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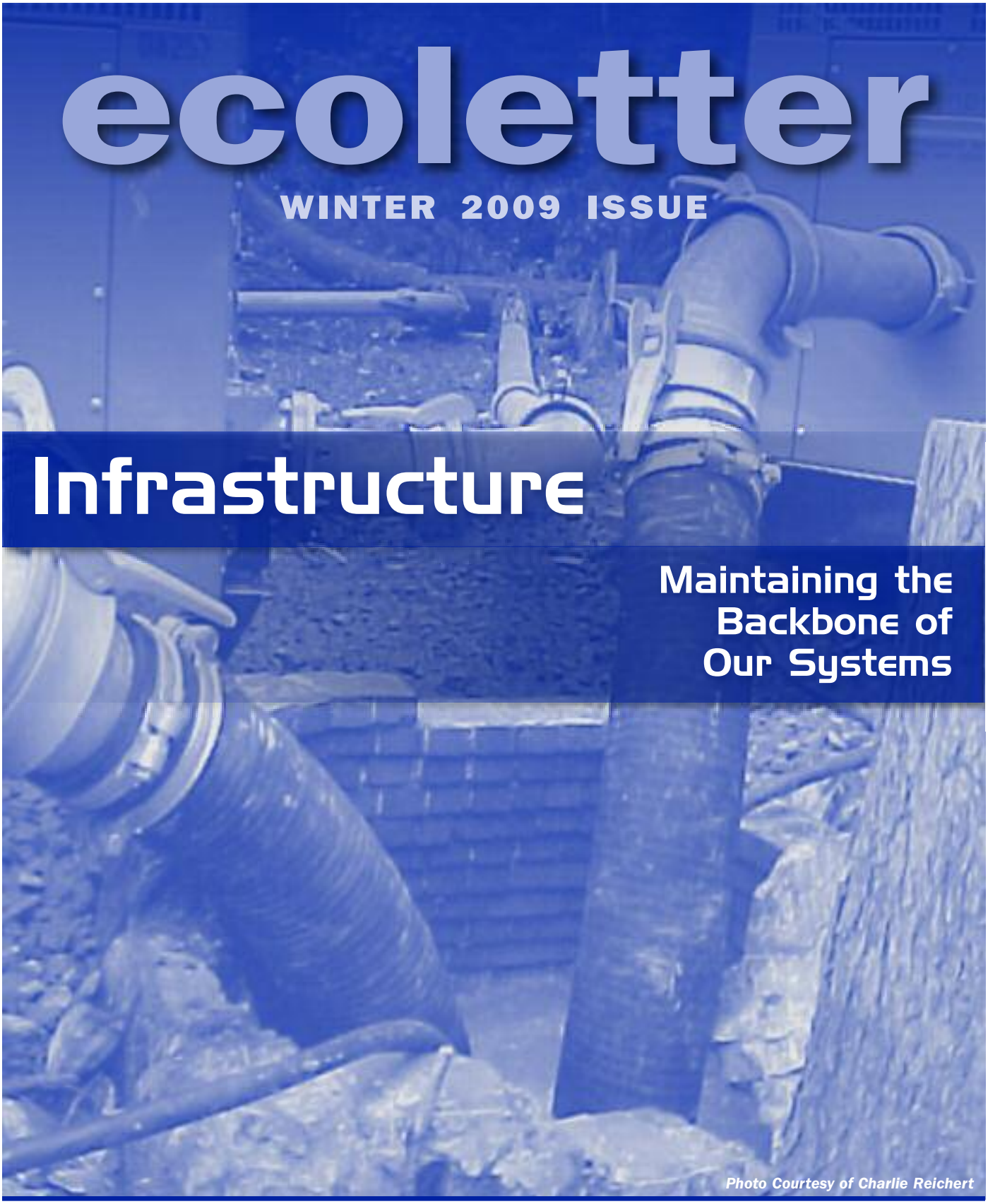
WINTER 2009 ISSUE

Infrastructure

Maintaining the Backbone of Our Systems



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A Publication of the
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PRESIDENT'S MESSAGE

CWEA President

—Aaron Nelson

Let's be Mindful of others.

As I pondered what message I should relay to the CWEA and WWOA membership many thoughts came to mind like dealing with legal enforcement and consent order compliance, the movement to sustainability, the never ending resource management stories, unifying and directing this multi generational workforce, and so on. All of these topics are current, relevant and full of regional examples. However, nothing really grabbed my attention until a recent chain of events made fully appreciate the tension that everyone in our nation (and to a certain extent globally) is feeling during these unprecedented times. In this case I realized how each person reacts differently to these additional stresses, and also realized the true need for emotional awareness and compassion is upon us especially now.

As an example, I can't be the only one looking at financial summaries of my supposed retirement accounts in disbelief of the reduction in value over this past year. I may be one of the few that, due to my recent relocation to a new city and job, is fully entrenched in the reality of the horrible housing market (from a seller's point of view). I also know several people on a fist name basis that have been on the short side of reductions in the work force, and I have also seen the uncomfortable tension on faces of people making decisions as to which of their valuable and needed staff will have to be released as part of 10% to 20% reductions in work force that we are constantly hearing about on the news channels.

As you can plainly see these are not fun times for most of us, and as I told my father, I now realize how lucky I (born in 1969) have been in my life not having to deal with (first hand) national and global instability such as this. I also realize that most of us, self proclaimed or peer acknowledged experts at stress management, are being tested to the limits on how we handle these conditions and most importantly our families, friends and last but not least our jobs.

During these times, let us not forget, that each and every one of us is dealing with a HUGE amount of abnormal stress levels. Some people of course can handle this, but most cannot. However, no matter how capable we are at stress management we need to recognize that all of us will be operating at a level well beyond what we are accustomed to. In times like this, we are likely to allow our angst and emotions to contaminate or influence business and engineering decisions during our business lives, and common courtesy throughout our relationships with family and friends. That being said, we should expect, what would normally be considered unexpected actions, reactions and consequences to normal day to day business, personal and family matters.

During these times, when our colleges, associates, friends, members of our families or others have reacted in what seems to be an inappropriate fashion outside of their normal character, Let Us Be Mindful that they may be reacting to the total stress of the times. Although their actions/reactions may be directed at you, it is more than likely a symptom of their elevated stress levels. How that situation is handled becomes a sensitive matter, and at that time it is especially important to understand and appreciate the stress of these times that do not relate to the situation that have broken this persons stress management capacity. I wish I had the answer on how to handle all situations like this especially when I am the one breaching the limits, but I don't. Fortunately, I have been made more aware of this possibility, so when I feel I am at that point or I recognize that others are there I try to pause or suggest a break. That gives all parties time to reflect and think about the situation at hand and consider what options we have. I have personally found apologies helpful to reinvigorate discussion followed by a sincere offer to help with the situation.

I recently realized that my priorities have significantly shifted in response to these times. I find myself being truly thankful for the basics in life, and my son and I share this each evening. We are thankful for our family, our friends, our health, our house, our jobs, and the country we live in.

So my message to our membership is; Let Us Be Mindful of each other, try not to take things personally if possible, and most importantly lets help each other get through these challenging times.

Sincerely,
Aaron K. Nelson, PE
President CWEA

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CALENDAR OF EVENTS

Spring

April 17, 2009
CWEA Collection Systems Committee
Lunch Seminar

May 14, 2009
Joint CWEA/CSAWWA Water Reuse
Committee Seminar

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.

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EDITOR'S CORNER

Just two issues ago in our Summer offering, we reported that the Chesapeake Bay Foundation was partnering with agriculture. Well now they've taken the gloves off and returned to fighting instead of togetherness. Of course we speak of their recent lawsuit against EPA accusing our nation's environmental agency of telling big fibs about cleaning up the Chesapeake Bay. The twenty-five year, six billion dollar effort has been nothing more than failure. We'll not get into what the lawsuit means or what likely will occur as a result of it, rather we'll take it as a sign of increasing frustration with stubborn resistance of the Bay's waters to improvement. Here we are at the start of another year and another year closer to the inevitable train wreck of the Bay wide TMDL. If you were appointed Dictator of The Bay what would you do to restore water quality? Think about that. A bigger question is what could you do?

* * * *

The Big Necessity—The Unmentionable World of Human Waste and Why it Matters by Rose George is a book you should read. While Ms. George talks about some of the bigger issues we're all familiar with, it's when she gets into the personal scale where things are really brought home. If you want to know why waterborne diseases are still epidemic, consider one number—2,600,000,000. That's the number of people who do not have access to a toilet. The World Toilet Organization is trying to do something about that number with an effort to bring toilets to the people. You will also learn about how Japan and China deal with human waste. The Japanese have by far the most technically advanced toilets in the world. They have engineered the act of a bowel movement to a degree unimagined by most Americans, who they regard as primitive for using barbaric fixtures. China is the digester capital of the world. Starting over 50 years ago, small digesters were built to handle waste from households. These digesters produced biogas that provided fuel for heating and cooking in the house where the waste was generated. There are five million biogas digesters in China. By 2020, they hope to have 80 million digesters producing 40 million cubic meters of gas. By the way, in the chapter on biosolids, WASA's Mr. Biosolids, Chris Peot gives a good account of himself educating Ms. George on that topic.

