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Upcoming Issue Themes

Issue #5/2001 – Small UV Systems
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Your Editors are soliciting articles and advertisements for these topics. Please contact either Rip Rice or Jim Bolton (see below) with (a) intentions to submit, (b) contributions, or (c) special advertisements (item “c” to Rip Rice).


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Dear Friends:

As the gavel (made of beautiful Waterford crystal) was passed to me in June at the 1st IUVA Congress by our first president and my dear friend and colleague, Jim Malley, I was thrilled to be taking over as the second international president of IUVA. When we began our organization back in April 1999, I had no idea whether we would or could survive. I had not been part of a start up organization of this type, and while I was filled with enthusiasm and willing to work hard, I knew it would take more than that. We needed active members that would also take up the mantle and make IUVA a success. In addition to the untiring devotion of Jim Malley, the hard work and dedication of Jim Bolton, our executive director, Kathy lawey, IUVA’s administrative assistant, and Rip Rice, our editor-in-chief of IUVA News, have been invaluable to our growth and success. I am fortunate to have them on board as I begin this new term of office.

Since our inception just over two years ago, we have seen increased interest from all over the world. The decision by the U.S. EPA to include UV disinfection of surface water in the upcoming U.S. drinking water regulations has surely given IUVA a boost, but this is not the only factor. We now have over 400 members from 29 countries. Nearly 300 members and non-members were in attendance at the Congress. Having just completed our very successful first Congress, we already have plans in progress for a regional IUVA conference next year in Singapore, and have established a program committee to organize the 2nd International Congress on UV in 2003 in Europe (destination to be decided, send suggestions). My fears of survival now seem irrelevant. So onward we go!

As did my predecessor in this post, I too, have traveled the globe extensively to speak on behalf of IUVA. I have not kept track of my miles, but I have visited every continent except Antarctica at least three times, to spread the word on UV. While the majority of my work and hence my message is on disinfection, as president, I plan to expand my knowledge and encourage the growth of IUVA in the other areas of UV applications.

The IUVA is about UV, but it is people that make our success. Please feel free to write to me about ideas and suggestions that can make IUVA a better organization. It is your organization and I look forward to serving you as president.

Happy Trails.
Jennifer L. Clancy, Ph.D., President
What a resounding success!! I first want to commend the entire organizing committee for their efforts in making the Congress a huge success, both professionally and financially. When we decided to hold our first IUVA World Congress, I volunteered to act as Congress chair for two reasons: 1) I have considerable experience through AWWA in organizing scientific meetings, and 2) I knew I had excellent volunteers to whom I could delegate most of the work. With e-mail and conference call meetings from time to time, I knew this gang would take the ball and run. And they did. Some special thanks are in order.

To me, the most important job in organizing a successful conference is the technical program. An excellent program will draw attendees and make the meeting a success. Karl Linden, an international vice president and assistant professor at Duke University, was the one who did this for IUVA’s first world congress. At our first organizational meeting on the Congress, Karl volunteered for this role. I enthusiastically said yes, knowing that he had no idea what he had just volunteered for, but that he would rise to the occasion and put together an outstanding program. Karl organized all aspects of the technical program including the workshop just prior to the congress, the invited speakers, and the submitted papers. He worked closely with Kathy Harvey on getting the papers finalized for the CD-ROM. The comments I heard from attendees on the program were all superlative.

Jim Bolton, our Executive Director, was officially in charge of the exhibits but as is his nature, he just can’t stay out of it, and helped me organize all aspects of the Congress. We had excellent exhibits and the exhibitors were very pleased with the Congress organization and ‘traffic’. Jim and I served as ‘floating caretakers’ throughout the congress to be sure that any problems that arose were quickly solved. We seemed to have been successful in this effort. This in part due to the excellent staff at the Hyatt Regency on Capital Hill, who did everything they could to make the Congress run smoothly.

Uday Kelkar of CDM had the onerous job of soliciting sponsorships so that we could cover many of the costs associated with holding the Congress and improve our financial status, which has been an operation on the proverbial shoestring. Uday did a great job pestering and re-pestering potential sponsors and we were able to reach our financial goal due to his persistence and diplomacy.

Kathy Harvey, our administrative assistant, did an outstanding job in getting the Congress together from the overall organizational standpoint. She provided the structure and support for the committee to do its work, from the initial call-for-papers through the final throes of preparing the CD-ROM. Kathy worked closely with the hotel in making all of the arrangements, registered everyone, assisted Karl in aspects of the program development, and followed up on all of the loose ends to insure that it ‘all came together’. And it did. Somehow she managed to do all of this without ever having attended a conference.

The AWWA also played a role in this first IUVA Congress. Many thanks go to April DeBaker of AWWA who helped us from the beginning with all of the behind-the-scenes planning that goes on invisibly but contributes to the overall success. April selected the hotel, arranged housing through AWWA, and helped us in numerous other ways to make the Congress successful.

So from me, a big thank you to everyone involved. It was a great success and now we need to get on with our planning to do it all again in ’03. – More –

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Now about the program. We began with the pre-conference workshop on “The Basics of UV Technology – Everything You Need to Know About UV”. The workshop was sold out before the Congress started, but we had walk-ins before 7:00 am on that morning. We had expected 50, and thought we might get 55 attendees. In fact, we had nearly 80 show up, eager to pay their fees and listen to the usual gang cover everything from UV dose calculation to advanced oxidation and disinfection. We ran out twice to make more workbooks for the class, but finally had to limit attendance due to fire safety regulations based on room capacity. A great way to begin.

The sessions took a slightly different twist than has been seen at past conferences when UV inactivation of microorganisms was presented. There were three sessions on UV inactivation of microorganisms, and attendance was OK, but not overwhelming. The reason for this became apparent after the first day’s session -- we know and accept that UV is an excellent way to control bugs. Paper after paper in the first session discussed the success of controlling everything from Cryptosporidium to viruses. Each author’s results supported those of previous speakers. While some may have felt that this was redundant and wondered why there was so much information being repeated from around the world on the subject, there is another view. It is important in science to repeat the work of others to corroborate initial data and demonstrate that the results are correct and repeatable (remember cold fusion?). In the case of UV inactivation of microorganisms, it is especially crucial, as this is a technology that is to be used in public health protection. Before the public and regulatory bodies can accept this technology, considerable evidence is needed by multiple investigators for confidence. This is a much higher level of certainty than is required for other types data in normal scientific use. If we get this wrong, the consequences are extreme.

So while I initially felt a bit concerned that my field, microbiology, was not getting all the attention, I quickly realized why. Microbiologists in dozens of labs have been working diligently over the past three years to repeat the work on Cryptosporidium and Giardia inactivation and look at other organisms such as microsporidia and emerging viruses. The excitement over UV had stimulated many labs into conducting research on UV inactivation of a variety of organisms. This resulted in a program with three half-days of presentations, all indicating that UV was an answer for controlling many pathogens. This information had been coming out over the past year and so much of it was not brand new. The talks on UV inactivation of microorganisms served to give us all confidence in its efficacy under the various conditions tried in the many labs around the world. This is not to say our job as microbiologists is done, but as a discipline, we have accomplished in a very few years what would normally take much longer to complete — a good working data set on UV disinfection efficacy.

This allows the attention to swing to the area where we now need to focus — application and reliability of UV technology in drinking water. The sessions on practical application of UV for engineering and operations were standing room only. Talks on how to design treatment, how to operate plants, historical data from operating plants in Europe, and how to ensure that the UV is working were where the highest interest was at the Congress. Implementation of UV for water disinfection will be a high priority goal for the foreseeable future. UV will work well for microbial control. Microbiologists all over the world have demonstrated this for a variety of microbes and types of UV lamps. Now we need engineers (I never thought I would say that!) to make it happen. For IUVA, this is our challenge as we move into this new millennium -- let’s make it happen!!

The E-I-C’s Take on IUVA’s First Congress

Your Editor-in-Chief uniquely was a cofounder of both the International Ozone Association and the IUVA. As such, he was in attendance at the First International Congresses of both associations – IOA’s in 1973 and IUVA’s in 2001. And clearly, there were huge differences between the two “firsts”. First and foremost, the IUVA had the huge benefit of having so many interested members help out with the planning and organization of IUVA’s Congress. As Past President Jim Malley and President Jen Clancy have pointed out, without all this volunteerism, we would not have had the success that we did. Bless all helper-outers, and special thanks are due our many exhibitors -- 22 strong.

