ClearBakk Water Solutions

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OPTIMIZING PRODUCED WATER TREATMENT USING CERAMIC MEMBRANES

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TRANSFORMING THE FUTURE OF PRODUCED WATER TREATMENT

THE CRITICAL ROLE OF TREATMENT IN PRODUCED WATER MANAGEMENT

Produced Water is a byproduct of oil and natural gas extraction, representing the most significant volume of waste associated with these industries. It typically contains high levels of Oil, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Silica, Dissolved Organics, and Volatile Organic Compounds (VOCs). Treatment of Produced Water is crucial before its disposal, reuse or discharge to meet regulatory standards and minimize environmental impacts.

CHALLENGES IN PRODUCED WATER TREATMENT

Managing and treating Produced Water involves several challenges, including:

- **High Volume:** Large quantities of Produced Water require substantial infrastructure for storage, handling, and treatment.
- **Complex Composition:** High contaminant levels and diverse compositions, including both suspended and dissolved contaminants, often result in significant treatment costs.
- **Variable Quality:** Water quality varies based on location, reservoir characteristics, and production stage, necessitating customized treatment approaches.
- **Strict Regulations:** Stringent environmental regulations govern Produced Water discharge and reuse, aiming to protect ecosystems and groundwater resources.
- **Evolving Standards:** Changes in regulatory frameworks add uncertainty and increase compliance costs.

TRADITIONAL PRODUCED WATER TREATMENT

Conventional Produced Water treatment processes typically include Oil removal, TSS removal, TDS reduction, softening (hardness removal), and the elimination of toxic substances like heavy metals, Naturally Occurring Radioactive Material (NORM), Hydrocarbons, and other harmful compounds. Among these, deoiling, a process focused on removing oil and suspended solids, is typically the initial step. Traditional deoiling technologies include API separators, CPI separators, Induced Gas Flotation (IGF), Dissolved Gas Flotation (DGF), Hydro-cyclones, and Oil removal filters for polishing.

Despite their widespread use, these traditional technologies face several limitations that can hinder effective produced water treatment. The challenges are becoming more apparent as water composition varies and contaminants become more complex.

LIMITATIONS OF TRADITIONAL TECHNOLOGIES

Conventional methods are increasingly being challenged by the complexities of Produced Water, leading to significant limitations in their effectiveness.

- **Emulsified Oil:** Emulsions such as straight, reverse and double emulsions are difficult to separate from the water using conventional oil separation technologies without using expensive specialty chemicals and/ or thermal treatment.
- **Fine Suspended Particles:** Small particles and colloids resist removal using conventional methods.
- **Variable Water Quality:** Fluctuations in oil concentration, particle size, salinity, pH, viscosity, and temperature impact system performance.
- **Multiple Stage Treatment:** Traditional deoiling systems often require multiple stages due to the relatively low efficiency of oil and solids removal in each stage. This adds to the capital and labour costs.

ALSYS CERAMIC ULTRAFILTRATION (CUF) SYSTEM: ENGINEERED FOR EFFICIENCY & RELIABILITY

The ALSYS Ceramic Membrane System offers a superior alternative to traditional deoiling system, providing distinct advantages:

Enhanced Water Quality:
Ceramic membranes act as a highly effective physical barrier, removing oil droplets and fine particulates down to sizes ranging from 5nm to 0.2 micron.

Consistent Performance:
- Highly effective at removing oil and solids, even from stable and complex emulsions.
- Provides consistent permeate quality even with fluctuating influent water quality.
- Performs effectively in the most challenging conditions, including upset scenarios with extreme TSS (Total Suspended Solids) and high oil concentrations.

Compact Design:
Smaller footprint compared to traditional systems.

Robustness:
Ideal for demanding and complex operational conditions, including high temperatures, highly aggressive chemicals, extreme pH levels, and environments with high corrosion or abrasion. Chemical resilience allows Ceramic Membranes to resist aggressive cleaning procedures without degradation, ensuring sustained high flux rates over extended periods.

Operator-Friendly:
Fully automated systems minimize operator intervention.

Simplified Process:
Offers a more efficient alternative by combining high removal efficiency for both oil and solids into a single stage, simplifying the overall treatment process and decreases operational complexity.

Simplified Installation:
Modular, Plug-and-Play designs reduce on-site labor requirements.

Reduced Chemical Use:
Effectively removes oil and solids without or with minimal chemical addition.

Flexibility:
Offers adaptability for various operational setups, functioning effectively as either a centralized treatment facility or a mobile, non-centralized treatment solution.

