CHESAPEAKE

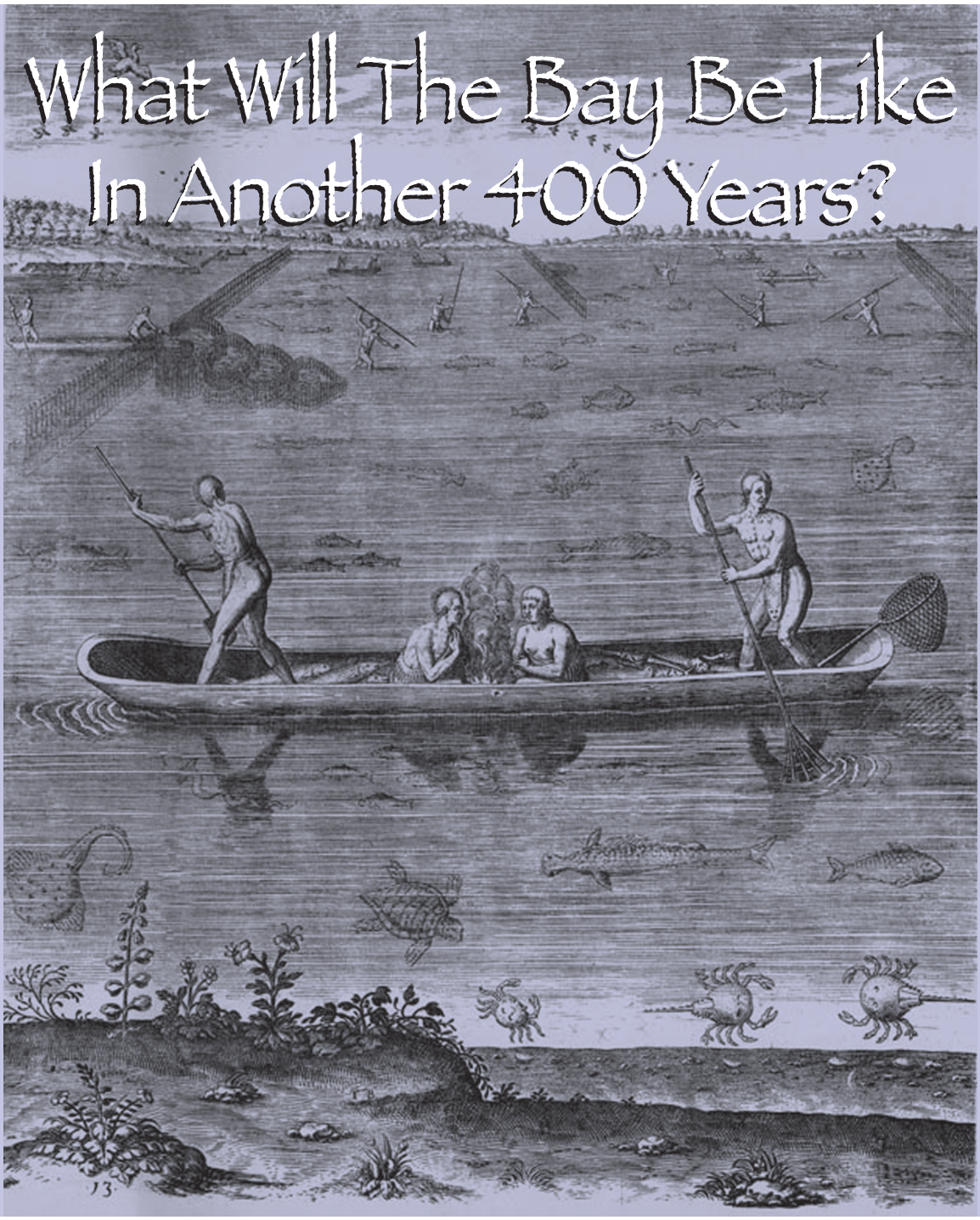
Ecoletter

SPRING 2007 ISSUE

WWOA

What Will The Bay Be Like In Another 400 Years?

"Their Manner of Fishynge,"



from "A Brief and True Report of the New Foundland of Virginia, 1590."

A Publication of the Water and Waste Operators Association of Maryland, Delaware, and the District of Columbia, & the Chesapeake Water Environment Association

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President's Message

CWEA President

—Bharat Desai

In this issue I would like to highlight some of the CWEA officers and committees' activities for stream lining CWEA administrative procedures and organizing programs for membership benefits.

The CWEA officers have set goals for the fiscal year 2006-07. Some of the goals include:

- Development of written business practices to facilitate association's activities and provide guidance to new officers and committee chairs and members.
- Investigate opportunity to outsource publication and distribution of Ecoletter to free up some time of the Publication Committee's members as this task is very time consuming.
- Formalize memorandum of understanding with Federal Water Quality Association for cooperative joint activities for benefits of both organizations members; with WWOA for Joint Conferences; and with WWOA and CSAWWA for Tri-Association conferences.
- Update Articles of Incorporation and Bylaws to change association's IRS nonprofit tax exempt classification from 501(c)(6) to 501(c)(3). The present classification is for trade association and need to change to educational association like all other WEF member associations.
- Publish CWEA Members Directory.

It is anticipated that some of the goals will be achieved this year and some will be carried forward to next fiscal year. I commend officers for excellent planning, setting goals, and putting significant efforts to accomplish these goals.

All programs for members' benefits are organized by various CWEA committees. The commitment and effort of committee members and strong leadership provided by committee chairpersons are demonstrated by organization of very successful variety of programs. Some of the programs include:

- CWEA–WWOA–CSAWWA Tri-Association Conference, Ocean City, MD, August 2006 and August 2008

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WWOA President

—Bob Stenger

We Need You
WWOA History 101

The Water and Wastewater Operators Association of Maryland, Delaware, and the District of Columbia began as the Maryland Water and Sewage Association in 1927. In 1929 Delaware joined the organization. This led to a name change in 1930 to The Maryland and Delaware Water and Sewerage Association. The first of many highly successful short courses, a tradition that continues today, was held at the University of Maryland in 1935 to aid in the training of water and wastewater professionals. The District of Columbia joined the organization in 1936.

In 1962 the name was changed to the Maryland-Delaware Water and Pollution Control Association. Six years later the name was changed once more to the Chesapeake Water and Pollution Control Association. This led to the formation of a new association known as the Water and Wastewater Operators Association (WWOA) which is where we are today.

What—might you ask—is the mission of WWOA?

Mission:

The WWOA is a non-profit organization whose objective is:

- To further the knowledge of the planning, design, construction, operation, maintenance and management of systems for water supply and distribution, collection and treatment of domestic and industrial wastewaters, and solid waste collection, disposal, recycling and utilization;
- To inform the public about those systems and the necessity for highly skilled operating personnel; and
- To promote the certification of operators in these facilities.

The WWOA as we know it today was built over the decades on the backs of a countless number of volunteers who had the foresight to see the value of a strong organization to serve the Water and Wastewater community.

So what is a volunteer anyway?

I checked the web and stole this definition from Wikipedia, the free encyclopedia:

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Ecoletter

Calendar of Events *Summer/Fall*

S M T W T F S

August 28–31, 2007
WWOA/CWEA Joint-Conference
Ocean City, MD

October 13–17, 2007
WEFTEC '07
San Diego, CA

November 2, 2007
Collection System Committee Private Property Inflow & Infiltration Seminar
Linthicum, MD

Change of Address

Please forward your change of address and membership number to the appropriate organization:

WWOA Secretary
Danny Coats
DCWASA
202-787-4046
dcoats@dcwasa.com

CWEA Secretary
Ray Schulte
KCI
410-316-7800
rschulte@kci.com

www.wwoa-cwea.org

TO ALL MEMBERS:

When completing membership renewals, make sure all information is correct and current. We use WMBA (WEF Membership By Access) for membership information. If there is an e-mail address, please include it.

Table of Contents

Editor's Corner

This issue is devoted to the Chesapeake Bay. Let's hope we never have to do an issue in memorial to the Bay. The subject of the Bay is important, immense, compelling and troubling. This issue we focus on the conditions in the Bay, the quality of the water, and the challenges that we all must face if we are to have a healthy Bay ecosystem. In a future issue, we will address possible—at least we hope they are possible—solutions to the host of ills that plague the Bay. As always our attention at the *Ecoletter* will never stray far from the master and ruler of our actions as water professionals, The Chesapeake Bay.

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The May-June 2006 issue of Audubon magazine featured the Mississippi River. The numbers are staggering. At 1.25 million square miles, the watershed is the 3rd largest watershed in the world. By contrast, at 64,000 square miles, the Chesapeake Bay watershed is a mere 5% of the Mississippi watershed. Problems like unnatural, channelized flood protection and wetland loss abound in the Mississippi. The fastest shrinking state in the country, Louisiana, loses a football field sized area every 30 minutes. That keeps up and Rhode Island will lose its crown as the smallest state. The Mississippi also has a familiar problem to us in Bay country—excess nutrients. These nutrients are producing a dead zone in the Gulf of Mexico the size of New Jersey. In the post Katrina rebuilding, the Mississippi's problems are getting more attention. That is good and bad, especially for the Bay. Already competing with the Everglades and Great Lakes for large sums of federal funds, that competition will only get more fierce with the Mississippi's huge hand out.

****

It's a small step, but definitely one in the right direction. Baltimore has become an Adopt-A-Waterway city. Using the same concept as the Adopt-A-Highway program, the Adopt-A-Waterway program brings together public and private sectors to raise money to help with debris cleanup, greening projects, streambank restoration and stormwater management. In addition to getting help with cleaning up its streams, Baltimore will also receive a program that will educate residents of the benefits of taking care of their streams. Bank of America is one large business that has signed onto the program. Any business that participates will receive advertising and acknowledgement that the business cares about improving our environment.

****

A recent report by PennEnvironment, a public interest group based in Philadelphia, should give all water professionals a good kick in the head—and perhaps somewhere else. 62% of U.S.industrial and municipal wastewater treatment plants exceeded permit limits at least once in the eighteen-month period ending December 31, 2004. The news is especially not good for the Bay since three states (Pennsylvania, New York and West Virginia) are among the ten states with the most permits exceeded. In Pennsylvania, 383 facilities alone accounted for nearly 2,000 permit exceedences. If we thought that point sources were not the big problem anymore, that non-point sources are cause of all the ills, we are mistaken. Much work remains on point sources.

****

With the start of another year, more and more people are concluding the obvious; there is no way, short of changing the rules and how we keep score, that the Bay will meet the 2010 deadline for meeting restoration goals. We will hear reasons, excuses, damage control, finger pointing, pleas for mercy and worse over the next four years. Hopefully we won't hear "Ho-hum, what did you expect with such unrealistic expectations? You need to replace your expectations with acceptance of changed conditions." It's one thing to say you've lost, it's another thing to say you're defeated.

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A story from the Great Lakes reminded us of the bombing the Navy used to do in the Bay. The US Coast Guard has proposed a series of 34 machine gun training (shooting) areas throughout the Great Lakes. Boaters are afraid of being shot and environmentalists are concerned about all the lead going into the water. Who comes up with these ideas? Whoever it is, let them find another idea.

****

A recent tour of Fairmont Water Works Interpretive Center in Philadelphia was most interesting and educational. Created by the Philadelphia Water Department, the center provides both a wonderful hands on history of the city's water supply, and a current status on water issues. At a beautiful setting along the Schuylkill River, it is well worth a visit if you get up that way. Admission is free. If you get hungry, a restaurant right on site, appropriately called Waterworks, will fill you up with tasty food overlooking the river.

****

Hats off to the WSSC. They get a big green environmental star for announcing a major renewable energy purchase. Beginning in 2008, the WSSC will use 70,000-megawatt hours of wind power from a wind farm in Western Pennsylvania. This represents one-third of all electricity used by the utility and will make it the largest user of renewable energy among local governments in the United States. Let's hope WSSC's leadership will prompt other utilities to join the burgeoning revolution in green power.

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The State of the Bay, Revisited, Revised

—By Floyd B. Johnson, Ecoletter *Co-editor*

In the Summer 2005 issue of the *Ecoletter*, I wrote "The State of the Bay", which summarized conditions in and around the Bay. Depending how you look at it not much has changed or much has changed. The Bay problems are still present aplenty, but the lead government organization, EPA's Chesapeake Bay Program, has taken a turn for the worse. Responding to criticism that they were not telling the whole story and were taking a too hopeful outlook, the Bay Program has taken a darker approach. While their 2005 Health and Restoration Assessment published last spring is not a sort of hard-boiled environmental noir; it does present woefully disturbing data. It sure bummed me.

This assessment, with two major components, Ecosystem Health and Restoration Efforts, measures present conditions and compares them against established restoration goals. The tone is set at the beginning of the Ecosystem Health section. "Although there are a number of smaller-scale success stories, the overall ecosystem health of the Chesapeake Bay remains degraded. For more than twenty years, on the ground restoration efforts have managed to offset the impact of the region's growing population while making modest ecological gains in some areas. Major pollution reduction, habitat restoration, fisheries management, and watershed protection actions taken to date have not been sufficient to restore the health of the Bay." So all the money we have spent and all the focussed effort we have made has merely stopped further damage from the 150,000 people added to the watershed each year. In other words we are down in the same hole we were in 25 years ago. How deep is that hole? Brace yourself, here is a look down into it:

Dissolved oxygen levels are 24% of the restoration goal. The summer dead zone above and below the Bay Bridge is the worst manifestation of these killing concentrations. A large area of the Bay, that keeps getting bigger and lasting longer, has to be avoided by living creatures if they want to continue living.

Water clarity is 45% of the restoration goal. Bernie Fowler does not have to get very wet before he can't see his sneakers.

Chlorophyll a, (measure of algae present in water) is 41% of the goal.

PCB levels in White Perch are low enough for unrestricted consumption in only 38% of the Bay's tidal rivers. What is worse than "Don't eat the fish?"

Nitrogen is 47% of the goal. Wastewater treatment plants have achieved 61% of the goal set for them, while non-point sources have much further to go.

Phosphorus is 49% of the goal. Once again wastewater treatment plants lead the way having achieved 80% of the goal. Agriculture and other non-point sources have much work to do here.

Sediment from agriculture is 41% of the restoration goal.

Bay grasses are 39% of the goal. Success has been reached in the Upper Bay where 92% of the grasses have been restored. Unfortunately the two largest portions of the Bay, the middle and lower reaches are only 29% and 42% of the goal, respectively.

41% of the Bay's bottom habitat is considered healthy.

9% of the Phytoplankton communities are considered healthy. Phytoplankton makes up the base of the food web. Like all foundations, it is very important.

While no goal has been set for crabs to date, the number of mature crabs has been below the long-term average for seven consecutive years. Given the poor condition of the bottom habitat, this situation needs to be watched closely.

Rockfish have made a remarkable comeback, yet a troubling 2/3 of the population is infected by a bacterial disease.

Oysters are 7% of the restoration goal. This is nothing but pitiful and tragic.

Shad spawning in the Susquehanna River are 3% of the goal.

These numbers are so low that surely there will be an effort to change the restoration goals so the task ahead will not be so daunting. The temptation to change the rules of the game when the outcome doesn't turn out right is a strong one. These goals are not near what the Bay was or could do 100 years ago. They have been

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The State of the Bay

continued from page 7

set to take the Bay back about half that length of time. So we are already dealing with lowered expectations. The sad reality is that we better get used to modest outcomes and far from great expectations.

The Interstate Commission on the Potomac River Basin published a nice summary of conditions in the Potomac River last year in their November/December, Potomac Basin Reporter.