We had 295 people in attendance from 17 countries, and too many concurrent sessions going on at all times for this one man show to attend everything he wanted to attend. But here are of my observations:

PLENARY SESSION NOTES –

1. Dr. Jim Malley classified UV as a “green technology” – quite appropriate.
2. Dr. Jim Bolton noted the existence of 300-400 (drinking water) plants using UV and hydrogen peroxide, and that in the system peroxide/ozone/UV, the peroxide acts as an enhancer of hydroxyl radical production.
3. Dr. Regina Sommer listed the ca 4000 UV public drinking water installations in Europe, with Germany and Austria having about 1500 each. Many more UV installations are in the private sector and are very difficult to try to count.
UV installations have been growing at the rate of 10% annually; this rate is expected to increase to about 30% annually by 2005.

OTHER NOTES

1. Dr. Willy Masschelein announced at his presentation his upcoming book, *Ultraviolet Light in Water and Wastewater Sanitation* to be published this Fall/Winter by CRC Press, St. Lucie Press, Lewis Publishers (Boca Raton, FL). Details will be available in early September (2001) and will be reported in IUVA News as soon as received.

2. This editor sat in on several papers dealing with UV for Air Treatment and several on UV Curing. These topics were well attended and interest has been expressed in forming two Technical Committees – one on UV for Air Treatment and one on UC Curing. Technical Committees are provided for in IUVA’s Bylaws. Anyone interested in forming such committees, please contact either myself or Dr. Jim Bolton (IUVA’s Executive Director). See the insert on page 3 for contact details.

3. At the General Assembly that followed the last paper (also well-attended – showing the extent of interest in the IUVA), not only was the concept of forming technical committees supported, but also the formation of a Jazz Band. Seems there are a lot of musicians in the IUVA. Jim Malley is a trombone player, Tom Marshall plays drums, Zamir from Israel is one heck of a piano player, Bruce Long plays trumpet, I play tenor sax, etc. We even had a name sanctioned – “The Ultraviolaters”, and are planning some sort of musical entertainment at IUVA Second UV World Congress in Europe in 2003. Stay tuned for details.

4. Also at the General Assembly, many people were nominated to positions on the IUVA Board of Directors. When confirmed by official Board procedures prior to voting, these new Board members will be welcomed officially and the entire IUVA Board of Directors for 2002 will be profiled in a future issue of IUVA News.

5. The Proceedings are available (on CD Rom only) from IUVA Headquarters (see insert on page 3) for $150, plus air mail postage. Kathy Harvey will accept Visa and Master cards.

All in all, a very fine start for our Association!!!
The U.S. Food and Drug Administration announced an amendment of the food additive regulations (21 CFR Part 179) for the safe use of UV light to reduce levels of human pathogens and other microorganisms in juice products. This final rule became effective November 29, 2000. This action was in response to a food additive petition filled by California Day Fresh Foods, Inc submitted in May 1999.

According to section 201(s), a source of radiation is used to process or treat food to affect the characteristics of the food. In the subject of the petition, the intended technical effect was a change in the microbial load of human pathogens in juice products. Processors subject to the performance standard (i.e. a five-log pathogen reduction) still must validate their system to show they achieve desired the standard.

BACKGROUND

Several outbreaks of E. coli O157 in juice across the USA and Canada caused FDA to propose regulations requiring the processing of apple cider and other fruit juices prior to consumption. Until now, the only suitable processing technique available has been thermal pasteurization. Heat-pasteurized juices experience substantial changes in flavor and nutritional content. In response to processing limitations of heat treatments, UV light treatment was recommended. Preliminary evidence suggests that UV treatment conserves more of a juice's fresh attributes.

Ultraviolet light (UV) is the term given to that portion of the electromagnetic spectrum, which lies between visible light and X-rays in the region between 100 and 380nm. UV wavelengths in the vicinity of 280 nm are the most effective for inactivating microorganisms and are referred as "germicidal". Germicidal UV wavelengths are capable of inducing widespread damage in cells including DNA because they coincide closely to the peak of DNA absorptivity.

Two competing mechanisms occur when a microbial cell is irradiated with UV. On the one hand, there are the forces of destruction, which manifest themselves by the formation of the photo-products at a rate depending on the intensity of irradiation. On the other hand, there are the forces of restoration, the repair mechanisms of cell, operating at rates determined by a number of external and internal parameters. If the former exceed the latter, cell inactivation ensues, whereas if the reverse happens the microorganism survives.

There are a number of commercially produced sources which emit energy in the UV-range. These include mercury vapor, metal halide, antimony and xenon sources. Low-pressure mercury sources provide a high efficiency in inactivating cells and a number of other advantages. They emit most of their UV-energy at 253.7 nm, they are relatively cheap, they have reasonably long service (thousands of hours) and they can run at the low surface temperature of 60°C.

UV FOR FOOD TREATMENT

UV systems are widely used for water disinfection. Worldwide, the brewing industry is a huge user of UV water treatment as a non-chemical system. Other studies have demonstrated that UV light can be used to reduce levels of certain pathogens on pork skin and meat surfaces. There is an interest in and considerable promise of UV light to reduce levels of microbial contamination for a quite wide range of liquid foods and beverages. The example of the successful UV treatments is a combination with temperature process for orange juice. It was claimed by the authors that the level of vitamin C was not significantly reduced.

UV absorption effects of liquids are defined by the Beer-Lambert Law by incorporating an absorption coefficient. The presence of colored compounds in an aqueous medium, organic solutes or suspended matters lead to UV attenuation effects which are dependent on the concentration of the chemical species. For liquid food products, absorptivity can be relatively high; that means that the effective treatment requires alternative approaches to those normally employed for water. The two strategies are to perform the treatment: in the very thin liquid films or to increase turbulence in the device to bring all liquid elements into close proximity to the UV sources for a time sufficient to deliver the necessary UV-dose. The key to the successful treatment is to ensure that all surfaces receive sufficient irradiation to achieve the desired reduction in cell viability. Therefore, FDA is not specifying a minimum or
maximum dose by regulation, but concludes that this should be achieved for individual usage situations in a manner consistent with Good Manufacturing Practice (GMP). The expectations are that the maximum dose applied to the juice will be economically self-limiting due to the costs associated with UV irradiation.

**UV-FOOD RESEARCH AT NCFST**

A research project at the National Food Safety Center and Technology (NCFST), in partnership with FDA, Aquionics Inc, and California Day-Fresh Foods Inc. is currently investigating the efficacy of UV light to deliver 5-log cycle reduction of *E. coli* in apple cider. The team of NCSFT/IIT (Illinois Institute of Technology) Dr. Charles Sizer, Director, Dr. Tatiana Koutchma, Assistant Research Professor, and NCSFT/FDA scientists Dr. Edgar Murakammi, Dr. Lauren Jackson and Dr. Susan Keller will address the regulatory safety and quality aspects for commercial application of UV devices by small and medium sized producers.

After study of *E. coli* inactivation in the static UV reactor and absorptive properties of apple cider, field-testing was performed in a typical cider mill production setting in Placerville, CA in July 2000. The treatment of fresh apple cider in the thin film of the continuous-flow system showed the effectiveness of UV light to achieve regulatory requirements. In the coming year, two types of continuous-flow processings are planned to compare: very thin film treatment vs treatment in high turbulent flow. The UV unit donated to the Center by Aquionics Inc. will be used to test turbulent conditions of apple cider irradiation.

Another question that must be answered is the accurate estimation of UV dose delivered to the product. The dose calculations, based on the destruction of biological and chemical actinometers, will be compared with the measurements made by an ultraviolet sensor. The guidelines for commercial applications will be a deliverable from this project.

Finally, it should be noted that with the growing public reaction against chemicals in foods, the application of UV holds considerable promise as a purely physical treatment. FDA concluded the use if UV irradiation is safe. Moreover, UV irradiation has a positive consumer image.

Keith Carns, Oluf Hoyer and Karl Linden were elected International Vice Presidents. Uday Kelkar was elected International Treasurer. Jim Bolton was reappointed IWA’s Executive Director. Rip Rice was reappointed Editor of IUVA News.

A List of Attendees to the Congress was developed by Kathy Harvey — available on IUVA’s Web Page (www.IUVA.org).

A proposal has been received from a group in Singapore to host a **regional IUVA Conference in Singapore in August 2002**. The Organizing Committee was empowered to proceed with evaluating and organizing this meeting. A decision will be made at the next Board meeting this Fall.

Proposals for the **Second International Congress on Ultraviolet Technologies in Europe in 2003** will be coordinated by Regina Sommer and reported at the next IUVA Board meeting.

A **Regional Workshop Committee** was established to develop a series on UV technologies to be held in strategic geographic locations. Bruce Macler is Chairman of this new committee.

A **Committee on UV Practice** was established, to be chaired by Karl Linden. Proposed initiatives include development of specific “Technical Memoranda”, such as UV Technologies, Bench Scale Testing, Data on Microbial Effectiveness, How UV Fits in to UV Curing and Other Application Areas, etc.

