

# Mobile Wastewater Treatment Technology for Midsize Contingency Base

The NDCEE is demonstrating an energy efficient, mobile wastewater treatment technology that reduces the environmental footprint of contingency bases while complying with applicable environmental regulations.

## Problem Statement

There is a critical need to provide soldiers with a healthy and sanitary place to live, while protecting the local environment when establishing, operating, and closing base camps as part of contingency operations. For example, improperly managed wastewater poses health risks to soldiers and the surrounding communities, as pollutants can be released to surface and ground water. In addition, the Army needs to reduce the logistical footprint of wastewater treatment while achieving required environmental compliance.

## Technology Description

The selected mobile waste water treatment technology, AX-Mobile by Orenco Systems, Inc., is capable of supporting a contingency base of 100 to 200 soldiers, depending on the model. The units can be used in series to treat even larger base sizes. The treatment technology is a multi-stage unit incorporated into two 20' ISO containers (5,000 gallons per day) or two 40' ISO containers (10,000 gallons per day) for convenient transportation. Solids are settled in the primary tank which includes an aeration unit. The secondary container is a multiple-pass, packed bed, textile media filter expected to treat wastewater to a level that exceeds secondary treatment standards. The textile media has a large surface area and void volume for free flow of oxygen. The biological film that develops on the filter media reduces the biochemical oxygen demand (BOD) and total suspended solids (TSS) in the wastewater. In addition, the secondary treatment unit also includes an ultraviolet component for eliminating pathogens in the treated wastewater.

The unit also includes a wireless cellular telemetry which is capable of providing performance information, notifying the user of alarms, and providing remote operation. The unit can be powered by a tactical combat diesel generator. The distinguishing features of the unit are its low energy consumption, low operation and maintenance costs, and ability to treat fluctuating flows and shock loads. The technology vendor also claims the unit has the capability to treat wastewater containing limited amounts of blue water from portable toilets used at contingency bases. This blue water contains biocides such as formaldehyde that interfere with wastewater treatment processes.

## Environmental, Safety, Occupational Health, and Energy (ESOHE) Benefits

- Can reduce BOD, TSS, and fecal coliform going into existing open lagoons at contingency bases
- Has lower energy requirements than similar treatment systems

## Demonstration

The NDCEE is demonstrating the mobile treatment technology at Fort Leonard Wood (FLW), MO, by treating wastewater generated on the installation and destined for the FLW Wastewater Treatment Facility. The FLW demonstration was designed to allow the NDCEE to evaluate the technology over seasonal weather conditions. Treated wastewater is then discharged back to the FLW Wastewater Treatment Facility.



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The demonstration was initiated on February 27, 2012, and is expected to continue for three months during which samples will be collected and analyzed for BOD, TSS, and fecal coliform. The technology will be subjected to various scenarios: low flows, high flows, and addition of blue water to determine its effect on wastewater treatment performance. The demonstration will also track the energy consumption of the unit. Preliminary effluent sampling data indicate the effluent BOD and TSS are below 20 mg/L and are meeting environmental compliance requirements.

## Technology Benefits

- Start-up and decommissioning requirements are minimal and achievable in approximately one day with two people.
- Technology can achieve regulatory standards in approximately three days, producing odorless effluent with less than 30 mg/L of both BOD (5-day) and TSS.
- Effluent from the system can be used for above-grade irrigation or dust control based on local regulatory requirements.
- Power requirements are approximately 10 kW, which can be provided by a portable generator, direct electrical connection, or solar panels.

## Technology Limitations

- Treatment capacity of the model that is currently being demonstrated is limited to flows associated with 100 soldiers; but results can be scaled up to the larger model for a 200-soldier contingency base, or several units in series for even larger bases.
- Treatment performance varies during colder winter periods

## Technology Transition Opportunities

The wastewater treatment technology could also be used in emergency disaster relief camps where mobile wastewater treatment is required.

## Points of Contact

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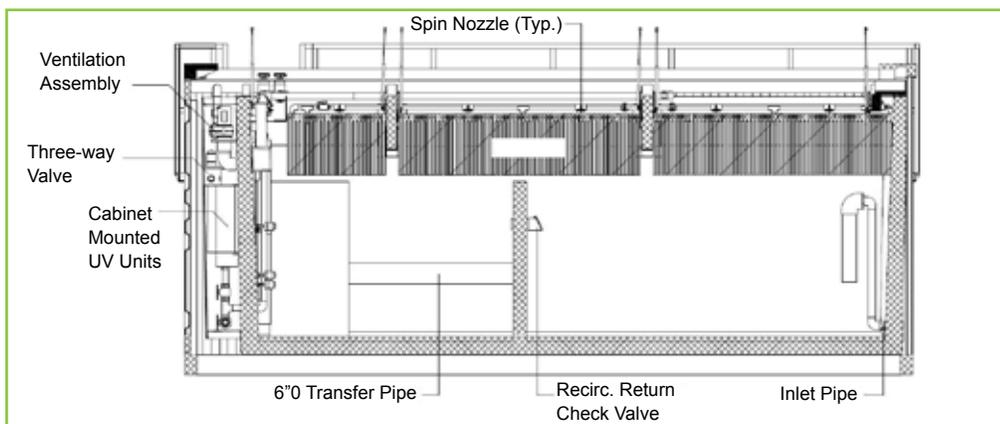


Diagram of secondary treatment unit with textile filters



Secondary treatment unit with open access to textile filters



Control panel for wastewater technology



Ultraviolet disinfection unit



Transportation of technology to demonstration site