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GREAT EXPECTATIONS
Chesapeake Bay Restoration Efforts set New Industry Standards
H2O is life

PBS&J highlights
Winter 2010





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David "Lefty" Lefkowith, Chief Marketing Officer

PBS&J
Transportation
Max D. Crumit, PE, Group President

Federal & Design
L. Dean Fox, F.SAME, Group President

Environment, Energy & Construction
Randy L. Larson, PE, CCM, F.ASCE, FCMAA, Group President

Editor
Kathy L. Botticello

Contributing Writers
Kathy L. Botticello
Kathleen Hardesty
Timothy C. Kaiser
Jay Landers
Lillian L. McAnally
Kelli Pharo

PBS&J Technical Contributors
Brian Balchunas, PE, BCEE
Stephen DeSesa
Larry Hentz, PE, BCEE
Aurora Schaefer
Jacqueline Torbert
Marc Walch
Roy Walden, PE
Bill Whidden, PE

Design and Production Manager
Rick DeCamp

Graphic Designer
Norma Villafaña

Direct Comments and Inquiries to
PBS&J Highlights
482 S. Keller Road
Orlando, Fl 32810-6161
407.647.7275
800.284.5182
Fax: 407.838.1602
e-mail: 22895@pbsj.com

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Commitment to Our Company
Commitment to Our Communities and Surroundings

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PBSJ Subconsultant/Supplier Diversity Program

We recognize and appreciate the value that local, small, and disadvantaged business partners bring to our clients. We've experienced first-hand the creativity, efficiency, and responsiveness that they contribute to our project teams, elevating us as a company, consultant, and corporate citizen in a diverse, dynamic, and expanding global community.

The PBSJ Corporation, through our subsidiaries, is introducing a new initiative—PBSJ Subconsultant/Supplier Diversity Program. Our goal is to provide small, minority, and women-owned business entrepreneurs access to PBSJ. Potential subconsultants and suppliers can go to our website at ***www.pbsj.com/diversityprogram*** and find everything they need to connect with PBSJ. Registration with our diversity program is easy. Download and complete the online application and then mail the application, a W-9, and relevant local, state, and federal diversity certifications to accounts payable vendor set-up at our Tampa headquarters or scan and e-mail the forms to diversityprogram@pbsj.com.

We're excited about helping interested diversity partners connect with PBSJ. If you know a firm that fits the bill, please encourage them to register now, at ***www.pbjs.com/dssregis***.

What's NEW

PBS&J FYI

Water is life. It is the common element that links all ecosystems. It covers two-thirds of Earth's surface yet only about 3 percent is drinkable. In the United States alone over 250 million people depend on the freshwater in our rivers, lakes, streams, and ground water supplies for their drinking water.

The Chesapeake Bay watershed spans parts of six states. Recognizing the complexity and importance of the Bay, the Chesapeake Bay Program was formed. A multijurisdictional partnership, the program is working to restore and protect the Bay and is considered a model for similar programs. In May 2009, President Barack Obama signed an executive order recognizing the Chesapeake Bay as a national treasure and calling on the federal government to lead a renewed effort to restore and protect the nation's largest estuary and its watershed.

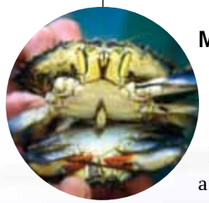
Please make sure to visit us at ***www.pbsj.com*** for more online content and additional information about the Chesapeake Bay Program, and other projects and practices impacting the water industry. And don't forget to check out ***www.pbsjbuzz.tv.***

As always, we would love to know what you think. Drop us an email at 22895@pbsj.com.

Restoring Chesapeake Bay

When Captain John Smith began his exploration of the Chesapeake Bay in 1608, he wrote of shores thick with pines and firs, oysters so plentiful that they "lay as thick as stones," waters filled with more sturgeon than he felt could be eaten by man, and a watershed left nearly undisturbed. "Heaven and earth never agreed better to frame a place for man's habitation," he declared.

If Smith were to retrace his voyage today, he would find a Bay dramatically changed over time—in fact, he would probably need a new map.



Man's Habitation

Stretching 200 miles from Havre de Grace, Maryland, to Virginia Beach, Virginia, the Chesapeake Bay is the largest of the United States' 130 estuaries and the third largest in the world.

For centuries, the Chesapeake Bay watershed has faithfully served the human inhabitants drawn to its shores, which today span parts of six states (New York, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia) and the District of Columbia. The Bay saw the first English settlement established in Jamestown, Virginia, and since then has served as a major economic and political center, including two of the five major North Atlantic ports in the United States: Baltimore and Hampton Roads.

Man's habitation, in turn, has taken its toll. The more than 16.6 million people now residing in the Bay watershed live within minutes of 100,000 streams and rivers that drain into the Bay. From building homes and factories, to planting crops, fertilizing lawns, flushing toilets, and driving cars, the environmental impact of a growing population living their daily lives has become a major stressor on the delicate Bay ecosystem and the more than 3,600 species of plants and animals that call the Bay home.

According to the Chesapeake Bay Program, the oyster population that so impressed Captain Smith barely survives today at only 2 percent of its historic levels. Sturgeon species, now a rare sight in the Bay, must be protected to preserve their populations. Nearly half of the forested areas have been stripped for agriculture and urban uses, and nearly 90 percent of the Bay's underwater grasses have been lost. The sobering statistics go on and on.

FY insight

A Partnership Is Formed

In the 1950s, Calvert County resident Bernie Fowler could wade into the Patuxent River up to his shoulders and still see his white sneakers more than 60 inches below. Fast forward 30-plus years to 1988, and Fowler, by then a Maryland state senator, encountered water clarity so poor that he lost sight of his sneakers in just 10 inches. He has waded into the Patuxent every year since—now an event that attracts a large crowd and numerous public officials—to track the Bay's health through his "Sneaker Index."

In response to public outcries and citizen demands for action, the Chesapeake Bay became the first estuary in the United States to be targeted for rigorous government-sponsored restoration efforts.

Steny Hoyer and Bernie Fowler wade into the Patuxent River during the 2008 Patuxent River Wade-In. The wade-in, founded by Fowler in 1988, draws attention to the health of the Patuxent River and the Chesapeake Bay by having people wade into the water until they can no longer see their feet.
-Photo Courtesy of Chesapeake Bay Program

In 1983, a congressionally mandated report completed by the U.S. Environmental Protection Agency (EPA) stressed four areas requiring immediate attention in the Chesapeake Bay: excessive pollution from nitrogen and phosphorus, a dramatic decline in underwater bay grasses, toxic chemical pollution, and over-harvesting of living resources.

