium, most bacteria, protozoan cysts, iron, manganese, and arsenic with pre-treatment, plus other solid particulate to deliver water that is proven to exceed US EPA standards for safe drinking water, such as the requirement of the Surface Water Treatment Rule (as amended December 16, 1998).

Pall Aria microfiltration and ultrafiltration systems, backwash systems, and reverse osmosis systems treat wastewater to meet your requirements and allow you to meet zero liquid discharge requirements.

Pall Aria® water treatment system is compact and flexible and produces high quality treated water

Pall module cut-away reveals hollow fiber membrane

* Trademark of Asahi Corp.

Reliability Solutions

Not just filtration

Filtration solutions are only one part of what Pall can provide mining customers. Reliability Engineering is a common term used within the mining industry. However, it is frequently misunderstood, and rarely put into actual practice. Pall has established a Reliability Solutions Group that is comprised of recognized industry experts. This group has extensive experience across all industry sectors including mining, and is fully accredited in the specialized fields of reliability engineering, RCM II, vibration analysis, thermal imaging, oil analysis, and rotor dynamics.

The key deliverables we offer our clients through our Reliability Solutions portfolio are:

- Advanced multi-technique (CM) problem solving
- Commissioning and operational support
- Severity analysis
- Integrity survey
- CM program implementation
- Critical plant reliability analysis
- Development of a reliability improvement business plan
- Root cause analysis management
- Solution design (failure mode elimination)
- Solution implementation
- Quality assurance/quality control, witnessing, inspection, and test plans
- Process and system design
- Warranty claim management
- Training

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Quality & Service

Quality service to optimize system performance
Pall provides quality service to ensure that your filtration, separation, and purification systems operate efficiently. Pall is dedicated to providing quality service to help maximize the efficiency of your system. Our engineers have a thorough knowledge of the components, design, operation, and maintenance requirements of Pall filtration and separation systems.

They are experienced troubleshooters who can quickly identify and resolve process inefficiencies. When additional resources are needed to diagnose and solve a problem, they call upon Pall's local and global teams of Scientific and Laboratory Services (SLS) engineers and scientists to help resolve fluid system challenges.

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