* * * *

At the most recent annual conference there was three technical sessions devoted to WSSC's Western Branch WWTP. Nearly twenty years ago, as part of the first Bay agreement, Western Branch became the first major plant in the region to be upgraded for nitrogen removal. In this issue you will find details for all the work planned at that plant to bring it up to date with current technologies.

* * * *

In this issue there's a story on WASA's Operations Challenge team competing at the national WEFTEC conference. In bygone years, the WASA team actually had competition within CWEA, but for the past several years they have been the only team in the association. It's so bad that we had to import teams to our most recent conference to show members what a competition looks like. Come on Baltimore, come on WSSC, come on Anne Arundel County, come on Howard County, come on anybody, get a team together, and show WASA you can compete with them.

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F.O.G. Seminar – 2008

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— *By Chip Wood, PE;* Ecoletter *Staff*
Laurie Perkins, PE; Collection System Committee Chair

Fats, Oils, & Grease (F.O.G.) In Wastewater Collection Systems

The Chesapeake WEA Collection System Committee (CSC) annually produces informative seminars on issues concerning the operation and maintenance of collection systems. The seminars provide an opportunity for collection system workers to interact with their colleagues and to gain new ideas related to keeping a wastewater collection system in top shape. This year's focus was on FOG, (Fats, Oils and Grease)

Laurie Perkins, the current CWEA-CSC Chair, in coordination with the committee, presented the FOG seminar which attracted 130 attendees and 13 exhibitors. Every attendee was given a booklet containing the speaker agenda listing and copies of all the slide presentations. The full day event included morning and afternoon technical presentations, vendor raffles, and a buffet lunch.

The seminar featured leading experts and exhibitors experienced with the control and removal of FOG in sanitary sewers who provided insight and inovative solutions for dealing with the challenges associated with FOG . Fats, oils and grease are the leading causes of sanitary system blockages and overflows and also rob the system of hydraulic capacity.

Leon Holt, Pretreatment Manager of Cary, North Carolina was the Keynote Speaker and presented an overview of the history of regulations, status of regulations today, and possible future courses titled "FOG: Where We've Been, Where We Are, and Where We're Going". In August 2004, EPA transmitted a report to Congress on the extent of health and environmental impacts caused by sewer overflows (CSOs& SSOs). In 2005, the USEPA's Office of Wastewater Management provided several objectives, including: improve monitoring and reporting information and restore impaired watersheds and wetlands. Translated to utility specific goals, this meant no stoppages, blockages, overflows or backups and the institution of a sustainable asset management program.

Unlike many other states, North Carolina has virtually zero combined storm and sanitary sewers. Moreover, North Carolina requires Collection System Permits which are similar to NPDES permits. To make your regulations more stringent to deal with FOG, Holt recommended making the new regulations as a reference to your Sewer Use Ordinance (SUO). If you attempt to revise your SUO directly, you may incur extensive delays if the SUO has to be approved by your state. Holt also suggested changing the penalties for FOG violations from civil to criminal. FOG violations are made similar to littering violations and require police enforcement. Naturally, the police will need specialized training in collection systems in order to provide effective enforcement.

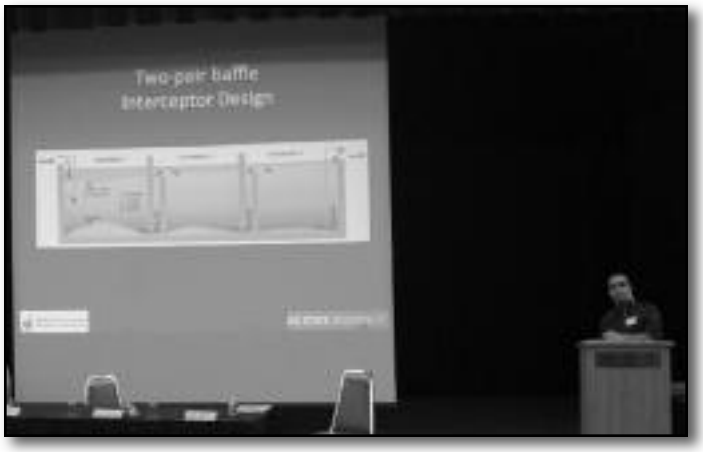
David Johnson of BioStim presented "Microbial FOG Reduction" illustrating a biological alternative to removing FOG from collection pipelines. Rather than using known practices such as hydro-jetting with water, cleaning with chemicals, or dipping out the FOG accu-

mulations, the BioStim solution puts a mesh bag containing one or more "BioPlugs" into the flow stream of a manhole. The bag is supported by a nylon rope which is tied to a step or ladder rung. The BioPlugs are composed of eco-friendly organisms that will dissolve and be carried downstream and will literally consume the FOG and convert it to CO2 and water. In less than 120 days, this so called "bioremediation process" claims to considerably reduce any FOG accumulations.

Ben Peters of Linko Data Systems presented "FOG Data Management Options" outlining various methods related to running a FOG control program from a computer. In most cases, adequate data base, spreadsheet and publishing software is required. FOG should be stopped at the source by managing so called "Food Service Establishments (FSEs)" such as restaurants, kitchens in schools, hospitals, etc. Food processing operations such as kitchens should follow Best Management Practices (BMPs) by having grease removal and pretreatment equipment installed and appropriately maintained. FOG information that needs to be managed includes, a FSE inventory, grease removal equipment maintenance schedule, inspections, violations, enforcements and determined "hotspot" areas.

Anthony Laufik, of Greeley and Hansen presented "Controlling FOG in DC WASA's Collection System", a case study on removing FOG from three 60-inch diameter wastewater siphon pipes that cross under the Anacostia River in Washington, D.C. Fortunately, each of the three siphons was valved in such a way that the flow thru any one siphon could be shut off, thus enabling the pipe to be accessed for TV camera inspection and maintenance. Results of the TV inspection found that two of the three siphon pipes had remarkable accumulations of grease and silt. To clean any one siphon pipe, the other two were valved off so that all the flow passed thru the one siphon, at increased velocity, for several weeks. Each siphon was capable of passing 100 per cent of the design flow. Followup reinspections confirmed that the siphon pipes were cleaned. Other large diameter wastewater pipes in D.C. that were designed with "up-and-down" profiles (or virtual siphons) were found to trap grease and were very difficult to clean. Designing for grease avoidance and maintenance removal is very important because once constructed, pipelines are very expensive to modify to deal with grease.

Charles Card of the Washington Suburban Sanitary Comission (WSSC) presented "Development of New FOG Regulations: WSSC's Process and Findings". The WSSC FOG program was mandated by a Sanitary Sewer Overflow Consent Decree. WSSC was directed to submit a modified FOG plan to both USEPA and MDE. The objective of the plan was to reduce grease-related SSOs and basement backups. In implementing the plan, WSSC coordinated with FSEs, the Restaurant Association, manufacturers of grease interceptors, waste haulers, plumbers, county departments of environmental protection, county health officials, public, MDE and USEPA. WSSC did extensive research on various types of grease interceptors and their effectiveness. Basically, there are three types of grease interceptors: Volume-Based, Flow-Based-Passive, and Flow-Based-Mechanical.



Volume-Based Interceptors are typically large tanks made from pre-cast concrete. Similar to a septic tank, the tanks typically employ baffles at the top of the tank to enclosed floating FOG material and employ baffles at the bottom of the tank to trap settled solid material. Mr. Tarek Aziz from North Carolina State University presented "Design Considerations for Volume-Based Grease Interceptors". Selection of an appropriate Volume Based Interceptor is based on flowrates and detention times. Volume-Based Interceptors usually require less cleaning and maintenance than Flow-Based interceptors, but they are typically larger and require more space for installation. Currently, WSSC has developed

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their own design for the Volume-Based Interceptors, but WSSC is working with researchers at the North Carolina State University to determine the best design. To deter-

mine the size of a Volume-Based Interceptor, WSSC intends to change their code so as to adopt Table 10-3 in the 2006 Uniform Plumbing Code. Flow-Based Grease Interceptors are typically made from either steel or some form of plastic material. They are to be selected and installed according codes issued by the American Society of Mechanical Engineers (ASME).