A **Who's Who in IUVA** will be developed by Jim Bolton and Kathy Harvey.

A **Student Activities Committee** was established to be co-chaired by Jim Malley and Susan Andrews. Some initiatives include student sessions at future conferences and Congresses, paper competitions, travel assistance for students, etc.

The feasibility of beginning a quarterly **On-Line UV technical journal** is being investigated — by Jim Malley.

The Board recommended that IUVA work closely with AWWA and WEF to develop a **White Paper on Mercury Issues**. Jen Clancy will coordinate this effort.

A **Topical Group on UV Disinfection in Air** is being formed. Those interested please contact Jim Bolton or Rip Rice (see insert on p. 3 for contact details).

The **next Board meeting** will be held in Atlanta, GA on Sunday morning 14 October 2001, just prior to the WEFTEC meeting. A parallel Board meeting will be held in Berlin, Germany following the IWA Conference (same week as WEFTEC).

Quite a list of accomplishments and significant beginnings.

---

**Actions of the IUVA Board**

Here are some significant actions of the June 17 2001 International Board meeting held post-Congress in Washington, DC.
VANCOUVER, BRITISH COLUMBIA — Service Systems International Ltd. (OTCBB: SVSY) has made its first inroad into the South American market with an order for its Ultra Guard ultraviolet (UV) disinfection system. The purchase order for delivery was received from USFilter/Wallace and Tiernan, the company's exclusive sales agent offering wastewater disinfection products in North and South America.

SVSY will supply its patented Single Lamp Reactor (SLR) system for a municipality in Chile within the next several months, the company said. The SLR modules will be placed within an existing structure and offer automated flow pacing to suit the varying quality and flow conditions of wastewater. The system is an alternative to the current application of chlorine used to treat wastewater in Chile, according to the company.

Marcelo Mena, who works for TEMAC, USFilter's representative for the project in South America, said that this is an important first step in applying UV disinfection technology in a wastewater application with the country's largest utility owner. "The Chilean WWTP market was traditionally inclined to work with wastewater chlorination, with Wallace and Tiernan products," said Mena. "Recently the use of chlorination in wastewater treatment has been revised. Now, clients can rely on Wallace and Tiernan and TEMAC to give them a solution, regardless of the technology required. We are convinced that our decision to use the Ultra Guard technology is the right one."

Industry analysts and equipment suppliers expect that chlorination will be phased out over time and that UV will replace or supplement a majority of the existing chemical disinfection systems, according to the company.

From WaterTech On Line, July 12, 2001
"This project will bring good, quality water to communities throughout northwestern North Dakota, a critical step toward creating better paying jobs in the region," Gov. John Hoeven said. "This project has been in the works for 15 years and it is gratifying to see it move forward," Hoeven said. "The Bush administration responded to North Dakota's interests, and I appreciate the support."

Construction of the NAWS project should be able to begin this summer with the main transmission pipeline between Lake Sakajawea and the Minot Water Treatment Plant, according to Hoeven. The Bush administration has given the Canadian government a 30-day comment period to look over the plans and voice any concerns or objections before the Interior Department gives its final approval, according to officials with the governor's office.

Local funding for the project will come from water users. When completed, the project will serve approximately 63,000 North Dakotans. The Minot Air Force Base and 15 cities have signed contracts with the State Water Commission to receive water from the project. Rural water systems in the area, which may also receive water, include North Prairie Rural Water Association, All Seasons Water Users, and Upper Souris Water Users.

From WaterTech On Line, June 13, 2001

**New York City May Be Exempt from Filtration Rule – If UV is Used**

NEW YORK, NY -- The US Environmental Protection Agency (EPA) is proposing to relieve New York City of its obligation to complete the final design of a drinking water filtration system for the Catskill/Delaware watershed in upstate New York, as long as the city increases protections of the supply. A filtration avoidance determination (FAD) issued by the EPA in 1997 allows New York City to not filter the drinking water from this system, but does require it to complete a final design for a filtration system that could be used if filtration were deemed necessary in the future.

The federal agency is willing to drop the FAD requirement for a final filtration system design as long as the city completes its preliminary design, sticks to a strict schedule for upgrading sewage treatment plants that empty into the watershed, takes other watershed protection measures, and designs and builds a facility that would disinfect the Catskill/Delaware water using ultraviolet (UV) light. The EPA is seeking public comment on its proposal.

The EPA is currently reviewing the city's overall watershed protection programs under the FAD and assessing whether these and future efforts will be enough to continue to protect the health of more than 9 million people who drink water from the Catskill/Delaware system. The system provides nearly 90 percent of the city's drinking water. Drinking water taken from surface reservoirs must be filtered to remove microbial contaminants, according to the Safe Drinking Water Act (SDWA). But the law allows the EPA to grant a waiver to suppliers if they demonstrate an effective watershed control program and that the water meets strict quality standards. The EPA granted this waiver to New York City four years ago for water coming from the Catskill/Delaware watershed.

In 1992, New York City sought a waiver from the SDWA's filtration requirement for the Catskill/Delaware portion of its system. The EPA granted the waiver and issued an FAD the following year. The FAD was last updated in 1997, when additional requirements were included to protect the water. But in June 2000, the EPA announced New York City may have to build a filtration system in the future because they were not making enough progress with its upstate watershed.
The FAD requires the city to undertake many programs to control pollution before it reaches the water supply, but to also continue the plan for the construction of filtration facilities, should they prove necessary. According to the FAD, New York City could ask the EPA for relief from going ahead with the final design of a filtration plant after it completed the draft preliminary stage, which the New York City Department of Environmental Protection (DEP) did last December.

The EPA believes that design of filtration facilities beyond the preliminary stage may not be necessary because of the agency's review of information provided by the city, as well its commitment to a number of protections and commitments, including the UV light disinfection plant and the upgrade of key sewage treatment plants. However, New York City is required to complete its preliminary design of a filtration system by September. If the city fails to meet the timetable set for the improvements, the final filtration plan design requirement of the FAD would take effect again.

Among many other watershed protection programs, the EPA's FAD required the city to install a high level of treatment, including microfiltration or its equivalent, in all wastewater treatment facilities in the Catskill/Delaware watershed. The EPA said in its mid-course review that these improvements were not being made fast enough.

In its request to the EPA for relief from having to complete the final design stages of a filtration system, the city's DEP said it would upgrade wastewater treatment facilities in the watershed that make up more than 83 percent of the area's wastewater flow by the end of next June. The wastewater treatment plant upgrades would remove waterborne pathogens and greatly reduce phosphorus discharges into local streams. If New York City fails to meet these deadlines, it would result in the FAD requirements to complete the final filtration system design for Catskill/Delaware.

"This approach allows us to continue to ensure that the drinking water provided by the Catskill/Delaware system continues to be safe and clean while providing the city relief on what could be a very expensive venture -- the final design of a filtration system," said EPA Acting Regional Administrator William J. Muszynski. "This will add to the incentive to upgrade the sewage treatment plants as quickly as possible and will also introduce a promising new technology that will give an added measure of protection from microbial contaminants."

Muszynski said the EPA still has the authority to require New York City to filter the water from Catskill/Delaware. The city is required to build a filtration plant for the Croton portion of its drinking water system. The city DEP will also complete a feasibility study on the use of UV light to disinfect Catskill/Delaware water, and will submit its findings to the EPA by 31 December. If the EPA and the state Department of Health approve it, the UV facility's design and construction will proceed.

Copies of the city's request for relief can be obtained from the US Environmental Protection Agency, New York City Watershed Team, 290 Broadway, 28th floor, New York, NY 10007. Its phone number is (212) 637-4012, fax (212) 637-4942 and e-mail address is zambratto.paul@epa.gov. Comments must be postmarked (if by mail) or received (by e-mail or fax) by 27 August. This deadline is an extension of the previous deadline, which was 31 July.

From WaterTech On Line, July 24, 2001
The Orange County Water District (OCWD) was recently awarded a $118,000 grant from the U.S. Environmental Protection Agency (EPA) to conduct research on low-molecular-weight trace organic compounds — or compounds with a very low detection level — commonly found in wastewater environments. This year, the OCWD’s Water Resources and Technology Department will focus on two specific research projects.

Numerous state-of-the-art ultraviolet (UV) technologies will be assessed for their ability to remove low-molecular-weight trace compounds such as methyl tertiary-butyl ether (MTBE). Specific objectives to be addressed include reviewing the quantity of UV exposure needed in the design and operation of future water purification plants. Reverse osmosis (RO) membranes also will be evaluated for their ability to remove similar compounds.