The North Branch, the center of coal mining in the Potomac watershed and whose water quality's much improved by Bloomington Dam, continues to be plagued by acid mine discharges. Two years ago, seepage from an abandoned mine killed a stream. Killed a stream.

The news in the South Branch and Shenandoah River watersheds is fish kills and fishes sex. The fish kills, mainly involving smallmouth bass, but also including redbreast sunfish and suckers, are not explained. The worst fish kill was in the spring of 2005 when 80% of the adult smallmouth bass and redbreast sunfish populations died in the South Fork of the Shenandoah. More frequently fish are showing up with lesions and intersex conditions (a male fish carrying eggs). Groups in both watersheds have formed to study what is causing the problems. In addition to looking at point and non-point sources, disease, parasites, spawning stress, temperature, sediment chemistry and population dynamics, a growing drumbeat is raising on the influence of emerging contaminants and endocrine disrupter compounds.

The tidal Potomac, really part of the Chesapeake Bay, has many of the usual problems that the Bay has, and some more specifics. Snakeheads, that foreign fish invader, are here to stay. It remains to be seen how this large fish will effect the estuary's ecology and food chain. Good news is the increased submerged vegetation in the upper part of the estuary and the continued restoration of the American Shad. Bad news is the die off in eelgrass in the lower estuary and algae blooms in the middle estuary. While much of the Potomac fishery is doing decently (with the notable exception of oysters), fish consumption advisories on many fish species are posted. Most of these advisories are due to mercury and polychlorinated biphenyls (PCBs).

I can not end this on such a troubling send off. All is not bad. Last year's flows, especially in the critical spring period, were below normal and that allowed some improvement to Bay waters. Flow, with all its non-pt source pollution, is the most important factor in the Bay's water quality. Bald Eagles, down to 72 nests in the Maryland, Pennsylvania, Virginia portion of the watershed in 1977, have rebounded to 819 nests in the same area in 2004. Once endangered, they could soon be removed from the threatened list for the watershed. The most important good news to report is that many smart, dedicated people continue to work hard for the Bay. In their hands rests the Bay's future.

A Growing Awareness: It's a Good Thing

—*Pearl Laufer,* Ecoletter *staff*

Must have been something in the water. In late March, *The Washington Post* ran three articles that dealt with different facets of our industry. Suddenly, the silent service was getting some play—and I was delighted. On March 26th, the Sunday "Arts" section featured an above-the-fold lead piece on the egg-shaped digesters. that will be installed—when they get a contractor to bid on them—at Blue Plains. Benjamin Forgey, renowned architecture critic for the paper, sang the praises of the design. His opening sentence, "Washington is about to get a striking new skyline," says it all. The caption for the architect's rendering describes the digesters. as "elemental yet elegant." This for structures that process

Rendering of Blue Plains Plant with the planned egg-shaped digesters.

sludge, folks. Would you believe? I don't think we've heard those kind of adjectives before. More importantly, though, this helps bring awareness of what we do to the public we serve. Beautiful sewage digesters. that are "almost magical" according to Forgey—that is a definitely a good thing. Now if only we could find a contractor who will materialize these beauties, we will be in business.

The following day, two pieces appeared in the paper. The first was about Fairfax County's participation in a White House pilot program to analyze wastewater from communities throughout the Potomac River Basin for the urinary byproducts of cocaine. Wow! How 21st century is that. Has a "big brother" feel to it, but also shows how valuable our industry is and how it impacts all aspects of our lives. This kind of research has its genesis in Italy, where researchers found that the Po River in northern Italy carried the equivalent of four kilograms of cocaine and concluded that "the 1.4 million young adults living in the Po River Basin were consuming about 40,000 doses a day, more than twice the existing national estimates." Other studies done in Italy, with other wastewater studies, came to the same conclusions. We know about pharmaceutical and personal care byproducts showing up in wastewater. No surprise about the cocaine being detected. It will be interesting to see what they can do with any information they glean. Can it help with the drug wars? That remains to be seen.

I particularly enjoyed the second piece that appeared on March 27th. That article had to do with privatization of the water industry and how it has fallen out of favor in Latin America. I was with the Washington Suburban Sanitary Commission's Office of Public Affairs (now Public Communications Office) when a bill was introduced in the Maryland Legislature to study WSSC for privatization. I thought it was a terrible idea, as did many of my colleagues, and began to collect articles and studies from all over the world where privatization had been instituted. There was no place with a large system where the customers were better served by the private system. In almost every instance, the rates were raised and the quality was lowered. The article in the *Post* reported at the World Water Forum, where representatives from 148 countries gather every three years to discuss global water supplies, the forum voted to issue a decree stating that governments—not private companies—should hold primary responsibility for providing safe drinking water. Argentina has rescinded its contract with the French company, Suez, and is reinstating government control of the water supply.

To be fair, some of this backlash is political and not just environmental—and not all governments have measured up in the past. That is why some countries turned to privatization—that, and the promise of lots of cash. I seem to recall that Jeff Skilling (Enron) was involved in a water deal in Argentina. Big business sees customer rosters and that is a lure almost too tempting to pass up. Meanwhile, the real bottom line is that people want good, safe water at a reasonable price. Where they get it from is immaterial to them—but I contend they are more likely to get it from government. Time will tell.

Way up Along the Susquehanna River

—*By Floyd B. Johnson,* Ecoletter *Co-editor*

The source of the Susquehanna River at Lake Otsego, New York.

Way up in New York State, they are very aware of the Chesapeake Bay's reach, and that's a good thing for us way down in the watershed. Lake Otsego is the source of the mighty Susquehanna River and New York is the 4th leading state contributor of loads to the Bay. Compared to other states, New York is a leader in fewest pounds of pollutants per acre. With 10% of the Bay watershed, New York only contributes 7% of the nitrogen, 5% of the phosphorus and 3% of the sediment. They have recently completed their tributary strategy for the Susquehanna and shaped it around the load allocations assigned to it by the Chesapeake Bay Program. Those allocations are 12.58 million pounds of nitrogen, and 0.59 million pounds of phosphorus per year. In order to achieve these allocations, nitrogen must be reduced 5.5 million pounds (or 47%), and phosphorus 0.5 million pounds (or 39%) per year. Also because only 10% of the nitrogen and 27% of the phosphorus comes from point sources, most of the reduction will have to come from agriculture. On the point source side, the largest WWTP in the watershed is being upgraded. A group taking the lead up here is the Upper Susquehanna Coalition that represents all 11 New York counties in the Bay watershed. Using a Targeted Watershed Grant from EPA, they are working on a variety of initiatives, including; wetland and stream restoration, promotion of farm stewardship with expansion of riparian buffers and introduction of intensive rotational grazing, use of GIS to target restoration efforts, and develop unpaved road and road ditch improvements to better manage runoff. In 2005, the Upper Susquehanna Coalition helped: over 20,000 acres of agriculture get into a nutrient management plan, construct 38 miles of stream bed fencing, and establish over 22,000 feet of forested buffers and 492 wetland acres.

Many times we forget about the most distant state in the watershed and while we necessarily focus on the big three Bay states, it was nevertheless encouraging seeing what the folks in New York are doing for us. Maybe some day we will reward their effort and make Cooperstown famous for something besides the Baseball Hall of Fame and the guy who wrote The Last of The Mohicans. A restored shad run to Lake Otsego would be a nice thank you.

Plant Profile
Blue Plains WWTP

—*By Chip Wood,* Ecoletter *Staff*

At the southern most tip of Washington, D.C., on the east shore of the Potomac River, you will find the Blue Plains Wastewater Treatment Plant. The plant serves more than 2 million Washington metro area customers. Service area comprises more than 750 square miles that includes Washington, D.C., portions of Prince George's and Montgomery Counties in Maryland, and portions of Fairfax and Loudoun Counties in Virginia. Plant is rated for 370 mgd average daily flow and 740 mgd peak flow. Typical average daily flow is about 330 mgd. Annual operations and maintenance budget is over $80 million.

Current liquid process stream includes: raw influent screening, aerated grit chambers, primary sedimentation tanks, aerated secondary reactors, secondary sedimentation tanks, nitrification/denitrification tanks, multimedia filters and sodium hypochlorite chlorination followed by sodium bisulfite dechlorination. To gauge the mammoth complexity to this plant, there are 44 primary gravity settling tanks, 60 activated sludge clarifiers, and 80 1000-square foot dual media filter cells. Blue Plains claims to have the world's largest nitrogen removal process. Current solids process stream includes: gravity thickening of primary sludge, dissolved air flotation thickening of secondary sludge, centrifuge dewatering, lime stabilization, and land application and other beneficial uses of final product. The plant strives for 100 per cent beneficial reuse of its biosolids.

Focus of this article is the Central Control Room

Continued on page 13

Left, Central Control Room. Five large screens on back wall are, from left to right: Primary/ Secondary Treatment, Nitrification/Multi-Media Filtration, Alarms, Thickening/Dewatering, and Solids Processing.

Below, Operator at Desktop Computer. Note typical primary sludge pumping diagram on left screen and view of plant building complex on right screen.

(CCR) for the plant complex. In addition to a dozen or so desktop computers, there are five chalk board size screens that cover the entire back wall of the room. The CCR is staffed around the clock and monitors the entire plant. At least one person is in the CCR at all times. Plant control is primarily done from the CCR; however there are three additional control centers that receive the same information as the CCR. In an emergency, the plant can be controlled from any one of the four control centers. Using a Distributed Control Concept, multiple areas of the plant can operate independently even if an area loses its connection with the central system.

Left, Secondary Clarifier.

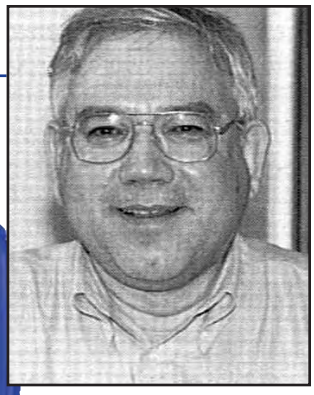
Below, Dome roofed gravity sludge thickening buildings on left. Note spherical tank for storing methane gas on right (this is no longer in service). Top portion of Washington Monument can be seen in background over top of white pickup truck in the center of the picture.

Management of the CCR and control of the plant processes is under Salil Kharkar, P.E., Manager of Process Engineering. The Process Engineering Group (PEG) reports to Salil and consists of a team of engineers and technicians. Only the PEG is authorized to make changes to the plant control logic. During the course of any particular shift, the CCR will be visited and used by process engineers, process operators, and maintenance foremen. Of those using the CCR, some are authorized to both monitor and control while others are limited to monitoring only.

One mission of the PEG is to automate as much of the plant monitoring and control as possible. Over sixty (60) cameras are being installed to monitor operations in remote and unattended areas such as grit and screenings loading stations, primary sludge and scum screening, and the degritting building. Data to and from the field equipment (input/output or I/O) is routed to the control system directly, or through a remote I/O panel or through a programmable logic controller. More than twenty five (25) remote I/O panels and eighteen distributed control units are connected to the CCR. To ensure quick response and resolution to problems in the plant, the CCR is equipped with an interface to the plant maintenance management system.

Future plans for the plant include evaluation of high rate settling for combined sanitary and storm water flows so as to avoid overflow discharge and to upgrade the nitrogen removal process to meet ENR limits. Plant effluent averages 5.7 ppm of total nitrogen with a NPDES limit of 7.5 ppm. New permit for the plant requires a total nitrogen limit of 4.2 ppm.

Charlie, the Photography Man



—By Pearl Laufer and Floyd B. Johnson, Ecoletter *Staff*

Sometimes you never know what you have until you don't have it. That was the case at last year's Tri-Conference when we didn't have Charlie Reichert. He gave us plenty of notice that he would not be able to attend the conference; even so, we could not replace him. Yes we made a good effort and pictures were taken, but the sad reality was that it just wasn't the same. But then again, it would have been unrealistic on our part to expect any one or any group of people to do what Charlie does.

If you attend the annual conference or many other events such as the Short Course, you can not miss Charlie. He's ubiquitous, omnipresent; he is everywhere all the time taking his pictures. And if you attend these events, you stand a good chance of having Charlie take your picture. It's as if he's preparing information for a documentary. He is quite proficient, prolific, and complete. That completeness is fully evident when we meet to plan the issue of the *Ecoletter* after the conference. Charlie comes in with scrapbooks and packets loaded with pictures. We're always amazed at the number of photos, and how well he has them organized. What a treat it is to leaf through all those photos, selecting ones to put in the issue while revisiting the conference through his pictures. One thing always amazes us—pictures of Charlie. Whoever takes them had to have gotten a detailed lesson on camera use. We always try to run these pictures figuring if Alfred Hitchcock can appear in his own movies, then Charlie can appear in the *Ecoletter*.

In the Spring issue of 1988, Charlie first received official recognition as being on the *Ecoletter* staff. At that time no one on the current staff was associated with the publication. Not only is he the longest serving member of our staff, but also he's worked on the *Ecoletter* longer than any one in its 36-year history. Even before Charlie's name appeared on the *Ecoletter* masthead, he had been taking pictures for our publication for many years. His involvement goes back to the infancy of the *Ecoletter*. Without question Charlie is a verified, certified institution.

When I think of Charlie's pictures, I mostly think of the many cover photos and the populated collages (such as the one for the Millennium Short Course) we put together of his numerous people shots. While it is necessary to take the multitude of posed shots, it is the candid, unposed shots where he really shines. Charlie has a knack for catching people intently listening, warmly talking, deeply in discussion, and unaware. Even when he takes the grip and grin shots, his manner helps produce quality images.

It is hard to pick favorite cover photos, however we will try our best.

The startling contrast shown in Winter 1998 with all black cattle in the foreground and suburbia in the background, is a succinct representation of varied sources of runoff and the pace of development.

Later that year in the Fall issue, he captured an Operations Challenge team in busy competition with the words "How America Works" from one of the sponsor's ad's making a perfect caption in the middle background.

The Winter 2000 cover, under the headline, "The Biosolids Puzzle" presents irregular shaped, solids in dried lakebed like scene and simply made the point of the issue that many things have to fit together in deciding what to do with Biosolids.

Sunrises over the Atlantic are classic and it doesn't get much better than Charlie's photo of one for the Fall 2004 issue

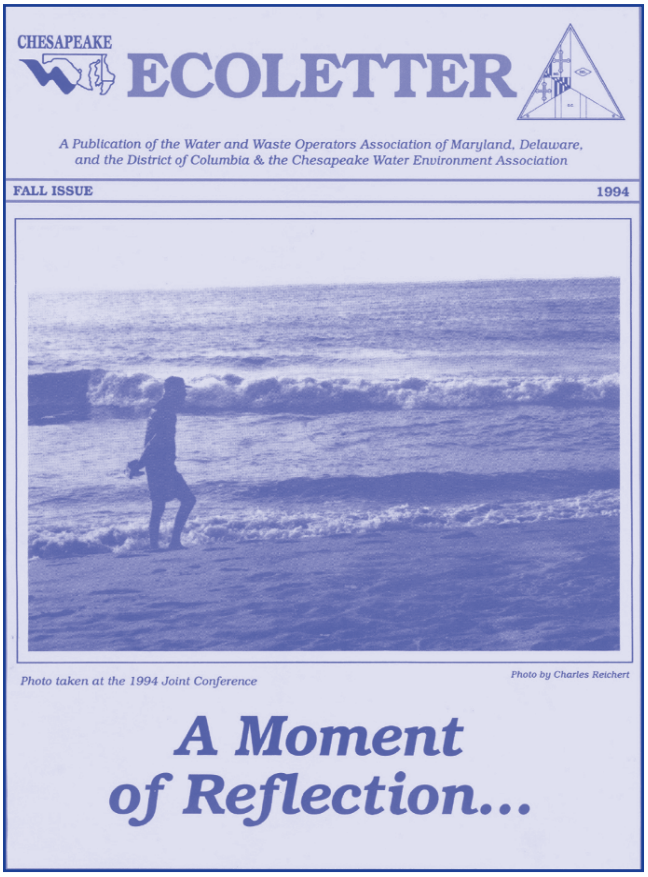
The Spring 2005 cover shows a complex urban excavation site showing pipes everywhere under the headline, "Is This Our Future?" Any one who doesn't think working on urban sewers is very difficult needs to look at this picture.