In most cases, WSSC inspects to and enforces to what is known as the "25 percent rule" for both Volume-Based and Flow-Based Interceptors. This means that the combined depth of the floating FOG layer on the top of the interceptor and depth of the solids layer on the bottom of the interceptor can not exceed 25 percent of the total depth of the interceptor.

Ted DeBoda, PE of the URS Corporation presented on indentifying and strengthening "Weak Links in the FOG Management Chain". After Ted explained the considerations for an effective FOG program, he went on to cover dealing with weak links. One potential weak link to remedy is to determine who regulates the various aspects of the FOG program. Determine the roles of the sewer utility, the plumbing and building code enforcement, the department of health, the department of environment, and law enforcement. Another weak link is inadequate public education. Residents may routinely discharge FOG down their drains and be unaware of the connection between grease and SSOs. Improve this weak link thru well placed posters, bill stuffers, public workshops, website design, and targeting problem areas. A third weak link is inadequate FSE staff education. Improve this link with FSE training programs, interceptor maintenance

training, and multilingual posters. A fourth weak link is clear and adequate directions for Grease Interceptor sizing. Frequently, the size recommendations provided by the various agencies, e.g., EPA, department of health, plumbing code, and ASME will differ over a wide range. Establish the sizing methodology in an ordinance. Include sufficient retention, adequate volume for cooling, turbulence control measures, maintenance access, and sufficient storage capacity for floating and settling materials. Also, require upgrades to older systems.

Paul Sayan, P.E. of Black and Veatch presented the"Use of GIS Tools for Grease Control Prioritization." He provided color slides of various types of maps such as sewer pipe layout with trouble spots identified, aerial photographs with trouble spots, grease deposition density analysis, flowmeter basin approach, work order assignments, and water-in-celler maps.

Based on the interest and feedback received surrounding this topic, The CWEA Collection Systems Committee plans to create a permanent FOG subcommittee in order to keep its members appraised of current FOG developments and initiatives. For more information please contact Laurie Perkins at lperkins@rjn.com or John Fletcher at cmom@dukes.com.

WEF Policy Statement on Sustainable Infrastructure for Clean and Safe Water

Approved by the Board of Trustees, April 2005

We have made tremendous progress toward achieving national water quality goals since the passage of the Clean Water Act in 1972. High levels of wastewater treatment are the norm throughout the United States and we enjoy one of the highest levels of water quality in the world. Despite this progress, water pollution still persists. According to EPA's 1998 Water Quality Inventory Report to Congress, 44% of assessed estuaries and 35% of assessed rivers and streams have impaired water quality due to a variety of sources, including inadequately treated wastewater. One of the most critical issues facing Americans is how to improve and maintain our infrastructure to ensure that we fully enjoy the health, economic and social benefits that clean and safe water provide. Infrastructure problems associated with aging pipes, outdated systems, and inadequate capacity to meet growing population demands are requiring many communities to make huge investments in upgrades to their water and wastewater infrastructure systems. According to the EPA, the costs associated with these upgrades range from a low of $485 billion to a high of $896 billion over the next twenty years. These amounts are beyond the capacity of some municipalities to shoulder alone. If this challenge is not met, EPA estimates that by 2016 water pollution levels could be similar to levels observed in the mid-1970s.

WEF POSITION

The Water Environment Federation supports a three-pronged approach to solve the infrastructure challenge facing water and wastewater utilities: First, utilities must be well managed and appropriately funded to ensure long-term sustainability of collection, treatment and distribution systems; second, there must be a significant and continuing federal investment commitment; and, third, the general public and business community must play a larger role in ensuring that utilities continue to effectively serve their communities.

Utilities must be well managed locally to ensure long-term sustainability of collection, treatment and distribution systems: The first line of defense in ensuring Americans enjoy the benefits of clean and safe water is ensuring our local water and wastewater utilities are well maintained and operated with sufficient local support. Specifically, WEF supports:

- Strong professional staff that are viewed as advocates for clean and safe water in the community and on the state and federal level. In addition, utilities must have employee development and training programs that ensure utility staff possess the skills needed to manage, operate and maintain the utility using best practices;
- Full cost-of-service pricing systems that encourage local communities to establish rates that reflect, to the maximum extent practicable, the system's true life-cycle costs, including debt service, and that can support long-term management needs;
- Sustainable management approaches, including asset management and environmental management systems, that proactively ensure long term viability of each component of the system while simultaneously ensuring compliance with local, state and federal environmental regulations;
- A culture of constant innovation and research into new technologies and management approaches that support best management practices, including conservation, efficiency and reuse; and a system to ensure transparency and public participation so the utility remains accountable to ratepayers and the general public.

There must be a significant and continuing federal investment: WEF recognizes that even if local utilities do all the above and are managing their systems using best practices, federal assistance in financing infrastructure costs will continue to be essential for many communities. Congress must make a significant renewed commitment to help communities and regional watershed partnerships meet their obligations under the Clean Water Act and the Safe Drinking Water Act. Specifically, WEF supports:

STRENGTHENING THE SAFE DRINKING WATER STATE REVOLVING FUND PROGRAM (SRF)

- Reauthorization of the Clean Water and Safe Drinking Water State Revolving Fund Programs (SRF) with a significant increase in appropria-

tions to more closely reflect financing needs that exist;

- Improved administration of State Revolving Funds, that streamlines the application process, provides increased flexibility to States to determine, with public input, project eligibility and environmental compliance standards, and encourage innovative partnerships that bring diverse stakeholders together for more effective broad-based solutions; and reduces paperwork burdens on communities;
- Flexible forms of financing, made available by states on the basis of need, to assist communities that do not have the rate base to support conventional or SRF loan financing costs. These include extended loan terms, loan forgiveness programs and grants. Communities in need often include low-income communities and small communities or those facing costly environmental challenges such as correction of CSO and SSO problems or meeting new TMDL and security requirements. More comprehensive affordability criteria should be developed for states to use in allocating SRF financing;
- A dedicated revenue source for the SRF could ensure that federal investment in water infrastructure is consistent and no longer solely depends on annual discretionary appropriations. WEF believes that any dedicated SRF revenue source identified should be broad-based, related to clean and safe water, and should not impose a national tax on local water and wastewater ratepayers.

SUPPORT FOR STATE PROGRAMS, SMALL COMMUNITIES, RESEARCH, ASSET MANAGEMENT, AND PUBLIC EDUCATION

- In addition to increased funding for the SRF, assuring infrastructure sustainability will require increased federal support for States to administer clean water programs, including support for watershed based approaches; federal support for technical assistance to small communities; increased federal investment for research and development of treatment and infrastructure technologies and asset management strategies that improve the life-cycle of wastewater treatment systems; and federal support for the development of a national program to educate the public about the benefits and economic importance of water and wastewater infrastructure.

The general public and the business community must play a larger role in ensuring clean and safe water.

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Water Environment Federation's Vice President Testifies at House Water Resources and Environment Subcommittee Hearing

Jeanette Brown, Vice President of the Water Environment Federation, testified February 4 at a congressional hearing of the House Water Resources and Environment Subcommittee of the House Transportation and Infrastructure Committee. The hearing, "Sustainable Wastewater Management," was an information gathering exercise that specifically focused on improving the energy efficiency of our nation's wastewater treatment plants.

The House Water Resources and Environment Subcommittee has broad jurisdiction over water resources activities including the Clean Water Act and Clean Water State Revolving Funds that help State and local governments meet their water infrastructure needs. Recognizing that energy is one of the highest costs in the wastewater treatment process, it is estimated that our nation's treatment plants consume more than one percent of all energy used in the U.S. The purpose of this hearing was to identify ways to mitigate this consumption by exploring energy efficient technologies and operations.

As the Executive Director of the Stamford Water Pollution Control Authority (Conn.) with more than thirty years of experience, Brown provided a real world perspective on energy use and the modern wastewater treatment plant. Her testimony, "Energy Efficiency and Energy Independence for Sustainable Wastewater Treatment," included recommended approaches to energy efficient wastewater treatment and the relationship between treatment requirements and energy consumption, including the potential for wastewater treatment systems to generate renewable power. An excerpt of her testimony is provided below.

Good morning, Madam Chair and Subcommittee Members. My name is Jeanette Brown and I am the Vice President of the Water Environment Federation. I am also the director of one of the largest wastewater utilities in Connecticut, the Stamford Water Pollution Control Authority. I am honored to be here today to discuss the opportunity within the wastewater sector to ensure protection of water quality and public health in a more energy efficient and economical manner through conservation, new technology, and innovation.

