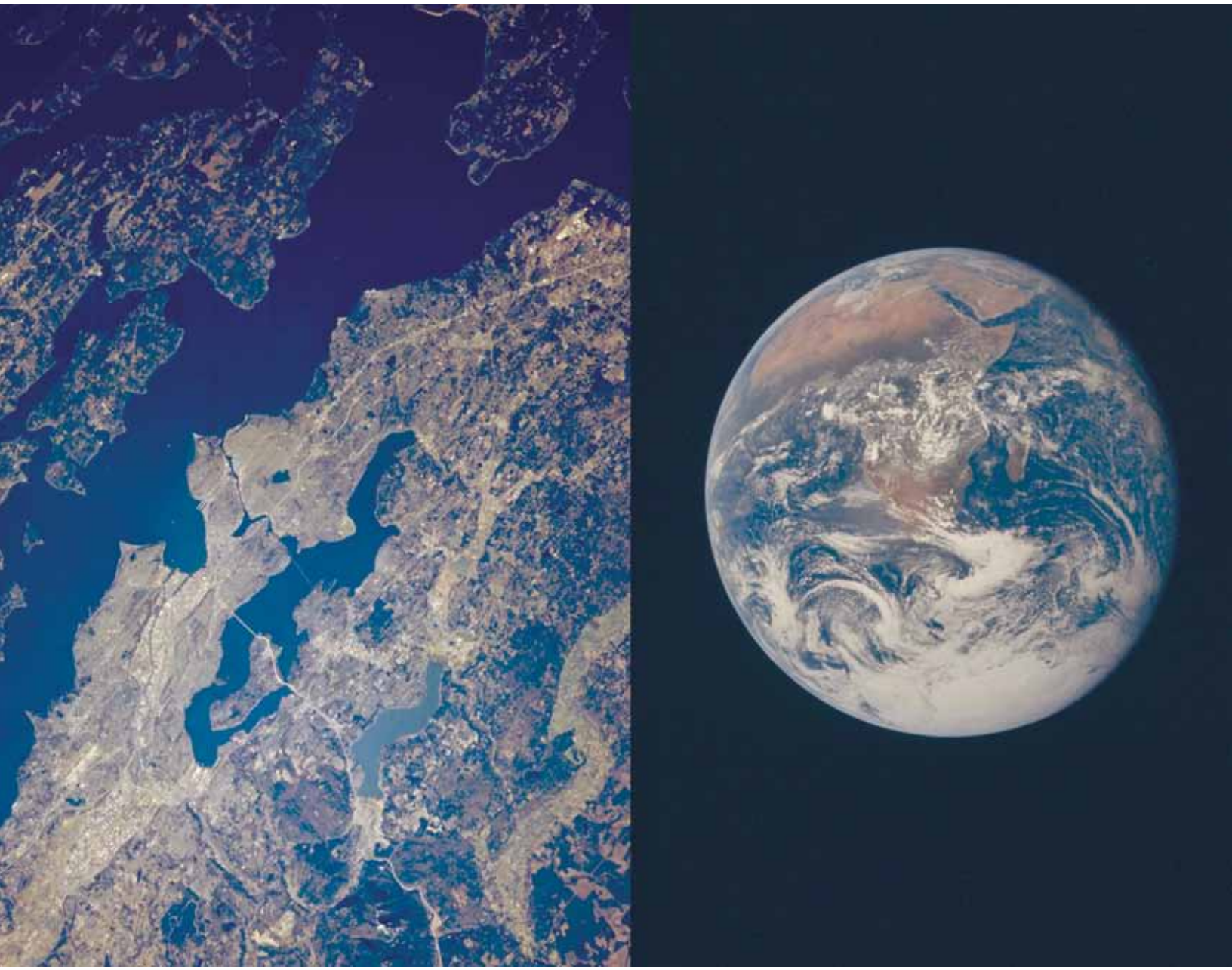
Pacific Northwest Clean Water Association

PNCWA

Newsletter
Summer 2011



FEATURE FOCUS: SUSTAINABILITY
Starts on page 17

UTILITY WORKERS SAVE A LIFE
Page 6

OPS CHALLENGE WORKSHOP SUCCESS
Page 14

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For the Scholarship Fund Silent Auction (front)

For the Water For People raffle (front)

Water For People quilt (back)

Star Quilters from Clark County

Donated Quilts to Raise Money for PNCWA Scholarship Fund and Water For People

PNCWA member Kay Hust (Salmon Creek WWTP) teamed with the Star Quilters (Clark County employees) to create quilts for both the PNCWA Scholarship Committee's silent auction and the PNCWA Water for People Committee's raffle at PNCWA2011. Kay paid for the materials and the long-arm quilting and her friend Peggy Muhly (far left on the bench) did the sewing. The Star Quilters have made quilts for good causes for years. For example, this year all the proceeds from the sale of one of their quilts went to the Clark County Food Bank. Thank you Kay, Peggy and all of the Star Quilters for the donations to PNCWA!