In recognition of Charlie's dedication to the *Ecoletter* and the organization, he received a CWEA Service Award in 1996. Charlie's extraordinary service to the CWEA was further acknowledged in 2000, when he received the Arthur Sidney Bedell award. We don't have *Ecoletter* awards, but if we did there would be little doubt that Charlie would have received numerous ones.

We are now faced with the task of finding a way to take pictures for the *Ecoletter*. Except that is only part of the problem. How will we uphold the high quality Charlie gave us? Fortunately Charlie will remain with us in a helping and consulting capacity. One thing is for sure; we all owe Charlie a great big thank you for all he's done and for being such a gentleman.

Charles Reichert

Over the last thirty years, Charles Reichert has dedicated himself towards capturing the highlights of our Associations' Joint Annual Conference by serving as the official photographer. On occasion he has caught on film the inspiring Abel Wolman, his Reds declaring that our water is drinkable, an enlightening Ralph Fuhrman, the paradigms of Alan Manning, the legislative vision shared by Bill Hasfurther, and most of our knowledgeable presenters. His unceasing presence has shown our families enjoying the beach, while the operators, engineers, and environmentalists are listening to presentations on the newest treatment and collection system technologies. His quick shutter captures the wonderment of a listener first hearing of a new technique that might solve a facility problem. Many times he has also assisted the Tri-Associations' Short Course Committee in documenting their annual training efforts.


CHESAPEAKE ECOLETTER

A Publication of the Water and Waste Operators Association of Maryland, Delaware, and the District of Columbia & the Chesapeake Water Environment Association

FALL ISSUE 1994

Photo taken at the 1994 Joint Conference

Photo by Charles Reichert

A Moment of Reflection...

Each issue of the Association's newsletter, the *Ecoletter*, contains his work. Pictures are his avocation. Pictures that appear on *Ecoletter's* cover such as a skip jack touring the Chesapeake Bay, sludge cake drying under cover on the Eastern Shore, the late Gerry Slattery meditating as he strolled along an Ocean beach, cattle grazing with apartments in the background, a sail boat docked at the pier on the St. Mary's River or pictures of our conferences compiled into a collage all have come from his camera.

Charles Reichert began working for the City of Baltimore over thirty-seven years ago. Starting as a Chemist at the Patapsco Wastewater Treatment Plant, moving onto Process Control Systems for the City's Wastewater Facilities Division including the Back River Wastewater Treatment Plant, and then onto Geographic Information Systems, he has always remembered our Associations, his employer, and has worked toward presenting a positive image of them in his photographs.

He was encouraged to join the now Water Environment Federation as well as the Water and Waste Operators Association of Maryland, Delaware and the District of Columbia by Harold L. Barrett, Charles J. Catalano, and Jerold D. Wingeart. In subsequent years supervisors like Jay Sakai, Robert Mohr, Amar Sokhey, Jaswant Dhupar, and Gary Wyatt encouraged him to continue improving his skills in support of the *Ecoletter* and the Associations. When attending his second Joint Conference he snapped a few photographs and was encouraged by Gene Vanderbilt and Dick Suplee to submit some of those early photographs to the Associations' newsletter. Years later he was encouraged to join the *Ecoletter* staff. Thus, his skills have brought him with camera to each conference and to many Short Courses.

Two Association events were high points in his life. One was the Annual Awards Ceremony at the 2000 Tri-Association Conference at the Hunt Valley Inn where he received the Arthur Sidney Bedell Award from the Chesapeake Water Environment Association in the presence of his family and friends. The second high point came when the Waste Operators Association of Maryland, Delaware and the District of Columbia made him a Life Member at a Luncheon Ceremony in Ocean City's Clarion Hotel, in the presence many of his colleagues, associates, co-workers, supervisors, and friends. At those two high points and through out his career he met Operators, Superintendents, Engineers, Inspectors, Sales representatives, Company Officers, Directors of Public Works, Department Heads, and Mayors. Many of those individuals have appeared in mini-highlights thereafter.

His hope is that other association members will step forward to fill his shoes in support of the Associations, the Short Courses, and the *Ecoletter*. He hopes that he will be able to work with those folks at a slower pace.

Now, God and life are telling him to slow down. Some of his health issues are keeping him from being dependable, always there. So, he is asking to retire from his position as *Ecoletter* and Conference Photographer. However, he desires to continue to assist the Associations and the *Ecoletter* in whatever capacity that he can.

A or B or 20/20 Hindsight

—By A. Will, JMT, Inc.

Technology is now producing fantastic developments at such a dizzying rate that we can't even keep track of what is now possible. Through the magic of time-space continuum.com, we are able to present you with a choice of two news articles from the future:

CHOICE A:

The Chesapeake Bay Buoy, August 1, 2020. Delaware Governor M. Brace Inertia and Maryland Governor Rollo "Red" Tape will meet today with the Mayor of Washington, D.C., the Honorable I. M. Languid, to discuss the deteriorating condition of the Chesapeake Bay. This forum was hastily arranged after the failure of a last-ditch effort to reduce the DZI. The DZI is the "Dead Zone Index," a complicated computation that is based upon the total square acreage of "dead-zone" area throughout the central region of the Chesapeake Bay. The DZI more than doubled between 2005 and 2015.

Since that revelation in mid-2016, little has really been done to alleviate the problem as regulators, environmentalists, wastewater treatment plant owners, and agricultural groups have all focused intensive efforts on finger pointing and spinning statistics. The last attempt at coordination among these disparate groups was the ill-fated Pocomoke Summit last September. In desperation as the three-day summit neared to a close with no progress made, representatives agreed upon a pilot program to inject large quantities of sodium bicarbonate some 75 feet below the water surface in a randomly selected dead zone in an attempt to "effervesce" some oxygen into the water. All reports on the results of the trial have been sealed or destroyed. The only official announcement was a terse joint press release of six words: "That wasn't a very good idea."

The Chief Executives of the two states plus the District have become directly involved due to the catastrophic impact of the poor health of the Bay upon their respective economies. In addition to the devastating effect upon the shellfish and fishing industries, the tourist industry in Maryland alone is losing an estimated $400 million per year as boaters, swimmers, and fishing enthusiasts travel elsewhere in search of cleaner waters and shores.

Historians trace the current crisis back to the period around 2006 to 2008 when the various clean-water "communities" finally got fed up with one another and began to concentrate their efforts upon informing the public how their counterparts were failing to do their part. Treatment plant owners pointed to "non-point" sources of pollution, especially from agriculture. Agriculture groups cited regulations that drove food prices far above competitive rates, forcing farmers out of business. Environmentalists blamed regulators for lax enforcement. Regulators noted that treatment plant owners have consistently ignored permit requirements that effluent discharges contain "undetectable" levels of phosphorous and less than 0.0 mg/l of nitrogen. The Chesapeake Bay Foundation filed over 200 lawsuits in an eighteen month period against all identifiable parties, stopping only when they mistakenly named themselves as a defendant.

The Buoy was unable to obtain any statements on the record from anyone in any way associated with the clean water industry. As a last resort, we located a Mr. A. Will, a longtime resident of the Maryland Home for the Bewildered. Mr. Will was President of the Chesapeake Water Environment Association about the time that the whole mess started. After a lengthy, irrelevant, and mildly incoherent ramble, he offered, "I guess we should have said something or gotten involved in some way."

CHOICE B:

The Chesapeake Bay Buoy, August 1, 2020. A ribbon-cutting ceremony today marked the official opening of the Jaworski Memorial Clean Water Cooperative Studies Institute. Mr. Jaworski presided as the Guest of Honor, although he voiced strong opposition to the use of the term "Memorial" in the facility's name. (It was explained to him that the Institute was intended to serve throughout the remainder of the millennium, so it is assumed that the term will eventually become appropriate. This approach will avoid the need to modify numerous signs and stone carvings at some point in the future.) The JMCWCSI will provide a center for advancing the model of cooperation credited with saving the Chesapeake Bay, thereby boosting the economies of Delaware, Maryland, and the District of Columbia, among other states.

The Institute traces its roots back to the later years of the first decade of this century. At that time, the Chesapeake Bay was undergoing an environmental crisis, considered by many to be at a critical crossroads for survival. Regulators, environmentalists, wastewater treatment plant owners, and agricultural groups were largely at odds with one another as each felt the pressure of their own vital role in the future of the Bay.

The Chesapeake Water Environment Association was then little known outside of its own membership. A

regional Member Association of the national Water Environment Federation, CWEA is a non-profit association of water environment professionals. Members include employees of sewage authorities, consultants, vendors, regulators, and others with common interests in clean water. According to Mr. R. Sharpe, unofficial Historian for CWEA, the association membership had long been an under-utilized resource, possessing widespread knowledge, experience, and perspective across a range of industry roles, ages, and geographic locations. CWEA's members and leadership became increasingly aware that conflict among the various "communities" associated with clean water was draining away energy and resources that could better be applied to the problems. The foundation of this new perspective was a realization that all of the parties seemingly at odds with one another had the same, overriding common interest—clean water for health, aesthetics, and economy.

Combining a formidable storehouse of knowledge and experience from older members with a surge of energy and creativity supplied by an influx of young professionals, CWEA began to establish itself as a trusted authority in the water environment field. Through seminars, workshops, conferences, etc., the association began to build communication bridges to bring together groups with common interests but different perspectives. Gradually, trust began to replace suspicion and blame and previously misplaced effort was applied to real solutions. Once this transformation in the process had begun, the real accomplishments began to show up in the form of dramatic improvements throughout the Bay and its watershed. Today the Chesapeake Bay is recognized around the world as a model for thriving environment in coexistence with a large human population. And because of that recognition, water environment professionals from around the world will now visit the JMCWCS Institute for instruction on teamwork, unified purpose, and collaboration.

Obviously, these two articles will not both appear. But we get to make choices now and over the next few years that will help decide which one might be printed.

Agriculture—The Big Beast

—*By Floyd B. Johnson,* Ecoletter *Co-editor*

I spent my career in wastewater treatment. Not working in that field now, my thoughts and actions are more into the non-point source world. That means among other things, agriculture gets more of my attention—for example I volunteer at a CSA (Community Supported Agriculture) farm. Having grown up around my grandfather's farm it might be said I've come full circle, except his farm, and many like it, are long gone. The farms of today are bigger and much more mechanized than my grandfather's, and are more polluting. In the Chesapeake Bay watershed, agriculture activities are the largest source of nutrients and sediment. There will be no clean-up, no restoration and no progress in improving Bay water quality without the participation of the agriculture community. The trouble is, there is so much to do.

What makes agricultural activities in the watershed particularly troublesome is that they are largely animal, and not crop based farms which are less polluting. Large-scale chicken and turkey operations along with dairy and beef farms are numerous. All these animals must be fed and that's a big problem. Only a small portion of the livestock is fed with locally grown crops. By and large, food (think nutrients) is brought into the watershed for these animals. As we all know, the last thing the Bay needs is more nutrients. The importation of food, along with air deposition from out of watershed sources, is the Bay's chief immigration problem. A further sign of how bad this is, is the expanding transport of litter and manure (think nutrients) out of the watershed. Not only can't the waterways take any more nutrients, but also neither can the soil. From a purely nutrient balance point of view, it's insanity to continue to bring enormous quantities of nutrients into the watershed. I won't even get into the pollution caused by the transporting of all these nutrients.

A central issue when talking about agriculture is not only the farms but also the farmers. In contrast to point sources where a fairly small number of organizations operate facilities, many individuals and businesses perform agricultural activities. Whereas enforcement of standards is well established and closely followed in point sources, enforcement is an immense challenge in agriculture. On top of that, farmers are independent, self-reliant (ok, I'll not talk about government subsidies), business people. Their focus has always been on planting, growing, harvesting and taking things to market. Sure you can appeal to farmer's sense of what's right, moral ethics and an expanding awareness of being stewards of the land, but the decision to reduce nutrient discharges has to be based on good business practices and enforcement of standards. Like any business, farmers are entitled to a fair profit, and like any business they must be made responsible for their pollutants. And like any one, they should not have anything rammed down their throat without explanation or cooperation. There's an old corny saying that applies here; you don't bite the hand that feeds you. A clear case must not only be made by showing agriculture people how their activities are harming the Bay, but also equal clarity must be shown in telling them what must be done, and how they can do it.

Another important issue here is us. More to the point, what we eat, how we are fed, and what we pay for it all. Back a few generations, we were more connected to the land and what we ate was mostly grown at or near to where we lived. We ate crops in season and canned the excess for the cold weather. Fast food did not exist, and obesity was uncommon. Now because of the vast transportation network, we eat anything, anytime, from anywhere, and all too often. One of the reasons that the Bay watershed has a high livestock concentration is the limited growing season. You can grow animals year round with modern transportation. By just about all measures, the production and productivity of agriculture is extraordinary. Crop yields and animal growth rates have risen to levels unimaginable just a few decades ago while the number of farms and farmers have shrunk. Each farmer and each acre feeds hundreds of people. To paraphrase Winston Churchill, never was so much owed by so many to so few. Actually we don't owe that much. Food is a bargain. Part of that bargain comes with an environmental cost. In addition to high nutrient and sediment loads coming from agriculture activities, there are bacterial and chemical loads that we're still learning about. Simply put, the treatment, mitigation, and disposal techniques of the residue and byproducts have not kept pace with the technological race of agriculture.

Any discussion on environmental problems stemming from agriculture must get into money. Something is amiss when one of the largest sources of pollution receives less than 10% of all money spent to restore the Bay. Something is amiss when the US Department of Agriculture (USDA) spends only $62.5 million (out of $60 billion) each year on Bay area farmer's environmental problems. Making the situation worse is a disparity of spending by the USDA. Nationally farmers receive 9 cents of federal funding for every $1 of farm production. In the Bay region, farmers only receive 4 cents for every $1 of production. This year the US Farm Bill will be reauthorized. Hopefully our farmers will get a fairer shake in future funding.

I'm old enough to remember when wastewater treatment plants were considered pollution sources. We worked long and hard to improve our plants and educate the public that we aren't polluters but enhancers of water quality. That same kind of work (and money) will be needed if agriculture is to fully join the effort to restore the Chesapeake Bay to the goals adopted by our elected officials. One of the most important events in the history of agriculture was the domestication of animals. An important event in the history of the Chesapeake Bay will be the environmental taming of agriculture.

The New Challenges that BNR and ENR Create for the Wastewater Treatment Plant Operator

—By Michael Rumke, Loudoun County, Virginia Sanitation Authority

The most immediate challenge for anyone dealing with Biological Nutrient Removal (BNR) and Enhanced Nutrient Removal (ENR) is knowledge. Many operators are beginning to get a handle on BNR. Seminars are being tailored to meet these needs. Nitrification and Denitrification are terms that still create confusion. One uses air and one does not. The big question is WHY. The next big question is why we should care.