Since the development of the RO membrane, numerous improvements have been made in the design and use of new synthetic membrane materials. The treatment of low-molecular-weight trace compounds by RO membranes is particularly challenging due to their very small size. The ability of RO membranes to remove these compounds will be evaluated using a rapid and inexpensive testing protocol currently in development by OCWD’s Technology Department.

OCWD has a history of research in water quality and health benefits. The OCWD Water Resources and Technology Department conducts basic and applied microbiological research leading to the development of new, more effective technologies to benefit groundwater and supply programs. The Orange County Water District manages a groundwater basin that supplies 75 percent of the water needs of more than 2 million Southern California residents.

From WaterTech On Line June 27, 2001

Quebec's New Drinking Water Regs Good For UV Suppliers

London, Ontario — Trojan Technologies Inc., a Canadian-based company that develops ultraviolet (UV) disinfection systems for water and wastewater, said it welcomed Quebec's announcement of more stringent disinfection standards across the province. These new standards create a framework for the use of UV disinfection to address parasites known to be resistant to chlorine and to achieve a reduction in chemical disinfection byproducts, according to the company.

The regulation, announced on 4 June, requires all municipalities within the province that draw their drinking water from a surface water source to filter and disinfect drinking water supplies before distribution. Approximately 4,500 water systems in the province are subject to this regulation, which supports the reduction of harmful disinfection byproducts caused by traditional chemical treatment methods and puts in place further protection against microorganisms, such as Cryptosporidium and Giardia cysts, which are difficult to treat using traditional chemical disinfection methods.

"We look forward to working with municipalities to help them meet these new regulations," said Marvin DeVries, executive vice president and chief operating officer for Trojan
Technologies. "We expect that, through implementation of the regulation, ultraviolet disinfection will become a more attractive treatment alternative. We believe UV technology will provide an efficient and cost-effective solution to many of the municipalities affected by this regulation in the province of Quebec."

From WaterTech On Line June 7, 2001

UV Coming For Shipboard Effluents

LONDON, UK -- Water and wastewater treatment systems are not only confined to dry land. Today's ships require some sort of system on board to treat generated sewage or effluent generated before it is discharged into seas and oceans, according to market research firm Frost & Sullivan.

Discharge of raw sewage into the sea can create a major health hazard. In more coastal waters this sewage can lead to oxygen depletion and visual pollution, but it has been generally considered that on the high seas, the ocean can naturally assimilate and break down raw sewage through natural bacteriological processes. However, this still doesn't divert from the fact that these discharges can create major problems to the health of the world's oceans and their inhabitants, said Matthew Barker, an industry analyst with Frost & Sullivan's Water Group in Europe.

In terms of the laws governing discharge of sewage, by international agreement, the world's commercial and military ships will have to comply with new, more stringent discharge requirements within the first decade of the 21st century (English translation -- by 2010). These international requirements will affect every new and existing naval ship, commercial vessel, and private yacht. The marine marketplace is demanding new...
products and equipment that will provide: safe and compliant wastewater discharge into coastal waters; treatment cost reductions; and space savings for other critical cargo and equipment.

The most important convention regulating and preventing marine pollution by ships is the International Maritime Organization (IMO) International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978. In addition to pollution by sewage, it covers accidental and operational oil pollution as well as pollution by chemicals, goods in packaged form, trash and air pollution.

It is generally considered that on the high seas, the oceans are capable of assimilating and dealing with raw sewage through natural bacterial action and therefore the regulations prohibit ships from discharging sewage within four miles of the nearest land, unless they have in operation an approved treatment plant. Between 4 and 12 miles from land, sewage must be collected and disinfected before discharge.

Governments are required to ensure the provision of adequate reception facilities at ports and terminals for the reception of sewage. The annex, which is currently optional, will enter into force after being accepted by 15 EU Member States where merchant fleets represent 50 percent of world tonnage. It has not yet entered into force. When it does come into force, the annex will apply to new ships (built after the date of entry into force of the annex) of 200 gross tons and above or carrying more than 10 people. It will also apply to existing ships (built before the date of entry into force of the annex).

Although the annex has not come into force yet, many countries have imposed regulations that are in line with its requirements, on ships visiting their coastlines to avoid the damage to health and amenities from the discharge of sewage. In practice, evidence suggests that all cruise ships and large passenger ships already have sewage treatment plants on board, so that ships are not seen as a major source of sewage pollution.

A revised Annex IV requires ships to be equipped with an approved sewage system of one of three types: a sewage treatment plant; a sewage collecting and disinfecting system for the temporary storage of sewage when the ship is less than three nautical miles from the nearest land; a holding tank for the retention of all sewage, having regard to the operation of the ship, the number of people on board and other relevant factors. Typical product types that are becoming increasingly popular for the treatment of sewage generated onboard include: reverse osmosis; evaporators; chlorine dosing; demineralization; ultraviolet disinfection; and protective filters.

The size of the equipment that is being installed ranges from small residential-sized equipment to a similar size as is being installed into the world’s water and wastewater treatment plants. Essentially, the equipment performs the same function as it would in a land-based application and so with only minor modifications any OEM involved in water and wastewater treatment could leverage its skills and target its products at this market.

For more information on the report and the company’s predictions, go to Frost and Sullivan’s Web site.

From WaterTech On-Line, June 20, 2001
Calgon Carbon Awarded $9.4 Million Contract for Unique ISEP+(TM) and RAYOX (R) Systems

PITTSBURGH, July 30 /PRNewswire/ -- Calgon Carbon Corporation (NYSE: CCC) announced today that it has been awarded a $9.4-million contract from a water utility in Southern California to design and provide its unique ISEP+(TM) and Rayox (R) Ultraviolet/Oxidation systems for the removal and onsite destruction of perchlorate, N-Nitrosodimethylamine (NDMA), and 1,4-dioxane from groundwater. Calgon Carbon's state-of-the-art systems are the only ones approved by the California Department of Health Services for the removal and destruction of Perchlorate and NDMA.

The project is scheduled for completion by June 1, 2002. The systems will purify up to 11 million gallons of water per day and help to provide pure drinking water for several communities in Southern California. Commenting on the contract, Robert P. O'Brien, senior vice president of Calgon Carbon, said, "This is the second contract we have received for the removal of perchlorate, NDMA, and 1,4-dioxane from groundwater in Southern California. We are pleased that another water utility has chosen Calgon Carbon's leading-edge technology to purify its drinking water. We look forward to applying our technology at other sites in Southern California that contain perchlorate and NDMA."

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UV Disinfection Protects Tomatoes from Disease

To protect tomato plants from fungal disease, Hanovia Limited has installed four UV water disinfection systems at Horticulture Research International's (HRI's) research center in Hampshire, England. The systems will disinfect recirculating irrigation water used for experimental hydroponics crops. HRI is the leading horticultural research and development organization in the United Kingdom. Employing over 450 scientists over five sites, HRI provides both core research and applied development throughout the UK and Internationally.

The UV units are being used in a project funded by the European Union (Project Acronym: MIOPRODIS) investigating natural disease suppression in greenhouse plants, looking especially at the spread of fungal diseases through recirculating (recycled and reused) irrigation water. UV is being tested alongside alternative water treatment techniques such as slow sand filtration; the results are expected in November of this year. However Dr Tim Pettitt, plant pathology project leader, has already been impressed by the performance of the UV system: "There's no doubt that UV does work for disinfecting irrigation water," he said. "Last year the UV treatment controlled the spread of phytophthora, a fungal root disease."

The impact of these diseases on the roots of plants can be devastating," he continued, "and UV is very effective at killing fungal propagules (part of a fungus capable of growing into a viable organism) in recirculated irrigation water."

The experimental work being done at HRI is assessing the effect of UV and other effective disease control systems like slow sand filtration on the natural populations of disease-suppressive microbes in recirculated irrigation water. Nothing is wasted in the experiment; tomatoes are produced on a commercial scale and marketed to the retail industry.

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Issue date: July 2001

UV Disinfects Boiler Feedwater

Hanovia has installed a Photon water disinfection system in the power station boiler water treatment plant of Slough Heat and Power (SH&P) Limited. The UV system will destroy any microbiological contamination in boiler feedwater for the utility provider. SH&P is based on the Slough Trading Estate in Berkshire, one of Europe's largest trading estates. A wholly owned subsidiary of Slough Estates plc, SH&P supplies electricity, water, steam and district heating on the estate.
The boiler feedwater is abstracted from local boreholes, chlorinated at source and treated with UV before delivery to the RO (reverse osmosis) plant. The RO permeate is then polished with a demineralization unit before use as boiler water. Handling 40 m³/h, the UV system ensures the water is free from microbiological contamination before it passes through the RO plant, which is very vulnerable to biological fouling, as is the demineralization unit.