TABLE OF CONTENTS

DEPARTMENTS

COVER PHOTO: IMAGES COURTESY NASA, JOHNSON SPACE CENTER. LEFT, PUGET SOUND, SEATTLE, TACOMA AREA (IMAGE REFERENCE STS036-152-13), MADE FROM SHUTTLE ATLANTIS STS-036, 1990; RIGHT, FULL EARTH IMAGE (IMAGE REFERENCE AS17-148-22732), MADE FROM APOLLO 17, THE ELEVENTH AND FINAL MISSION IN THE APOLLO MANNED SPACE PROGRAM, LAUNCHED DECEMBER, 1972.

MISSION STATEMENT

Pacific Northwest Clean Water Association (PNCWA) is dedicated to preserving and enhancing the water quality in the states of Idaho, Oregon and Washington. We promote the professional development of our members, the dissemination of information to the public, and the advancement of science and technology needed to protect public health and the environment.

VISION STATEMENT

The Pacific Northwest Clean Water Association will ensure clean, sustainable watersheds for future generations.

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TROJAN UV

Retirement

PNCWA President
Andy O'Neill
Rural Community
Assistance Corporation

A close friend and colleague recently announced that he would be retiring within this next year. I'm excited and happy for him. However, I wish I had more time to tap into his wealth of knowledge. He has been my mentor for some time, but soon this valuable resource will be gone.

Because many talented people within our industry will be leaving us soon, I feel compelled to share my thoughts on mentoring. First and foremost—start mentoring today!

Establishing a mentoring program in your organization is one of the smartest things you can do.

From a happier staff to an increased organizational productivity rate, the benefits of a workplace culture that actively supports organized mentoring opportunities will translate into money and time well spent.

In our time of economic uncertainty non-profit associations, municipalities and private businesses must be healthy and smart. For some of us, "healthy" and "smart" may seem like impossible challenges; others may view mentoring as a luxury. However, establishing a mentoring culture is key to improving your organization's health and the ability to attract and retain the best people.

I'm fortunate. My work culture is such that we have and participate in a mentoring program. Many people seek other employment opportunities because they believe they are not appreciated or feel they lack the support they need in performing their job duties. Mentoring allows for the organization to set the standard of expectations, empowers the employee to contribute to a higher level, and reinforces this behavior by modeling expectations that encourage excellence.

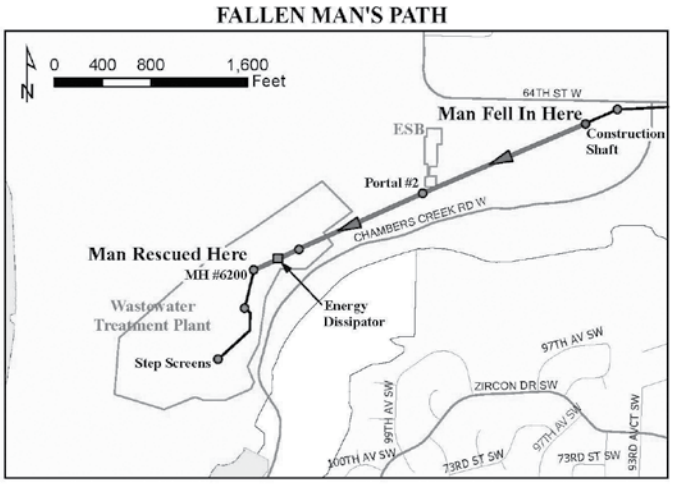
Mentoring can assist in succession planning and the development of new leaders, providing a better basis for promotion and advancement decisions. It benefits those receiving the training, as well as the mentors themselves who are prompted to review and reassess their own actions as they train.

Effective mentoring is smart business. Mentoring can improve retention, build morale, increase commitment, accelerate leadership development, provide ongoing career development, reduce stress, build teams, and facilitate organizational learning. Creating a mentoring culture in your organization will deepen the way employees manage their own growth and development. That return on investment should make mentoring a high-priority on the list of sustainable practices.

I can't stop my friend from retiring, nor would I want to. However, I can follow his lead and continue to develop my skills and begin to pick up where this valued predecessor left off.

Utility Workers Save a Life

By Gloria Van Spanckeren,
Pierce County Sewer and Water Utility



Victim's path through the sewer

On March 21, a contract worker who was accidently swept into the sewer tunnel was rescued by wastewater maintenance and operation crews whose confined space entry training kicked in. The man had been working in a 72-inch tunnel over a half mile away when he became untethered and started sliding toward the energy dissipator and treatment plant. More than 30 workers mobilized, working together as a single, well-practiced team with no time for coordination or a central leader. Each person did what needed to be done.