An analogy that might be used is one of heart surgery. It is a fairly good assumption that none of use will ever perform heart surgery. Yet the majority of us know what causes heart disease and how to prevent its occurrence. With this in mind, knowing more about BNR will help prevent nutrient occurrence in our receiving waters. Yes, we all know that only one person makes process decisions at most facilities. How that person makes those decisions is a direct result of information provided. If we know why we need mixers with no aeration in one zone of our basin we will be more apt to keep the air off and the mixers on. If we know why the air being used is set to maintain a 1.5 mg/L dissolved oxygen level, we will make the effort to keep the DO meters in perfect operating conditions. If we understand the nitrogen cycle, we will know why anoxic zones work at various locations in our basins.

If you are "old school" you probably remember Trickling Filters and how your major concern was keeping the orifices cleaned. The technology that has rained down on our profession makes many long for the good ol' days. Instrumentation could be viewed as the invention of the wheel. Computers would be the combustion engine. Technology is a scary thing. This is due to a lack of understanding. The two technologies are separate yet dependent upon one another.

We had instrumentation long before process control computers. Computers can be our best friend or our worst nightmare. The nightmare comes from their accuracy. They are seldom incorrect. They never forget. They report everything. These same traits make them an invaluable friend. We can now trend any point of contact in our facility. We can determine the cause of our upsets and overflows. We can be awakened at home by an automated alarm paging system that will contact us 24-hours a day.

We can also be overloaded with data and reports. One has to ask, "What is being done with the information?" If the answer is—nothing—then would be a good time to disable that part of the report. The information would still be available, but only upon request. Another consideration is the range of measurement. If one is measuring a pH that is fairly stable at 6.8 units, do you really need a data range of 1 to 14 units, or would 5.0 to 8.0 units be a more acceptable range? The fluctuation in the trend is enhanced as the measuring range is tightened. This makes a pH of 7.2 units stand out like a sore thumb. That throbbing thumb tells you (or your chemical pump) that less lime or caustic is required. Or maybe it is telling you that your chemical pump is malfunctioning.

As an operator/technician, it is always better to see any changes exaggerated. As you flip from screen to screen on that computer at 3:00 in the morning, all those "soft" lines tend to blur. Striving to tighten the trend ranges provides that at-a-glance line that tells you something is not correct. One word of caution here—if you are using any of your process control data for Effluent Permit reporting, those trends should be full range to capture the value of non-compliance.

The veteran operator/technician has always had a sixth sense for bad weather. They do not wait for the storm to arrive. Many preventive measures are performed as the news of the storm is broadcast. The effort is to mitigate the surge flows and line scours that we all know are coming. Dust off that High Flow procedure the moment the weatherman says "Chance of rain." Each rain event should be followed by a review of this procedure and an update. There are times when the staff is overwhelmed and comments in the log book may be confusing or non-existent. A review at the end of the event provides an opportunity to refresh memories.

Finding out that your only backup barscreen may need some minor widget adjustment is not something you want to happen after the flow doubles. Testing equipment manually the day before the big storm may save you from a costly overflow. Are all the influent pumps in working order and primed? Are they pumping to specifications? Is that 10-mgd pump only putting out 7-mgd? With the technology available, checking pump performance can be done from the computer terminal. Right now some of you are twitching and shaking your heads. You are thinking, "You can't start pumps from the office—what if something happens." Let's break this down. Most wet wells operate pumps on a Lead/Lag process. Somebody, somewhere programmed those pump controls to start and stop pumps when the flow changes. Usually, there is no one around when this occurs. And let's face it, when the flow doubles, these pumps will come on in the lag position… unattended.

We have just moved to the next logical step. Under a controlled setting, we can start a pump and verify that it is pumping from the computer in front of us in a matter

of minutes. Routinely changing the pump sequence will aid in keeping the system in a ready state. This process can work at all locations in a plant. The return activated sludge pumps is just another example. Does this apply to all pumps? NO. Those mega-million gallon pumps may indeed need some personal attention. And the plant manager may have reasons for operating differently.

The point of preparing for the high flows is important to ENR. You will now have some processes that enjoy consistency. How you prepare for those high flows will directly impact the performance of your facility. What steps are available at your facility? Are there extra units that can be placed in service. Are you allowed to by-pass any process? If so, what determines when to by-pass and how much can be allowed to by-pass? Just because we can by-pass doesn't mean we should fully open the by-pass. A by-pass means a reduction in treatment. It is not a recommended event. Our job is to treat as much product as possible to the best of our facility's ability.

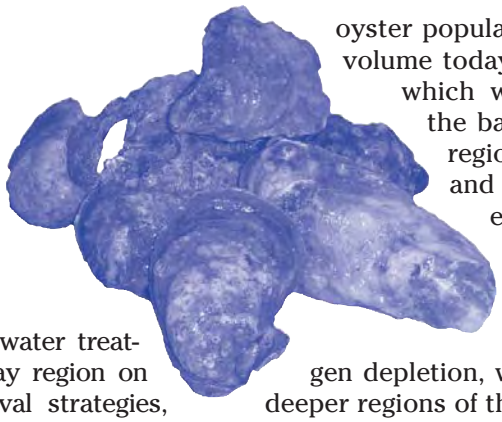
What is headed our way? Enhanced Nutrient Removal (ENR) has been around for a while. There are a few books available on the subject at WEF but they are not listed as "ENR." They are titled to the specific process. Meaning, if you don't know what processes are used to perform ENR, you may have some trouble finding some basic literature.

There are the internet search engines. These searches provide many links to manufacturers of the processes. Using an internet search engines provides some interesting results. If you type in ENR you are provided with very little information about treatment processes. The Engineering News Record shows up quite a bit—surely this is not by accident (operator comment). There are 7.2 million listings under ENR and if you had the time you may find some data on nutrient removal. Better results are achieved when searching with "Enhanced Nutrient Removal." Use the parentheses for a more selective search. This will provide a mere 9,000 sites to view. Collecting articles, vendor literature, and government guidelines yielded a quick 46 page starter manual after a mere three weeks of sifting data. There was plenty more to view.

With the ENR starter manual in hand it was now time to look for training. If one looks at this year's Short Course offerings, a wastewater student may find the water courses a bit interesting. Is it possible that our technologies are one and the same? Almost always have been, why change now? The change is in the training thought process. Does a wastewater person dare to take a "Water" class? Does the water class instructor dare to apply for wastewater recertification credit? The smart money demands a resounding YES to both questions.

Restoration of Chesapeake Bay Water Quality

—By Kelly Spivey, JMT, Inc.



With emphasis in the municipal wastewater treatment industry in the Chesapeake Bay region on ENR treatment levels and nutrient removal strategies, some have questioned how the goals of the 2010 Chesapeake Agreement will be met if reductions from point source discharges alone are not enough. One strategy for decreasing nutrients and improving overall water quality in the Chesapeake Bay is to restore the oyster population in the bay. As part of the 2010 Chesapeake Agreement, a commitment was made to increase the oyster population ten-fold from the year 2000 oyster population.

Oysters were once the most prevalent fishable species in the Chesapeake Bay, but since the 1980's, oyster populations have declined rapidly due to disease, over-harvesting, and loss of habitat. Large oysters are capable of filtering up to 2 gallons of water per hour, and at one point, oyster populations were numerous enough to filter the entire water volume of the Chesapeake Bay in a week. It is estimated that it would take the current oyster population over a year to filter this same volume today. Furthermore, oyster populations which were once widespread throughout the bay and existed even in the deepest regions of the bay have been destroyed, and current oyster populations only exist in the shallow regions of the bay and its tributaries. This distinction is an important one as a major concern for the Bay's water quality is summer dissolved oxygen depletion, which is of greatest concern in the deeper regions of the Bay.

Oysters improve water clarity by filtering phytoplankton and suspended solids from the water. Additionally, they remove nutrients such as nitrogen and phosphorus which can help to limit algae and phytoplankton growth. Improving water clarity aids the growth of submerged aquatic vegetation (SAV), which contributes to increased dissolved oxygen levels and provides habitat for many aquatic species including blue crabs, striped bass, and sea trout. Oyster bars also help protect SAV from waves and currents which can uproot sea grasses and stir up sediment which further blocks sunlight from reaching the SAV.

With all of the benefits oysters can provide to the Bay ecosystem, the question is not whether or not to revive the declining oyster population, but how to successfully

Continued on page 27

Don Jacobs Moves On

—By Floyd B. Johnson, Ecoletter *Co-editor*

At the end of April 2006, Don Jacobs retired from the WSSC after working over 31 years for that organization. The last 26 years of his WSSC career he was the Plant Superintendent of the award winning Piscataway WWTP in southern Prince George's County, Maryland.

In addition to his work at Piscataway, Don has been an active member of CWEA where he chaired the Public Education committee for many years. In this role he has been a true ambassador for our industry. His leadership of the Adopt a School program, school science fairs and the local Jr. Stockholm Water Prize has made future water professionals out of school kids, and raised the awareness of many others to the importance of wastewater treatment and water quality. At his retirement party, two parents spoke of how much he made a difference in the lives of their children.

Always a person who likes to take vacations and travel the world, Don and his wife, Pat now travel just about full time. Last year he sent numerous dispatches on his trip to Alaska and out west. This year the dispatches come from the sunny south of Florida. We hope he stays involved in our industry and organizations, most of all we wish him continued happy trails.

Pat and Don Jacobs

What is it All Going to Cost?

—Peter J.H. Thomson, PE, Ecoletter *Staff*

What it will cost to complete the cleanup of the Chesapeake Bay is a question that is at the forefront of many minds these days. Unfortunately, no single answer is available and the alternatives that present themselves are incredibly unsatisfying. The bottom line is that we don't really know what the cleanup effort is going to cost, but we do know that it will cost a lot, that the cost estimates are increasing on an almost daily basis, and we know that the amount that has been allocated to fund the clean-up is woefully inadequate.

Capital and Annual Costs by Jurisdiction

Jurisdiction	Capital Costs	Annual Costs
Delaware	$ 60,000,000	$ 13,000,000
District of Columbia	$ 368,000,000	$ 34,000,000
Maryland	$ 2,069,000,000	$ 262,000,000
New York	$ 405,000,000	$ 66,000,000
Pennsylvania	$ 1,940,000,000	$ 320,000,000
Virginia	$ 2,901,000,000	$ 407,000,000
West Virginia	$ 232,000,000	$ 37,000,000
Total	$ 7,975,000,000	$ 1,139,000,000

CAPITAL COSTS

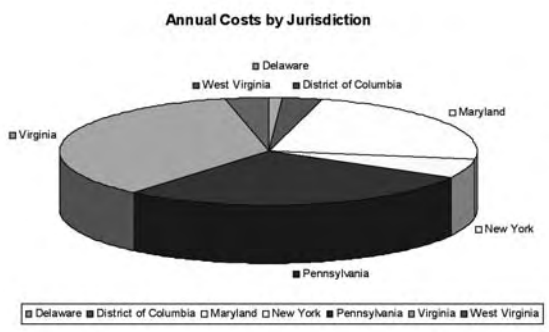
The best data that is available for the capital costs to reduce nutrients and sediments come from a September 2003 US EPA, Chesapeake Bay Program Office report titled Economic Analyses of Nutrient and Sediment Reduction Actions to Restore Chesapeake Bay Water Quality. According to this report, the costs will be on the order of $8 billion! What's more the annual costs, for operations and maintenance and, generally maintaining the program, will be more than $1.1 billion! Now, these costs date from prior to the 2003 report and one of the answers to the original question indicated that the costs are likely to increase. So, what are they now? In October 2004, The Chesapeake Bay Blue Ribbon Finance Panel issued a report titled Saving a National Treasure: Financing the Cleanup of the Chesapeake Bay. In this report, the panel estimated the total costs of the cleanup, which they estimated using the individual jurisdictions' Tributary Strategies, at more than $28 billion. They also said that the costs were rising and that this may not be a high enough estimate. So, where is all of this money going? Virginia and Maryland have the largest totals, each more than $2 billion, with Pennsylvania running a close third with just less than that. The majority of the expenditures will go toward urban and treatment plant costs, though other estimates for the costs for upgrading on-site systems have been much higher than the $68 million shown in the 2003 report, possibly large enough to be the largest value here.

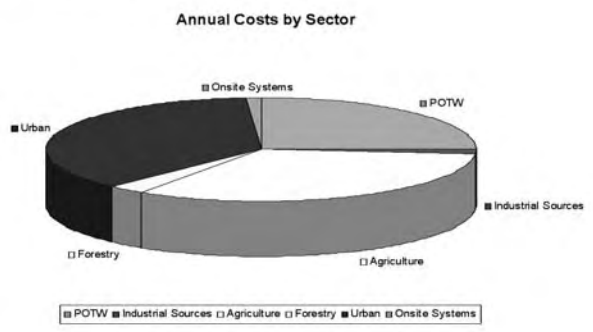
Capital and Annual Costs by Sector

Sector	Capital Costs	Annual Costs
POTW	$ 3,087,000,000	$ 286,000,000
Industrial Sources	$ 98,000,000	$ 15,000,000
Agriculture	$ 1,490,000,000	$ 376,000,000
Forestry	$ -	$ 31,000,000
Urban	$ 3,233,000,000	$ 418,000,000
Onsite Systems	$ 68,000,000	$ 13,000,000
Total	$ 7,976,000,000	$ 1,139,000,000

These are really big numbers, but, when you look at them in comparison to the size of the regional economy, they don't seem so daunting. The 1999 annual personal income in the region totaled to more than $610 billion (taken from the 2003 report). Even the highest available estimate is that the total cost of the Bay cleanup is less than 5% of the annual

Annual Cost Summary





income. The annual income in the region has grown substantially since 1999 due to the excellent economy and these estimates are certain on the low side of the current conditions.

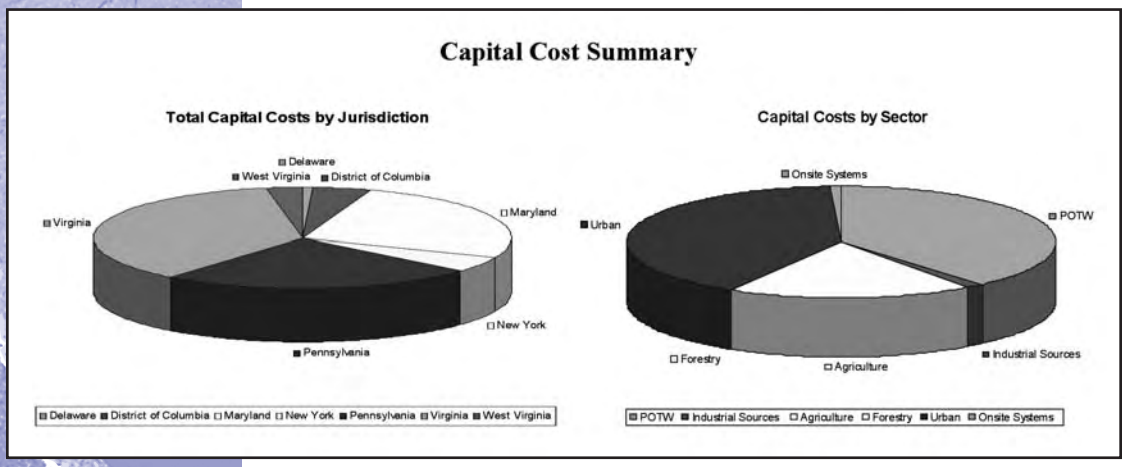
Annual Personal Income

Jurisdiction	Total Annual Personal Income
Delaware	$ 24,600,000,000
District of Columbia	$ 21,600,000,000
Maryland	$ 178,800,000,000
New York	$ 47,400,000,000
Pennsylvania	$ 134,700,000,000
Virginia	$ 197,400,000,000
West Virginia	$ 5,600,000,000
Total	$ 610,100,000,000

ANNUAL COSTS

The annual costs to maintain the installed systems, operate the treatment plants, and keep the agricultural programs going make the capital costs seem small. The 2003 report estimates the annual costs at more than $1.1 billion! These are costs that will be incurred year after year in order to keep the Bay healthy. If we fund the capital costs, but do not fund the annual costs, we will make little or no difference in the health of the Bay.