Photon UV series controls provide an interactive microprocessor-driven controlled system for optimum ease of operation and traceability. Screen displays include UV dose in mJ/cm², UV intensity in mW/cm² or percentage, hours run, water flow rate and temperature. The Hanovia UV monitor is sensitive only to germicidal wavelengths and is immersed directly in the water to avoid problems of condensation on windows. Within the treatment line, the complete UV system represents a belt-and-braces approach to water purification for the boiler feedwater.

Founded in 1920, Slough Trading Estate was the UK's first business park. Throughout its history the estate has been owned, developed and managed by Slough Estates plc. SH&P has provided utility services on the estate for over 75 years. The largest business park in Europe under single company ownership, it covers some 200 hectares and includes a total of just over 700,000 sq. m. of business premises occupied by over 450 companies and employing over 20,000 people.

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Santa Monica (California) Uses UV to Recycle Stormwater Overflows

In the early 1980s, when Santa Monica, California (USA), residents began complaining about pollution of the Santa Monica Bay, local officials knew they had to act. After all, the community's beach with its world-renowned pier draws more than 2 million visitors each year.

In response to residents' continuing concerns about the pollution and studies on the health impacts of swimming near flowing storm drains, Santa Monica and Los Angeles signed an agreement to jointly fund a recycling plant to address urban runoff pollution. "In the final analysis, the only way to truly improve water quality in this region is through multi-jurisdictional coordination," says Maribel Marin, president pro tempore of the Los Angeles Board of Public Works.

In 1996, a feasibility study concluded that the stormwater flows could be treated and reused for irrigation in the area surrounding the proposed plant site. The city retained Greenwood Village, CO-based CH2M Hill, along with Newport Beach, CA-based Boyle Engineering; Miralles Associates, an architectural firm based in Altadena, CA; and local artist Richard Turner to design the Santa Monica Urban Runoff Recycling Facility (SMURRF). As part of the project, the design team reviewed many existing reports showing a number of contaminants in the city's urban runoff, including:

- suspended solids;
- oil and grease;
- trash and other debris;
- pathogens;
- heavy metals (lead, copper, zinc and chromium);
- nutrients; and
- organics (polynuclear aromatic hydrocarbons from soot, phthalates from plastics, pesticides, and polychlorinated biphenyls [PCBs], probably from transformers).

To deal with those contaminants, the team incorporated screens, a grit chamber, flow equalization, air flotation, microfiltration and ultraviolet (UV) light disinfection into the SMURRF's treatment train. In preliminary treatment, the runoff passes through a flow equalization basin to stabilize flows to the secondary treatment process. Then, the water moves through a rotating screen and grit chamber to remove debris and sediments.

In secondary treatment, a flotation unit removes oil and grease, and microfiltration removes turbidity and suspended solids and produces an effluent that meets state standards. (Microfiltration has other advantages; it has a small "footprint" and the ability to handle a wider range of variable influent water quality than do other treatment techniques.) UV light's small physical requirements, minimal chemical handling, reduced environmental impact and low cost make it ideal for
disinfection. The treatment plant's design capacity of 0.5 million gallons per day is capable of treating most, if not all, of the dry weather urban runoff and, depending on flow conditions, even some of the first flush.

Once treated, the water is safe for all landscape irrigation and dual-plumbed systems. Landscape irrigation customers include Santa Monica's parks and streets departments and Woodlawn Cemetery. Dual-plumbed customers abound as well.

From June/July 2001 AC&C Product Review
By Rendi Howard and Noni Strawn

Caldwell WWTP Wins OCEA Award

The City of Caldwell, Idaho (USA), and Montgomery Watson have been awarded the 2000 Outstanding Civil Engineering Achievement Award from the American Society of Civil Engineers, Southern Idaho Section, for the $13 million Caldwell Wastewater Treatment Plant Improvements Project. The upgraded plant includes new treatment facilities, an emergency power system, an advanced instrumentation and control system, an operations building, a new pump station, and piping to connect the new facilities with existing facilities.

Phase two, currently under construction, includes a new ultraviolet disinfection facility that eliminates the need for chlorine. The low-pressure UV facility is one of the first of its kind in the Northwest and features an automatic cleaning mechanism and high-output, high-efficiency lamps. A key benefit of this facility is the improved water quality of the Boise River and other downstream rivers-water that leaves the plant is 60 percent cleaner than in the older facility.

The project is honored for its use of superior engineering skills in successfully processing and cleaning city wastewater using an affordable and easy-to-maintain approach.

From Pollution Engineering 33(7):4 (August 2001)

Nanowires Produce Ultraviolet Laser Light at Room Temperature

A team of scientists at the University of California, Berkeley, and Lawrence Berkeley National Laboratory (LBNL) has developed nanowires that can be used as ultraviolet lasers, [Science, 292, 1997 (2001)].

Team leader Peidong Yano, an assistant, professor at UC Berkeley and a faculty scientist at LBNL, says this is the first demonstration of using nanowires to make an active lasing device. He believes that such lasers could find use in applications such as in information storage and microanalysis; for example, lab-on-a-chip devices.

Yang and his coworkers grew single-crystal zinc oxide nanowires; 20 to 150 nm wide and 2 to 10 μm long on gold-coated sapphire substrates. The wires grow – catalyzed by the gold – vertically from the substrate.

The nanowires, form a natural resonance cavity suitable for lasing – without the addition of fabricated mirrors. Instead, the wires provide their own mirrors, with the interface between the substrate and ZnO serving as one mirror and the perfectly cleaved hexagonal end of the nanowire serving as other.

Above a lasing threshold, when the wires are excited with 266-nm light, they lase in different modes between 370 and 400 nm. Although the team demonstrated collective lasing from the arrays, Yang says the wires also will lase individually.

From Chemical & Engineering News June 11, 2001, p. 9, by Celia Henry
With this issue, we begin a special section in your newsletter dedicated solely to information regarding UV curing and its closely related activities. At some point, we might even enlist the (volunteer) services of someone more skilled in that art than your current Editor-in-Chief to prepare and edit this section. In the meantime, please review and enjoy the input in this issue.

**UV Glossary to Standardize Terminology**

BETHERSDA, MD, June 20, 2001 -- A glossary of terms related to UV (ultraviolet) technology — Terminology Used for Ultraviolet (UV) Curing Process Design and Measurement — has been assembled by the RadTech UV Measurement Committee to provide users, formulators, suppliers and researchers with common language used in the design and measurement of UV curing systems.

"The glossary was prompted by the scattered and sometimes incorrect terms used in industrial UV curing technologies," says Robin Wright of 3M. "It is intended to provide common and technical meanings as used in and appropriate for UV process design, measurement, and specification." "General scientific terms are included only where they relate to UV Measurements," says Dick Stowe of Fusion UV Systems. "The objective is to be 'user-friendly,' with descriptions and comments on meaning and usage. Occasionally, where two or more terms are used similarly, notes will indicate the preferred term."

For historical and other reasons, terms applicable to UV Curing may vary slightly in their usage from other sciences. This glossary is intended to 'close the gap' in technical language, and is recommended for authors, suppliers and designers in UV Curing technologies.

For a copy of the glossary, please contact RadTech or visit their website at www.radtech.org. Please contact RadTech for information on joining the UV Measurement Committee.

UV (ultraviolet) technologies are used to instantly "cure" or polymerize inks, coatings, and adhesives. Traditional curing methods involve hot air and/or oven drying and often result in high levels of air polluting emissions. UV/EB technology typically provides end users a safer, faster, more efficient process, combined with very low VOC emissions. As a result, the industry has been growing at over twice the rate of the traditional processes over the last several years.

RadTech International North America is a nonprofit trade association dedicated to the technical, educational and market advancement of ultraviolet and electron beam processes. RadTech has over 700 members that supply and use UV/EB equipment, raw materials and formulated products.

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**New CD-Rom Fills Information Needs**

BETHERSDA, MD, June 25, 2001 -- A new free CD-ROM aimed at providing a basic overview for those interested in UV/EB technology is now available from RadTech International, the industry non-profit Trade Association. "Introduction to UV/EB Curing" addresses a range of topics including the history of UV/EB curing, economic benefits, health and safety, as well as chemistry. The CD-ROM was produced by RadTech International North America's Canada Focus Group.

"This interactive CD-ROM is designed to benefit people at all levels: it can be used by sales and marketing professionals to help them better understand and promote this technology. In addition, we welcome potential UV/EB users to use the CD to learn how UV/EB technology can benefit them." says Jason Hart of Stochem Inc. The CD contains a wealth of pictures, background information, and streaming video on UV/EB technology, economic benefits, the process, the chemistry and health and safety issues.