"This man wouldn't be alive today if it weren't for your people," said West Pierce Fire and Rescue incident commander Kevin Kroenert to Pierce County utility managers. The man could not have held on much longer against the force of the current, and his hand slipped from the ladder the moment the lifeline was

PNCWA NEWSLETTER

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To contribute an article, contact Sheri Wantland, 503.681.5111 or wantlands@cleanwaterservices.org. Submission guidelines are on pg. 15. Newsletter articles reflect the author's opinions and not necessarily those of the PNCWA Board of Directors or Water Environment Federation. The PNCWA newsletter is published quarterly, © 2011 Pacific Northwest Clean Water Association. Change of address inquiries should be directed to the PNCWA office.

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Confined space training prepared rescuers to save a life.


Group photo of rescuers

attached. Kroenert added, "It was great working with people who didn't lose their cool and are well-versed in their training."

For the rescue, 2-man entry teams with retrieval hoists set up at three sewer tunnel access points at the plant. Not knowing exactly where the man was, they followed the sound of his voice and quickly realized he had passed the first opening, made it through the energy dissipator and entered the 48-inch pipe leading to the headworks. They waited anxiously at the next manhole, hoping to snag him and hook him to a lifeline.

Resigned to the possibility that this could become a body recovery effort, they peered down the hole. Finally a hand reached out from the wastewater and grabbed the rope. Very much alive, the man emerged from the pipe and stood up on the manhole ladder. In seconds, rescuers hooked onto his harness and hoisted him out of the hole, to an eruption of cheers.

All utility maintenance and operation employees must pass confined space entry and fall protection training, including mandatory annual manhole and confined space drills with everyone training in the role of the rescuer as well as the person being rescued. The utility spends about $9,400 each year on confined space refresher training and $250,000 for personal protective gear, larger equipment and vehicle safety systems. In 2010, the utility documented over 938 hours of formal safety training.

Pierce County's commitment to constant and sustained safety practices resulted in real financial savings. Although the Department of Labor and Industries investigation found the County was not responsible for the accident, if anything had been out of compliance the fines could have ranged from $25,000 to $500,000.

The utility workers feel teamwork contributes to their safety-oriented culture, and continuous safety training is the cornerstone of their best management practices. For them, high standards in safety and housekeeping are normal operations even in a business often overwhelmed with compliance challenges. This time, their high standards proved invaluable during one very exceptional operation.

You may contact Gloria Van Spanckeren at gvanspa@co.pierce.wa.us


Rescuers pull the victim from the manhole.

Storing in the Collection System during Wet Weather

By Eddie Speer, P.E., CDM

When the hydraulic capacity of either the treatment plant or part of the interceptor is exhausted, the owner faces one of the following choices:

- Increase the capacity
- Reduce the load (fix inflow/infiltration, green stormwater infrastructure, etc.)
- Use existing storage or build new storage to temporarily handle excess flow when dealing with weather capacity issues

Increasing capacity is the simplest option to understand, but if the bottleneck is in the collection system the project may cover many miles of pipe and the capital cost is prohibitive. Reducing the load is an attractive option and should be explored, but it usually yields very modest results that are measured over the course of decades.

In some cases, especially in older systems, storage within the existing collection system may be available. Alternatively, storage tanks are being built across the country to address this issue. This article will take a brief look at the configurations of these facilities.

IN-LINE VERSUS OFF-LINE

A common criterion for describing a storage facility is whether it operates with flow continuously entering and exiting the structure, which is referred to as *in-line storage*. This configuration is commonly used when the storage is essentially a very large diameter pipe or box culvert that can be used both for conveyance and storage. An optional outlet can be designed to release to an overflow when the storage is full.

A key element for in-line storage is controlling the downstream end, which dictates when storage will be used during high flow situations. Usually an orifice, gate, or small diameter outlet is used to control the volume of flow travelling downstream. In this kind of setup the storage drains by gravity when downstream conditions allow, at the end of the storm event. For in-line storage it is important to maintain minimum velocities, especially during low-flow periods. A cunette or low-flow channel is often included in the design for this reason. A special case of in-line storage would be the utilization of a pump station with a very large wet well or large interceptor upstream. The pumps are programmed to regulate the rate of downstream flow to match the treatment capacity while using the capacity upstream to store excess flows.

