UV Disinfection
in the Developing World

By Dan Shaver

UV systems provide clean, safe water for Rwandan communities

Clean water is essential for life. Nearly one billion people around the world lack access to safe water, and approximately 3.5 million deaths each year are linked to water-related diseases. The scarcity of clean water is most apparent in developing countries, where limited resources are available for water treatment.

In Rwanda, the traditional method of purifying water is to boil it using firewood; however, this method is time consuming and impractical for those who do not have access to or cannot afford firewood. Limited access to clean drinking water has led to disease and poor quality of life for the local residents utilizing the source water. Providing small communities with clean water has been a challenge.

Left: Local welders put finishing touches on a filter body.
Right: A meter in the treatment system measures UV transmittance to ensure proper disinfection.

Community-Sized Systems

With the ongoing concern about water quality in developing countries, Manna Energy has stepped forward to implement community-scale water treatment systems in rural areas of Rwanda.

Since 2003, the Manna team has been working to install sustainable water treatment systems to supply clean water to schools, hospitals and other public places. The source water is filtered to remove sediment and other particles before being treated by solar-powered ultraviolet (UV) disinfection systems. As part of the treatment systems, Manna selected Real Tech Inc.'s Real UVT field meter to measure the UV transmittance (UVT) of the water for proper operation of the UV reactors.

Having a reliable field instrument to measure UVT allows volunteers to make adjustments onsite when necessary. A UVT value less than 90% would indicate that a decrease in flow rate is required. This is triggered automatically by the water treatment system to ensure that the water is being properly treated by the UV light. Ensuring proper disinfection gives the team confidence that it is producing the cleanest water possible for local residents.

With plans to reach other communities in Rwanda, the Manna team also is using the field meter for site assessments to ensure that they are properly sizing future UV disinfection systems. Measuring the UVT at various sites in Rwanda gives the engineers the data to design a water system that will ensure proper disinfection.

Clean Water for the Future

Manna has provided an immediate solution to the lack of clean water in Rwanda. It also has taken further steps to ensure the long-term sustainability and operation of the systems through Carbon Emission Reduction credits gained by reducing the amount of wood-burning emissions.

By properly sizing and operating the UV reactors with the field meter, Manna is able to ensure that they are producing the cleanest water possible for the safety of local community members. Manna has installed a number of these treatment systems in rural Rwanda, providing thousands of local residents with clean, safe drinking water.

Staff in the field continue to use the UVT meter to assess conditions for future installations, with plans to install the Real UVT Online monitor in the coming months. The unit is earmarked for a water treatment system being installed in Mugonero, Rwanda. It will be part of a unit treating surface water for 3,000 people. *wqp*

References:

1. UNICEF/WHO. 2008. Progress on Drinking Water and Sanitation: Special Focus on Sanitation.

2. World Health Organization. 2008. Safer Water, Better Health: Costs, benefits, and sustainability of interventions to protect and promote health.

Dan Shaver is vice president, sales, for Real Tech Inc. Shaver can be reached at dan@realtech.ca or 905.665.6888.

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