Case Study

Tactical Water Purification Systems

Project Details

End User: U.S. Department of Defense

Application: Drinking Water

Capacity: 200,000 gpd

Project Engineering:
Village Marine Tec— EUWP
MECO— LWP

Overview

The U.S. Congress initiated the Expeditionary Unit Water Purifier (EUWP) program in 2003 to stimulate discovery and invention in water reclamation, purification, energy and distribution technologies and to validate emerging science in this arena.

The first measurable objective of the program was to develop a transportable water treatment system that could be airlifted in a single C-130 transport plane and be quickly assembled to produce 100,000 gal/day of purified water from seawater.

The U.S. Department of Defense (DoD), acting on the EUWP initiative, developed a new tactical water purification system that employs state-of-the-art, commercially-available ultrafiltration (UF) membrane technology, sometimes in conjunction with reverse osmosis (RO).

The new system can be easily transported to remote locations and quickly set up to produce safe drinking water from almost any available raw water source, including highly-turbid water, seawater, and water with nuclear, biological or chemical (NBC) contamination. The system is designed to provide potable water for missions ranging from the battlefield to humanitarian relief efforts around the world.

The Challenge

To find a compact, flexible, and transportable drinking water purification system.

The Solution

Through extensive collaboration between Office of Naval Research, U.S. Army Tank Automotive Research, Development and Engineering Center, Naval Surface Warfare Center–Carderock Division, and the U.S. Bureau of Reclamation along with industry experts, two first-generation EUWP demonstration systems were built by Village Marine Tec, of Gardena, California.

The EUWP system consists of two skids that together can be airlifted in a single C-130 transport plane. Each EUWP uses 16 TARGA™-10 hollow fiber UF cartridges designed and manufactured by Koch Membrane Systems (KMS).

TARGA-10 membranes operate at a low pressure, minimizing the electrical power demands on the portable generator. Moreover, unlike other UF membranes that use blasts of

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coarse bubble aeration during backflush to shake material loose, the TARGA™-10 cartridge minimizes power requirements and noise because the system does not require large amounts of compressed air. Less compressed air means smaller compressors which results in space and power savings.

The EUWP systems were quickly put to the test when Hurricane Katrina struck. A unit was sent to provide potable water to the Biloxi Regional Medical Center and within a matter of hours it was converting seawater into clean water suitable for use in the hospital.

Prior to Katrina, the EUWP system also passed another real-world test, purifying 250,000 gallons of water in three days at a remote U.S. Coast Guard station at Port Clarence, Alaska, after severe storms drove seawater into the reservoirs used to supply drinking water for the station.

The Treatment Plant

The EUWP system can be set up in as little as eight hours, and is completely self-contained, requiring only diesel fuel to run power generators. The UF system can produce 200,000 gallons of drinking water per day from a contaminated water source, enough to support the needs of between 40,000 and 50,000 people.

An identically-sized RO system can receive pretreated water from the UF system, and purify 100,000 gal/day when the source is highly turbid surface water or seawater, as well as feed water with NBC contamination.

The system was benchmarked against the similarly-sized U.S. Army's Tactical Water Purification System capable of treating 36,000 gal/day of freshwater and 28,000 gal/day of seawater.

The DoD also uses membrane technology for its much smaller and more portable scale Lightweight Water Purifier (LWP), designed by Mechanical Equipment Company Inc., (MECO) of Sugar Land, Texas.

Each LWP system employs three ROMIPURE™ UF cartridges that can be can be cleaned and reused. ROMIPURE cartridges consistently produce filtrate water with less than 0.1 NTU, a more than tenfold improvement compared to multimedia and cartridge filters.

The U.S. Army awarded MECO an exclusive multi-year contract for 400 of the LWP units, some of which are in use in Iraq and Afghanistan.

Product Overview

In 2011, KMS launched the TARGA II hollow fiber UF system, which offers cost effective, safe, high quality water for a variety of treated water applications, from drinking water to seawater RO pretreatment, industrial water treatment, and tertiary wastewater treatment. The TARGA II system is seawater compatible to meet the unique challenges of RO pretreatment for seawater desalination, and offers consistently good filtrate at low overall operating costs.

The TARGA II system features several significant advantages:

Optimal System Design

- Smaller footprint
- Easily expandable
- Reduced capital costs

Proven 4-log Virus Removal

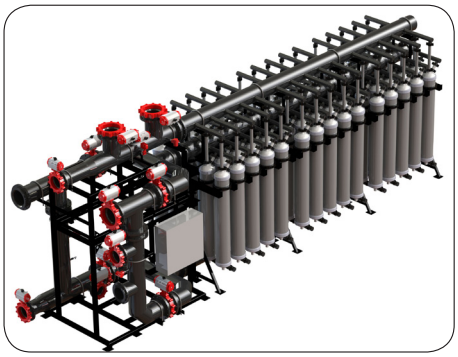
- Fiber ideally suited to meet stringent regulations
- Prevents contaminant breakthrough
- Cost-effective compliance for drinking water treatment

Intelligent Controls

- Reduced chemical usage
- Reduced energy cost
- Minimized operator involvement
- Efficient handling of feed water quality upsets

Robust Fiber

- Robust PES fibers
- Reduced fiber breakage
- Wide range of pH cleaning—1.5 to 13



TARGA II System

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