

Water in the spotlight

JENNIFER MULLER gives an insight into innovative products and applications for municipal water recycling and reducing the environmental impact of wastewater disinfection.

Innovation, inspired ideas and cutting edge technology have all helped businesses thrive and attain reputable status. Truly great ideas not only change the way we work, but the best thinking also changes the way we live. In most cases, ideas that change our world are initially responses to the biggest problems at the time. Today, the pressing issues of environmental protection and sustainability are two key driving forces behind innovation in many major industries.

Water scarcity is set to dominate the sustainability agenda in the 21st century. Population growth, climate change and increasing demand for water mean we have to do more with less. Urban areas are especially vulnerable and recent trends in rainwater harvesting and water reuse will become mainstream. As municipalities face the pressing issue of water scarcity, Trojan Technologies has led the way providing solutions using environmentally responsible, cost-effective ultraviolet (UV) light for water recycling and disinfection applications.

Water sources we rely upon every day are becoming increasingly impacted by natural and man-made contaminants such as pesticides, fuel additives, volatile organic compounds and nitrosamines. UV light alone, or in conjunction with hydrogen peroxide, can safely destroy these biological chemical contaminants in water, helping to restore its natural condition and making the water safe for reuse or for release back to the environment.

Wastewater treatment plants have traditionally used chlorine gas or liquid bleach to disinfect treated sewage before discharge into rivers and streams. Chlorine, while an effective disinfectant, is a toxic, hazardous chemical that can be deadly in the event of a leak or spill. The chlorination process can also create carcinogenic byproducts harmful to the environment and aquatic life. Today, large US cities including Atlanta, Birmingham, Hono-

lulu, and Las Vegas have adopted environmentally friendly Trojan UV disinfection for their wastewater treatment plants.

Climate change, growing populations and the resulting water stress are driving forces for wastewater reuse in arid states such as Florida, Arizona and California. A water reuse plan that augments fresh water supplies, either directly or indirectly, is a viable option for municipalities of any size or location. Recycled and disinfected water is commonly used for irrigation of golf courses, landscapes and commercial properties. Demands on the city's drinking water supplies are also reduced when recycled water is used for cooling, firewater, service and other processes.

The Orange County Groundwater Replenishment System in California is the world's largest Indirect Potable Reuse (IPR) system

larger carbon footprint due to transportation of chemicals to the treatment plant. Similarly, Trojan Technologies performed a Life Cycle Assessment on various disinfection processes to determine the overall environmental impact of UV and chlorine. It was shown that UV had the least environmental impact in all categories (e.g. global warming potential, human health effects, ecotoxicity, ozone depletion, etc.). As sources of electricity become more renewable, UV's overall impact on the environment will continue to decrease.

Reuse of wastewater, now recognized as an ecological and economic necessity, is increasingly practiced not only in the United States, but globally in water scarce regions such as Australia, Spain and Italy. For over two decades ultraviolet radiation has been successfully used to disinfect reuse water in a

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– capable of recycling 100 million gallons of wastewater per day. The finished water, treated with a TrojanUVPhox UV-oxidation system, is used to recharge groundwater aquifers and prevent seawater intrusion. The Orange County facility is an award-winning example of how advanced treatment can cost-effectively convert wastewater back to a quality that exceeds drinking water standards. Some insist on calling it ‘toilet to tap’ – I call it socially responsible engineering in challenging times.

The City of Palo Alto, California conducted a detailed carbon footprint analysis concluding that chlorine disinfection has a

cost-effective manner. UV is a non-chemical disinfection technology that protects the public against pathogenic micro-organisms including protozoa, bacteria and viruses. In comparison to chemical disinfection, UV does not produce harmful by-products, is non-toxic to the environment and has the lowest environmental impact making it truly a ‘green’ solution. ■

Jennifer Muller is a professional engineer and expert in the field of water and wastewater UV disinfection. As Municipal UV Marketing Director for Trojan Technologies, she commercializes technology and product innovations to help municipalities install sustainable and cost-effective water treatment solutions.