An *off-line storage* facility is used to store flow above what is normally conveyed (or above what can physically be conveyed) to treatment. While there are a number of ways to configure this, there are typically two appurtenances associated with an off-line tank: one to send flow into the storage and another to drain, or dewater, the storage. For the former, a weir or gate is typically used. For dewatering, a common objective is to avoid the cost and maintenance of providing pumps to send the stored flow back into the trunk or interceptor. Achieving this will depend on the lay-out of the storage and the elevation of the downstream pipeline. In some cases, control of the storage outlet is handled with an orifice or gated structure. Preventing backflow into the storage from the downstream end is also required.

Odors will be a problem unless the tank is cleaned after each use. Solids will settle to the bottom and a wash-down or cleaning will be required. Automatic systems can perform this function, but they must be maintained and monitored.

DUAL-USE FACILITIES

In some cases, the construction of additional conveyance capacity leads to a large diameter parallel line that can also be used for storage. Or, a conduit connecting two distinct basins may be up-sized to provide temporary storage for high wet-weather flows. This may lead to competing objectives when determining operating procedures or designing automated gate functions. For example, a relief sewer may provide additional conveyance to

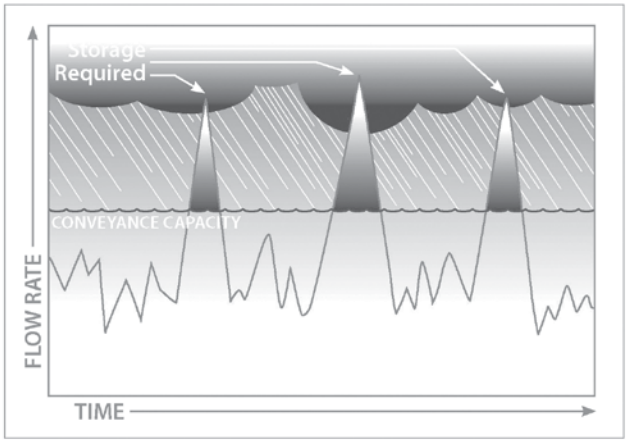
Continued on page 10

Continued from previous page

protect a local neighborhood from flooding, while providing additional storage to prevent overflows into a local waterway. If the storage is in use, the conveyance capabilities are hindered.

CONTROLLING WHAT GOES IN, AND WHAT COMES OUT

The effectiveness of storage will be improved by better control of the inflow and outflow rates. Passive structures such as weirs and orifices are very common and don't require much maintenance. However, active controls including float gates, motor operated gates, inflatable dams, pinch valves and pumps will provide better flexibility in operating the storage, and in most cases, can reduce the size of the tank while providing the same protection as a passively operated facility.



An important issue to determine for wet weather flows is when to drain the facility. In the coastal areas of the Northwest, the concerns are not usually the summer thunderstorms that heap volumes of water onto our systems, but the winter "Pineapple Express" that generates back-to-back waves of rain. You do not want to be caught with your storage tank still full when the next rain approaches. A monitoring system is usually employed to provide control signals to pumps or actuators to drain the system based on downstream conditions. The data generated from the monitoring system can also provide helpful information for compliance reporting and system modeling.

Finally, storage can also be beneficial if it is located near the treatment facility and can be used in flow equalization. Due to the reduction in fluctuation of the influent flow, the treatment processes provide higher quality effluent.

You may contact Eddie Speer at speered@cdm.com

SJWP State Winners Announced

The Water Environment Federation (WEF) recently announced the 2011 state winners of the U.S. Stockholm Junior Water Prize (SJWP)—the most prestigious youth award for a water-related science project. PNCWA will sponsor the Pacific Northwest state winners and their science teachers to attend the national competition, hosted by the Illinois Water Environment Association, June 23-25, 2011 at the Palmer House Hilton in Chicago. PNCWA also provides a $100 award to each state winner and funds both the winning student and teacher to attend the PNCWA annual conference.

The purpose of the SJWP program is to increase students' interest in water-related issues and research and to raise awareness about global water challenges.

PNCWA representative Sheri Wantland with Oregon SJWP winner Ajay Krishnan and his teacher Catherine Molloseau at Oregon Episcopal School

The competition is open to projects aimed at enhancing the quality of life through improvement of water quality, water resources management, water protection, and water and wastewater treatment.