Chesapeake Bay Program
A Watershed Partnership

To address these issues through one governing body, a unique voluntary partnership was formed between Maryland, Virginia, Pennsylvania, the District of Columbia, the EPA, and the Chesapeake Bay Commission. Known as the Chesapeake Bay program (Bay program), this partnership has undertaken the formidable task of heading off centuries of population growth, resource depletion, unchecked pollution, and landscape changes in the Bay's enormous 64,000-square-mile watershed.

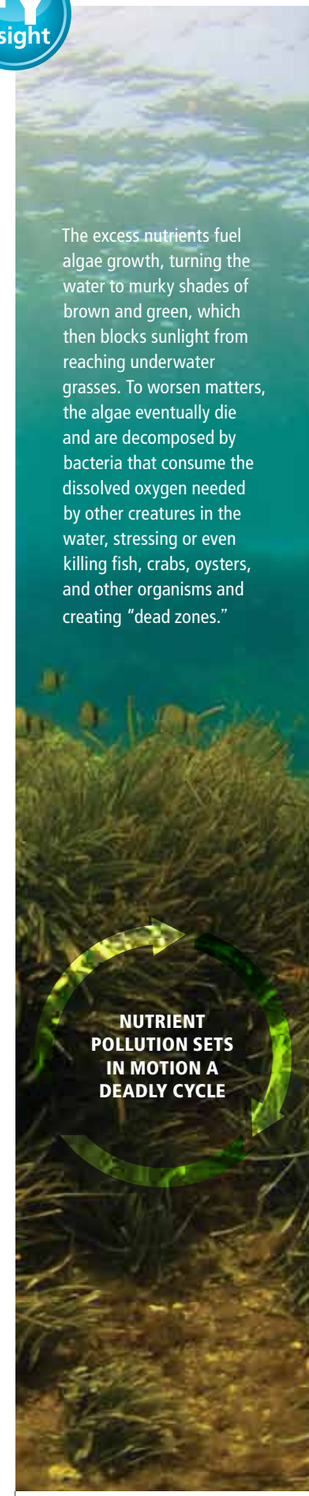
The Bay program partners have signed several agreements since the 1980s, setting goals to reduce the release of pollutants into the bay and restore its habitats. While results have been mixed, given the scope of the effort, the Bay program partnership has served as a model for subsequent estuary cleanup efforts around the country, such as those for Tampa Bay, Puget Sound, Monterey Bay, and Long Island Sound.

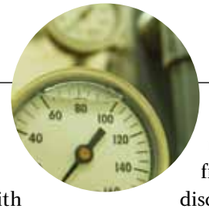
The Wastewater Sector

"At the heart of the matter, the Bay's water must be safe for both the creatures on land and the aquatic life it supports, and therefore water quality has been a key measure of the Bay's overall health," says PBS&J Senior Vice President Larry Hentz, PE, BCEE. "The Bay program has focused on nutrient pollution as the watershed's primary problem, caused by excess nitrogen and phosphorus entering the water mainly from agricultural activities, urban and suburban runoff, wastewater effluent, and airborne contaminants."

Nutrient pollution sets in motion a deadly cycle: excess nutrients fuel algae growth, turning the water to murky shades of brown and green, which then blocks sunlight from reaching underwater grasses. To worsen matters, the algae eventually die and are decomposed by bacteria that consume the dissolved oxygen needed by other creatures in the water, stressing or even killing fish, crabs, oysters, and other organisms and creating "dead zones."

In 2000, the Chesapeake Bay Program partners signed the *Chesapeake 2000* agreement, which set ambitious targets for reducing nutrient and sediment pollution and improving water quality, with the goal of both supporting aquatic life and removing the Bay and





its tidal rivers from the EPA's impaired waters list by 2010. With this deadline looming, the signatories have admitted that the 2010 goals will not be fully met, but important foundations have been laid in some areas.

For example, the 483 major municipal and industrial wastewater treatment plants (WWTPs) in the Chesapeake Bay watershed have been a central focus of nutrient reduction efforts to date. Collection and treatment of sewage is crucial to public health and sanitation for Bay area residents, but every flush starts a cycle that ultimately leads back to the Bay. According to the EPA, WWTPs are currently responsible for about 20 percent of total nutrient discharges into the watershed. And as the population in the Bay area continues to boom, so does the amount of water requiring treatment.

To further the goals of the *Chesapeake 2000* agreement, in 2004 the Bay jurisdictions agreed to undertake a new permitting approach setting stricter limits as permits come up for renewal for all of the area's 483 major WWTPs. Since then, millions of dollars have been spent to upgrade area facilities to state-of-the-art treatment technology so they can remove more pollution from the water they discharge. The state of Maryland, for instance, has been working to place its WWTPs at the forefront of modern treatment technology.