"While a recent RadTech survey indicated that strong UV/EB market growth is driven by fast throughput, superior performance, economic and environmental benefits — the real barrier to even more rapid acceptance of the technology is simply, a lack of awareness of such benefits and a lack of understanding of the technology," says Anita Shrier of Ciba. "This CD-ROM is intended to fill the information gap."

UV (ultraviolet) and EB (electron beam) are technologies that instantly "cure" or polymerize inks, coatings, composites and adhesives. Traditional curing methods involve hot air and/or oven drying and often result in high levels of air polluting emissions. UV/EB technology typically provides end users a safer, faster, more efficient process, combined with very low VOC emissions. As a result the industry has been growing at
over twice the rate of the traditional processes over the last several years.

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UV Coating Technology Provides Big Payoffs for Kidde-Fenwal

This case study is one in a series prepared by the Office of Technical Assistance (OTA), a branch of the Massachusetts Executive Office of Environmental Affairs. OTA's mission is to assist industry in reducing the use of toxic chemicals and/or the generation of toxic manufacturing byproducts. Mention of any particular equipment or proprietary technology does not represent an endorsement of these products by the Commonwealth of Massachusetts or Radtech International NA. This information is available in alternate formats upon request.

Summary

By updating its coating operations with computer-programmed spray applications and ultraviolet (UV) curing, Kidde-Fenwal Incorporated reduced its air emissions by 75%, eliminated 20 drums per year of flammable waste and reduced its production cycle by an entire day. The system, which also reduced the amount of coating used per printed circuit board by 96%, has saved the company $300,000 annually providing a payback on its investment in less than one year.

Background

Kidde-Fenwal is a manufacturer of automatic fire suppression systems and gas ignition controls for non-residential applications. The manufacturing site in Ashland, MA (USA), employs 470 people. A critical part of the company's production operations is the spray application of a conformal coating to the finished circuit boards. This coating protects the board from potentially degrading external influences such as moisture and dirt.

Prior to installing the new system in 1996, Kidde-Fenwal was using a conventional coating system, originally set up in 1974, and operated without modification since that time. In the original process, the printed circuit boards were coated with a high-pressure spray application and low-solids solvent-based coating was used, which required a 24-hour post-cure. Additional solvents were used for equipment clean up. These solvents contained a large portion of toluene, which is a hazardous air pollutant (HAP).

The nature of this high-pressure spray application is to coat everything that falls under the oscillating spray pattern. This, in turn, requires masking critical areas of the board where it is imperative that no coating be applied. Consequently, several worker hours were required to mask these areas by hand, using costly specialized masking materials.

In 1995, the process had actual emissions of 14 tons of volatile organic compounds (VOCs), of which 60% was toluene. Because the potential for emission of toluene was greater than 10 tons, Kidde-Fenwal was classified as a major air emissions source and required to file for an air-operating permit. Air-operating permits are accompanied by triennial permit fees, which are substantial. In addition, formulation restrictions may be required, which limits the type of coating that can be used.

Toxics Use Reduction Planning

In late 1994, Kidde-Fenwal sought assistance from the Massachusetts Office of Technical Assistance (OTA) as it looked for ways to make its coating operations more efficient and reduce emission levels. After walking through the original coating process, OTA technical staff made suggestions including the use of a computer-programmed spray applicator that would provide precise control over the spray pattern and eliminate the need for masking. OTA also suggested that the company investigate the possibility of using UV-curable coatings. Both of these ideas offered the possibility of significant reductions in HAP and VOC emissions and the conservation of labor and materials.

After reviewing OTA's suggestions, Kidde-Fenwal decided to launch a formal engineering study of acquiring a comprehensive new application system that incorporated a solventless, UV-curable coating coupled with a programmable low-pressure spray application process.

Toxics Use Reduction Modifications

Nordson Company, Amherst, Ohio, was selected to design and build an application system. Meanwhile, the Kidde-Fenwal engineering staff surveyed more than 15 different coatings and selected a UV-curable polyurethane. The Nordson equipment was subsequently ordered. It was delivered in 13 weeks, took 40-worker hours to install and required 48-worker hours for production startup.

After the startup period, the coating application system was producing coated boards at the expected rate with better than expected quality. The new system uses four gallons of
polyurethane polymer to coat 10,000 boards, whereas the old system used 125 gallons of epoxy solution polymer to coat an equal number of boards. Further, the epoxy coating required a 24-hour post-cure in an oven before the boards could be quality control tested. The UV-urethane coated boards could be tested immediately after exiting the UV-light chamber. One day was taken out of the production cycle by eliminating the bake period. Standing inventory and work in progress was reduced by $50,000 per year.

Results – Economics

The overall cost of producing a finished printed circuit board has been substantially reduced. A savings of $75,000 was achieved per year in materials alone through the elimination of masking. Another $75,000 savings was realized on the cost of the coating. Indirect and direct labor savings were estimated at 14,000 worker hours per year. Cost savings were also realized in hazardous waste transportation, permit fees and electric bills. All told, the annual savings were at $300,000, which means an extraordinary one-year payback time.

Results – Reductions Achieved

Kidde-Fenwal anticipated other benefits as well. Because 75% of the actual emissions were eliminated, the site was reclassified as a minor air source, reducing the compliance fee from a minimum of $2,000/year to as low as $150/year. The need to store approximately 4,000 pounds of flammables onsite annually, which presented a significant safety issue, has been eliminated. In addition, the cleanup routine of the new system requires almost no solvent use, whereas the old system used 400 gallons/year of solvent for cleaning and generated 20 drums/year of flammable waste.

For further information about this or other case studies, or about OTA's technical services, contact the Office of Technical Assistance, Massachusetts Executive Office of Environmental Affairs.

Reprinted with permission from March/April 2001 RADTECH REPORT
The IUVA takes great pleasure in extending a heartfelt "welcome!!" to the following new members.

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WEFTEC Latin America, San Juan, Puerto Rico, November 11-14, 2001.  
Contact: Water Environment Federation, Attn.: WEFTEC Latin America 2001 Program, 601 Wythe Street, Alexandria, VA 22314-1994 USA. Tel: 1-703-684-2452; fax: 1+703-684-2492. e-mail: confinfo@wef.org; www.wef.org.

.... 2002 Meetings ...


Aquatech Amsterdam 2002, Amsterdam RAI, Amsterdam, The Netherlands, 1-4 October 2002. Contact: Aquatech RAI, P.O. Box 77777, 1070 MS, Amsterdam, The Netherlands, Ph +31 (0)20 549 1212; Fax: +31 (0)20 549 1843; e-mail: aquatech@rai.nl; or visit www.aquatech-rai.com.

**INDUSTRY UPDATES**

Disclaimer: Much input to this section comes from press releases provided by suppliers of equipment. Although *UV News* is very grateful for these materials, publication implies neither verification nor endorsement by the IUVA of these products.

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**New UV Curing System Delivers UV Energy in Different Wavelengths**

Chicago, June 14, 2001 -- With the introduction of the CONT-TROL-CURE™ UV Developer's Kit, UV Process Supply® offers the first economical bench top UV curing system that allows its users to switch UV wavelengths from job to job. Since many of today's UV formulations demand specific UV wavelengths for complete and efficient curing, UV Process Supply designed its new system to deliver maximum UV energy in all popular wavelengths, specifically mercury, iron, gallium and metal halide. The kit's 4" wide effective curing area and its use of a 110/60/1 or 220/50/1 power source make this system ideal for all laboratory use, prototype development, and small production applications.

Compact and easy to use, the UV Developer's Kit includes a universal power supply, a precise focus lamp housing with quick-change lamp holders, and four UV lamps (mercury, iron, gallium and metal halide). The universal power supply is designed to drive all of the lamps and to vary the output of each lamp from 75 watts/inch to 300 watts/inch. To enhance performance, the UV Developer's Kit can be combined with a lightweight bench top conveyor system offering a 4" wide belt and an adjustable speed 5-60 FPM. The standard non-shuttered lamp housing can be replaced with a shuttered lamp housing as well.

To obtain information on the UV Developer's Kit or any other UV curing equipment contact: UV Process Supply® via phone at 800-621-1296 (toll free) or 773-248-0099 (direct); via fax at 800-99FAXUV or 773-880-6647; via e-mail at info@uvps.com; or via the internet at www.uvprocess.com.

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**Trojan Wins Ontario Contract**


don, ONTARIO, July 26, 2001 -- Trojan Technologies Inc. was awarded a contract to supply drinking water disinfection systems to the city of North Bay, Ontario. The contract, which is worth about CAD 1 million (US $652,443), includes a total of four Trojan ultraviolet (UV) units designed to treat up to 21 million gallons per day of drinking water.