As the Executive Director of the Stamford, Connecticut Water Pollution Control Authority with 30 years experience in wastewater treatment I feel that I am most qualified to speak about the sector. The Stamford Water Pollution Control Authority provides advanced wastewater treatment for a community of 100,000 people. As an engineer, and a water professional, I am a steward of the environment and very proud of the job we do providing an essential community service and protecting the water quality of Long Island Sound. Later I will explain the steps that we are taking in both conservation and innovation, specifically utilizing the oldest waste product known to man as a sustainable and renewable energy source. I am referring to the by-product of the wastewater treatment process, technically referred to as wastewater residuals or biosolids. There are more than 16,000 wastewater treatment plants in the United States. Almost all are publicly owned. In the process of collecting and treating wastewater to protect public health and the environment, these plants use over one percent of all the electricity generated in the United States. Energy costs typically represent over 30% of a utility's operating budget second only to labor. In many communities the water and wastewater utilities are the largest municipal energy consumers.

The water professionals who make up the Water Environment Federation are very concerned about the high use and cost of energy as well as the age of our infrastructure. Protection of our waterways requires that systems be expanded to meet the pressures of growing populations, increased treatment requirements to meet water quality needs and that aging systems be upgraded in a way that enables energy efficiency and the capture of energy from the waste products. As a sector, we are very concerned about the detrimental effect that high energy costs and high capital improvement costs can have on the ability of local communities to maintain or upgrade their water infrastructure. This in turn can have a detrimental effect on our ability to protect public health and the environment. Therefore, we need to act now if we hope to continue to protect our environment and ensure sustainable wastewater treatment through energy efficiency and energy independence.

Sustainability Includes Green Infrastructure, Water Efficiency, and Energy Efficiency and Independence

The Water Environment Federation is supporting this concept of sustainable water infrastructure in a variety of ways including the promotion of green infrastructure. We are also advocating sustainable operation of more conventional infrastructure. This includes advocating energy conservation through effective operational practices and through technological advances, and innovation that allows the utilization of renewable energy sources.

WEF's membership understands that energy conservation and renewable energy initiatives in wastewater treatment plants cannot solve the world's energy crisis, but we know that it will certainly make a difference. We are therefore taking a proactive leadership approach; WEF hosts conferences, publishes papers, and convenes forums on the issue for water professionals. Of particular note, WEF is updating our Manual of Practice on *Energy Conservation in Water and Wastewater Treatment Facilities*, to be released later this year. This manual will cover energy efficiency and tools to measure, assess, and conserve energy. It features new information on cogeneration, energy recovery, energy efficient design, use of renewable fuels, and related climate change issues.

In 1989, WEF founded the Water Environment Research Foundation, (WERF). WERF is engaged in research to optimize wastewater operations for energy, cost, and environmental footprint. Additionally, WERF's climate change program is assessing processes and technologies to cost-effectively mitigate the sector's potential impact. One WERF project, *Improving the Wastewater Plant Environmental Footprint: Options for Your Locality*, will help wastewater treatment plants define their current carbon and ecological footprint as they take steps towards reducing their impact.

As stated earlier, over one percent of all the electricity generated in the United States is used for collecting and treating wastewater. Within wastewater treatment systems, energy is used to run pumps and motors, aeration systems, disinfection processes, solids processing equipment, lighting, computers, and other electrical equipment. It is also consumed in pumping wastewater to treatment plants. To reduce energy use, water conservation has to be our first line of attack: conservation through change of habit, conservation through the introduction of new technology, and innovation to open new doors and new approaches to solving old problems. In order to change old habits; we need to educate people about the value of water. We are very supportive of efforts to educate the public about water conservation measures and water-efficient products. Conservation of water will help conserve other vital resources. Our formula is: **Use Less = Treat Less = Reduced Costs and Energy Required**.

In addition money has to be used wisely and put toward research and development of new technology and innovation, and prioritized to bring the most good or biggest bang per dollar.

Water professionals over the past few years have worked hard to reduce power consumption by using high efficiency motors, high efficiency lighting, computer controls which can turn equipment on or off based on process needs, and education. Conservation alone is not enough to reduce the need for fossil fuel generated power, but it has to be our first and most pronounced step in our efforts to decrease our use of fossil fuels.

Necessity is said to be the mother of invention. The need for new approaches is certainly apparent given present economic conditions and pressures on both limited resources and our natural environment. Innovation is indeed blossoming all around us driven by need. The landscape is changing as technologies and concepts are being developed to allow plants to be energy independent or even net energy producers. This evolution in thinking moves wastewater treatment plants from being major energy *consumers* to net energy *producers* and represents a paradigm shift in the sector.

Why is this paradigm shift so important?

There are three major reasons:

1. Cost of Energy and Energy Independence
Recent spikes in energy prices highlight the volatility of global energy markets and their impact on a utility's bottom line. Energy efficiency, with a movement toward energy independence for treatment plants, reduces or eliminates a utility's vulnerability to energy prices and saves communities monies through decreased operating costs. Additionally, it can help mitigate the stress that an increasing population and aging electrical infrastructure are creating on our already strained energy grid.

2. Climate Change
The water sector is keenly aware of the impacts of climate change as the tangible effects of these changes are already being manifested in the water cycle. Prolonged droughts, amplified storm intensity, and increased variability in precipitation patterns are forcing water managers to adapt to a new reality. As a result, the sector is taking steps to reduce its carbon footprint by reducing greenhouse gas emissions associated with the energy required for its operations and by capturing greenhouse gas emitted from the treatment process.

3. Sustainability
Sustainable practices and approaches are becoming integrated into utilities' operating principles and capital improvement plans. Water managers view themselves as environmental stewards charged with protecting and enhancing water resources for the immediate and future generations. Sustainable approaches to water management include having a sound fiscal program where costs are scrutinized and revenues account for the true costs of treating water and capital improvements. Additionally, sustainable approaches achieve environmental goals such as minimizing resource consumption and production of waste products. Energy efficiency plays a role in both of these aspects of sustainability in the water sector. Examples of these sustainable approaches include the use of natural, biological processes to remove pollutants rather than using chemicals and the reuse of biosolids to augment or replace chemical fertilizers.

Besides energy conservation, what else can we do to guarantee sustainability in the water sector?

Here are three examples of innovative processes:

Stamford Biogas Turns Waste into Energy
Wastewater treatment generates solid residual material known as biosolids when it is appropriately treated. This material has a relatively high BTU (british thermal unit) or energy value. In other words, it is a good fuel and it is produced by every community. Typically wastewater residuals are trucked out of a community after processing and used on land as a fertilizer or buried in landfills. In some cases, they are burned at on-site incinerators at the treatment plant. Think about this: A one-pound package of the dried biosolids produced in Stamford Connecticut, or most other treatment plants, has a heating value of almost 9000 BTUs! My utility feels that putting this material on land is a waste of a renewable energy source which can help in a small way to reduce dependence on fossil fuels and significantly reduce our carbon footprint. We are using a gasification process to convert biosolids to a synthetic gas which we call Stamford Biogas (you can read more at www.stamfordbiogas.com). Gasification produces no greenhouse gases and any gases produced by the generation equipment can be returned to the gasifier to remove the carbon dioxide. This biogas can be used as fuel to run internal combustion engines or to fire boilers to produce electricity. The gas produced from this one-pound bag of biosolids can light three 60-watt light bulbs for an entire day. In the United States, just over seven million tons of wastewater residuals or biosolids are generated every year. That's over 14 trillion pounds per year. Just think how many bulbs we can light from this renewable energy source which is currently considered by most of the public as a waste product.

We have built a pilot facility in Stamford where we test biosolids from various treatment plants and develop technology to improve gas production. Not only have we used the Stamford Biogas to generate electricity, but also have used it to run a car. Additionally we have tested our biosolids in full-scale equipment supplying energy to the electrical grid. Once funding is available (and we are hoping for stimulus funding), we plan to construct a 15 megawatt facility. This facility will demonstrate the feasibility of this technology for other plants in the United States.

This truly falls within the definition of our conservation and innovation approach to the future. We have taken a waste product which is costly to dispose and by managing the product on site we conserve energy by elimination transportation, we produce a fuel by an innovative process, and we sustain our responsibility to the environment.

Solar Energy Powers Water and Wastewater in Rifle, Colorado
A different approach to energy efficiency is being practiced in the City of Rifle, Colorado, a city of 10,000 residents in Western Colorado. The City has recently built one of the largest renewable energy solar systems used for a combined (potable water and wastewater) municipal system. Ninety percent of the daytime power used to pump drinking water is provided by a 600 kilowatt solar array. Sixty percent of the daytime power to run Rifle's wastewater reclamation facility is provided by a 1.7 megawatt solar array. These two systems will prevent more than 152 million pounds of carbon dioxide from being emitted using traditional fossil fuel electricity over a 20 year period. More electricity could be generated by solar power but the City has approached the limit of power generation set by the Colorado Public Utilities Commission.