THE PNCWA STATE WINNERS ARE:

Oregon: Ajay Krishnan

Improving the Generation of Electricity and the Treatment of Wastewater in a Novel Dual-Chambered Mediator-less Microbial Fuel Cell

Oregon Episcopal School, Science Teacher—Catherine Molloseau

Washington: Kathryn McClintic

Can You Drink a River? An Evaluation of Solar Disinfection Efficiency in the Inactivation of E.coli and Coliform Bacteria at a Northern Latitude

Cedarcrest High School, Science Teacher —Kellie Halverson

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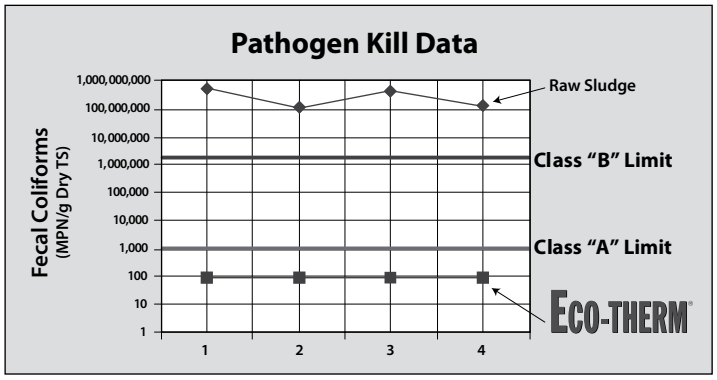

Current trends are moving toward both land application and the use of Class "A" biosolids.

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Update on the Washington State Reclaimed Water Rule

By Chad Newton, P.E., Gray & Osborne

In Washington State, the Department of Ecology and the Department of Health administer a reclaimed water program based on the *1997 Water Reclamation and Reuse Standards*. In 2006 the State legislature directed the departments to develop a new *Reclaimed Water Rule*, a state regulation that would provide a consistent and efficient regulatory process that supersedes the current guideline standards. A Rule Advisory Committee was established, along with several subcommittees such as the Technical Advisory Panel and the Water Rights Advisory Committee. These committees met between 2006 and 2010, and the current draft of the *Reclaimed Water Rule*, which will be labeled Chapter 173-219 WAC, was made available to the public in May 2010. The draft rule may be downloaded from the internet at: *http://www.ecy.wa.gov/programs/wq/reclaim*.

To be flexible enough to stand the test of time, the Rule refers to a *Reclaimed Water Facilities Manual*, a.k.a. the "Purple Book," for supplemental guidance on implementing the Rule. This guidance document, which would be a companion to the "Orange Book" of guidelines for wastewater treatment plants, could be revised more frequently than the Rule to keep up with changes in science and treatment technology. A draft of the purple book has been developed for review by the Rule Advisory Committee.

The legislature initially required the Rule to be completed by the end of 2010. However, the governor's moratorium on non-critical rule development and adoption during 2011 (Executive Order 10-06) has delayed finalization of the Rule. Ecology anticipates that the Rule and the associated Reclaimed Water Facilities Manual will become effective during 2012 or 2013.

You may contact Chad Newton at cnewton@g-o.com

All-day Ops Challenge Workshop a Resounding Success!

By Preston Van Meter, Kennedy/Jenks Consultants

Workshop participants from Veolia Water (Gresham WWTP), Tacoma and Glide work together to complete a practice run on the Laboratory Event.

Clean Water Services River Rangers demonstrate the lab event to workshop participants.

Pam Randolph from the City of Tacoma practices cutting the pipe for the Collections Event. Pam will be part of an all-women team at the Vancouver conference.

King County, shown here practicing the Safety Event, will be participating in the Operations Challenge at the Vancouver Conference.

The PNCWA Operations Challenge Committee hosted a workshop for prospective new Operations Challenge participants on May 19, 2011 in Hillsboro, Oregon. The workshop was a resounding success, with nine new prospective participants or judges from King County and the City of Tacoma in Washington and Veolia Water (Gresham) and the City of Glide in Oregon. The day- long workshop was hosted by Clean Water Services beginning with a morning session at the CWS Administration Building Complex where an overview of the five Operations Challenge events (Process, Laboratory, Collections, Maintenance and Safety) was provided along with video followed by a detailed discussion of the process control event to provide new participants with strategies for maximizing scoring.

After the morning session, the workshop moved on to CWS' training facility at the nearby Hillsboro WWTP where CWS Operations Challenge team members provided demonstrations of the four other events. Lunch was provided after the event demonstrations, followed by an afternoon session where participants were organized into teams for some hands-on walk-throughs on each of the events.

Continuing education credits (CEUs) were provided at no charge to workshop participants (0.50 CEUs in water and wastewater for Oregon and 0.50 CEUs in wastewater for Washington). Due to the success, it is anticipated the workshop will be repeated each year in May as long as there is interest. Many thanks to PNCWA for providing lunch and refreshments, Clean Water Services for organizing morning refreshments, Kennedy/Jenks for organizing the lunch menu, Kennedy/Jenks and Brown and Caldwell Ops Challenge Team Members who helped with the afternoon session, and especially to CWS Ops Challenge team who provided the training.