The cost estimates show a slight difference from the capital costs, with Virginia again accounting for the majority of the costs, but Pennsylvania coming in second, followed by Maryland. By far, the largest share of the annual costs will go to the urban program, with agriculture coming in a close second, followed by treatment plants.



Again, the annual costs are not large when compared to the size of the regional economy, amounting to only 0.2% of the annual personal income in the region.

SO, NOW WHAT?

There are a number of groups, including the Chesapeake Bay Program and the Blue Ribbon Panel, that will continue to work to procure funding for the program and to ensure the cleanup of the Bay. The Blue Ribbon Panel has proposed a Federal/State-funded grant program of $15 billion to fund the cleanup. The proposal is for $12 billion to come from the Federal government and $3 billion to be funded by the State governments. This program is believed to be able to provide funding to, at least, get things moving in the right direction. It would certainly be appreciated by those of us working on a daily basis to upgrade treatment plants, replace septic systems, protect and construct wetlands, etc.

Area outlined in white shows the Chesapeake Bay and its's watershed area.

Asset Management Seminar

Joint effort of the Collection System and Plant Operations & Maintenance Committees

—By Jeff Cantwell, Isco, Vice-chair, CSC

On Friday, May 12, 2006 the Collection Systems Committee and the Plant Operations & Maintenance Committee jointly presented a seminar on Asset Management. Early reports from the attendees indicated the seminar was a success. Eighty-five students-for-a-day enjoyed twelve different sessions, as well as the facility and cuisine of Mitags (Marine Institute of Technology and Graduate Studies).

The seminar was structured to offer a joint track in the morning and a dual-track in the afternoon. The morning joint track started with CSC chair Ted DeBoda of URS offering some opening remarks. Ted was actually able to include a good sewer joke, not a small feat for an early morning talk. (Be sure to ask Ted to repeat the joke for you next time you see him.) First speaker was Steve Allbee of the US EPA who provided an EPA perspective on asset management. Steve's talk focused on the projected gap between asset needs and asset funding. Next up was Glynn Stoffel of the Maryland Center for Environmental Training to discuss program driven maintenance. Glynn talked about the value of applying intelligent scheduling to maintenance as opposed to the practice of waiting for failure. Hiram Tanner of DCWASA followed with a discussion of his organization's asset management program. Hiram brought a large municipality perspective that he has seen first hand as the manager of Sewer Pumping for the District of Columbia's Water and Sewer Authority. Final speaker of the morning was Steve Shofar of WSSC. Steve provided an overview of WSSC's negotiation and compliance with their consent decree.

Following a fabulous lunch which featured ropa vieja (literal translation is old clothes, but that did not describe the taste), the attendees broke into two groups.

The group labeled "A" followed this schedule:

- *Building a better business case for funding infrastructure through asset management* by Wayne Miles of CDM in Raleigh, NC
- *Enterprise infrastructure management—the complete picture* by John Hoynacki of Wallingford Software in Fort Mill, SC
- *Sewer scanning technology* by Stu Bowns of Hydromax in Louisville, KY
- *SCRAPS—sewer cataloguing and retrieval system* by Andy Lucas of Brown & Caldwell in Milwaukee, WI

The "B" schedule was:

- *Demystifying asset management infrastructure* by Michael Sweeney of EMA
- *Getting reorganized for asset management* by Marcus Jennings of WSSC in Laurel, MD
- *Technology supporting best practices* by Mike Sweeney of EMA
- *Capital efficiency, how and why we prioritize capital projects* by Myron Olstein of Black & Veatch

Each talk provided current and cutting-edge knowledge on its asset management area of focus. Attendees were exposed to some thinking from outside their own organizations, along with a national perspective. TRE credits were offered for the afternoon sessions, which was beneficial for those keeping-up their credentials.

Some of the attendees claimed that they enjoyed Mitags so much that it influenced their decision to attend. Mitags offers a campus-like setting that is well suited to seminars of this type. The auditorium offers stadium seating, and the classrooms provide comfortable chairs and a professional setting. Mitags' food is remarkable. The lavish spread for the morning and afternoon breaks was only surpassed by the incredible buffet-style lunch served in their cafeteria. They are conveniently located near BWI Airport, not far from most of the CWEA membership. Parking is ample at the facility. For speakers and other attendees traveling from out of the area, if you don't like the numerous airport hotels within a few miles of Mitags, then you can always stay right there at Mitags. Mitags has its own hotel. The price of the room includes the lavish Mitags dinner and breakfast.

The seminar was the culmination of months of planning and hard work by both committees. Scott Wells of WSSC chairs the Plant Ops group, which was instrumental in many areas of arrangement including recruiting speakers. Ted DeBoda of URS is the chair of the CSC, which arranged the facility, some of the speakers, and other logistics of this seminar. Priscilla Brown of URS, an active member of the Young Professionals, volunteered her talents to provide excellent brochures and hand-outs.

The Collection System Committee strives to host one or two small seminars each year. In the past year they hosted a lunch time seminar in February on "Wastewater Capacity Management Plans." This seminar was held at the Chesapeake Exploration Center in Chester, MD, and was well-attended.

Other activities for the CSC include participation in the Short Course. Wednesday afternoon and all-day Thursday have been Collection System days. Ten of our CSC members teach courses on various aspects of collection systems, including: SSO rule, effective sewer cleaning, pump station O&M, emergency response, CMOM, flow measurement, physical survey, CCTV and rehab.

Last Summer's issue of the *Ecoletter* was a true Collection System Committee edition. There were seven articles from the CSC covering a variety of collection system topics. This was by no means the only time the CSC submitted articles to the *Ecoletter*. Many past issues contain reports from our members.

To learn more about the Collection System Committee, please contact Ted DeBoda at (302) 791-0700 by phone or ted_deboda@URSCorp.com by email. To learn more about the Plant Operations & Maintenance Committee, please contact Scott Wells at (301) 206-4224 by phone or swells@wsscwater.com by email. If you plan to attend the Joint Conference in Ocean City this summer, be sure to stop by the passport event to learn about each CWEA committee.

Restoration of Chesapeake Bay Water Quality

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restore oysters to the bay in the most cost effective means. The greatest challenge to restoring the oyster population is how to protect introduced oysters from parasitic diseases such as MSX and Dermo, which are known to be present in high numbers in the bay and have been the main cause of failure for previous attempts at restoring the oyster population.

Researchers have made great progress in farming both disease-resistant native oyster strains, as well as non-native oyster species which may also thrive in the Bay environment. Unfortunately, many legislative road blocks exist for introducing non-native species to the Bay, and current 'pilot projects' have been allowed for sterile non-native oysters only. Additionally, due to the vast resources that will be required to jump start the oyster population, careful consideration must be given to where these new oyster habitats will be created in order to maximize their benefit, and ensure their survival.

This leads to another point in the oyster debate: restoring the oyster population to the bay will not be a 'quick-fix' solution to the Bay's water quality problems. In order for oysters to have an effect on nutrient reductions in the Bay, the oysters must be in an oxygen rich environment. Oysters assimilate only 70% of the organic material that they intake; the remaining mixture of organics, sediment, and nutrients get deposited as nutrient-rich biodeposits back into the surrounding water for bacterial consumption. In oxic environments, these nutrients are broken down into nitrate and nitrite by aerobic bacteria. In this form, the nitrogen is quickly converted to nitrogen gas and released to the atmosphere. In anoxic environments, anaerobic bacteria cause ammonia to be re-released into the water, for consumption by algae. Therefore, introducing oysters into the deeper regions of the bay, where depleted dissolved oxygen conditions are most likely to occur, will not maximize the benefits of the oyster populations, and in fact, little benefits to water quality may be seen. A better strategy is to introduce oysters into areas of higher water quality, and allow the population to gradually improve and expand into areas of lesser water quality, i.e. the deeper bay regions. This will of course take time for noticeable improvements in Bay water quality to be seen.

Despite all this, oyster restoration is still an endeavor worth pursuing. Oyster restoration has been modeled as part of the overall Chesapeake Bay Model, developed to help regulators determine the most effective means to improve water quality in the Chesapeake Bay. Using this model, researchers predict that increasing the oyster population in the bay ten-fold from the 1994 population may improve nitrogen reduction by 1%, chlorophyll a, used to measure algae growth by 6% and increase dissolved oxygen by 3.7%.

Additionally, most recent estimates of nutrient contributions from atmospheric deposition predict that as much as 30% of the total nitrogen in the bay may result from this largely uncontrollable source. Nitrogen in atmospheric deposition is thought to originate from power plant exhaust towers in the Midwest, and automobile exhausts from all over the east coast. This source of nutrient contribution will not be alleviated by measures to reduce point source nutrient discharges, or efforts to improve run-off quality. Using oysters to improve water quality from the 'bottom up' may be the best way to control nutrient releases from all of the many point and non-point source contributors.

The cost required to meet the goal of a ten-fold increase in the Chesapeake Bay oyster population will be substantial, but with smart planning and correction of previous oyster restoration mistakes, the cost expended may yield significant improvements in Bay water quality. By focusing on placement of new oyster populations and continued research into disease-resistant oyster species, a foundation may be built for restoring the Bay's oyster population and in turn improving many facets which will lead to improved water quality. Restoring the oyster population will lead to an increase in SAV, a decrease in algae populations, and an increase in habitat for many species which are important to this region both economically and ecologically.

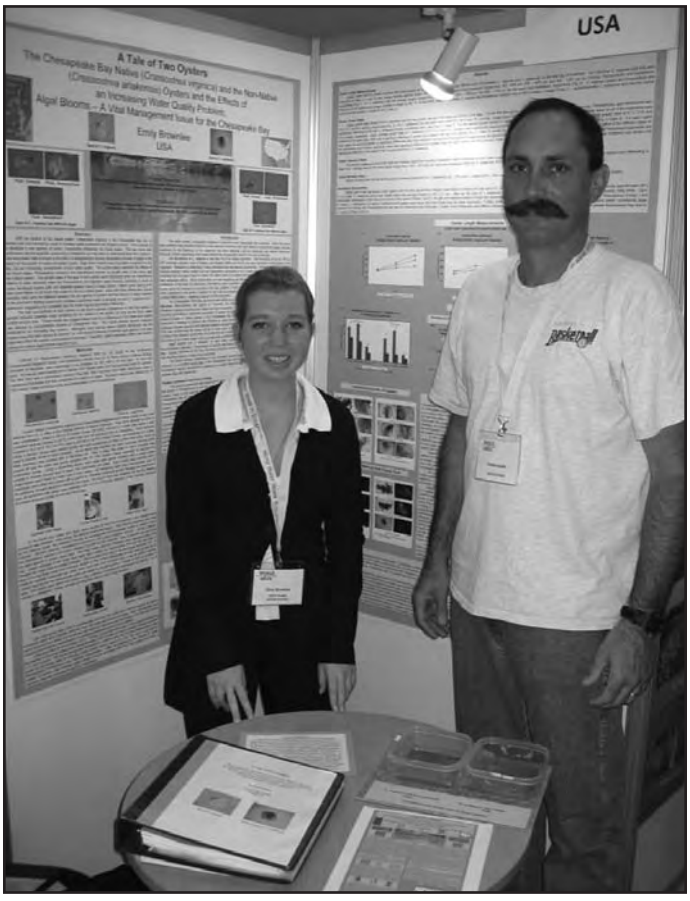
Smart restoration efforts and an appreciation of oysters for their ecological value, not just their economic value, will allow improvements in water quality to be gained, and in turn will help meet the nutrient reduction goals of the 2010 Chesapeake Agreement.

Stockholm Junior Water Prize
Winners of Regional Competitions in Maryland

—By Kathleen Kharkar, Metcalf & Eddy, Inc.

The Stockholm Junior Water Prize (SJWP) is the most prestigious international youth award for a high school water science research project. Its purpose is to encourage youth interest in the water environment, and to sensitize them, as future leaders, to local and global water challenges. SJWP is open to projects aimed at improving the quality of life through improvement of water quality, water resources management, water protection or water and wastewater treatment.

Created in 1997 by the Stockholm Water Foundation, the SJWP was established internationally to mirror the adult Stockholm Water Prize (SWP). The Stockholm International Water Institute (www.siwi.org) facilitates the award and ITT Industries is the sponsor.



Emily Brownlee and her teacher Mr. Gustin in Sweden

HRH Crown Princess Victoria and HM King Carl XVI Gustaf are patrons to the SWP.

The Water Environment Federation (WEF), and its member associations, are the organizers of the competitions in the United States with support from ITT Industries and The Coca-Cola Company. The U.S. SJWP competition consists of three levels: state, national and international. This tiered competition approach generates participation for a wide variety of projects from all over the country. Generating student interest in water environment issues is a great benefit to WEF.

Emily Brownlee, US Winner SJWP

Regional Competition

Several members of CWEA graciously agreed to spend a Saturday morning last spring visiting eligible projects at regional science fairs in Maryland. Kevin Selock selected Jarrett Remsberg as the winner of the Frederick County competition. Jarrett's project was titled "Removal of Estrogenic Compounds in Dairy Waste Lagoons by Ferrate (IV): Oxidation/Coagulation."

Brittany Earnest investigated polymer addition to digested sludge from the Back River Waste-water Treatment Plant. Mark Behe and Sharon Cole were the CWEA members to choose her project as the winner for the Anne Arundel County competition. Don Jacobs judged two regional competitions before he set off to see the world. He chose Emily Gore as the winner in Charles County with her project "Efficient Algae Control—Is It Possible?" and the team of Yue Claire Li and Yegene Cha as the winner in Baltimore County. Robert Tuttle and Naveen Krishnamurthy visited the

Montgomery County Science Fair and selected Kelly Hinkle as the winner for her project "The Effects of Nutrient Concentrations on the Chesapeake Bay Watershed." Naveen also joined Salil Kharkar to judge the water-related projects presented at the Prince George's Area Science Fair, which include schools from Prince George's, Calvert and St. Mary's counties. The SJWP regional winner at that fair was Emily Brownlee, who also won the regional prize last year.

Presentation of SJWP Plaque to Calvert High School, Prince Frederick, Maryland, June 2006. Left to right Charles Gustin (Environmental Science Teacher), Kathleen Kharkar (CWEA), Emily Brownlee (Maryland SJWP winner), Gene Bridgett (Calvert High School Principal)

State Competition

The winners of the regional competition prepared and submitted papers on their projects to participate in the Maryland competition. A panel of CWEA judges reviewed the papers and the competition was very intense. The state winner was Emily Brownlee. Her paper was titled "A Tale of Two Oysters—A Vital Management Issue for the Chesapeake Bay." CWEA presented Calvert High School with a special plaque in recognition of Emily's accomplishment and the support she received from, her science teacher, Charles Gustin and the school's principal, Gene Bridgett. In addition, CWEA funded her flight to Atlanta, Georgia to compete in the National Competition.National Competition

Emily was named the U.S. winner of the SJWP during a June 24th ceremony at the Georgia Aquarium in Atlanta, Georgia. Brownlee's project was selected from a pool of 44 state SJWP winners at the national competition held in Atlanta, June 22–24.