From Left to Right: FEED → Final Product

WHAT VALUE DOES ALSYS BRING?

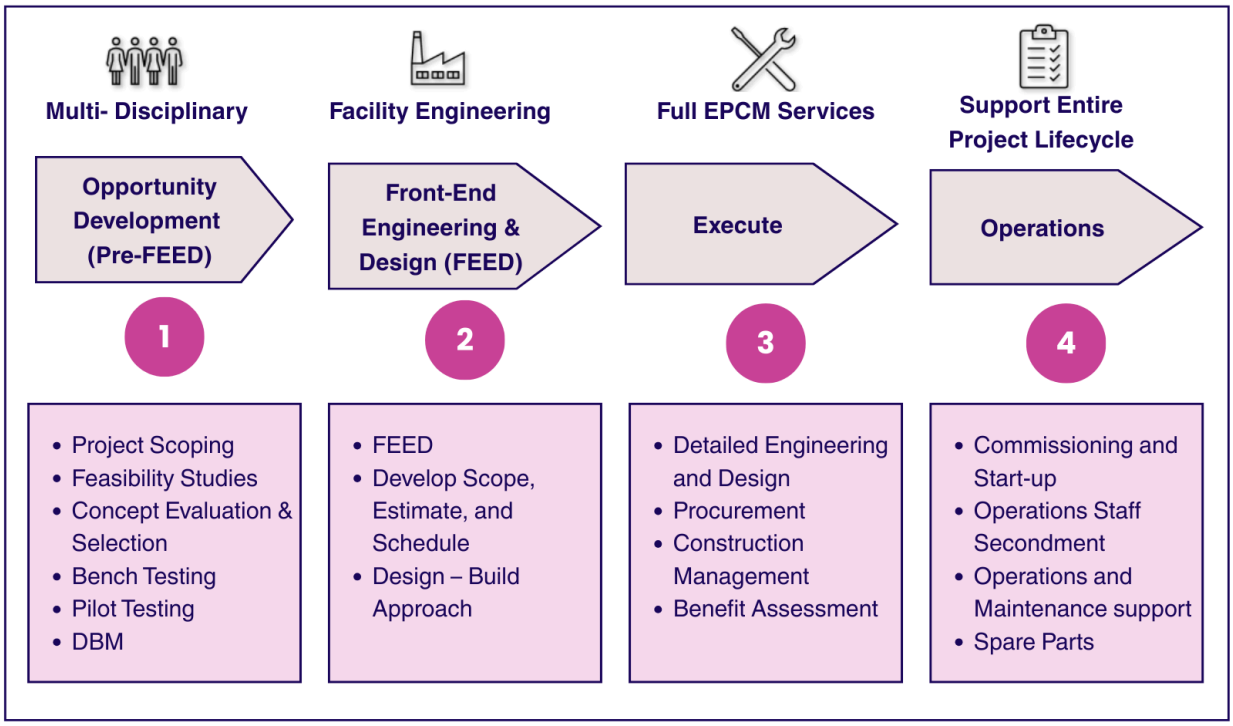
ALSYS delivers advanced Ceramic Membrane solutions through a fully integrated value chain, we deliver complete, customized solutions that drive performance, sustainability, and operational excellence. Leveraging extensive engineering and process design expertise, ALSYS supports clients across every stage of the project lifecycle. Our offerings include Consulting, Pilot Testing, Membrane and equipment supply, EPC (Engineering, Procurement, and Construction) services, System Troubleshooting, and Long-term Operational Support. This comprehensive approach ensures each solution is tailored to meet specific treatment goals and operational conditions.

ALSYS Ceramic Membrane-based systems are designed to overcome the limitations of conventional Produced Water treatment technologies, providing superior efficiency, reliability, and adaptability. Our solutions combine robust performance with operational simplicity to meet increasingly stringent regulatory and environmental requirements. With a wide range of Ceramic Membrane options—available in various configurations, materials, and designs—we enable optimized performance and cost-efficiency across diverse applications.

Our adaptable systems effectively address unique challenges such as variable water quality, complex contaminant profiles, space constraints, and fluctuating process conditions. By integrating advanced technology with expert-driven design and support, we deliver high-value, turnkey solutions that ensure competitive advantage and long-term success in Produced Water treatment.

We are more than a service provider - we are an experienced and trusted partner, focused on understanding our customers' needs and delivering integrated, sustainable solutions that drive long-term success for our customers.

Built to Deliver: Practical, Effective, and Reliable Solutions !



Partner with ClearBakk - Alsys Group to deliver scalable, reliable and high-performance solutions that optimize efficiency and drive long-term value !

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