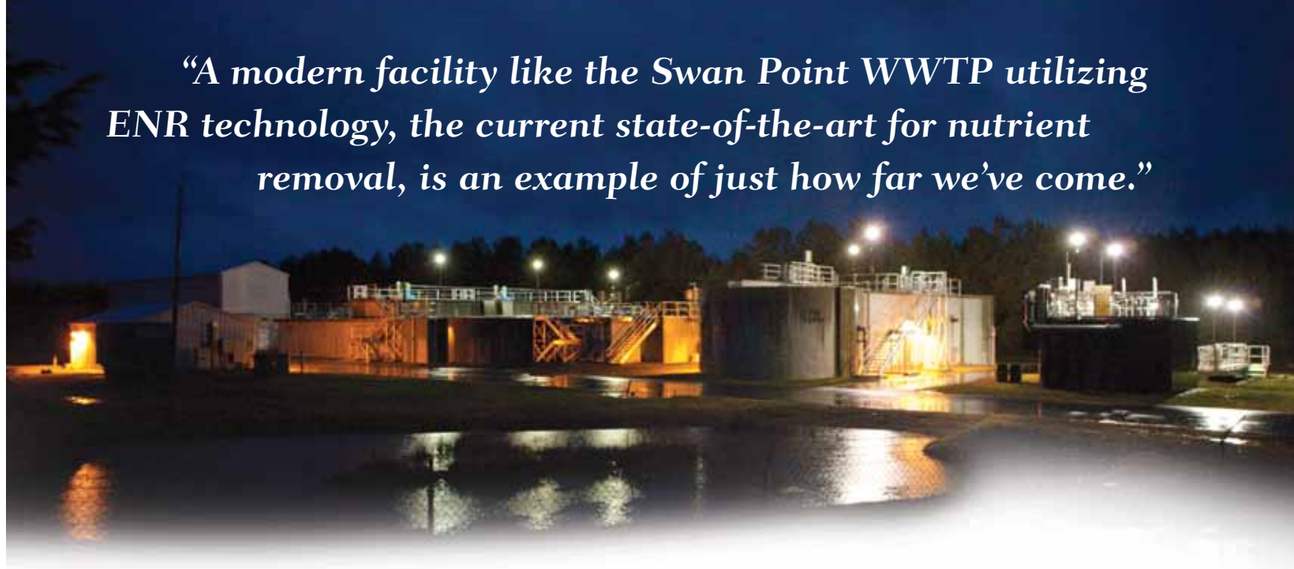
The Maryland Sixty-Six

To help meet the state's commitments under the Chesapeake 2000 agreement, Maryland lawmakers signed Senate Bill 320 into law on May 26, 2004, creating the Bay Restoration Fund (also known as the "Flush Tax"). The fund, financed by fees collected from WWTP users, is dedicated to upgrading the major players in Maryland's wastewater effluent discharges into the Chesapeake Bay—66 publicly owned WWTPs with design flow of 500,000 gallons per day or greater—by 2015. According to the Maryland Department of the Environment, these upgrades are expected to reduce nitrogen and phosphorus loading to the Bay by an additional 7.5 million pounds per year and 0.26 million pounds per year, respectively.

After the initial Chesapeake Bay Agreement in 1983, Maryland's WWTPs began removing pollutants from wastewater using an advanced biological nutrient removal (BNR) process. Now that supplemental funding is available through the Bay Restoration Fund, Maryland is the only state in the Bay program partnership to require an even more advanced level of nutrient removal—known as enhanced nutrient removal (ENR) technologies—for all of its major WWTP upgrades. ENR strategies achieve an even higher level of nutrient reduction by building on the success of the BNR programs already in place. Facilities that treat wastewater using ENR are capable of producing effluent quality of 3 milligrams per liter (mg/l) of total nitrogen and 0.3 mg/l of total phosphorus.

Swan Point Comes Online

"The technology available to treat wastewater has progressed by leaps and bounds since the early days when primary treatment alone was required through screens and grit removal units and primary clarifiers," says Hentz. "A modern facility like the Swan Point WWTP utilizing ENR technology, the current state-of-the-art for nutrient removal, is an example of just how far we've come."



In March 2004, USS Real Estate committed to construct a new WWTP to support their proposed Swan Point development in Charles County. This new facility was designed to treat up to 600,000 gallons per day of domestic sewage and, in anticipation of Maryland's new requirements, was designed to meet ENR limits for total nitrogen and phosphorus discharges.

"Since time was of the essence to the developer, Swan Point was one of the first complete WWTPs designed and constructed using the design-build process in Maryland," says PBS&J Senior Engineer Roy Walden, PE. Walden and his team served as the owner's representative for Swan Point WWTP and provided oversight during design and construction. When the project was completed in 2007, the new plant was turned over to the Charles County Department of Public Works, which now owns and operates the plant.

"An extended aeration carousel treatment process followed by denitrification filters was selected to meet the ENR goals for the Swan Point facility," explains Walden. With ENR, the new plant has the potential to discharge 83 percent less total nitrogen and 90 percent less total phosphorus than before.

"Swan Point now serves a population of just under 1,000 residents. Although it's one of the smaller plants among the 66 slated for upgrading, ENR has significantly reduced the amount of pollution flowing into Cuckhold Creek, a tributary of the Chesapeake Bay," says Walden.

Seneca and Little Patuxent Help Save the Bay

Swan Point and ten of the other major WWTPs in Maryland are now fully operational with ENR capabilities, with the remaining 55 currently in the planning, design, or construction phases. PBS&J has been supporting a number of these projects, pushing the limits of treatment technology to help accelerate restoration efforts.

"From treatment process to delivery method, creativity and innovation have been at the heart of the plant upgrades, which often require designs that expand capacity while at the same time reducing nutrient loads" says PBS&J Senior Project Manager Stephen DeSesa.

PBS&J is leading the $100-million upgrade of the Little Patuxent Water Reclamation Plant near Savage, which serves the central part of Howard County and 56 percent of the county's population. This complex project's goals are threefold and include expanding selected treatment processes to the build-out capacity of 29 million gallons per day (mgd), improving treatment performance to achieve ENR, and treating a significant industrial waste load discharged from an ice cream plant located nearby. To help save time and money, Howard County will use a construction management at-risk delivery method.

"Wastewater treatment plant upgrades continue to be the workhorses of Bay restoration," said Shari Wilson, Secretary of the Maryland Department of the Environment, at the Little Patuxent project's ceremonial groundbreaking in May of this year. When complete, she added the project is expected to reduce the amount of nitrogen released into the Patuxent River by 62 percent and phosphorus by 85 percent.

In neighboring Montgomery County, the Seneca WWTP is also doing its part to help save the Bay by returning cleaner water to the environment.

"The Seneca WWTP has seen a lot of changes since 1978, when it was built as a temporary, 5-million gallons per day (mgd) facility to assist the county's economic development, and PBS&J has been there nearly every step of the way," states DeSesa. "PBS&J designed the permanent, 20-mgd facility, which was completed in 2004. At that time, the plant was designed with vigorous BNR treatment processes to reduce the nutrients discharged to Great Seneca Creek and, in turn, to the Potomac River and the Chesapeake Bay. The plant is producing a high-quality effluent, even during the winter months, when low temperatures and high inflow typically challenge wastewater treatment processes."

The new Seneca plant removes 64 percent more nitrogen and 77 percent more phosphorus than the original plant, reports the Washington Suburban Sanitary Commission (WSSC). "Knowing that stricter requirements were coming soon, however, we also designed a flexible system capable of incorporating ENR processes in the future," says DeSesa.

In 2007, PBS&J was again tapped by WSSC to design the upgrade and expansion of the Seneca WWTP to 26 mgd with ENR capability. The project is nearing the end of the design phase, and when constructed will be capable of achieving an effluent with total nitrogen of 3 mg/l and an even more rigorous total phosphorus goal of 0.18 mg/l.

Pollution from the Air, from the Land

"By upgrading plants like Seneca, Little Patuxent, and Swan Point to use ENR technology, we're helping our clients achieve some of the strictest water quality standards not only in the nation, but also in the world. This is an important step in improving the overall health of the Bay," says Hentz.

The Chesapeake Bay Program reports that, as of 2008, the partnership had achieved 67 percent of the wastewater nitrogen reduction goal and 91 percent of the wastewater phosphorus goal. Decreases in the amount of pollution discharged from WWTPs represent the lion's share of the estimated nutrient reductions in the watershed thus far—a point that has not gone unnoticed by the sewer authorities working hard to meet strict discharge requirements.