Peter Bullock, manager of North Bay's environmental services, said there would soon be an environmental assessment for a potential new filtration treatment facility. The Trojan units, which were purchased by the city, will eventually be transferred from the existing plant into the future facility, Bullock added.

Trojan's systems have been designed specifically for the North American market in anticipation of new regulations in many jurisdictions that will require municipalities to implement a multi-barrier disinfection treatment strategy.

Trojan designs, manufactures and sells UV disinfection systems for municipal wastewater, drinking water systems for residential, municipal and commercial use, and industrial systems for food and beverage, pharmaceutical and semiconductor applications. Trojan also designs and installs treatment technology for the environment contaminant and micropollutant destruction market.


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**Calgon Awarded Canadian Patent**

Pittsburgh, PA, July 9, 2001 -- Calgon Carbon Corp. (NYSE: CCC) has been granted a Canadian patent for controlling *Cryptosporidium* in drinking water using ultraviolet (UV) light. The company was granted a U.S. patent for controlling crypto last year.

*Cryptosporidium*, a microscopic parasite present in most surface water, is resistant to traditional methods such as chlorination, the company said. When ingested through drinking water, it can cause cryptosporidiosis, an illness characterized by severe abdominal cramps and diarrhea that can be fatal in people with suppressed immune systems.

Calgon uses its Sentinel UV technology that creates a disinfection system to act as a barrier against viruses, bacteria and parasites at a fraction of the cost of other treatment
methods, the company claims. Sentinel does not produce disinfection byproducts.

In addition to marketing Sentinel, Calgon is licensing its patented continuous wave UV technology to water producers at $0.015 per 1,000 gallons of water treated, officials said.

Bob O'Brien, Calgon senior vice president, said the company is pleased that the Canadian officials "recognized the significance of Calgon Carbon's groundbreaking research and technology by granting our company a patent. Their action strengthens our leadership position in the growing market for disinfection of drinking water using ultraviolet light."

Calgon Carbon supplies products for water and air treatment, including activated carbon; systems for distillation, solvent removal and volatile organic compound removal; oxidation systems and related services.

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**Trojan Wins $1.9M Contracts**

LONDON, ONTARIO -- Trojan Technologies Inc. received contracts worth more than CAD $3 million (US $1.9 million) to supply ultraviolet (UV) systems to remove N-Nitrosodimethylamine (NDMA), and other chemicals found in contaminated groundwater at three sites. Each of these low-energy UV treatment systems is expected to be delivered within this calendar year.

Trojan recently entered the environmental contaminant treatment (ECT) market when it purchased the assets of Advanced Ultraviolet Solutions (AUVS) in March. During the past two years, AUVS and Trojan were working cooperatively in the development of low-energy UV lamp technology systems.

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for the removal of compounds such as NDMA, which is released to the environment as a manufacturing byproduct.

"When we acquired [AUVS] earlier this year, our strategy was to enter the [ECT] market quickly with a superior product offering," said Marvin DeVries, Trojan Technologies' executive vice president and chief operating officer. DeVries said the contracts, awarded 12 July, 2001 "confirm our strong competitive position in this emerging market."

Trojan designs, manufactures and sells UV disinfection systems for municipal wastewater; drinking water systems for residential, municipal and commercial use; and industrial systems for food and beverage, pharmaceutical and semiconductor applications.

From WaterTech On Line, July 17, 2001

**WEDECO AG Water Technology: Excellent first half year**

**D**üsseldorf, Germany, August 8, 2001 -- The Düsseldorf company WEDECO AG Water Technology, has reported an excellent first half year in its recent interim report for the second quarter and the first six months of this year.

The company booked a range of important new large orders in the reporting period. WEDECO UV Systems, the British subsidiary, was commissioned by Northumbrian Water, an important water utility, to supply UV-disinfection plants along the North-East coast of England for a total of six effluent treatment plants. In Belgium WEDECO is to upgrade the Grobendonk waterworks with a UV disinfection performance of up to 4,000 m³/h drinking water.

In Utah (USA), the American subsidiary WEDECO Ideal Horizons obtained an order for the UV element in a multi-barrier system for processing more than 17,000 m³ drinking water a day. A pharmaceutical company has awarded the German daughter WEDECO Katadyn a large order to supply UV systems for the disinfection of industrial process water for the production of a new insulin agent.

The company had an order book of EUR 22.3 million on June 30. This and the continuing positive development of sales and earnings promise a continuation of the positive development of business this year.


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**Dyne Pens, the Solution to Testing Surface Tension**

**C**hicago, IL -- UV Process Supply® offers printers, coaters and extruders, Dyne pens and testing solutions for the accurate measurement of the surface tension of plastics and other non-porous substrates prior to the application of inks or coatings. Dyne Pens provide a fast, simple and clean method of testing treatment levels achieved on polymer plastics. Testing the surface of a substrate with a Dyne pen allows the user to prove if the wettability of a given dyne level has been reached, thereby assuring good adhesion of a specific ink or coating.

The CON-TROL-CURE™ Liquid Dyne Pen Set offers a spring-valve tip design that keeps the pen's applicator away from the dyne fluid storage to prevent contamination. Pressing the tip down firmly opens the valve to flood the tip with fresh fluid. Available in sets of eight from 30 to 44 dynes/cm: 30, 32, 34, 36, 38, 40, 42,44.

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[Image of the 6D UV SAFETY METER]

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Working will start in winter 2002.

Bacteria and viruses as well as dangerous protozoa. The system is scheduled to become operational in summer 2003; installation than 4 log (99.99%) inactivation of human pathogens including conditions. The UV system will be able to provide a greater or exceed the plant's design UV dose criteria of 40 mJ/cm² certified by a third party testing center to ensure that they meet entire 46 MGD plant treatrnent capacity. The fourth unit will remain on "stand-by". Prior to installation, the reactors will be disinfection by ultraviolet light. The general constructor is Alder Construction (Salt Lake City, Utah).

Under the terms of the contract WEDECO-Ideal Horizons, Inc. (Poultney, Vermont) will manufacture and deliver four (4) of WEDECO's proprietary K Series ultraviolet disinfection units. Weber Basin 3 will represent the first large-scale potable water system in North America to employ WEDECO's advanced low pressure-high intensity ultraviolet lamp technology, used extensively throughout Europe for drinking water disinfection.

For drinking water applications, operational redundancy and independent verification of performance are important aspects in the design of any treatment plant. For Weber Basin, three of the UV units operating in parallel will be able to disinfect the entire 46 MGD plant treatment capacity. The fourth unit will remain on "stand-by". Prior to installation, the reactors will be certified by a third party testing center to ensure that they meet or exceed the plant's design UV dose criteria of 40 mJ/cm² (millijoules per square centimeter). This dose was selected by Carollo to ensure effective disinfection at the plant's design conditions. The UV system will be able to provide a greater than 4 log (99.99%) inactivation of human pathogens including bacteria and viruses as well as dangerous protozoa. The system is scheduled to become operational in summer 2003; installation work will start in winter 2002.

The ozone system to be installed as part of the upgrade will provide pretreatment of the water prior to UV disinfection. It will deliver up to 1200 pounds per day (PPD) (23 kilograms per hour) of ozone to reduce levels of taste and odor in the water as well as provide some disinfection assistance to the ultraviolet system. It is to be manufactured and supplied by PCI-WEDECO Environmental Technologies, Inc. (West Caldwell, New Jersey), a member of WBL Holding Group. PCI-WEDECO is a subsidiary of WBL Holding (Düsseldorf, Germany).

John Marrino, President of both WEDECO-Ideal Horizons, Inc. and PCI-WEDECO Environmental Technologies, Inc., is enthusiastic about the project. "We believe that Weber Basin 3 represents the beginning of what will become a significant upgrade for potable water treatment throughout North America. The benefits of combining these two technologies are clear. The result will be exceptional quality drinking water that consumers can trust."

WEDECO AG is a most experienced UV company globally for drinking water applications with tens of thousands of UV systems operating worldwide. In Europe, where UV disinfection of municipal drinking water is common, WEDECO's references include some of the largest drinking water UV projects in the world. These include plants for Helsinki (Finland), the Wahnbachtalsperrenverband (Germany), Hambleden (Great Britain) and Stockholm (Sweden). All of these plants feature the same advanced WEDECO UV lamp technology to be provided for Weber Basin 3. Spektrotherm lamps are the most efficient high intensity, low-pressure UV light sources currently available for disinfection applications. Compared with other technologies, e.g., medium pressure UV lamps, UV disinfection units utilizing Spektrotherm lamps exhibit maximum disinfection performance with significantly lower life cycle costs.