East Bay MUD's R2 Program Generates Electricity and Income
Another local agency that has embarked on an innovative approach to utilizing a resource commonly thought of as waste is the East Bay Municipal Utility District (EBMUD) of Oakland, California. About six years ago, EBMUD initiated what they refer to as their "Resource Recovery" or R2 program. The R2 program uses existing wastewater treatment capacity to treat high-strength industrial or commercial wastes from food processors such as dairies and wineries. By adding these high-strength wastes to anaerobic digesters, EBMUD was able to double biogas production and on-site electricity generation from the biogas. Currently EBMUD's on-site generation meets about 90% of its demand and they aim to exceed 100% in the future so that the wastewater plant becomes a net energy producer. The R2 program yields many

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CHESAPEAKE WATER ENVIRONMENT ASSOCIATION

THE CWEA COLLECTION SYSTEMS COMMITTEE

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(The Importance of Engineering Working with Operations)

April 17, 2009

10:30 a.m. – 1:30 p.m.

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This lunch workshop, entitled ***It Takes 2***, will feature a panel of area municipalities & engineering firms discussing the implementation & administration of communication & cooperation between Operations & Engineering. The panel presentation will be designed to stimulate a lively discussion with all attendees.

The Joint Water Reuse Committee of the

CHESAPEAKE

Chesapeake Water Environment Association

and

Chesapeake Section: American Water Works Association

PRESENT:

A Comprehensive Approach:

Water Reuse and Sustainability for Water and Wastewater Utilities

May 14, 2009

8:30 a.m. – 3:30 p.m.

To be held at:

Conference Center at the Maritime Institute

Baltimore, MD

This workshop will introduce the new water reuse regulations being proposed by the Maryland Department of the Environment. Representatives from several counties will discuss how their reuse programs might be modified as a result. There will also be presentations on ensuring the long-term sustainability of Maryland's water resources and of Maryland's public and private utilities.

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Improvements to WSSC's Western Branch WWTP

—Submitted by Brian Mosby, WSSC

The Western Branch wastewater treatment plant (WWTP) is a three-stage BNR process owned and operated by the Washington Suburban Sanitary Commission (WSSC). The system is comprised of three separate activated sludge processes in series: High rate activated sludge (HRAS), nitrification activated sludge (NAS), and denitrification activated sludge (DNAS). The HRAS process provides carbonaceous oxidation, followed by the NAS process for ammonia oxidation, followed by the DNAS process reducing nitrate to free nitrogen gas with methanol addition and aerated nitrogen stripping channels. Each activated sludge process is equipped with intermediate clarifiers making the plant a three-sludge system. Phosphorus removal is achieved by alum addition and tertiary filtration. Tertiary filter effluent undergoes ultraviolet disinfection prior to discharge to the Western Branch of the Patuxent River. The plant has four parallel trains of the HRAS and NAS processes that transition to two trains of two DNAS reactors, air stripping channels, and final clarifiers. Waste activated sludge (WAS) from each of the three stages is thickened with dissolved air flotation thickeners, dewatered with centrifuges, and incinerated with multiple hearth incinerators.

Under a previous contract, Metcalf & Eddy conducted an extensive process evaluation and alternatives analysis to identify upgrades necessary for compliance with future Chesapeake Bay enhanced nutrient removal (ENR) requirements. This process-related analysis has been documented in a series of Technical Memorandums submitted throughout the calendar year 2007 in the order they were completed. The recommended ENR process alternative is to essentially maintain the existing three-sludge system, enhance process control, and increase biosolids handling flexibility and capacity. The following is a list of the major facility upgrades. It should be noted that some major areas are still pending final inclusion in the ENR and facility upgrades project, and hence, their progress has not been carried out through 30% design.

01. Influent Pump Station Rehabilitation (PENDING)
02. Aerated Grit and Grease Removal Chamber (PENDING)
03. HRAS and NAS Reactor Compartmentalization
04. HRAS Aeration Partial Coarse Bubble Diffusers Retrofit
05. HRAS Aeration Piping and Valves
06. NAS Aeration Piping and Valves
07. High Efficiency Turbo Blowers (PENDING)
08. NAS Anoxic Zone Mixers
09. HRAS and NAS Rectangular Clarifier Baffles
10. Partial HRAS Reactor Bypass Line
11. Centralized RAS Pump Station for HRAS and NAS Processes
12. Dissolved Air Flotation Rehabilitation (PENDING)
13. Thickened Sludge Storage
14. Electro dewatering (PENDING)
15. Truck Loading Station

The Western Branch wastewater treatment plant (WWTP) is a three-sludge system that was evaluated relative to achieving enhanced nutrient removal (ENR) to comply with Maryland's efforts in restoration of the Chesapeake Bay. The WWTP will need to respectively achieve an effluent total nitrogen (TN) and total phosphorus (TP) of 3.0 and 0.3 mg/L on an annual basis at a design capacity of 30 mgd. The general upgrade concept is as follows:

- Maintain the existing three-sludge system with process-related and physical facility enhancements
- Avoid the expense of constructing primary clarifiers and primary sludge thickening facilities by enhancing grit removal and waste activated sludge (WAS) processing

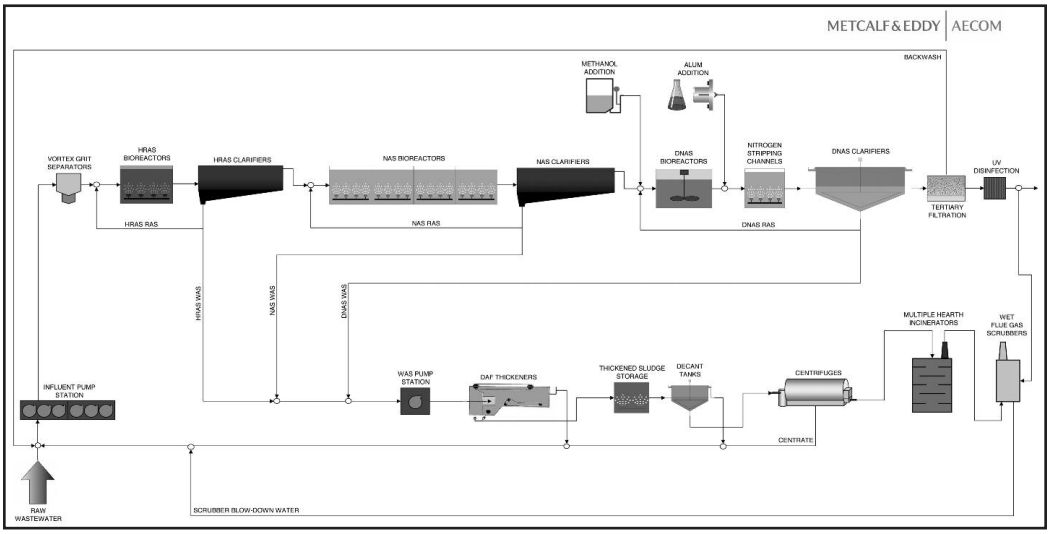

Figure 1.1 illustrates the existing WWTP process flow diagram.

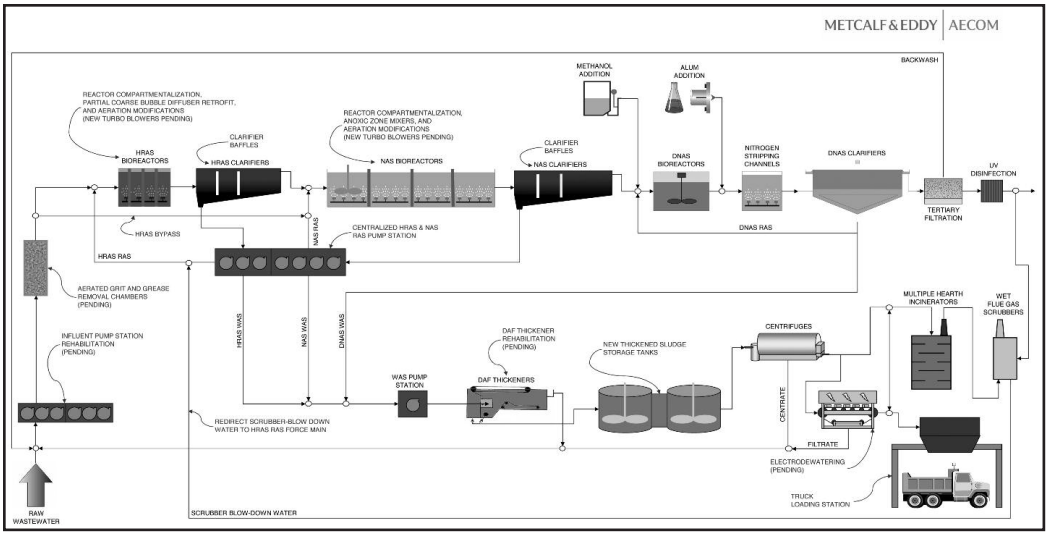

Figure 1.2 illustrates process flow diagram of the ENR and facility upgrade.