On September 22, 2009, WSSC General Manager Jerry Johnson testified before the U.S. House of Representatives Subcommittee on Water Resources and Environment. "Utilities, including the WSSC, are upgrading wastewater treatment facilities using the best of technologies available," he said. "We are moving to the limits of technology, and we are doing the most anyone knows how to do in the scientific universe to reduce the amount of nutrients that are discharged into the Bay's tributaries."

But the problem is greater than the point sources of pollution, those culprits that we can point to, like treatment plants and factories. Johnson also warned that "we can never address the multitude of challenges facing the health of the Bay without equitably sharing the burdens among all sources of water quality impairment which impact the Bay."

Larry Hentz explains: "The future of the Bay also depends on everyone's ability to manage the more diffuse, non-point sources, like agricultural and urban runoff, as well as air pollution. While clamping down on reducing nutrient loads from WWTPs is having a positive effect on water quality, the next phase will be addressing these other sources of pollution, which are increasing at an even faster rate. Until these issues are addressed as effectively as they have been in the wastewater sector, the Chesapeake Bay's recovery will stagnant."

Never Give Up

"From the White House to statehouses to town halls, commitments are being made to take strong actions to stem pollution impacting the Chesapeake Bay and its tributaries," writes Chesapeake Bay Program Director Jeffrey Lape in the program's 2008 annual review, the *Bay Barometer*. The review scored the overall health of the Bay at just 38 percent (with 100 percent representing a fully restored ecosystem), showing no improvement from 2007. Meanwhile, indicators for restoration averaged 61 percent, with 100 percent indicating that all measures necessary for Bay restoration have been implemented.

Lape's statement reflects a recent step up in efforts from the federal government to take action and enforce accountability in meeting Bay restoration goals. In May of this year, President Obama issued an executive order calling the Bay a "national treasure" and establishing a Federal Leadership Committee, headed by the EPA, to take the lead in helping state governments develop strategies and meet their goals to reduce the pollution flowing into the Bay. In compliance with the executive order, federal agencies issued seven draft reports in September with their strategies for cleaning up the Bay by 2025, including establishing total maximum daily load levels for the Bay and its tributaries, strengthening pollution control regulations, and increasing efforts to control agricultural runoff.

> *"From the White House to statehouses to town halls, commitments are being made to take strong actions to stem pollution impacting the Chesapeake Bay and its tributaries."*
>
> *— Jeffrey Lape, Chesapeake Bay Program Director*

The question of whether we're doing enough, and if not, who should take the lead in ensuring the Bay's future, will continue to be argued in the halls of universities, research consortiums, and Capitol Hill.

For many Bay residents, however, progress toward healthy water quality in the Bay will be gauged in a slightly less scientific, but more personal way—through one man's now-famous shoes. This June, after celebrating his 85th birthday, Fowler again donned his well-worn white sneakers and—this time hand-in-hand with Maryland Governor Martin O'Malley, House Majority Leader Steny Hoyer, and other VIPs—waded into the Patuxent River to see how the 2009 "Sneaker Index" stacked up to previous measurements. He could still spy his feet at 25.5 inches, a half-inch decline from last year's reading, but a significant improvement from 1988. The group held a sign declaring, "Never, Never, Never Give Up."

Fowler and his supporters, like many others, hope the tide of progress has turned for the better for the future of Chesapeake Bay restoration. Never giving up means ensuring the best technology, the right resources, and the necessary commitment from all stakeholders, who must work together to "reframe" the Bay as a place at harmony again with man's habitation.

Promoting Progress at Potomac

What are CMAR and GMP?

According to the Construction Management Association of America:

"'At-risk' CM is a delivery method which entails a commitment by the construction manager to deliver the project within a Guaranteed Maximum Price (GMP). The construction manager acts as consultant to the owner in the development and design phases, but as the equivalent of a general contractor during the construction phase. When a construction manager is bound to a GMP, the most fundamental character of the relationship is changed. In addition to acting in the owner's interest, the construction manager also protects him/herself."

In other words, in a CMAR/GMP scenario a contractor responds to a bid with the estimated cost to complete a specific scope of work. The contractor assumes the risk for any fees that exceed the estimated costs.

www.cmaanet.org

In the early 2000s, the Washington Suburban Sanitary Commission (WSSC) recognized that the Potomac Water Filtration Plant (WFP), constructed in the early 1960s, needed to be upgraded in order to meet projected long-term needs. Currently producing approximately 75 percent of the water used by 1.8 million customers in Maryland's Montgomery and Prince George counties, WSSC estimated that by 2030 the demand for clean drinking water will increase from 130 million gallons per day (mgd) to 183 mgd, with peak flow requirements approaching 300 mgd.

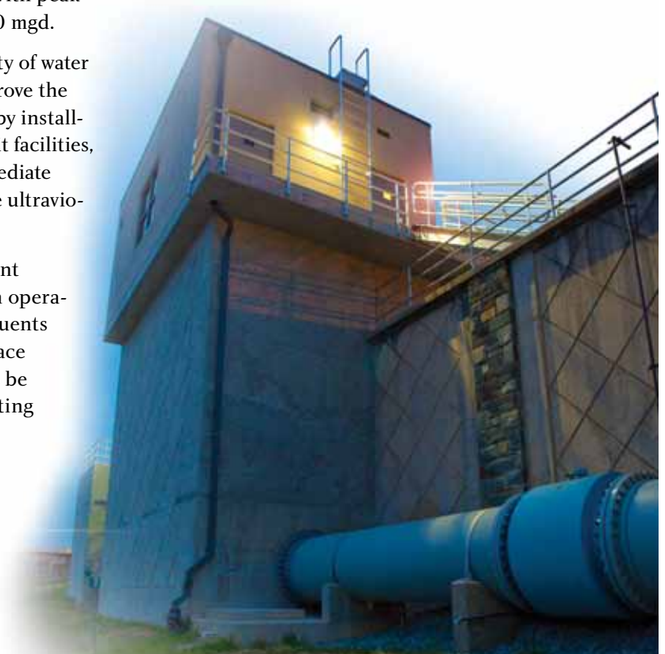
In addition to increasing the quantity of water processed, the WSSC wanted to improve the water quality and facility efficiency by installing improved rapid mix and flow split facilities, flocculation upgrades, a new intermediate pumping station, and a cutting-edge ultraviolet (UV) disinfection system.

But the upgrade faced two significant challenges. The plant had to remain operational and continue serving constituents during construction, and due to space limitations, most of the work had to be done within the confines of an existing concrete reservoir.