“This is an exciting opportunity to demonstrate the excellent quality and efficiency of our product,” says Mr. Werner Klink, CEO of WEDECO AG Water Technology. “The multi-barrier concept with ozone and UV will ensure safe drinking water for the population of the Weber Basin District. Combining the oxidation power of ozone and the disinfection power of UV will provide unsurpassed protection from waterborne illness due to human pathogens such as coliform bacteria, viruses and protozoa.

Mr. Klink added, “We anticipate that within a few years ultraviolet disinfection and the multi-barrier concept will become predominant treatment processes for drinking water in North America. WEDECO expects to be a major participant in this development. We continue to expand our R&D efforts in the area of drinking water UV disinfection. In addition to extensive product development programs we are also
collaborating with European and American regulatory authorities toward improving standards for potable water treatment worldwide."

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Weber Basin, Utah

**Trojan CEO To Retire**

**London, Ontario** -- Trojan Technologies Inc. is implementing a CEO transition plan following the announcement that Henry J. (Hank) Vander Laan will be retiring as president and chief executive officer (CEO). The company is actively seeking a replacement for Vander Laan, its founder and CEO since 1977.

"I believe this is the right time to trigger a transition," said Vander Laan. "The company is in an excellent position to prosper under the next generation of leadership. It has been my privilege to lead this company and to see it grow. I have been involved from its early beginnings and during its development into an international corporation.

"Throughout this time I had a vision to create a company that could deliver a significant positive environmental impact through chemical free disinfection of water and wastewater," he said. "The last 25 years has been an exhilarating journey for me personally. We have had, like all businesses, our ups and downs, but the company is now well-positioned for future success. I am extremely grateful for having had this opportunity to develop the business, to meet many wonderful people and to build a team of dedicated professional colleagues who have made my stay a joy each and every day."

"On behalf of shareholders, employees and customers, I want to express our appreciation to Hank for the outstanding contribution he has made as president and CEO," said Milton Haines, chairman of Trojan's board. "Hank has a passion for the environment. He has been able to see his vision become a reality through Trojan, which he has been able to build into a world leader in the use of ultraviolet disinfection technology for water purification."

At a meeting of the board of directors on 18 July, Vander Laan was elected chairman, succeeding Haines, who will remain as an active member of the board. George Taylor, who joined the board last year, will assume the position of vice chairman. He was previously the president and CEO of John Labatt Ltd. The Board's Human Resources and Corporate Governance Committee, comprised of four outside directors together with Vander Laan, retained an external search consultant to assist the committee and the process is now well underway.

From WaterTech On Line, 19 July 2001

**Hanovia Showing Brewing and Beverage Disinfection Systems At Drinktec-Interbrau 2001**

Hanovia Ltd will be showing its brewing and carbonated beverage treatment systems at Drinktec-Interbrau in Munich this September. The company's products will be exhibited in Hall 134 at stand number 231.

On display will be a PMS Sugar Syrup unit designed for use in the production of carbonated beverages. UV disinfection eliminates the wild yeasts and molds responsible for taste and flavor problems in sugar solutions, and can protect shelf life. Also on show will be a PMD disinfection unit, for use in brewing. No beer spoilage organisms can survive UV treatment and UV has no effect on pH, color, flavor and aroma. Among many other applications, UV may also be used to treat caps and
cans, disinfect air in packaging areas, and treat head space in water storage tanks.

Issued by: Hanovia Limited, 145 Farnham Road, Slough, Berkshire SL1 4XB. Web site: www.hanovic.net

Company contact: Sean Appleton. Tel: 0 1753 515328. Fax: 0 1753 534277. E-mail: sales@hanovia.co.uk

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**Solid-State UV-C Meter**

Gigahertz-Optik introduces a new technology hand-held UV-C radiometer featuring a solid-state solar blind detector for use in UV air and water sterilization, eprom erasure, UV Curing and other UV-C applications.

The compact X9 11 meter is designed for mobile or lab use and offers a large LCD, irradiance and dose modes, peak hold function, 9 VDC battery operation and RS232 interface.

The cosine corrected UV-3718-4 UV-C detector is solar blind above 300 nm permitting the isolation and accurate measurement of the UV-C content of low or medium pressure Hg and other types of broadband sources. Waterproofing of the 37 mm diameter x 32 mm high detector is optional.

The X9 11 UV-C meter measures from 0.1 microwatt/cm² to 1000 milliwatts/cm² and is calibrated at 254 nm.

X9 11 UV-C meter price is $1250.00.

Contact: Bob Angelo
GIGAHERTZ-OPTIK, INC.
5 Perry Way, Newburyport, MA 01950 - 4009
Tel: 978.462.1818; Fax: 978.462.3677
E-mail: b.angelo@gigahertz-optik.com

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Unlike a radiometer, which measures performance only at a given time, this software-controlled system (Windows®) tracks the performance of one to twelve UV curing lamps concurrently throughout the production cycle. If lamp performance fails to meet set standards at any time during a production run, the LM-9000 will alert the press operator of any deficiency. This will allow the operator to identify which production variable requires correction before excessive under- or overcured waste is generated.

Fully programmable for selective wavelength monitoring, the LM-9000 has a standardized spectral sensitivity range of 200 nm through 450 nm, which is adjustable. The LM-9000 permits event storage (including job, skid, hour, day, operation, operator, and machine), full range data storage, all lamp operation reporting, and event recording by critical wavelength/critical energy level.

With only a 1/4" (6 mm) profile, each conventional and right angle LM-9000 probe can be installed anywhere on or around the lamp, and can be used effectively without environmental barriers. Upon startup, the entire system automatically calibrates itself to ensure competent results.

To obtain immediate technical product information on the LM-9000 UV Lamp Monitor, please visit UV Process Supply’s web site at www.uvprocess.com. To obtain a free copy of our full product catalog, call or write: UV Process Supply, 1229 W. Cortland Street, Chicago, IL 60614. Phone: 800-621-1296. Fax: 800-99FAXUV.

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**Trojan Technologies to buy Pureflow**

ONOND, ONTARIO — Trojan Technologies Inc. (TSE:TUV) has signed a letter of intent to acquire Pureflow Ultraviolet Inc. (Pureflow) in Atlanta, GA. Pureflow is a leading distributor of ultraviolet (UV) equipment to the industrial and commercial markets in North America.

The purchase price was not disclosed, but will be satisfied primarily by the issue of Trojan common shares. Subject to approvals, the transaction is expected to close in September, Trojan officials said.

Trojan officials said the industrial and commercial markets for UV disinfection equipment offers the potential for significant growth. The acquisition of Pureflow immediately strengthens its position in the market and provides the opportunity for Trojan to further diversify outside its traditional municipal government markets, according to company officials.

"The acquisition of Pureflow is an important development in our plan to grow revenues and compete successfully in the industrial and commercial market. We will be building from a strong product base, specifically with the Trojan UVLogic and Trojan UVMax systems," said Doug Alexander, executive vice president of Trojan Technologies.

"Pureflow is well respected in the marketplace as a distributor of UV systems and has a well developed after market sales and service business. The company has strong relationships with key customers and has the required marketing and sales expertise to lead our efforts to build Trojan's profile in this market segment," he said.

"We have worked with Trojan Technologies for many years and I am excited about this opportunity," said Rich Combs, founder and owner of Pureflow. Pureflow, founded in 1978, distributes UV disinfection equipment, primarily to the industrial and commercial markets in North, Central and South America. The company had sales last year of more than CAD3 million ($1.95 million U.S.) and has seven employees.

From WaterTech On-Line, Aug 15, 2001
Your community doesn't have to worry about the safety of their water... but you do.

With Calgon Carbon Corporation's Sentinel™ UV Disinfection System, both you and your community can be worry-free.

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**Quality:** Calgon Carbon Corporation has been treating drinking water for more than 50 years and is the industry leader in UV disinfection technologies.

The bottom line is more than just clean, safe drinking water... it's peace of mind.

“"A Truly Fantastic System”—
"After learning the facts about UV technology, our city council voted unanimously to install a Sentinel UV Disinfection System from Calgon Carbon Corporation. Sentinel's performance has been truly fantastic. We're achieving a 6 log removal, and we're able to treat up to 14 MGD per day. The most significant benefit, however, is safer drinking water for our community."

Darrel Schuurman,
Water Superintendent, City of Grosse Pointe Farms, Michigan

Licenses for cryptosporidium inactivation technology are offered by Calgon Carbon Corporation. For more information about the technology license or the Sentinel system, contact Calgon Carbon at 1.800.422.7266 or send an e-mail to: iuvanews@calgoncarbon.com.