- Optimize the high rate activated sludge (HRAS) system to mitigate cyanide and prevent solids carryover into the nitrification activated sludge (NAS) system
- Optimize the NAS system for better SRT control and incorporate a NAS pre-anoxic zone and HRAS bypass for reducing methanol consumption and improving NAS mixed liquor floc structure
- Install a centralized trench-type RAS pump station for the HRAS and NAS processes
- Increase WAS processing and disposal capacity to maintain lower liquid-end solids inventory for improving intermediate solids-liquid separation between each activated sludge process. This will include a WAS storage facility and electro dewatering solids/liquid separation technology.

The WSSC Western Branch WWTP is a three-sludge system for achieving carbonaceous oxidation, nitrification, and denitrification. Phosphorus removal is achieved with chemical precipitation and tertiary filtration. Waste activated sludge is flotation thickened, centrifuge dewatered, and incinerated in multiple hearth incinerators. The WWTP will need to respectively achieve an effluent total nitrogen (TN) and total phosphorus (TP) of 3.0 and 0.3 mg/L on an annual basis at a design capacity of 30.6 MGD.

A process alternatives evaluation was completed and it concluded that retaining the existing three-sludge system with specific enhancements relative to the process and the physical facilities is the recommended alternative. Figure 1.3 illustrates the process flow diagram of the recommended alternative.

HIGH RATE ACTIVATED SLUDGE PROCESS UPGRADES

The HRAS process is designed specifically for carbonaceous oxidation using a low solids retention time (SRT) and biomass inventory. Intermediate clarifiers are used for solids-liquid separation prior to the next downstream process. The HRAS process is comprised of four independent trains with each train having four clarifiers (16 clarifiers). Return activated sludge (RAS) is withdrawn from the clarifiers with airlift pumps and is then conveyed by gravity to the head of the HRAS reactors. Two airlifts per clarifier are currently used resulting in 32 airlifts for the HRAS system. Waste activated sludge (WAS) flows by gravity from each clarifier and is controlled with 16 independent valves.

Centralized HRAS RAS/WAS Pumping System

Process performance is exacerbated by poor RAS and WAS control due to the nature of the existing infrastructure. Although full scale testing has shown that the process is capable of achieving 90% organic removal, this level of performance is difficult to operate because of the extensive number of airlifts and WAS valves that require operation. The airlift RAS pumps are constant speed, do not provide for positive control, and occasionally clog with debris causing clarifier failure. WAS withdrawal is difficult to control consistently among each clarifier and each treatment train. Replacement of the existing RAS/WAS pumping and conveyance facilities with a system that pro-

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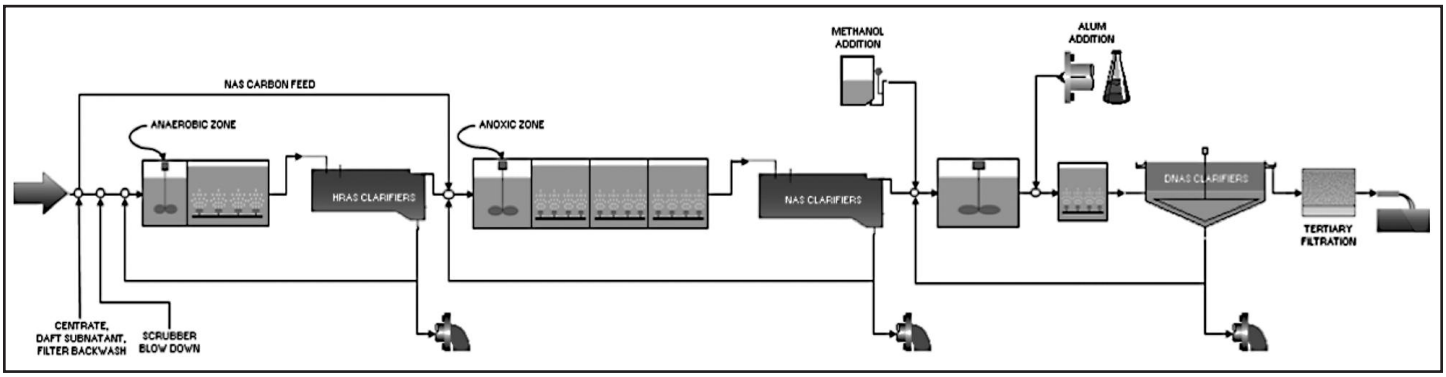

Figure 1.3 Recommended ENR process alternative: Existing three-sludge system with HRAS anaerobic zone, partial HRAS bypass, NAS anoxic zone, and isolation of scrubber blow-down water to HRAS influent

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vides for positive control is of the utmost importance to meet future ENR performance requirements.

The recommended RAS/WAS upgrade is a centralized pumping and control station for the HRAS system. This approach is currently in use for the denitrification process at the WWTP. A new centralized system consists of RAS gravity sludge collection from each clarifier. The RAS withdrawal pipe from each clarifier would be equipped with a motor operated pinch valve and magnetic flow meter for control of individual clarifier RAS withdrawal rates. Flow from each clarifier would be collected in a header pipeline for gravity transport to a new centralized pumping station with a wet well. An independent set of RAS pumps would pull from the wet well and convey RAS to the corresponding reactor trains. The RAS pumping system would be capable of providing a flow range of 10 to 42 MGD of pumping capacity. The system would have three pumps (1-standby) each with capacity of 14,200 gpm @ 25 TDH. To minimize the physical size of the new pumping station and the construction cost, wet pit solids handling pumps are recommended as shown in Figure 1.4. WAS would be removed from the process from the RAS force main using header pressure and a flow-rated control valve. This system would result in one centralized wasting location rather than the 16 wasting locations currently in place.

Figure 1.4 Typical Wet Pit Vertical Turbine Solids Handling Pump

Scrubber Blow-Down Recycle Conveyance to HRAS RAS Wet well

The WWTP currently uses multiple-hearth incinerators in conjunction with wet flu-gas scrubbers for particulate emissions control. The blow-down water from these scrubbers is often high in hydrogen cyanide, a compound extremely inhibitory to nitrification. This cyanide-laden stream is currently conveyed to the influent pump station wet well and accordingly to the head of the HRAS reactors. Intensive full-scale sampling showed that this cyanide is removed in the HRAS process before entering the nitrification activated sludge (NAS) system. However, under the recommended alternative, a partial bypass around the HRAS system into the NAS system is proposed. This flow scheme would potentially result in a direct inflow of cyanide to the NAS system. This can be avoided by simply redirecting all scrubber blow-down water into HRAS RAS force main ensuring that all cyanide laden water is directed to the HRAS system for treatment.

Anaerobic Zone Baffle Walls and Mixers

Use of an anaerobic selector zone in the HRAS system is for sludge settleability control as high sludge volume indexes (SVIs) contributing to poor solids-liquid separation has historically plagued the HRAS system. This retrofit is fairly straight-forward where baffles and mixers would be installed to create a 30 minute anaerobic hydraulic retention time (HRT) in the upstream portion of the HRAS reactors. Each zone would be created with fiberglass reinforced plastic baffles and include surface mounted mechanical mixers to keep solids in suspension. A portion of the existing influent-end diffuser grids would be modified to incorporate the anaerobic zonage.

HRAS Clarifier Optimization Baffles

The existing HRAS clarifiers are rectangular, narrow, and have a steep slope towards the influent end where the sludge goes. It is probable that this clarifier geometry lends itself to creating strong eddy currents that degrade settling performance. Full-scale clarifier dye studies, drogue testing, and vertical solids profiling will be accomplished in the field to determine strategic locations for baffle installations that will decrease eddy currents and improve clarifier efficiency.

HRAS Surface Wasting

As an additional measure for improving HRAS settleability, surface wasting has also been included. Nuisance foams such as Nocardia and Microthrix Parvicella and many species of filamentous bulking microorganisms can be controlled with surface wasting to improve sludge settleability and improve solids-liquid separation performance. This is a retrofit that includes telescoping valves and piping in the HRAS reactors that can be used to waste mixed liquor from just below the water surface elevation. This surface waste would be directed to the scum processing facilities.

HRAS Miscellaneous Building/Pipe Gallery Improvements

The existing HRAS clarifier pipe gallery will be reused for the combined RAS/WAS gravity piping system conveying flow to the centralized RAS/WAS pumping station. The gallery will need to be brought up to current codes with respect to fire protection, ventilation, electrical components such as lighting, utility outlets, and egress.