The upgrade and improvements to the Potomac WFP would become one of the WSSC's biggest construction contracts to date—making it one of the largest UV WFPs in the country. In the past, most WSSC projects had the owner, contractor, and engineer in separate corners of a virtual work triangle. Recognizing the herculean task at hand and wanting to avoid scheduling and delivery problems that plagued previous projects, WSSC turned to PBS&J for a fresh look at how to approach the contractual arrangement itself.

Ready, Set, Go

PBS&J worked with WSSC to evaluate the challenges and recommend improvements to meet current and long-term needs. After careful consideration, PBS&J recommended construction management at-risk (CMAR) as the best delivery method for the Potomac WFP project.



Says PBS&J Project Manager Brian Balchunas, PE, BCEE, "Our team knew from experience that this delivery method was an excellent choice to round things out—each member of the project team functioning as part of the whole cycle."

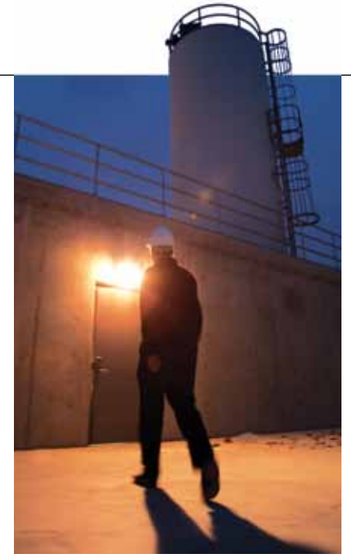
With the delivery method determined, front-end documents were prepared, and a standard operating procedure (SOP) was developed and distributed.

In 2005 the WSCC issued a request for qualifications for the CMAR services. Applicants were short-listed, a request for proposals issued, and a best-value selection made. In the end, the contract award went to the joint venture of Clark Construction and Ulliman Schutte Construction, which came on board at about the 50-percent-design stage.

With the team selected, work got under way. PBS&J and the CMAR team worked closely with the owner through final design. The CMAR team offered ideas on constructability and value engineering, and it provided cost estimates as design progressed. At approximately the 90-percent-design stage a guaranteed maximum price (GMP) was established and construction could start.

Why UV Disinfection?

It was in 1992 that a parasite by the name of Cryptosporidium made its way into Milwaukee, Wisconsin's drinking water, making nearly half a million people ill and killing 100. As a result of this outbreak, the U.S Environmental Protection Agency (EPA) put into effect "The Long-Term 2 Enhanced Surface Water Treatment Rule"—a regulation requiring that surface water treatment plants sample raw water for Cryptosporidium and treat the water based on the results of the sampling.



Cryptosporidium and another microscopic organism, Giardia Lamblia, both potentially found in drinking water, are known to be resistant to chlorine disinfection. However, in the late 90s, researchers found that UV light damages the DNA of the organisms so that they cannot reproduce. An organism that cannot reproduce cannot infect.

Even though the EPA had yet to finalize the Long-Term 2 Enhanced Surface Water Treatment Rule as design was progressing, the WSSC decided to implement UV disinfection to achieve multiple-barrier disinfection.

Proof of Progress

Solids removal at the plant will be improved by installing new rapid mix and flow split facilities and new flocculation equipment.

To overcome past problems with hydraulic restrictions between the filter and the finished water storage, a new intermediate pumping station was installed.

Finally, water filtered through the Potomac WFP will undergo UV disinfection following the intermediate pump station, after which it will receive a lime addition and additional mixing, followed by chlorine disinfection—providing customers multibarrier disinfection.

Construction on the $89.5 million WTF began in October 2006 and is currently about 80 percent complete. When the final plant design comes online fully in mid-2010, the Potomac WFP will be one of the largest UV treatment plants operating in the United States and well situated to meet the drinking water needs of its constituents to 2030 and beyond.

What is a UV Disinfection System?

According to the U.S. Environmental Protection Agency, an Ultraviolet (UV) disinfection system transfers electromagnetic energy from a mercury arc lamp to an organism's genetic material (DNA and RNA).

When UV radiation penetrates the cell wall of an organism, it destroys the cell's ability to reproduce. UV radiation, generated by an electrical discharge through mercury vapor, penetrates the genetic material of microorganisms and retards their ability to reproduce.

For more on this please see: ***www.epa.gov/owm/mtb/uv.pdf***

Ice Cream for Wastewater Treatment

7
N
Nitrogen
14.0067

15
P
Phosphorus
30.973761

What do ice cream and wastewater treatment have in common? The Little Patuxent Water Reclamation Plant (LPWRP) is a wastewater treatment facility serving the central part of Howard County, Maryland. Howard County is also home to the Dreyer's ice cream manufacturing plant, which generates the majority of industrial influent sent to LPWRP. It is safe to assume that most people don't connect the making of ice cream to the production of industrial waste. It also stands to reason that few people would have imagined that the waste stream from Dreyer's ice cream manufacturing plant could have a positive impact on enhanced nutrient removal (ENR) of LPWRP effluents.

"...the contribution of Dreyer's waste to the influent stream is at least partially responsible for the better-than-expected nitrogen removal performance."

But it turns out that is exactly the case, and the realization of this mutually beneficial relationship is playing a significant part in the expansion plans under way at LPWRP to expand the plant's currently approved design capacity of 25.0 million gallons per day (mgd) to 28.5 mgd by 2013.

To understand how this "Ah ha!" moment occurred, we first need to understand how the treatment process works. A key component to wastewater treatment is the reduction of nitrogen and phosphorous in effluents so they have minimal to no impact when those effluents are reintroduced to local water sources. According to the Maryland Department of Natural Resources, "Excess amounts of nutrients are the most extensive pollution problem affecting the Maryland Coastal Bays. While nutrients in streams and bays can encourage the growth of aquatic plants that provide food, oxygen, and habitat, excessive nutrients can result in the growth of algae that contribute to an unhealthy environment." Excessive algae blooms can impact the growth of seagrasses and when algae die, they directly impact oxygen levels and drive fish and blue crabs out of their preferred habitats.

To help prevent these negative impacts, new guidelines are requiring LPWRP to meet ENR or produce effluents that average year round less than 4 milligrams per liter (mg/L) total nitrogen (TN) and less than 0.3 mg/L total phosphorous (TP). Meeting this effluent limit will require that the plant be upgraded to achieve a goal of less than 3 mg/L TN. So how does Dreyer's ice cream fit into the mix?