Section NEWS

***Section Leaders**—email your news and pictures to your Regional Director and copy the newsletter editor, wantlands@cleanwaterservices.org.*

Northwest Washington Section has been working with Skagit Valley Community College to promote their Wastewater Certificate program. The section encourages education and is taking an active role in promoting and encouraging the training and placement of new operators. Our May 18th Section meeting was held at Skagit Valley College and was an opportunity for students to meet with operators and managers from several plants in the area. We look forward to continuing our new partnership with the college to promote our industry and to encourage quality candidates to join us in this vital and fulfilling industry.

Olympic Section elected new officers: President Al Chrisman, City of Sequim Treatment Plant, Vice President Mike Cays, Sunland Water District, and Treasurer Lorisa Watkins, West Sound Utility District.

Yakima Valley Section held a meeting at the City of Richland's Wastewater Treatment Facility on March 9th to discuss improving membership, plan for the year's events, and to elect new officers. The Section's new officers are Tom Helgeson, President; Dean Smith, President-Elect; Keri Higgins, Vice president; and Steve Hatke, Secretary-Treasurer. Plans are underway for other events to take place throughout the year. The West Pasco Water Treatment Plant was the site of a June 8th meeting, featuring a training session on Membrane Filtration by Dean Smith of the Washington Department of Ecology.

Southwest Idaho Operators Section (SWIOS) held a great CEU approved training in April on Primary Treatment by Cyndy Bratz of Brown and Caldwell at Disaster Kleenup in Nampa with lunch provided by Veolia Water-North America. The June CEU training will be Sampling by Mike Moore of Analytical Laboratories in Kuna, Idaho. In August, the topic will be Electrical/Pump Training by Joe Evans of PumpTech in Garden City, Idaho. Check your SWIOS training schedules for more details. All training classes are free of charge to our members, and lunch is always provided. Please contact Laurelei Ball, SWIOS President Elect, if you have any additional questions or comments about upcoming SWIOS trainings or events at *lball@meridiancity.org*.

PNCWA Newsletter Submission Guidelines

Upcoming focus topics:

2011 Q3 Asset Management—deadline August 1

2011 Q4 Energy & Energy Recovery—deadline November 15

2012 Q1 Threats to Water Quality—deadline February 15

The PNCWA quarterly newsletter is built on articles contributed by PNCWA members. Each issue has a focus topic selected by the PNCWA Board and refined by the Editorial Advisory Group to address technical, community-based, case study and regulatory themes. If you have a story idea or an article to submit, please use the following guidelines.

- 200 to 500 words (longer articles may be accepted, space permitting)
- No overt marketing, but it's fine to talk about your company's achievements
- High resolution color photos or graphics, if possible
- Provide author email for readers to contact

Please submit articles to Sheri Wantland at *wantlands@cleanwaterservices.org*

Fort Flagler State Park

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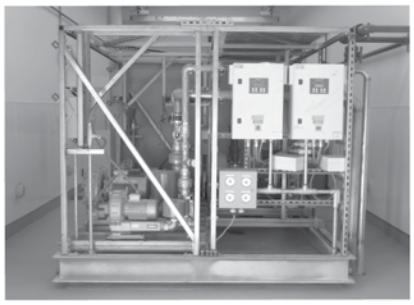
Highlights

- 25,000 GPD / $1.66M
- DOE Permit
- UV Disinfection
- Contract Operations: 1 day/week
- Public Design-Bid-Construct
- Greenfield Construction: 8 Months, No Change Orders

PARAMETER	INFLUENT AVERAGE	EFFLUENT AVERAGE
BOD	356 mg/l	< 3 mg/l
TSS	217 mg/l	< 2 mg/l
TKN/TN	75 mg/l	< 5 mg/l



Constructed Cost Breakout

MBR Equipment Cost	$ 490K
MBR Facility Construction	$ 1.17M
Total Constructed Cost	**$ 1.66M**

- Operations Building
- Concrete Basins
- Installation of MBR Equipment
- Influent Pump Station
- Odor Control
- Autosamplers and Flow Metering Manhole
- Power Generator/Transformer
- All Site Work (water, sewer, grading, paving, fencing, etc)
- Temporary Erosion Control

CONTRACTOR ITEM	BID
Trench Safety Excavation Provisions	$ 1,000
Mobilization and Demolition (NTE 7.5%)	$ 165,149
Traffic Control	$ 1,000
RV Dump Facility	$ 33,627
MBR Facility	**$ 1,171,993**
Campground Sewer Facilities	$ 380,385
Campground Water Facilities	$ 148,253
Campground Electrical Facilities	$ 465,366
Asphalt Surface Restoration	$ 45,320
Tree Removal	$ 3,000
Total	***$ 2,415,093***

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Sustainability: Big Challenges, Big Opportunities

By Jennifer Belknap Williamson, P.E., LEED AP, City of Gresham, PNCWA Sustainability Committee Chair

Welcome to the Sustainability focus issue of the PNCWA newsletter! It's an exciting and challenging time for municipal organizations and consultants in the environmental field. We face daunting challenges for a wide variety of sustainability-related issues, ranging from the financial sustainability of organizations with aging infrastructure and increasing regulatory requirements to the environmental sustainability of rivers receiving pollutants that our wastewater treatment plants are ill-equipped to remove.