With the decline of the native oyster, Crassostrea virginica, in the Chesapeake Bay due to disease and overharvesting, ways to increase oyster production are of great concern. One proposal that has stirred controversy is the introduction of a new species of oyster, Crassostrea ariakensis, the Asian oyster. It is however uncertain how the growth of newly set oysters would be affected by the annual phytoplankton blooms in the bay. Emily Brownlee examined and compared the effects of two species of blooming algae on the growth rates of both native and non-native oysters. Her results show high susceptibility of both oysters to the algae species Karlodinium in their first growth weeks, which indicate major potential problems for oysters as long as the water quality of Chesapeake Bay remains poor. The study also suggest that there is a possible difference in how the two oyster species are affected by phytoplankton blooms, implying that oyster managers must identify where oysters would have the best chance for survival when accounting for where algal blooms regularly occur.

"The degradation of the quantity of native oysters in the Chesapeake Bay has been of considerable concern," explains Dr. Charles Sorber, SJWP Nominations Chair. WEF awarded Emily $3,000 and an all-expense paid trip to Stockholm, Sweden, where she competed against more than 30 countries for the international honor during World Water Week, August 20–26, 2006. Calvert High School received a $1,000 grant toward enhancing water science education and Brownlee presented her research at WEFTEC.06—the Water Environment Federation's 79th Annual Technical Exhibition and Conference in Dallas, Texas.

International Competition

Emily traveled with her environmental science teacher and several members of her family to the international

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Stockholm Junior Water Prize

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competition in Sweden in August 2006. The trip included a seven-day educational and cultural exchange program for the international students. H.R.H. Crown Princess Victoria of Sweden presented the Prize on August 22 to Weng Jie, Xiao Yi and Wang Hao. They were a team from China who were awarded a US $5,000 cash award and a blue crystal sculpture crafted in the shape of a water droplet for their project "Application Research and Practice of a Comprehensive Technology for Restoring Urban River Channels Ecologically." This year the jury also decided to award two other countries with "Diplomas of Excellence," which consist of a diploma and a US $500 award to each one. Both teams had projects related to increasing water efficiency in agriculture. One team, Satomi Kosho, Sae Nishino and Naomi Sugimoto, was from Japan and the other, A.P. Mihirani Kethumalika, G.D. Uthpala Rathnayake and J.M.A. Chathurika Rathnayake, was from Sri Lanka.

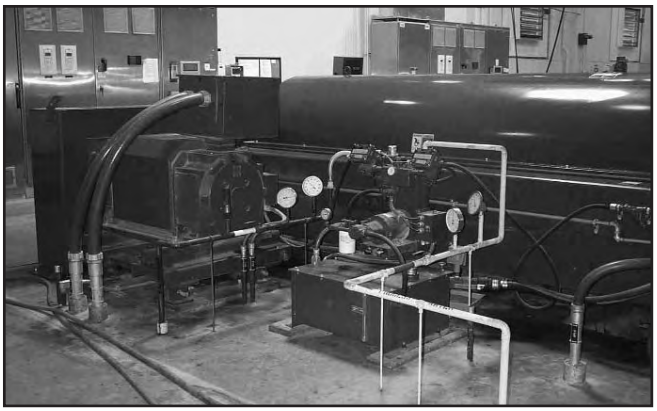
Princess Victoria of Sweden and Emily Brownlee

Students before the Royal Banquet during the SJWP International Competition

Cost Effective Centrifugation

—By Jim Worthington, Vice Chair, CWEA Plant O&M Committee

On Thursday, November 16 2006 the CWEA's Plant Operations and Maintenance Committee sponsored a one-day training event entitled "Cost Effective Centrifugation." About 45 operators, supervisors, engineers, maintenance personnel and others from both the water and the wastewater fields attended the



class. The instructor, Mr. Peter LaMontagne, is a highly qualified expert on the topic. Mr. LaMontagne has been an independent centrifuge consultant for the last five years, focusing on operator training programs, centrifuge optimization, field testing, industrial process development projects, consulting on centrifuge repairs and upgrades, and brokerage of used centrifuges. Prior to setting off on his own, Peter worked for Sharples / Alfa Laval for about twenty years where he served as a technical manager responsible for the process development of the PM and DS series of centrifuges used at hundreds of plants both here and abroad. Some of his responsibilities with Alfa Laval included testing, scale-up and startup and optimization of many of the P, PM, XM, and DS series of decanter centrifuges made by Alfa Laval Sharples.

Mr. LaMontagne's training experience is quite extensive: He is a sponsor of wastewater courses in California, Colorado, New York, Pennsylvania, Texas, and Virginia. One of the first courses he developed was "Cost Effective Centrifugation," which deals with the optimization of thickening and dewatering centrifuges. Other courses developed are specific to engineers, centrifuge manufacturers, and the process industries. He has conducted centrifuge schools in over a dozen states. Additionally, Peter writes quite extensively, contributing often to such publications as Water Environment & Technology Journal, Operations Forum, and WEF Manuals of Practice. He is serving as the lead author on the chapters on thickening and dewatering for WEF's revision of Manual of Practice, MOPII, (2006 Revision).

The course covered a wealth of information about centrifuges, including:

1. A basic description of what's going on inside the machine, including discussion about pond settings, bowl speed and G-forces, Scroll differential speed and it's relation to torque.
2. Which variables affect the centrifuge and what control the operator has over them. These variables include items such as, sludge quality expressed in terms of primary to waste activated sludge ratios, torque settings, feed rates of sludges and polymer, location of polymer addition point, and desired output cake quality.
3. How to optimize centrifuges to produce the product that is desired,
4. How to choose and then use polymers and to verify that the polymer delivered is actually the polymer tested.
5. Troubleshooting centrifuges and polymer systems.
6. How to perform jar testing.
7. Maintenance considerations for making centrifuge operations easier and more reliable.

At the end of the day the class was treated to a field trip to the dewatering building of the Little Patuxent Water Reclamation Plant where they observed an Alfa Laval D-706 centrifuge and the RDP Class A stabilization process in operation.

Chairman's note: The Plant O&M Committee is very grateful for Jim Worthington's leadership and hospitality, which made this seminar a great success!

Are your open-channel meters accurate?
How a $5,000 Meter Saved a City $300,000

—By Jeff J. Cantwell, Teledyne, Isco
Email: jcantwell@teledyne.com

The City of Lowell, MA had quite a surprise when they installed an area-velocity meter in series with an existing flume. Not only did the two not agree, but they disagreed by a significant amount. Which one was correct, the flume that had been installed 25 years earlier, or the new area-velocity meter? With billing of $25,000 per month between Lowell and Tewksbury, the stakes were high.

The project to supplement the existing flume with an area-velocity meter is part of a CSO reduction plan. During high flow conditions, Lowell will use their collection system as temporary storage by adding some downstream control structures. This storage will cause a controlled back-up in the system, which is calculated to submerge the existing 24" Parshall flume at the Burnham Road Metering Station. Since area-velocity meters can measure submerged flow with ease, the City of Lowell, along with their design engineer The Maguire Group, added the Isco area-velocity meter to this station. The plan was to have the flume provide the primary read during normal flow conditions, and have the area-velocity meter read during submerged flow conditions. Submergence would be determined by reading level at two points of the flume (H_a and H_b) and allowing their PLC to use a standard flume calculation.

The area-velocity meter was installed during normal dry-weather flow conditions. Once good readings were established, the project team looked for correlation between the existing flume and the new area-velocity meter. They were disappointed to see the area-velocity meter reading nearly double the flow rate of the flume. Naturally, the project team assumed that the Parshall flume was the standard by which the newcomer should be judged. Bob Mack, the Isco representative for New England, was quick to defend the area-velocity meter. He has seen the Isco technology leap over the past fifteen years to provide very reliable and accurate flow readings. In this installation, which Bob assisted, the setting was done with great attention to detail. The readings are strong, and the onboard diagnostics of the meter indicate dependability. Bob was sure the Isco area-velocity meter was right.

If the area-velocity meter was right, then obviously the flume had to be wrong. The team looked for clues that this may be the case. The first visual clue was the approach pattern to the throat of the flume. Flumes require that "The approaching flow should be well distributed across the channel, and relatively free of turbulent waves. Generally a site with high velocity of approach should not be selected" [Isco Open Channel Flow Measurement Handbook, fifth edition, p. 65]. Standing

Figure 1: Flume throat

waves, as seen in the approach of this flume, indicate either an improper approach velocity or flow in excess of the flume rating. This was enough to merit an investigation by Lowell's engineers and a third-party flow expert.

Bruce Blades of CDM, the City's CSO program consultant, prepared an engineering memorandum summarizing his observations of the current flow conditions. According to Bruce's report: *The primary flow element is a conventional manufactured Parshall flume. It has a 2-foot throat, with dimensions matching a conventional flume and is installed level and straight. The flow enters the station through a 48-inch diameter pipe. The plans for the original installation show the pipe entering the vault at an angle of 8 degrees 30 minutes with a slope of 0.00031. Measurements were taken on August 9th that indicate the angle is about 4 degrees, 43 minutes and the slope greater than 0.007. The invert of the pipe and the floor of a transition section before the flume are at the same elevation as the flume inlet section. The floor of the transition section is also very close to level.* Bruce noted that the measured slope is 20 times greater than the designed slope. He also observed that the transition from the Tewksbury interceptor to the flume was skewed, causing an imbalance in the approach

Figure 2: CDM picture of approach skew

velocity pattern. His report noted that the level transmitters being used at the flume were out of calibration. He verified that the specifications of the area-velocity meter matched the requirements of this project, and that its settings were proper for this installation.

Paul T. Carver and Paul Levine of Maguire Group made a series of measurements to confirm the observed flume problems. Their physical measurements started with velocities across the channel at two locations: 5 foot upstream of the flume and at the flow (level converted to flow) measuring point of the flume (H_a). They were able to confirm that the flow was in the "super critical" regime. According to Maguire Group's report: *The definition of sub and super is most easily remembered as related to the critical depth line of any channel for a 'given' flow rate. In hydraulics of open channel flow, this means that there are 'two' possible depths in any channel for any 'given or same' flow, one above the critical depth line and one below.* In other words, the unintended supercritical flow condition had caused the depth measurement at H_a of the flume to correlate to the wrong flow rate.

Figure 3: Maguire Group's temporary energy dissipater

To visually prove that the approach velocity was causing the inaccuracy, Maguire Group employed a little "Yankee Ingenuity;" they held a large wooden board in the upstream flow approach to dissipate the energy *(see picture)*. The results were a dramatic and almost instant increase of the flume flow reading to agree with the area-velocity meter.

The next step was to bring in an independent third-party expert in flow measurement. When Bob Mack phoned Paul Casey of Flow Assessment Services (Manchester, NH) to inform him of the emerging situation and see if Paul could help, Paul said: "You would not believe how many of these situations my company addresses each year, and how many flumes or weirs are proven inaccurate."

Flow Assessment Services reviewed the reports by CDM and Maguire Group. FAS suggested installing a third meter to see if it would correlate with either of the first two meters. FAS selected, with the client's approval, the Isco area-velocity meter. After careful installation of the meter, and a thorough measurement of the pipe I.D., the readings of the temporary area-velocity meter matched the existing area-velocity meter. The temporary check meter was left in place for a period of 60-days, and the readings posted on an internet site for the convenience of all parties. The results were conclusive: the two area-velocity meters agreed, and the existing flume agreed with these readings when the upstream velocity problems were addressed.

Figure 4: Isco area-velocity meter probe

Mike Stuer with the City of Lowell worked hard with CDM, Maguire Group and Flow Assessment to find ways to increase the accuracy of the existing flume. None of these proved to be practical. The team decided instead to supplement the area-velocity meter with a redundant ultrasonic meter. The two independent level measurements track well, so the team has developed assurance in those readings. The velocity readings provide good diagnostics, so both sides of the Q=V*A basic flow equation are satisfied with reliable readings. Unlike the flume, the area-velocity meter provides a wider range of flow measurement from low flow through surcharge conditions.

Summary & conclusion: a blind assumption that a flume or weir metering site is accurate could be costly for the biller or the billee. Flume or weir flow measurement systems can be quite accurate, but must be used within their sometimes narrow range of proper conditions. If the conditions for the flume or weir fall outside their capability, the resultant inaccuracy is almost impossible to predict. Beyond a normal, periodic calibration check of the flow meter, consider doing one or more of the following:

- Install another flow meter in series with your existing meter
  - Area-velocity meters are portable and fairly easy to install
    - These are available to lease
    - Flow service professional service companies can install one for you on a temporary basis
      - And make sure it is installed correctly
    - Make sure you choose one that is accurate
      - This means stable, accurate level
      - This means true average velocity
- Perform a dye dilution calibration of the flow
  - This is done in-situ
  - Will require the services of a specialty company
  - Considered to be +/- 2% accurate
- Perform a thorough visual inspection of the metering site
  - Read-up on the right visual clues in an engineering handbook (such as the Isco Open Channel Flow Measurement Handbook)
  - If in doubt, contact your engineering firm or a flow service professional organization

Collection System Maintenance Can be Proactive

David Hofer

—By Ted Deboda, URS Corporation

A luncheon seminar entitled "Moving from Reactive to Proactive Operations in Sewer Maintenance," on November 3, 2006 provided the basics for setting up an organized preventive maintenance program. The seminar was conducted by the CWEA Collection System Committee at the Nauti-Goose Saloon in scenic North East, Maryland. The location was convenient to the many municipalities that attended from both Maryland and Delaware, and provided a parking area for equipment displays after lunch. A total of 51 Wastewater professionals from both public and private sectors attended the seminar.

The first speaker was David Hofer, P.E., who was the most recent recipient of the Water Environment Federation Collection System award for his lifetime achievements in sanitary sewers. Mr. Hofer has over 30 years of experience in New Castle County in all aspects of sewer operations and engineering. His presentation, entitled "How to Establish a Basic Sanitary Sewer Preventive Maintenance Program," gave useful and easy to follow guidelines for both small and large municipalities to establish a proactive maintenance program. A basic program does not need to be complex, and all that is needed is a map of the system and a method for documenting when lines are maintained. Work can be grouped by geographic areas, which should be revised as workers make recommendations for more efficient operations. A side benefit is continual improvement and updating of sewer mapping. The program also needs to be monitored to be sure a balance is maintained between increasing expectations for the amount of sewer cleaned and making sure cleaning is being done effectively.

Kevin Penoza, P.E., an engineer in the Operations Division of New Castle County's Department of Special Services, presented the county's proactive approach in assessing sewers under roads scheduled for paving. The program, which was initiated about 5 years ago, involves a coordinated effort with DelDOT to identify planned paving projects, determine which projects are located over county sanitary sewers, and assess the sewers. This assessment starts with prioritizing pipes by age, material, and other site specific factors. Higher priority lines are than televised using NASSCO's Pipeline Assessment Certification Program (PACP), and repair requirements are determined. Serious problems generally require detailed coordination with DelDOT to either delay work while repairs are made by the county, or incorporate the work into the DelDOT project. While the coordination of this step can be very difficult and fast paced, the payoff of having sound infrastructure under new roads provides significant cost savings and eliminates requirements to dig up newly paved roads.