Studies dating back several years show a correlation between the amount of influent from Dreyer's being sent to LPWRP and enhanced ENR, suggesting that either readily biodegradable carbon (which increases denitrification rates) is entering the plant with the Dreyer's waste and/or there was an increase in nitrogen uptake for synthesis purposes as a result of the increased carbon loading. Historical data suggest that the contribution of Dreyer's waste to the influent stream is at least partially responsible for the better-than-expected nitrogen removal performance.

LITTLE PATUXENT WATER RECLAMATION PLANT
Howard County, Maryland

To maximize use of this resource, new management options for the Dreyer's ice cream waste stream are being implemented at the expanded LPWRP. The 2008 preliminary engineering report prepared for the Howard County Bureau of Utilities by PBS&J described the management process for the new buildout. "Howard County is constructing a pretreatment facility for Dreyer's waste. This facility is located on the treatment plant site, and the pretreatment facilities include complete mix fermenters, anaerobic pretreatment facility, clarifier/thickener, dissolved air floatation, and aerobic treatment facilities treating effluent from the anaerobic system. Fermentation of the Dreyer's waste is being provided to generate additional volatile fatty Acids (VFA) for supplemental carbon in the main process reactors to support biological phosphorus removal and enhanced denitrification."

Because Dreyer's is the largest industrial waste contributor to the plant and it is also in the midst of a major expansion, its waste stream will be delivered to the LPWRP through a dedicated pumping station and pipeline. The new Dreyer's pretreatment facilities will allow the flexibility of two treatment options: fermentation with pretreatment or pretreatment of the entire industrial flow. In either option, the goal is to meet ENR, minimizing negative implications to the natural habitats surrounding the LPWRP.

Roy Walden, PE, a senior engineer in PBS&J's water division, discussed the ancillary benefits of properly managing the Dreyer's industrial flow. According to Walden, "A significant side benefit to pretreatment will be the production of methane gas, which may one day be used to generate electricity for power plant equipment."

The industrial pretreatment facilities have already been constructed and start-up is waiting for construction of the delivery pumping station to be completed. Ground has been broken on the new build outs at LPWRP, and permits are being drawn and finalized for construction of the new facilities

So what do ice cream and wastewater have in common? Ice cream waste has the chemical makeup to impact process denitrification kinetics—ultimately affecting the lower portions of the food chain. So if ice cream and denitrification kinetics seem out of place served up in the same sundae, chemistry says they belong together. And the positive implications to the environment are just the cherry on top.

Raising the Bar on Performance

PBS&J Highlights magazine had a chance to interview Jacqueline Torbert, Orange County Utilities water division manager, on their innovative Water CMOM approach to best practices in water management.

An Inside Look at Orange County Utilities' water division CMOM Process

HM: *How long have you been in the water industry and when did you begin working for Orange County Utilities?*

JT: I started out in this industry working for Orange County Utilities in 1991 as manager of the Utilities' laboratory, and then when there were organizational changes in 1996, I became manager of the water division, which also included the laboratory services.

HM: *CMOM was created to comply with the Clean Water Act and prevent the overflow of wastewater sewage. So how did Orange County Utilities take the CMOM process and adapt it?*

JT: The CMOM process was designed specifically for managing wastewater sewer overflows; the data, however, was information that any operation in the industry could use. In 2004, I started what I jokingly called a BDAD (benchmark data assessment-development) as a play on the CMOM acronym, which served as a springboard to develop the idea of the Water CMOM. From there, we worked with our consultants to develop a six-phase plan to implement our strategic goals.

HM: *How long did it take to develop each of the six phases of the Water CMOM?*

JT: It's been a continual process. We began this [process] in 2006. We started the process with Phase 1, where we reacquainted ourselves with [our vision] and conducted a workshop, receiving input from all the entities involved—including outside entities such as purchasing and the HR department. From this phase, we developed a consensus on project goals. This first phase took about one year. In Phase 2 of the process, we conducted a self-audit workshop with senior management in the water division. This is where we took a hard look and said, "ok; now that we have the information, let's narrow it down and put it into context to formulate steps to [correct the deficiencies identified and analyzed]." Phase 2 took about nine months to a year to complete. In Phase 3, we said, "let's do another analysis and implement some of the [corrective measures] identified and see if we had short-term improvements." We were able to identify 34 assessment elements that were important to our organization based on the current economy and our customer service base.

HM: *What phase of the program is Orange County Utilities currently in?*

JT: Phase 4, which we call the "Gap Closure Plan Implementation." This is the phase in which we identify CIP areas that we will need to move into. Although most utilities may conduct assessments, they do so using internal benchmarking that doesn't fully consider external performance. In the Water CMOM process, however, we use internal and external benchmarking, which takes the best of both approaches to achieve greater results.

HM: *So there are still two phases left; when will those be complete?*

JT: It's difficult to say because, given the state of the economy, budget dictates when a phase begins and ends. The other reason it's difficult to predict is because assessing our operations and management is really an ongoing process.

HM: *Identify the strengths and weaknesses of the process.*

JT: Strength—I say the flexibility to fit any water utility company and to continuously improve performance internally and externally [to customers]. Another reason to be flexible with the process is to "go with the flow" of the highs and lows in this industry—conduct a yearly assessment to recalibrate your priorities. For instance, when we began the process, training our staff was identified as an area of opportunity we could invest more resources in; but now that the market is such, we can invest more time in training. A weakness would be lack of resources [money and personnel] to dedicate to this type of project.

HM: *How do you see the program evolving in the future?*

JT: This [program] will become a part of our "life"; we're going to make this plan a part of our daily operation. It will continue to evolve based on the economic and regulatory climate we live in at the time.

HM: *If other utilities want to adapt Orange County Utilities' Water CMOM program, how can they implement it to fit into their utility department/division?*

JT: The Water CMOM is a very flexible program and can be adapted to any water utility. As manager of the Orange County Utilities water division, I want an excellent organization. I want my employees to know that we value them. As for other water utility managers, it's really about continuously reassessing where your utility company is. You need to have a good idea where you are, what you want to invest in, and how you want to prioritize your goals. The essential part is doing the initial assessment and then, based upon that, you can meet your goals.

FY insight

Over the last decade, Orange County, Florida, was one of the largest and fastest-growing counties in Central Florida. Orange County Utilities developed a long-range Capital and Facilities Improvement plan (CFIP) to help ensure adequate water and wastewater service to its customers.

Orange County Utilities' water division worked with engineering consultant PBS&J to create an innovative method—Water CMOM—for benchmarking performance based on the U.S. Environmental Protection Agency's (EPA's) Capacity, Management, Operations, and Maintenance program (CMOM) tool, commonly used for assessing wastewater utilities.