However, in the face of these challenges and many others there are also inspiring examples of innovative solutions that are being implemented to make a difference. Many organizations have set far-reaching goals and are taking action to reduce their energy use and carbon emissions, reduce the impacts of their purchasing practices, and continue to improve water quality. Our industry is constantly re-examining and improving how we meet the needs of both society and the environment through our work.

As operators, engineers, scientists and planners, one of our primary roles is solving problems. Sustainability problems are complex and interconnected with many aspects of our infrastructure, how we do our work, and our way of life. True sustainability is a very long-term goal. However, every step we take to become more in alignment with sustainability principles is an important step in the right direction toward the goal of prosperous, healthy communities and a well-functioning environment.

This issue of the PNCWA newsletter is dedicated to showcasing ideas and actions for tackling sustainability problems successfully. Our focus in this issue is on broad sustainability issues, going beyond energy challenges alone. Stay tuned for an excellent newsletter dedicated to energy topics in the Winter 2011 issue.

In this current issue, you will find perspectives on the challenges and opportunities facing municipal organizations related to water quality, water availability, climate change, energy, biodiversity and social systems. The focus on sustainability starts off with an overview by Chad Newton of how wastewater utilities can improve their own sustainability and resiliency. Other highlights include:

- The City of Meridian, ID shares their work integrating sustainability into the Comprehensive Plan and activities of the Public Works Department
- The City of Yakima, WA describes their holistic approach to meeting TMDLs in the Yakima River
- The City of Corvallis, OR provides an overview of their nutrient recovery process
- The Freshwater Trust shares examples of meeting regulatory requirements through innovative approaches such as stream restoration
- Oregon ACWA summarizes how WWTPs can maximize their positive impact in the community as Big Green Machines
- The PNCWA Collections Committee shares input on potentially reducing costs by storing in the collection system during wet weather
- A fascinating look at a new method of providing reclaimed water using pasteurization in Ventura, CA
- Ideas for integrating sustainability at home as well as at work

We hope this issue is inspiring and encourages your creative passion for developing new solutions to sustainability challenges. The PNCWA Sustainability Committee is currently developing plans for webinars, workshops and other educational activities on sustainability topics to help PNCWA members. Please let us know if there are any topics you would like to learn more about!

You can reach Jennifer, the Chair of the PNCWA Sustainability Committee, at j.belknap.williamson@greshamoregon.gov

The Sustainable and Resilient Wastewater Utility

By Chad Newton, P.E., Gray & Osborne, Inc.

Wind turbine installation at the Atlantic County Utilities Authority (NJ) Wastewater Treatment Facility
PHOTO CREDIT: MORTENSON CONSTRUCTION/LEE VERNON STUDIOS

Sustainability is simply the ability to continue anything indefinitely. Sustainability can be evaluated in three dimensions: environmental, social and financial, also known as the "triple bottom line." Resiliency, a related concept, refers to the ability to absorb adverse shocks without crisis. The Brundtland Commission of the United Nations in 1987 defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Which are the most significant unsustainable practices in our society, and what can utilities do to increase their sustainability and resiliency? We face drastic changes in the next few decades, which will place new stresses on utilities. Successful utilities will incorporate a sustainability ethic into all decisions.

GLOBAL CLIMATE CHANGE

The earth's atmosphere had a carbon dioxide (CO2) concentration of around 280 parts per million throughout the pre-industrial era. Currently the concentration is 385 ppm and rising due to widespread fossil fuel burning (coal, oil and natural gas, also known as methane). In the 1980s scientific consensus developed that the greenhouse effect of CO2 would result in a warmer global average temperature. Observed trends over the past three decades have only confirmed the initial hypothesis. James Hansen of NASA wrote: "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO2 will need to be reduced from its current 385 ppm to at most 350 ppm." To do otherwise is environmentally unsustainable for the complex webs of the biosphere.

Reducing and reversing global climate change will require transformation of our systems. The Water Environment Federation (WEF) has issued a resolution urging wastewater utilities to become community leaders for mitigating climate change.

