UV Has Made Steady Progress in Displacing Chlorine: Trojan UV President

Trojan Technologies has been in the news for winning the 2009 Stockholm Industry Award last month. The company has "contributed to a viable competitive industry in the area of ultraviolet technologies, leading to the development of a full range of industrial technologies in both specialised and general applications," noted the Stockholm Industry Water Award nominating committee in its citation. "Their work with other members of the UV industry has advanced world-wide regulatory acceptance, overcome many limitations of existing technologies, and provided a new means of protecting public health and developing new sources of water supply," it said. Here, the company's President Marvin DeVries speaks to Sahana Singh, Editor of Asian Water about Trojan's journey as well as the growth of the UV disinfection industry.

AW: Congratulation for winning the prestigious Stockholm award. What were the barriers to applying UV disinfection for water treatment when it was first started and how has that changed?

MDV: Thank you. In wastewater applications, we have made steady progress in displacing the use of chlorine in favour of using UV. In the beginning, the barriers to adoption were mostly the general resistance to change away from a proven method of treatment to a newer method. In some cases, the initial cost of switching over versus maintaining the status quo was also a barrier. These barriers are being overcome as more communities see the benefit of using a safe, reliable, cost-effective, non-chemical means of disinfection.

In water disinfection applications, the steady increase in the adoption of UV for disinfection has stemmed from the growing recognition that chlorine is not effective in addressing the full range of pathogens which may be present in surface water sources, coupled with the recognition that UV is very effective in addressing many of the pathogens that are quite resistant to chlorine. In most instances where UV has been applied to drinking water disinfection, it is applied as part of a multi-barrier disinfection strategy, one which uses both UV and chlorination.

AW: Would you like to recount the role Trojan Technologies has played in pioneering UV technologies?

MDV: From its very inception, Trojan has maintained a strong commitment to applied research and new product development. This has led to many of the innovations in the UV industry which have helped to make UV practical, user-friendly, cost-effective and scaleable - so that it can be used in a broad range of applications. Trojan has also been engaged in actively promoting the use of UV technology, by collaborating with academic institutions around the world in their various research programmes into the application of UV in addressing issues of local concern.

AW: How important are partnerships for the progress of a new technology? Can you give some examples from your own experience?

MDV: Partnerships are a key component of Trojan's product development efforts. We actively collaborate with leading companies in the UV lighting and power supply sectors to co-develop new core technologies which enable us to introduce newer, more efficient and cost-effective UV systems. In addition, ongoing partnerships and relationships with universities and various research organisations to investigate new technology and create innovation are a key part of Trojan's development as a leading water treatment solutions provider.

To give one specific example, for more than 15 years, Trojan has maintained a strategic partnership with Nedap, a leading provider of

About Trojan Technologies
Trojan Technologies (www.trojanuv.com) is a wholly-owned subsidiary of Danaher Corporation of Washington, D.C. Trojan designs, manufactures and sells UV systems for municipal wastewater and drinking water facilities, as well as for the industrial, commercial and residential markets. The company also provides UV treatment for the removal of certain chemicals from water. With over 5800 municipal facilities in more than 80 countries using its technology, Trojan has the largest installed base of UV systems in the world. Headquartered in London, Ontario, Canada, the company has offices in the U.K., Germany, China, France, Italy, Spain, and the U.S.

advanced electronic power supplies. Through this partnership, Trojan has been able to introduce the use of highly efficient and reliable power supplies for all of our major product lines. The benefits to Trojan customers of using these power supplies include high electrical efficiency, the ability to provide a UV dose that is precisely matched to the dynamic demands of the water quality being treated, and very compact space requirements.

AW: How do you think CFD modelling has helped the UV disinfection industry?
MDV: CFD modelling has helped the UV industry by enabling the prediction of UV system performance in full scale systems. While CFD modelling capabilities within the UV industry have improved significantly over the past few years, however, there is still a requirement to properly validate the actual performance of full-scale systems through bioassay-based testing.

AW: Do you agree that LEDs will be the new UV light sources of the future?
MDV: I think that remains to be seen. There is still a four or five orders of magnitude difference in the price-performance of UV LEDs versus conventional UV lights, and while we certainly expect that gap to narrow over the coming years, we believe it may be difficult for UV LEDs to achieve the overall price competitiveness with more conventional UV light sources, in spite of their potentially higher operating efficiency.

AW: In what ways are UV disinfection systems reducing their environmental footprint?

Creating wetlands with UV

In the Mt. View Sanitary District 1, Martinez, California, an enterprising wastewater treatment plant operator elected to recycle wastewater instead of building a pipeline to pump the waste into the ocean. As chlorinated water damages the ecology, he removed chlorination from the wastewater treatment plant, installed Trojan UV, and created a wetland on a piece of industrial wasteland (a contaminated site), which served as the discharge reservoir. The 135 acres of previously unusable land are now a beautiful marsh. "Biologists have identified in the marsh 123 species of birds, 69 species of plants, 26 species of mammals and 34 species of aquatic invertebrates. At least 13 species of birds find the marshes suitable for nesting."

Water that would have been "wasted" to the ocean is now available locally, and stays in the environment from which it was extracted. The district has received numerous awards for its environmental approach.

MDV: First of all, I should point out that various studies have shown that the environmental footprint of UV compared to other forms of disinfection can be substantially smaller, given the substantial environmental footprint of chlorine contact basins, as well as the energy requirements to produce chlorine. Secondly, UV disinfection systems are further reducing their environmental footprint through continued advances in UV system overall efficiency, advanced lamp cleaning systems, and reductions in the material inputs in larger scale UV systems relative to their treatment capacity.

AW: While the main markets for UV disinfection are in Europe and North America, how do you see the growth in Asian markets? Is the growth more in wastewater treatment?

MDV: In the near term, we believe the growth in Asian markets is likely to take place primarily in the wastewater treatment market segment. It is however, worth noting that China has already installed and will soon be operating its first large scale Trojan UV system for municipal drinking water disinfection, and plans are underway to apply the technology in other drinking water treatment facilities in China as well.

AW: What are the prospects for combining UV disinfection with other technologies such as ozonation and hydrogen peroxide? Where can these be applied?

MDV: The use of UV technology in combination with hydrogen peroxide has been demonstrated to be a very effective way to treat a variety of micro-pollutants in our drinking water supplies, or in cases where wastewater is to be purified to achieve drinking water quality.

Trojan has installed large-scale UV oxidation systems in numerous high profile projects around the world, including sites in Orange County, California, in Brisbane, Australia, in Aurora, Colorado, USA, and in PWN - a major Water Board in the Netherlands.

All is well that ends well

In Waterloo, Ontario, Canada, three wells providing water for the city were decommissioned when it was discovered that they were contaminated with an industrial chemical. Decommissioning of the wells led to water shortage and also caused the water table to rise, resulting in flooded basements. Installation of UV-oxidation on these wells allowed them to be brought back online. Basements are no longer flooded, the city is no longer short of water, the cost of the remediation is very manageable, and, most importantly, the water is safe.