The CMOM assessment allows utilities to take a snapshot of operational and maintenance effectiveness. The Water CMOM assessment crisscrosses the entire organization from engineering to customer service to human resources.

Orange County Utilities outlined four major strategic goals for the Water CMOM:

1. *Develop a comprehensive assessment of the water division's effectiveness and efficiency for each program/element.*
2. *Provide an overall benchmark to establish priorities and direct capital and personnel resources at a particular point in time.*
3. *Add value to the division, customer service, and other utilities by measuring progress and evaluating areas of need.*
4. *Use a performance management framework to translate Orange County Utilities' strategy that drives both behavior and performance and cover the spectrum of issues facing the organization.*

For more information on the EPA's CMOM please see:

http://www.epa.gov/npdes/pubs/cmom_guide_for_collection_systems.pdf

Helping Engineers Design Buried Flexible Pipe

Metering station for mortar-coated steel pipe.

Trench box and backfilling.

Manway for maintenance.

Receiving pit for 66-inch microtunnel.

The buried pipelines that transmit treated water to the nation's homes and businesses and send wastewater to treatment facilities typically receive little, if any, attention from the general public. However, if these pipelines experience a problem, the affected residents and business owners are quickly reminded of how much they rely on this hidden infrastructure. Because of the important role that drinking water and wastewater pipelines play in the lives of so many, civil engineers go to great lengths to ensure that they properly design these critical features. To assist these efforts, a new manual of practice (MOP) edited by PBS&J's Bill Whidden, PE, and recently released by the American Society of Civil Engineers (ASCE) is available to help engineers as they evaluate steel and other types of flexible pipelines.

ASCE's *Manual of Practice 119, Buried Flexible Steel Pipe: Design and Structural Analysis*, was prepared by the Buried Flexible (Steel) Pipe Load Stability Criteria and Design Task Committee. As chairman of the committee, Whidden served as the editor of the MOP, which was released August 16 at ASCE's Pipelines 2009 conference in San Diego. A 32-year PBS&J veteran, Whidden is a Senior Engineer in the company's Orlando office as well as a member of the American Water Works Association (AWWA) Steel Pipe and PVC Pipe committees.

Considered a technical resource for engineering professionals and others seeking knowledge of pipeline design, the MOP offers "the latest and greatest information available for engineers to use in designing and analyzing flexible pipe," Whidden says.

Along with providing a history of buried flexible pipe, the MOP addresses such key concepts as:

- *Pipe mechanics*
- *Soil mechanics*
- *Interaction of pipes and soil*
- *Design analysis*

Special considerations are discussed, including parallel pipes in a common trench and trenches in poor soil. The MOP also seeks to clear up longstanding confusion regarding the proper use of the Modified Iowa Formula in the design of flexible buried pipe. Published in 1958 by Dr. Reynold Watkins, now an emeritus professor with Utah State University, the formula predicts the amount of deflection that will occur with flexible pipe under a certain vertical soil load.

Since then, however, the formula has frequently been "misused" by engineers, Whidden says. Rather than simply using the equation to predict deflection, some pipe designers have employed it to determine pipe thickness, an approach that caused engineers to "over-design" their pipes, he explains.

Subsequent research by Dr. Watkins has found that soils surrounding a buried pipe provide most of the support needed by the pipe.

"Therefore, instead of designing a pipe using the Modified Iowa Formula, engineers should design the type of soil support they want for a buried pipe," Whidden says. "In this way, engineers can potentially save money for their clients by avoiding the unnecessary expense associated with over-designed pipelines."

Whidden knows from experience the value and benefits of buried flexible pipe. He is involved with the City of Orlando's Eastern Regional Reclaimed Water Distribution System. Designed by PBS&J, the project will distribute reclaimed water throughout the greater Orlando area by means of a 20-mile-long ductile iron pipeline ranging in diameter from 24 to 48 inches.

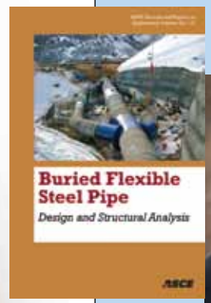
Initiated seven years ago, the roughly $33-million project recently entered its final phase of construction, an approximately 4-mile-long stretch of pipeline. Begun this past July, the work is scheduled to conclude in June 2010, Whidden says.

Upon completion, the pipeline will convey reclaimed water from the City of Orlando's Iron Bridge Water Reclamation Facility throughout Orlando and to several entities, including Seminole County, the City of Oviedo, the University of Central Florida, and Orange County. These entities then will be responsible for distributing the water to individual customers, who will use it to irrigate golf courses, parks, and the like. By making reclaimed water available for this purpose, the City of Orlando will reduce the amount of potable water that is used for irrigation. In turn, this decrease in demand will reduce the strain on the Floridan Aquifer, the primary source of potable water in the Orlando area.

FY insight

Want to Know More?

For more information on the ASCE *Manual of Practice 119, Buried Flexible Steel Pipe: Design and Structural Analysis* or other ASCE publications, please see: ***www.asce.org/books***




Pelayo Calante


Cecilia Green


Michael Hendrix


Robert Kennah


Randy Larson


Bill Lynn


Thomas Pellarin


Dennis Yates

SPOT Light

PBS&J PEOPLE NEWS

PELAYO CALANTE, PE, LEED AP | Miami, Florida | Design & Federal

Calante has joined PBS&J as group manager for the south Florida mechanical, fire protection, electrical, and plumbing engineering (MEP) group. With 25 years of extensive experience in the fields of mechanical, nuclear, civil, and environmental engineering; quality control; and design and project management, he will be responsible for the management and production of MEP-related projects. He holds both master's and bachelor's of science degrees in nuclear engineering from Moscow Institute of Power Engineering. Calante is a registered professional engineer in Florida and a LEED Accredited Professional (LEED AP).

CECILIA GREEN | Austin, Texas | Environment, Energy & Construction

Green, national service director for environment & energy, was appointed to the inaugural WTS Foundation Board at the 2009 WTS International Conference in Seattle, Washington. The Foundation, an outgrowth of WTS Scholarship, which was initiated in the 1990s, provides scholarships for women who pursue degrees in the transportation field. Green has 30 years of experience in environmental sciences and holds a bachelor's degree in botany from the University of Texas at Austin. She is also a member of PBSJ Foundation's board of directors and the board of directors of Texas Mining & Reclamation Association.