HRAS ENR Monitoring and Control Systems

The HRAS system will require enhanced dissolved oxygen (DO) monitoring and control to ensure effective and reliable carbonaceous oxidation and protect against low DO filamentous organism growth. This can best be achieved by implementing two key elements; automated air flow control valves on each drop leg with a DO meter in each aeration zone. The aeration system will be controlled with an appropriate control logic strategy so that the air flow can be adjusted automatically to maintain the desired DO set point for the zone. The air flow along the length of the tank will effectively be tapered with this system to achieve energy efficient but effective aeration. Each HRAS reactor will have two aeration zones, each with independent rated flow control valves controlled by DO feed back loops tied to the respective DO probe signals.

NITRIFICATION ACTIVATED SLUDGE PROCESS UPGRADES

Centralized NAS RAS/WAS Pumping System

The centralized NAS RAS/WAS pumping and control system is very similar to he HRAS system. The maximum design RAS capacity for a separate stage nitrification system is typically greater than for a separate stage carbonaceous oxidation system, and hence this system has been designed for a capacity range of 15 to 60 MGD. The centralized RAS/WAS pumping and control system would be a new combined building for both the HRAS and NAS processes with back to back trench wet wells for reducing construction costs. The NAS RAS pumps are of the same type used for the HRAS system. Their will be four NAS RAS pumps (1 standby), each with a capacity of 12,900 gpm @ 28 ft TDH.

NAS Clarifier Optimization Baffles

The NAS clarifiers exhibit nearly identical geometry as the HRAS clarifiers, and hence the upgrades are similar as previously presented.

Anoxic Zone Baffles Walls and Mixers

The main purpose of a pre-anoxic zone in the NAS system is to provide for methanol conservation. Process evaluation exercises estimate a methanol consumption savings of about 30 to 35% utilizing a pre-anoxic zone with an HRT of about 1 hour when used in tandem with the partial HRAS bypass as discussed previously. The evaluation also identified that sacrificing this portion of existing aerobic reactor volume for anoxic zonage will not adversely affect nitrification. This anoxic zone also has the added benefit of NAS filamentous control, oxygen credit, and alkalinity recovery. It is suggested that the NAS anoxic zone be constructed as a "swing" zone (can be operated as an aerobic or anoxic zone) to provide for additional operational flexibility. This upgrade would be constructed in a similar fashion as the HRAS anaerobic zones discussed previously.

HRAS Bypass Line

Providing a wastewater carbon feed to the NAS anoxic zone by bypassing a portion of the plant flow around the HRAS system is a key aspect to methanol conservation. Providing a carbon source to the NAS system has an additional benefit of improving the NAS floc structure, as separate stage nitrification systems often produce a difficult-to-settle "pinfloc" when the upstream carbonaceous oxidation process is very efficient. This bypass line will require an independent grit removal/classifier system as its most appropriate wastewater withdrawal location is at the influent distribution chamber residing upstream of the existing grit removal facilities. The bypass line will also be equipped with a flow meter and flow-rated control valve. The bypass line capacity range will be on the order of 1 to 5 MGD and discharge to the NAS RAS wet well for subsequent pumping to the NAS reactors with the NAS RAS.

NAS Plug Flow Baffle Walls

The existing NAS reactors have a length to width ratio and geometry resulting in nearly complete-mix conditions. Experience has shown that plug flow conditions will result in increased kinetic efficiency when compared to complete-mix conditions. Baffling with three full-width fiberglass reinforced panels per reactor has been conceptualized for the NAS reactors.

NAS Miscellaneous Building/Pipe Gallery Improvements

The existing HRAS clarifier pipe gallery will be reused for the combined RAS/WAS gravity piping system conveying flow to the centralized RAS/WAS pumping station. The gallery will need to be brought up to current codes with respect to fire protection, ventilation, electrical components such as lighting, utility outlets, and egress.

NAS ENR Monitoring and Control Systems

DO control of a similar manner to the HRAS system discussed previously is proposed for the NAS system, however, the NAS aeration system includes additional drop legs associated with additional aeration zones. The conceptual NAS aeration control system will have four dedicated aerobic zones and a swing zone, resulting in five DO control feedback loops per reactor.

DNAS ENR Monitoring and Control Systems

The conceptual DNAS monitoring and control system includes a dual feed forward/feed backward control strategy for minimizing methanol dosage while meeting an effluent NOx-N set point. Online nitrate analyzers placed at the DNAS system influent will estimate initial methanol dosage rates while a second analyzer will measure effluent nitrate for trimming the dosage and preventing methanol bleed through.

Dissolved Air Flotation Thickening Improvements

The ENR upgrade will require control of the biological treatment process and continuous wasting from the HRAS, NAS, and DNAS processes to meet ENR limits. The WAS solids concentration from these processes will be lower than that currently experienced and require a minimum of three DAF units in operation. The existing mechanical components serving the five dissolved air flotation thickeners exhibit signs of extensive wear and tear and are not considered reliable to provided continued service. The improvements include replacement of the collector mechanisms, air saturation tanks, saturation pressurization pumps, and the thickened sludge transfer pumps with components of current technology to provide reliable service into the future.

Thickened Sludge Storage

Continuous wasting at optimized WAS rates from the liquid process is considered a major importance for

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achieving ENR compliance. An inability to continuously waste sludge from the liquid-end of the process results in the cascading effect described previously. It is recommended that two 200,000-gallon thickened sludge storage tanks be installed for allowing up to three days of thickened WAS storage to accommodate biosolids dewatering and/or incineration down time. The storage tanks will be equipped with coarse bubble diffused aeration for mixing and maintaining aerobic conditions.

Dual Centrifuge Operation Capability

The current dewatering configuration has one centrifuge system in operation with a second system as standby to process up to 24-tpd of solids production from the DAF system. Further, the dewatered cake pumps can pump to either the incinerator or a truck, but not both. The control systems prevent the two centrifuges from operating in parallel, limiting biosolids processing when one incinerator is operating. The plant staff is forced to feed one operating incinerator at a rate less than the solids production rate and store the remaining solids in the clarifiers by reducing wasting rates. The other option is to divert all dewatered biosolids to a truck at great expense. The improvements will provide for parallel operation of the two centrifuges to allow one to feed an incinerator and the second to feed a truck. This will minimize truck hauling when one incinerator is out of service. The modifications include dedicated and independently controlled polymer feed systems, cross conveyor between cake hoppers, and simplified truck loading system.

Centrifuge/Shwing Pump No. 6

The design biosolids production rates of 35-tpd average and 40-tpd maximum month will match or exceed the capacity of the existing incinerators and require both existing centrifuges to operate in parallel. A mechanical failure of one centrifuge or cake pump may results in a significant outage period that would result in reduced wasting rates and biosolids build-up and carry-over in the biological treatment process that would jeopardize the ability to meet ENR limits. The existing dewatering system has no redundancy and a third dewatering unit is required to provide reliable dewatering system capacity and support ENR operation. The existing infrastructure is set up for a third dewatering centrifuge system and the ENR upgrade is to furnish and install this third unit.

Additional Sludge Disposal Capacity

The liquid-end process has historically been operated with an unconventionally high biomass inventory due to WAS processing and disposal limitations causing severe solids loss in the HRAS clarifier effluent and poor organic removal. The WAS disposal limitations are closely tied with (1) more stringent stack air emissions requirements that limit sludge loading to the incinerators, and (2) decreased incinerator feed sludge solids content due to the abandonment of a heat treatment process formerly used upstream of the centrifuges. These limitations significantly decrease the existing incinerator sludge disposal capacity. The WAS processing and disposal limitations, in conjunction with RAS and WAS controllability issues previously discussed cause the following cascading effect, making additional WAS disposal a crucial process upgrade:

(1) The HRAS MLSS increases, leading to:

(2) HRAS clarifier failure, which results in:

(3) Significant solids carry-over into the NAS system, which leads to:

(4) Major increase in the NAS MLSS, which causes:

(5) NAS clarifier failure, resulting in:

(6) Major decrease in NAS aerobic SRT, and finally:

(7) Nitrification failure

There are currently three alternatives under consideration for increasing sludge disposal capacity, each with similar order of magnitude costs. They include:

Post lime stabilization

Electro dewatering

Dual stage centrifuge dewatering

Miscellaneous Building Improvements

Performing work in the DAF thickening and Dewatering buildings will require those facilities to be brought to current codes with respect to fire protection, ventilation, electrical components such as lighting, utility outlets, and egress. The buildings also exhibit roof leaks and coating failures.

OTHER UPGRADES

Switchgear and Motor Control Center Improvements

A condition survey and arc flash study was performed for the six existing substations and 16 motor control centers. The results of these studies indicate significant deterioration in performance and significant safety issues requiring replacement of switches, switchgear and motor control centers. In addition, a new substation is recommend to serve the new ENR facilities, namely the centralized RAS/WAS pump station and mixing systems for the HRAS and NAS reactors.