Root Control in the sewers was the third topic presented by Dick Eubank from Baltimore County. Mr. Eubank has been responsible for management of both Engineering and Operations of sanitary sewers for over 35 years. He teaches collection system operations and has earned respect locally and at the national level for his contributions over the years. His presentation keyed in on the fact that when chemical treatment is used for lines with known root problems, maintenance can be performed on other sections of line. In other words, chemical root control enhances your preventive maintenance program by allowing your jet trucks to concentrate on the rest of the system. His implementation of a chemical root control program in Baltimore County resulted in an increase in the amount of sewers cleaned while decreasing the cost per linear foot of sewer maintenance. He finished his presentation with photographs of extremely impressive root masses pulled from some of the Baltimore County sewers.

After lunch and an opportunity for networking and telling fish tales, participants were invited to the parking lot to get the tour of some of the equipment used for preventive maintenance. TRB Specialties brought a CCTV truck and provided demonstrations on how the cameras are used and maintained. Cecil County Department of Public Works displayed their Combination Vehicle and described how the jet and vacuum are used to clean lines. The vehicle is also equipped with a camera that can assess the effectiveness of the cleaning when necessary.

Participants were provided useful and easy to follow procedures for establishing a preventive maintenance program for their municipalities. They also took advantage of networking opportunities with both municipal and private counterparts. In all this was a very informative seminar for all those involved with sanitary sewer collection systems.

Joint Water Reuse Committee

—By Scott Crosswell (sbcrosswell@stearnswheler.com) and Brian Aylaian (brian.aylaian@m-e.aecom.com)

The primary goal of the Joint Water Reuse Committee is to provide technical information and promote research in support of reclaimed water and its beneficial use to utility, regulatory, consumer, environmental, and legislative audiences. To promote the goals of the committee, each year the committee arranges a seminar to present current water reuse topics including successful case studies, emerging technologies and regulatory updates. On June 8th 2006, the Joint Water Reuse Committee held a seminar at the Maryland Department of Environment offices in Baltimore, MD. The focus of this year's seminar was "public perception." Public perception is a key factor in determining the success of a water reuse project. Regardless of the available technologies, effective communication of the benefits of water reuse is imperative to ensure a successful project. Environmental benefits, as well as public health assurance are important issues that shape public perception. The seminar was extremely successful with approximately 70 attendees. The keynote speaker was Patricia Tennyson, a senior vice-president with Katz & Associates, a public relations consulting firm out of San Diego, CA. Ms. Tennyson has developed and managed communication, government and community relations, and public affairs and media strategies for water and wastewater agencies including the Honolulu Board of Water Supply, San Diego Water Department, West Basin Municipal Water District, El Paso Water Utilities, Aurora Water, Detroit Water and Sewerage Department, San Antonio Water System, City of Tampa/Tampa Bay Water, and King County, Washington.

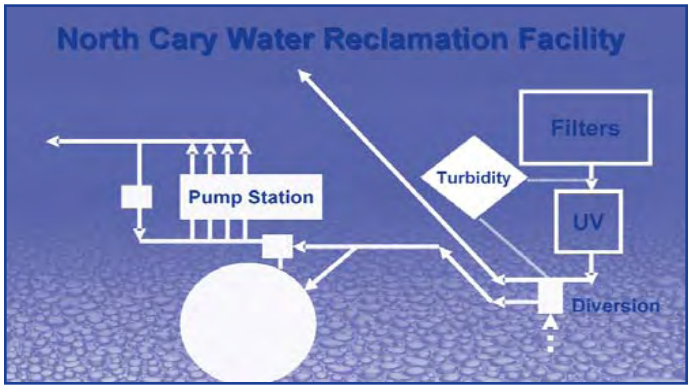
During Ms. Tennyson's presentation titled, "Is there a Magic Wand that will guarantee Public Support for my Recycled Water Project?", she discussed the role of public outreach and involvement in successful recycled water projects, reviewed the risky business of recycled water communication, and provided some tips for water reuse professionals who will meet the public.

Patricia Tennyson

Ms. Tennyson's presentation was followed by presentations illustrating how water reuse projects are being regulated and implemented in the Mid-Atlantic region. Wayne Miles, a project manager with CDM, was involved in the study, design, construction, and start-up phases of the Cary reclaimed water system. Mr. Miles presented The Town of Cary Reclaimed Water System: Implementation, Operation, and Plans for Expansion. The presentation included an overview of the

reclaimed water facilities that have been constructed at both the North Cary Water Reclamation Facility and South Cary Water Reclamation Facility. Implementation of the reclaimed water program has impacted multiple facets of the Town's public works and utilities operation. As part of the reclaimed water program, the Town has established a public information program, created a reclaimed water ordinance, created a position of Reclaimed Water System Coordinator, and placed a renewed emphasis on cross connection control and backflow prevention programs. The reclaimed water facilities for both the North Cary Reclaimed Water Program and South Cary Reclaimed Water Program have been fully operational for five years. The presentation also included a review of design and system start-up issues, review water usage data from the project, and strategies the town is using for expansion of the reclaimed water system.

Wade Miller, the Executive Director of the Water Reuse Association, discussed the different funding sources for water reuse projects including local, state



national and those internal to the Water Reuse organization. He also presented a few of the most recent projects funded through Water Reuse Association.

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Joint Water Reuse Committee

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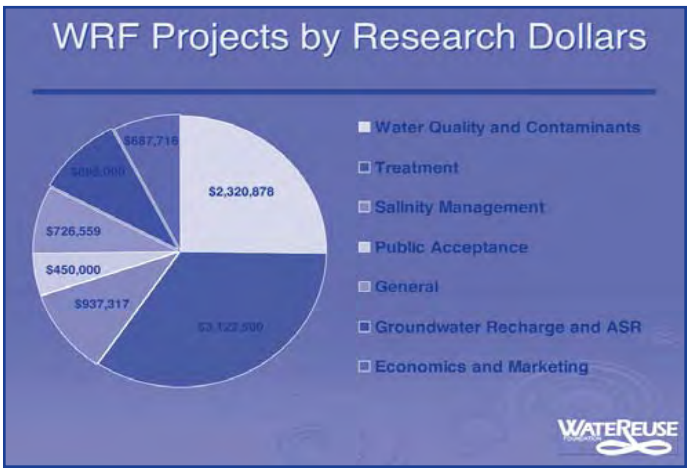
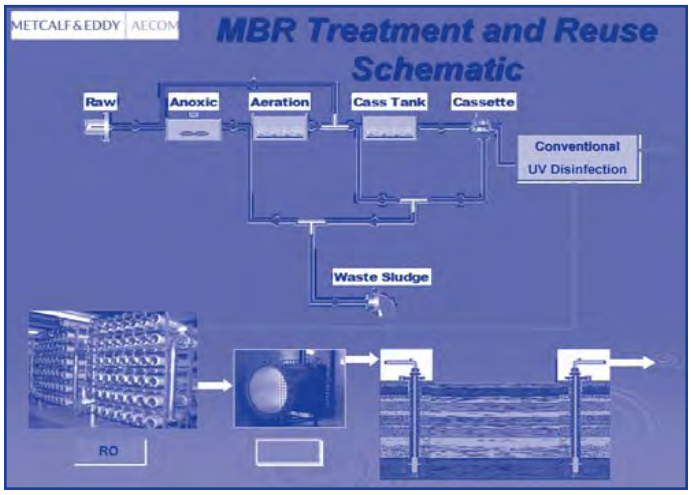
Tom Doherty (Dynatec Systems, Inc.) designed and built a 50,000 GPD membrane bioreactor (MBR) system



that treats and purifies the wastewater generated in a Manhattan, NY high-rise building for reuse within the building. The Helena Building is a 38 floor, 600 unit residential tower that is a model for resource efficiency, environmental balance and green construction. A silver ranking from the Leadership in Energy and Environmental Design (LEED) was the central focus for the project. The system has reduced water consumption by approximately 50%.

Anthony Elberti, a senior engineer for Metcalf & Eddy, presented Aquifer Recharge using Multiple Barrier Treatment: Exploring the First Indirect Potable Reuse Project in the Northeastern US. Logan Township Municipal Utilities Authority was awarded a $4.1 million

demonstration grant from the NJDEP to develop an indirect potable reuse treatment and injection system based on an upgrade at the existing wastewater treatment plant (WWTP) to replenish potable groundwater supplies, the first of its kind in the northeastern US. The multiple barrier treatment train incorporates membrane bioreactors (MBR) which provide a high sludge age and a physical barrier to microbes and organics; reverse osmosis (RO) to remove dissolved contaminants and provide a second microbial barrier; and an advanced oxidation process (AOP) with UV light and hydrogen peroxide to provide final disinfection as well as oxidation of any ultra-low molecular weight organics. The NJDEP does not currently have regulations or guidelines for indirect potable reuse; therefore, the LTMUA-M&E team has been working closely with regulators since the project commenced to ensure that public



health is protected and appropriate water quality criteria are set. Since reuse, particularly indirect potable reuse, is new to citizens in this region, public education is a very important component of this project's success.

The Future of Water Reuse in Virginia: Certain and Evolving, was presented by Valerie Rourke, the Wastewater Residuals and Water Reclamation and Reuse Coordinator for the Virginia Department of Environmental Quality in the Office of Water Permit Programs. Ms. Rourke discussed the regulatory framework for Water Reuse in the commonwealth of Virginia. She described the progress of the Technical Advisory Committee's efforts to prepare technical Regulations for Water Reclamation & Reuse in Virginia. Her presentation also included some discussion on public perception in the context of the regulations being developed.

Regulation of water reclamation and reuse in Virginia

- **Currently, no regulations or guidelines specifically for water reclamation and reuse**
- **Some activities that may be considered forms of water reclamation and reuse (i.e., irrigation with treated effluent) have been authorized under VPA permits and rarely under VPDES permits**
- **Technical advisory committee has been assembled to develop proposed regulations for water reclamation and reuse**

Common Ground in Private Property I&I

—By Ted Deboda, URS Corporation

Over 90 sanitary sewer professionals gathered for a luncheon seminar on May 4, 2007 entitled "Private Property I&I" at the Dutch's Daughter Restaurant in Frederick, MD. This seminar was the most popular luncheon seminar since the collection system committee has been providing these seminars, suggesting that private property I&I is a common problem in sanitary sewers. Interested consultants and municipalities came from Maryland, Delaware, Pennsylvania and Virginia to learn more about how municipalities are handling I&I on private property.

Jeff Cantwell, Chair of the Collection System Committee, provided a brief description of upcoming committee events, and introduced the speakers. The first speaker was Paul Calamita, a lawyer with Aqua Law. Mr. Calamita presented the Legal Perspectives on Private Property I&I issues. His discussion included an outline of dozens of methods of addressing I&I from private property used by various utilities. Interestingly, Paul recommended using incentives to encourage customers to comply rather than heavy-handed penalties.

One of the initial issues to overcome is expenditure of public funds on private property. Municipalities have legal responsibilities with performing proper Operations and Maintenance of the system, managing capacity, and controlling and eliminating SSO's and CSO's. Since private property I&I affects the ability to manage these requirements, and private laterals make up 30–60% of the entire utility, the removal of private property I&I serves the public good, and it is important that municipalities consider the use of public funds.

There are some common issues that can be addressed in a number of ways. Most municipalities have code that limits private property I&I. Some actually prohibit all I&I, which may be unrealistic since 100% removal is difficult and may be impossible to achieve. Another legal issue that should be codified is the utility's right of access to inspect private property. Such inspections need adequate access to find sump pump connections, french drain connections, and floor drain connections in basements, as well as outside access to inspect roof drains and cleanouts.

Actual correction of I&I sources is a major issue that needs to be overcome. While the utilities can exercise the authority to require property owners to perform the work at their expense, incentive programs can be a much more palatable method of working together with the customers. Incentives such as reimbursing customers for performing the work imply that the customers are hiring their own contractor to perform the work, keeping liability for potential related damages with the property owner and not the utility. Reimbursement programs can be established to provide a percentage of the costs back to property owners. The reimbursement generally uses a cap or maximum percentage of the costs, and utilities can be involved in reviewing the costs with the property owners.

Mr. Calamita recommended programs be developed with the assistance of a Citizen's Advisory Group to help educate the public on regulatory requirements and to obtain public participation when developing such a program.

Kelly Derr, P.E., of Hazen and Sawyer presented "The Comprehensive Lateral Investigation Program (CLIP) for the Miami-Dade Water and Sewer Department. The final report for this program was released in February, 2007. The program involved the investigation, a public outreach program, and comparisons of different inspection and rehabilitation methods.

As mentioned in the first presentation, Mr. Derr stressed the significance of private laterals on the entire system, and the utility's responsibility to address it. He also stressed the importance of a public outreach program to inform the public of common goals and allow participation in developing a solution. Also, shared funding of the corrective actions worked better than other funding methods.

The most effective testing was air testing, and sewer rehabilitation including lining the laterals with top-hats or T-Liners were the best rehab methods. Grouting laterals was not a highly recommended solution because of the potential for drying at elevations above the normal water level.

Dick Eubank of Baltimore County gave a final presentation that illustrated the ease with which cleanouts can be repaired. Baltimore County's program involved identifying problems with cleanout caps that allow excessive inflow. When identified, property owners are asked to allow a crew on the property to make the repair. Failure of property owners' to allow access are referred to code enforcement personnel, who will send a violation notification to the property, which may require property owners to perform the repairs themselves. This only happened for one property owner, who eventually saw the wisdom of allowing access of county crews to make the repairs.

Mr. Eubank stressed how a minimal expense (a $3.00 cleanout cap) can eliminate very large quantities

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Common Ground on Private Property I&I

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of inflow. The actual work takes an average of less than one half hour. The contact with property owners also provides an opportunity to achieve better customer relations and education.

After lunch and an opportunity for networking, participants were invited to see an actual lateral inspection by the Town of Frederick. The lateral inspection can be performed from the collector sewer without the requirement for access to the property.

The moral of the story is that all sanitary sewer utilities need to consider the condition of the private portion of the system, including sources of extraneous flows into the sewer. The private portion can make up over 60% of the entire system, and cannot be overlooked. For that reason, public education through public meetings or active participation in Citizens' Advisory Groups is critical to any I&I reduction program. Funding sources and the most appropriate corrective actions must be considered carefully based on past experiences.

The presentations from all three speakers are available for viewing on the CWEA website: http://www.wwoa-cwea.org/training.html.

On November 2nd, 2007, the CWEA Collection System Committee will be hosting a full-day Private Property I&I seminar at the Marine Institute of Technology & Graduate Studies in Linthicum, MD. For more information about upcoming seminars, please visit our events web page at http://www.wwoa-cwea.org/calendar.html. If you are interested in joining the Collection System Committee, please contact Jeff Cantwell at (610) 918-3857.

CWEA President Message

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- WEF–CWEA SPCC Workshop held at Baltimore, MD, September 2006
- WEF–CWEA Nutrient Conference held at Baltimore, MD, March 2007
- WWOA–CWEA Spring Meeting, Laurel, MD, April 2007
- Seminars by Plant O&M Committee, Collection Committee, and Joint Water Reuse Committee during May 2007
- CWEA, WWOA, CSAWWA Short Courses, Emmitsburg, MD, June 2007
- Ed Norton Gulf Outing by Collection Committee in June 2007 at Lutherville, MD
- CWEA–WWOA Joint Conference, Ocean City, MD, August 2007

I appreciate and commend committee members for bringing quality programs for members' benefits and success of the organization.

Make sure to visit the CWEA web site at http://www.wwoa-cwea.org to view listing of CWEA upcoming events.