MICHAEL HENDRIX | San Bernadino, California | Environment, Energy & Construction

Hendrix recently joined PBS&J as the air quality and climate change team leader with the California and southwest science and planning division. He will advise on issues surrounding the California Global Warming Solutions Act of 2006 (Assembly Bill 32), which requires state greenhouse gas emissions to be rolled back to 1990 levels by the year 2020—roughly a 25 percent reduction from 2006 levels. Hendrix has supervised many technical studies on air quality, global climate change, health risk, and acoustical issues, many in support of the California Environmental Quality Act (CEQA). Hendrix earned a bachelor's degree in environmental science from the University of California, Riverside.

ROBERT KENNAH | Denver, Colorado | Transportation

Kennah has joined PBS&J as project director in the company's national transit division. His immediate responsibilities include environmental consulting for Denver's I-70 east corridor. He has 15 years of engineering experience covering a wide spectrum of conventional and advanced-technology transportation systems. Kennah is a graduate of the University of Wyoming with a bachelor's of science degree in civil engineering. He is a registered professional engineer in Arkansas, Colorado, Texas, and Wyoming.

RANDY L. LARSON, PE, CCM, FASCE, FCMAA | Tampa, Florida | The PBSJ Corporation

Larson,The PBSJ Corporation's executive officer for construction, was recently named a fellow by two prestigious industry organizations—the American Society of Civil Engineers (ASCE) and the Construction Management Association of America (CMAA). Larson is a registered professional engineer in five southeastern states and the Commonwealth of Puerto Rico, a registered general contractor in Florida, and a certified construction manager. A graduate of the University of Florida, Larson has enjoyed a 32-year career in the construction industry.

WILLIAM C. "BILL" LYNN | Panama City Beach, Florida | Environment, Energy & Construction

Lynn was recently appointed principal project director and will serve as the national point of contact and internal liaison between the firm's environmental and aviation sectors for aviation-related environmental services. This will help ensure that clients have a dedicated focus in this area of expertise. With more than 30 years of experience in environmental permitting and a deep understanding of the aviation business Lynn will also represent the firm on national aviation environmental committees and conferences. Lynn holds a bachelor's of science degree in forestry/wildlife ecology from the University of Florida.

THOMAS D. PELLARIN, PE | Orlando, Florida | Peter Brown Construction

Pellarin has joined Peter R. Brown Construction, Inc. (Peter Brown) as vice president of business development. Pellarin is transitioning from a 20-year career with sister company PBS&J, where he most recently served as part of the company's transportation service's executive committee. He will be helping to identify construction opportunities within central Florida, particularly in the higher-education marketplace, and assist with the company's continued efforts in the federal marketplace. Pellarin holds bachelor's degrees in political science from Thiel University and civil engineering from the University of Dayton. He is a registered professional engineer in Florida.

DENNIS YATES | San Antonio, Texas | Design & Federal

Yates has joined PBS&J as a senior program manager in the business development division of the firm's federal services. The former Air Force civil engineer brings extensive Department of Defense installation management and leadership experience to PBS&J. A recently retired Colonel from the United States Air Force, Yates has more than 26 years of experience successfully directing complex and demanding programs ranging from installation level to the headquarters of the United States Air Force. Yates holds a bachelor's degree in civil engineering from the University of Texas and an MBA in economics from Boston University.

CURRENT NEWS

PBS&J + RS&H Team selected as Lead Design Engineers for FLL Expansion

Broward County recently awarded the Fort Lauderdale-Hollywood International Airport (FLL) Expansion of Runway 9R/27L project to the team led by PBS&J + RS&H. The project, an $810-million capital improvement effort, is significant because it involves the complete reconstruction of the south runway, expanding it from 5,000 feet to over 8,000 feet in length. The complex project will span an active federal highway and railroad, require large amounts of fill, and the runway tunnel and taxiway bridges will be bid out as separate design-build projects.

The Team credits its success to a proactive prepositioning approach and extensive experience with both Broward County and the industry.

Chris Spann, PE, PBS&J national aviation business sector manager explains, "This was a project that we have been tracking for a couple of years and have been pursuing in earnest since the beginning of the year. One of the key differentiators between our team and the competition was that we can draw on our experience in Atlanta to take months off of the schedule. In addition, our accomplishments completing a similar runway tunnel and taxiway bridge $100 million under budget will enable our team to bring cost saving measures to FLL."

New Directors Appointed to The PBSJ Corporation Board

The PBSJ Corporation recently announced the appointment of three new independent directors to its board of directors: Joel H. Bennett, Richard J. Dobkin, and Robert E. Klatell.

Joel Bennett fills a vacancy left by retiring board member, Philip E. Searcy, Bennett served as an independent director to the PBS&J and PBS&J International boards of directors in 2009. He is also the current president of Alchemix Corporation and an independent consultant.

Since retiring as a Tampa Managing Partner of Ernst & Young in 2005, Richard Dobkin has served on the board of directors of Cracker Barrel Old Country Store, Inc. (CBRL) (NASDAQ) and has been a member of CBRL's Audit Committee (Audit Committee chairman since 2007). He has been a member of CBRL's Compensation and Stock Option Committee since 2006. He is a certified public accountant in Florida and Pennsylvania and lives in Tampa, Florida.

Robert Klatell is chairman of the board of TTM Technologies, Inc. (NASDAQ) a leading manufacturer of printed circuit boards. He served as CEO and a member of the board of directors of DICOM Group plc (now known as Kofax) (London Stock Exchange) from 2005 through 2007. He holds a juris doctorate from New York University School of Law and resides in New Canaan, CT, and New York City.

Shareholders will have the opportunity to ratify these and all other directors at The PBSJ Corporation's 2010 Annual Shareholders Meeting in February.

PBS&J Part of Joint Venture for Temporary Housing Contract

The Federal Emergency Management Agency (FEMA) recently awarded the joint venture of PBS&J and URS Corp. a contract to assist the agency in providing temporary housing and mass care solutions for disaster victims. The five-year contract, known as Individual Assistance Technical Assistance Contract (IA TAC), has a maximum value of $375 million.

The joint venture will be responsible for hauling and installing, maintenance, and deactivation of temporary mobile housing units, as well as construction of temporary housing communities.

"We are honored by this selection and its reflection of support for the outstanding track record PBS&J has achieved in the field of emergency management," says David Maurstad, PBS&J vice president and manager of the firm's national emergency management business sector. "We look forward to continuing our long-standing working relationship with FEMA on this contract by assisting individuals through the many challenges to be faced following a disaster."

PBS&J highlights

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Swan Point Wastewater Treatment Plant

Charles County, Maryland

USS Real Estate retained PBS&J as the owner's representative for the design and construction of Phase 1 of the Swan Point Wastewater Treatment Plant to a capacity of 600,000 gpd in Charles County, Maryland, under a design-build method of delivery.

Have you had your buzz?
www.pbsjbuzz.tv