

Water-On-Wheels (WOW) Emergency Water Treatment System Cart

James Goodrich | U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency's (EPA) Homeland Security Research Program partnered with WaterStep, a NGO, to develop and deploy a mobile emergency water treatment system utilizing a Federal Technology Transfer Act Cooperative Research and Development Agreement (CRADA). The purpose of this study was to design, build, evaluate, and deploy a mobile emergency water treatment system capable of treating a wide variety of contaminated water following a natural or man-made disaster. Most emergency water treatment systems are very large and expensive tractor-trailer mounted systems. They can be complicated to operate and maintain (very high pressures and concentrated wastes) given their use of reverse osmosis water treatment technology. Therefore, an emergency water treatment system must be designed and built so the treatment train can be configured on-site to treat a broad spectrum of contaminants without utilizing other unnecessary and costly unit processes and without producing large amounts of contaminated wastes. The system must also be easy to operate by quickly trained first responders. The system integrated two washable pre-filters with additional media filtration (e.g., granular activated carbon) and on-site chlorine gas generation with options for UV LED and/or ultrafiltration membranes, which are all stored and transported on a wheeled, powder-coated steel frame about the size of a shopping cart. This WOW Cart also has (1) multiple power supply options that can be operated from the electrical grid (110v AC), (2) a dual-fuel generator, or (3) peripherals with a 12v DC deep cell marine battery (with solar recharge). There are also additional electrical outlets and USB ports for phones, computers, etc. The WOW Cart can also produce liquid bleach for sanitation purposes. Portions of the WOW Cart were quickly deployed in Puerto Rico following Hurricane Maria. Within weeks, nearly all 78 Provinces were equipped with the water treatment systems providing water to tens of thousands of people. Challenges at the USEPA Water Security Test Bed and the Test & Evaluation Facility successfully treated secondary wastewater, water contaminated with *Bacillus globigii* (an anthrax surrogate), and a surface water simultaneously contaminated with *E. coli* and diesel fuel. The WOW Cart can be fabricated for about \$20,000.