We would like to send out most of CWEA program announcements by E-mails for timely delivery and to minimize printing and mailing costs. For this purpose, we need your correct E-mail address. About 33% of E-mails are presently returned as undelivered. If you are not getting CWEA program announcements by E-mail, contact Kim Dighe (CWEA Administrative Assistant) at kimdighe@verizon.net and provide your correct E-mail address along with mailing address, telephone and fax numbers, so she can get your record corrected, or you can update your WEF member profile yourself by visiting https://www.e-wef.org/timssnet/login/tnt_login.cfm?redirect=CUSUPDATE.

Let me know (bharat.o.desai@usa.dupont.com) if you have any suggestions for improving CWEA activities.

Thanks to all for giving me an opportunity to serve as President for 2006–07. It has been an honor and privilege.

WWOA President Message

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> "Volunteerism is the willingness of people to work on behalf of others without the expectation of pay or other tangible gain."

Please Help

This is where your help is needed. The WWOA can not survive and carry out its mission without the steady infusion of volunteers. We have numerous elected offices and committees throughout the association that need to be filled on an annual basis. Many hard working volunteers are serving today as a committee of one. The burden of full time work, coupled with cutbacks in the work force at many facilities, is making it increasingly difficult for a relatively few volunteers to serve the masses. We need you.

If you have never served—please consider it.

If you have served in the past we could use your help and experience.

Please contact your local association representative or any main body board member today to Volunteer.

Energy Management Seminar Touched on Wide Range of Topics

—By Chip Wood, Ecoletter *Staff*

Approximately 85 people attended the seminar "Energy Management Techniques for Wastewater Treatment Plants" produced by the CWEA Operations and Maintenance Committee. The seminar was presented on May 4, 2007 at Baltimore City's Back River WWTP. The excellent program consisted of slide presentations by an array of ten super-qualified experts. A bound booklet containing copies of all the slides presented was handed out at the start.

Primer on Energy Related Terms

The seminar kicked off with a primer on energy and power. Work is equivalent to Energy, and means moving a force thru a distance, e.g., carry 100 lbs up a vertical distance of 10 feet and you have done 100 x 10 equals 1000 ft-lbs of work. Work/Energy can also refer to the heat required to raise a certain mass up to a higher temperature. Units of energy or work include: foot-pounds, BTU, joule, kilowatt-hour, and horsepower-hour.

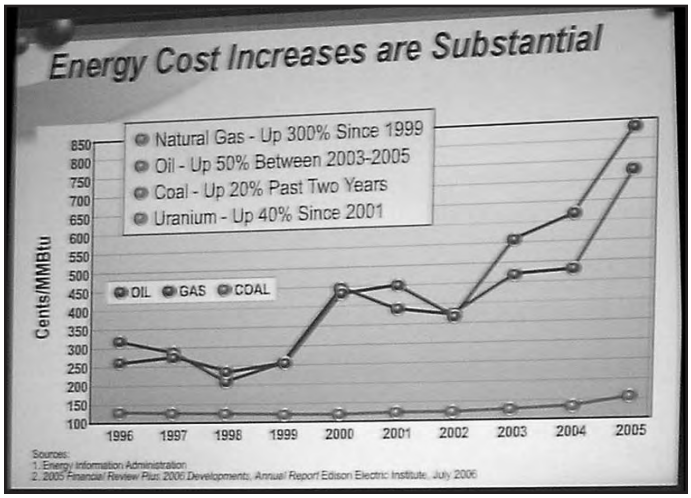
Power is Energy or Work done during a certain Time period, e.g., carry 100 lbs up 10 feet in one minute. You have exerted power at the 100 times 10 equals 1000 ft-lbs per minute. A Watt is a unit of electrical power that is represented by a current of one amp flowing from a pressure of one volt. Units of Power include: horsepower, watt, kilowatt, and BTUs-per-hour. All of the Energy and Power units are related by appropriate mathematical conversion factors. For example, one horsepower is approximately equal to 746 watts.

In the electric power utility field, Energy quantity is usually computed by taking Power times a Time period, e.g., kilowatts (kw) times hours equals kilowatt-hours (kwh).

Cost of electrical Energy is computed by taking the Power expended times the Time period times the Cost Rate. For example, 10 kilowatts times 5 hours times a rate of $0.09-per-kwh equals a $4.50 monetary charge. Cost of electrical Energy Demand is computed by taking the maximum (or peak) power demand, i.e., KW (or kilowatt) that occurs during a certain time period and multiplying it times the cost per KW. 1000 KW times $0.10-per-KW equals $100 in demand charges. Efficiency is the term used to evaluate energy usage and is computed by taking the energy (or power) going into a pump or unit process and dividing it by the energy (or power) going out. In real-world published articles, the terms Power and Energy are often used interchangeably.

Urgent Need for Energy Management

About four years ago, costs for energy were typically 30 % of a plant's total annual budget. Now the energy costs exceed 40 % of the budget and the costs are still going up. Natural gas has gone up 300% since 1999. Oil went up 50% between 2003–5. Coal went up 20% in the past two years, and uranium is up 40% since 2001. Time of Use (TOU) pricing is causing electric bills to be higher. And typically peak flowrates at the plant occur during peak electrical power demands, so the plant pays a demand charge penalty. Moreover, as the equipment ages in the plant, it usually becomes less efficient at the same time the energy costs are increasing. Also keep in mind that the energy required for water and wastewater treatment is expected to increase as greater levels of treatment are implemented to meet new regulations.



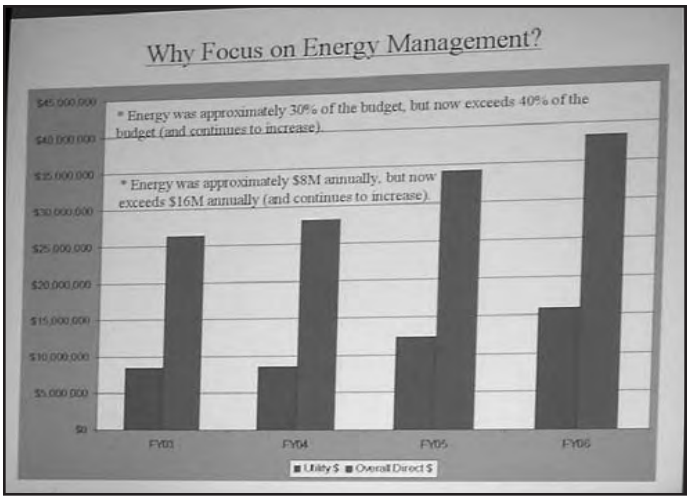
Energy cost for a plant has increased from 30 % to 40 % of the total budget, during the past four years.

Projected energy costs at WSSC for FY 2007 are:

Electricity	$20,000,000
Natural Gas	900,000
Diesel, Fuel Oil, Propane	100,000
Total	$21,000,000

And this total is expected to go up by 10 % for FY 2008.

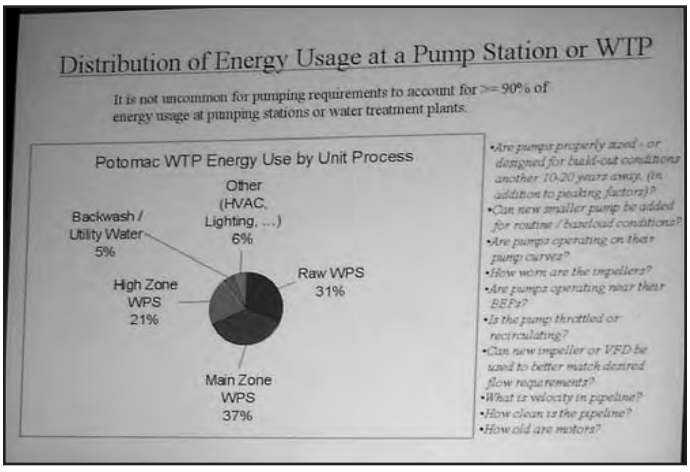
In past years, it was relatively easy to raise water and sewer rates to cover the costs of rising electrical power rates. But with the water utility customers also paying increased electrical rates too, there is pressure on the water utilities to "work smarter" by using less total energy and using less energy at peak demand times.



Increase cost of natural gas, oil, coal, and uranium fuels during past ten years.

Energy Management Techniques

An energy management effort usually begins by looking at the three broad areas of optimization, monitoring, and purchasing. Optimization refers to optimizing equipment and processes that are currently in place and then putting more attention on ensuring that new designs are efficient under all expected conditions. Frequently, installing equipment that is sized to accommodate the worst case of peak flowrates is very inefficient when operated at average flowrates. Monitoring refers to installing meters at various stages to measure the electrical power used in real time. Purchasing refers to analyzing the electrical rate structure and negotiating the best prices for your utility.



Distribution of Energy Usage at Potomac Water Treatment Plant

Energy Issues and Opportunities for Treatment Plants

One opportunity is the pumping elements of a treatment plant. It is not uncommon for pumping requirements to account for greater than 90% of the energy usage at a pumping station or water treatment plant. For example, at Potomac WTP, the kwh energy use by the unit processes is as follows:

Backwash/Utility Water 5%

HVAC/Lighting 6%

Raw Water Pumping 31%

High Zone Pumping 21 %

Main Zone Pumping Main Zone Pumping 37%

Thus 89% of the total energy used is for pumping and this presents an opportunity for optimization. Are the pumps operating at the best efficiency? Are the impellers worn or eroded? Does the plant have pumps sized to operate at the average conditions as well as the peak conditions? Are the motors driving the pumps of the best efficiency?

Optimization–Equipment Changes

At a wastewater plant, it is not uncommon for aeration processes to account for over 50 % of the energy use. The next biggest consumer is usually the pumping operations. From an energy perspective, fine bubble diffusers are about two times as efficient as coarse bubble diffusers. In many instances, the blowers for the aeration process are designed for peak flowrates and BOD loadings, that occur only on rare occasions or when the plant is at full capacity. Typical plant energy usage ranges from 1500 to 2500 kwh per mg.

As a case in point, at the Damascus WWTP, a 200-HP blower was found to be over-sized and allowed approximately 50% of the air it produced to be vented to waste. At a cost of $25,000 for a new 100-HP blower, the annual savings in energy costs was $47,300. At another plant cited, it was found that after spending $100,000 for a new 250-HP blower, a savings of $2.3 million would accrue during the 20 year estimated life of the blower. For those considering a blower replacement project, there is a business firm in Houston, Texas that will trade

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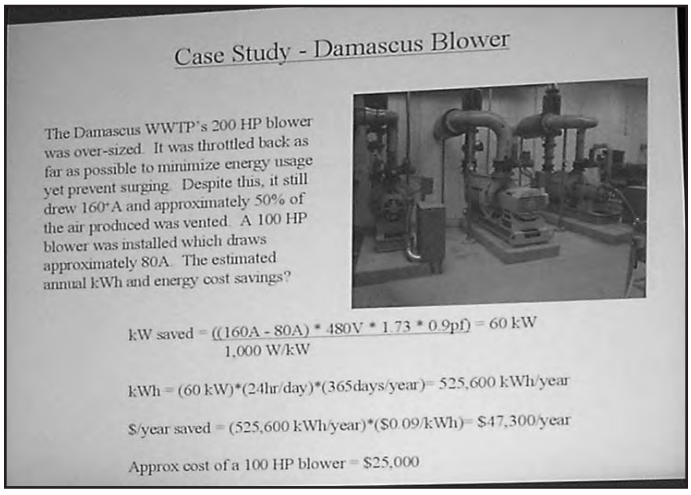

Case Study—Damascus Blower

Energy Management Seminar

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in larger blowers for smaller ones.

At the Patuxent Reclamation Plant, an over-sized pump impeller was replaced at a cost of $2000 and produced a savings of $10,000 in energy costs. At the Anacostia WWPS, a $1.9 million project will install two new 200-HP pumps with variable frequency drives that are expected to save $360,000 per year, thus making about five-year payback period. The two new pumps will handle about 80% of the flow into the station. The existing pumps will remain in place, but are used only during approximately 20 % of the time when peak flowrates occur. Downstream of the pumps, new pinch-valves have been added to throttle the pumps to run at their Best Efficiency Point (BEP.) When all project improvements are completed, it is estimated that the total efficiency of the station, i.e., the "wire-to-water" efficiency will increase from 13% to greater than 70%.

Purchasing Energy–Energy Supply Side Strategies

Negotiate new rates and rate structures. Look for interruptible rates. Look for Power Wheeling on the open market and consider cogeneration with microturbines and fuel cells. Electricity purchasing options range from traditional tariff rates to complicated spot/fixed combination prices. Look for competitive sourcing from another supplier.

Standard Offer Service (SOS) is the default service the customer pays for unless the customer chooses another energy supplier. Each year the Public Service Commission conducts an auction to set the SOS prices. The prices are set each year for one-third of the load. The total SOS price is the average of three year's of auction results. BG&E's SOS prices are slated to increase 50% on June 1 due to the auction that occurred one full year directly after Hurricanes Katrina and Rita. Hearings are pending to review this steep price increase. Components of the SOS Tariff include: customer charge; distribution charge for kw per month; transmission charge set by the PSC as approved by the Federal Energy Commission; generation charge per kwh with price changing with every June 1 auction results; and surcharges and taxes.

WSSC's strategy with electrical power utilities side includes:

1. Retain a retail broker on a long-term basis to buy wholesale power.
2. Unbundle capacity and energy-purchase and manage separately.
3. Buy energy real time on PJM hourly market.
4. Stabilize pricing by purchasing energy block financial hedges on competitive wholesale market for average load.
5. Shift load in conjunction with market pricing and water/wastewater system capacity.

Renewable energy refers to energy from sources that naturally replenish over time and are inherently cleaner than fossil fuels. Examples include: bio fuel, wind power, geothermal power, tidal power, hydro power, onsite generation with digester gas and solar panels. Starting in January 2008, WSSC intends to purchase power from a 29 mega-watt wind farm in Somerset County, Pennsylvania. This program has side benefits of improving air quality in PG and Montgomery Counties by reducing CO2, SO2, and NOx air emissions.

Monitoring Energy–Energy Demand Side Strategies

Most strategies will depend on your rate structure. Look for Peak, Mid-Peak, and Off-Peak Time of Use (TOU) charges. Consider load shifting to help on TOU rates. Typical load shifting strategies include: use time variant DO setpoints; shift solids dewatering to Off-Peak hours; backwash filters on Off-Peak; store digester decant and supernatant liquid and release during Off-Peak hours; optimize control of pumping.

KWH reductions typically help during flat rate periods. Typical KWH reduction strategies include: aeration (DO) control; raise wet well levels to save pump energy; switch to fine bubble diffusers; install VFDs on process water systems. Components of an aeration control system include: DO analyzers, air flow meters; control valves and actuators.

Should you trust the electric power company? Some utilities are installing their own meters to monitor incoming electrical power and finding that the power company had installed the wrong kind of meter and was incorrectly charging for high-demand charges. Another effort is to verify that the calculations for the electric bill accurately reflect the designated rate structure. WSSC was able to save $400,000 per year after finding bill calculation errors. Findings indicate that the power companies rarely err in the customer's favor.

Generating Your Own Power

Many paper mills, college campuses, pharmaceutical manufacturers, and steel plants, do their own power generation to some degree. Why not water and wastewater treatment plants? Methane gas produced by the anaerobic digestion process can be utilized to produce steam which can be used for onsite heating and sold for offsite uses. A WWTP with a flow rate of 6 to 9 mgd will usually produce enough methane gas to make it worthwhile to utilize the methane. Do you have a cascade aeration process at the plant effluent discharge? Consider installing a turbine to generate supplemental electric power. Windmills and solar panels can generate up to 80% of power needed for some plants.

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