Influent Pumping Station Improvements

A condition survey of the raw wastewater pump motors and variable frequency drives (VFDs) indicated that these 30-year old units are operating at reduced efficiency and in the case of the VFDs outdated and inefficient technology. The upgrades include replacement in sequence of the motors and VFDs with new generation technology to provide reliable and energy efficient performance of the raw wastewater pumps.

DCWASA Operations Challenge Team Competes at the Nationals

—Submitted By Duane McCoy, DCWASA

The Centrifugal Force challenge team competed in the WEFTEC 21st Annual Operation Challenge competition at the McCormick Center in Chicago on October 17, 2008. The challenge events are designed to test the diverse skills required for the operation and maintenance of wastewater treatment facilities, their collection systems and laboratories- all vital to the protection of public health and the environment. The event tests each team in collections systems, laboratory, process control, maintenance and safety.

This year, 43 of the best teams from all over the United States, Canada and Argentina competed making this the largest and most memorable competition thus far. Although our team was faced with several set backs as we trained and practiced for this competition, we were still able to compete on the national stage and place 21st overall, 17th in safety and 10th in collection.

Chicago's Operations Challenge was a rewarding experience for all the Centrifugal Force challenge team members. Although each member took something different away from the competition, they all agreed the "Windy City" did more than live up to its name. After the competitions were over, we had time to meet and befriend other team members, become reacquainted with members from previous challenge events, and experience some of the shopping, eateries and sites Chicago is known for.

The next annual WEFTEC Operation Challenge will be in Florida. As we prepare for the upcoming year, we are looking for some new players who not only would like to challenge their own skills and compete against other teams in the same profession, but would also like to represent DCWASA. Our goal is to be the best in the country and prove we are a world class organization. We are looking through all departments of WASA for any individual who would like to try out for our team. Please contact either Duane McCoy (Centrifugal Force Team coach) at 202-787-4158 or Wendell Smith at 202-787-4234 if you are interested or have any questions.

WEF Policy Statement

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WEF supports strategies that encourage greater participation by the general public and the business community in maintaining the healthy operation of community water and wastewater treatment facilities. WEF believes that to ensure long term environmental stewardship of our water resources, all parts of society must be involved. Specifically, WEF supports:

- Entering into partnerships and cooperative relationships with the business community to develop innovative, cost-effective solutions to infrastructure sustainability. Public/private partnerships should not be restricted or hindered by tax laws, grant conditions or other federal requirements. Public-private partnership decisions should be made locally based on what local officials determine is most appropriate for preserving and enhancing the water environment;
- Elected officials and non-governmental organizations, including public health organizations, advocacy groups, business associations and other civic organizations, playing a leadership role in highlighting the importance of water infrastructure and continued investment in it;
- A continued commitment from WEF to continue public outreach among all stakeholders to increase the public's support for investment in infrastructure for clean, safe water.

WEF recognizes that no single solution addresses the full range of clean water infrastructure and related challenges. All levels of government and the private sector must share responsibility for effective, efficient, and fair solutions to protecting our nation's waters.

Time For Lawn Thinking

—By Floyd B. Johnson, Co-Editor

Here in the winter, keeping warm can be a constant activity. And once physical warmth is achieved and maintained, it's not unusual for thoughts of warmer weather to advance. My baseball buddies and I engage in Hot Stove chatter, pining for games of that great warm weather sport. Two Maryland towns have also got into the act of warm weather thinking on a sport of a different sort.

Annapolis and Middletown decided to spend time this winter on home lawn care. The interesting thing is the divergent path their thoughts took. Annapolis banned the use of lawn fertilizer containing Phosphorus and Middletown wants to reduce the maximum height grass is allowed to grow. Annapolis gets some hand clapping. Middletown gets a round of boos.

I give Annapolis credit for taking a step in the right direction. You can grow fine grass without the application of Phosphorus fertilizer—or for that matter any fertilizer. Predictably there is an outcry from lawn doctors, those purveyors of thinking that all good lawns need outside intervention of the chemical nature. There's a large lawn company called TruGreen ChemLawn. Well they used to be called that, now its seems they just want to be called TruGreen. You got to wonder why. I'll miss the old name; it was one of my favorite oxymorons. I know one thing; their green and my green don't match.

Over in Middletown they have a town ordinance that says lawns have to be kept below twelve inches. Town officials think that's too high and want the maximum allowable height reduced to eight inches. What happens to the criminal lawn owner who doesn't keep their grass cut? Try being fined, having to pay for the cost of the town cutting the grass, and if the fine and cost of cutting isn't paid, a lien will be placed on the property. You can bet I'll not be purchasing any property in Middletown any time soon.

If I had a town, here's what I'd do:

- It would be illegal to apply any chemicals on any lawn.
- There would be a height restriction. Eight inches would be the minimum.
- Lawnmowers with bag attachments would be outlawed. The grass clippings are the fertilizer, leave it be and don't take it away.
- The word lawn would be redefined to mean ground cover that reduces erosion and/or promotes wildlife.
- There would be tax incentives to convert lawns to meadows. Special awards would be given to owners who take the ultimate solution and let it all hang out by declaring their lawns cutting free zones. While I'm at it, encouragement would be given for planting native grasses. They not only belong, but also are accustomed to growing in local conditions without human intervention.

Perhaps the most difficult obstacle in changing the thinking about what a lawn should look like is a re-ordering of what people regard as a good lawn. The current idea of a buzz cut, thick, single fescue, lush green carpet as the in-look, status symbol of being with it has deep roots in the suburban soul. The main function of these lawns is to look at and in many cases give someone an excuse to ride a mower to cut it. While I'm outlawing things, I'd stop calling what people use on lawns, tractor mowers. Farmers use tractors. You are not farming when you cut the lawn. The proper term is ride on mower.

Out here in Critton Hollow, away from suburbia, I have a wonderful lawn, care of no chemicals, a mower with no bag attachment set to the highest blade setting, and an infrequent cutting schedule. It's a simple truth that not cutting grass down low makes it grow and stay healthy. Not only have I never used chemicals on it, but also I've never had to use seed. Grass will seed it's self if you let it. And yes part of the lawn is a meadow. So what do I have? Plenty of wildlife viewing, and time on hot days to grab a cold one and watch the ballgame. My lawn gives me more free time, and it consumes less gasoline, causes less air, water and noise pollution and the only inputs to it are from Mother Nature. You don't have to water grass that is allowed to grow. What's there not to like?

WEF's VP Testifies

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benefits including cost-effective waste neutralization and minimization for industry, on-site energy generation to alleviate grid congestion, increased system reliability, less reliance on imported fuel sources, increased revenues, and a reduced carbon footprint. According to EBMUD staff, there were several drivers for an aggressive Renewable Energy program, including: 1) the opportunity for revenue from taking additional organic wastes trucked to the treatment facility coupled with use (and/or sale back to the electrical utility) of the associated green energy from digesting the waste; 2) the District's mission includes a commitment to "Sustainability," and renewable energy helps reduce fossil fuel usage, thereby reducing greenhouse gas emissions; and 3) increased reliability associated with being 100% energy self-sufficient, particularly in the event of major utility power outages during storms and following any moderate or major earthquakes.

These three examples demonstrate the kinds of innovative thinking being practiced within the wastewater sector. Another model is the performance of the Strass wastewater treatment plant located near Innsbruck, Austria, that is actually producing more energy than is needed to operate the facility. The Strass plant accomplishes this through a two-pronged approach of continually exploring options to improve the plant's overall energy efficiency and optimizing methane production from the solids digestion facilities that process its residual solids. WERF has a project that is studying the Strass plant and developing benchmarks for US facilities.

A Basic Triumvirate Thought Premise to Energy Sustainability

I would like to summarize some key concepts in energy efficiency and energy independence for the wastewater sector:

- **Energy savings through water conservation—**by changing our habits, old ways, and business as usual. The water sector needs a new mind set, and we as Americans need a new mind set;
- **Energy savings through reduced energy use—**by developing and introducing new technology, high efficiency motors, computer-controlled automation, and the capture of wasted power through hydroelectric generation, wind, and solar;
- **Energy savings through innovation and research**—such as utilizing by-products for the production of power in a way that doesn't pollute our environment.

In conclusion, we ask the Subcommittee to keep in mind that wastewater is NOT waste! Currently wastewater utilities are big players in *using* energy, but we desire to be big players in *conserving* and even *supplying* energy. Every day, 24 hours a day, seven days a week, the public produces wastewater. Our collective interest in a sustainable planet requires that we turn that waste into useful products. The water should be reused, and the solids should also be reused, and one way to reuse the solids is to create energy. This requires a shared vision, leadership and funding. We at the Water Environment Federation stand ready to work with you on a shared vision for turning "waste into watts" and ensuring energy efficiency and energy independence for sustainable wastewater treatment.

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