OIL DEPLETION

Fossil fuels have powered the industrial revolution in an accelerating fashion since World War II. Global oil consumption increased from 7 million barrels per year in 1945 to 85 million barrels in 2005, due to ever expanding fleets of cars, trucks and ships. The International Energy Agency has announced that peak production of conventional crude oil occurred in 2006. With conventional oil fields (the "cheap oil") being depleted throughout the world, exploration has shifted to expensive supplies such as deepwater off-shore and tar sands. Since 2006 the effect has been high oil prices marked by extreme volatility. Gasoline at $4.00/gallon, as we have seen recently, is financially unsustainable for many households and businesses. Cheap energy has allowed many unsustainable practices to flourish, but what is unsustainable will, by definition, come to an end eventually.

HABITAT AND BIODIVERSITY LOSS

Expanding and intensifying human activities have shrunk and degraded natural habitat, resulting in biodiversity loss and extinctions of entire species. The International Union for Conservation of Nature (IUCN) estimates that 900 species have gone extinct in the modern era and extinctions continue at more than 100 times the natural rate. Just as significant, pollution degrades the natural habitat for the remaining species, reducing ecosystem services and biodiversity as only the hardiest species thrive. In our region, wild salmon populations have dropped precipitously for reasons

Solar Array at the Hill Canyon Wastewater Treatment Plant, Camarillo, California. The Array provides about 15% of the facility's energy needs.
PHOTO CREDIT: PETER BENNETT/GREEN STOCK PHOTOS

including stream pollution and stream temperature increases. Continued habitat degradation and species extinction are simply environmentally unsustainable.

SOCIAL SUSTAINABILITY

Can our social structures be continued indefinitely? The "baby boom" generation is edging towards retirement, and lifelong skills and institutional knowledge could travel with them. Social sustainability requires a proactive process to transfer that knowledge to the next generation. Cost of living is a social and financial sustainability issue. It is mathematically unsustainable for the cost of any essential service, such as medical care or utilities, to grow at a faster rate than wages. Eventually the poor are shut out and forced to go "off-grid."

HOW CAN WASTEWATER UTILITIES IMPROVE THEIR OWN SUSTAINABILITY AND RESILIENCY?

In the face of these broad threats from unsustainable systems, how can utilities respond?

Water and wastewater utilities may be affected by climate change in a few different ways:

- If unchecked, climate change will have a significant effect on water resources. In the Pacific Northwest, climate models have predicted warmer and wetter winters leading to reduced mountain snowpack. To maintain resiliency, communities that rely on snowpack for water supply can identify other resources or reduce consumption.
- Climate change will lead to rising sea levels. Resilient utilities with coastal facilities can prepare by developing flooding defenses and protecting drinking water aquifers from saltwater intrusion.
- Climate change mitigation requires reduction of fossil fuel combustion. Utilities that rely on electricity produced by fossil fuels may face increased costs as carbon taxes or credits are imposed.

The primary component of the carbon footprint for wastewater systems is electricity consumption. Utilities consume a lot of electricity, 30 to 60 percent of a typical municipal government's total. Even facilities supplied with renewable electricity sources, such as hydropower, will face pressure for conservation as renewable supplies are stretched thinner. Many electric utilities offer financial incentives for energy conservation projects. WEF MOP 32, Energy Conservation in Water and Wastewater Facilities is a great resource. Beyond conservation, utilities can look to their facilities for electrical production with a goal of net-zero energy:

- Anaerobic digestion produces methane, which can be burnt for facility heat or electricity, or refined into natural gas. Gas microturbine technology is becoming available in smaller sizes for cost-efficient electricity production from methane.

Continued on page 20

Opportunities for energy recovery abound throughout water distribution and wastewater collection and treatment systems, particularly in areas with significant topography.

Continued from previous page

- Energy can be recovered from water flowing downhill via micro-hydropower turbines. Opportunities for energy recovery abound throughout water distribution and wastewater collection and treatment systems, particularly in areas with significant topography. If you pay to pump water up a hill, why not make money when it flows back down the hill?
- Thermal energy can also be recovered from wastewater, as a heat source for heat pumps and district energy systems, such as at the Olympic Village in Vancouver.
- Facility sites can be evaluated for renewable energy potential. Utilities may be able to offset their electric bills through on-site solar, such as several sites in California including Camarillo, or wind power installations, such as at the Atlantic County Utilities Authority (New Jersey).

In the face of oil depletion, resilient utilities will reduce their reliance on gasoline-powered maintenance equipment and diesel-powered standby generators, and provide employees with transportation choices. How would $10/gallon diesel affect your sewer inspection program? What if diesel deliveries became unreliable? Utilities can increase their resiliency by increasing on-site fuel storage, but better yet by switching to electric-powered equipment and vehicles.

Despite valiant efforts, wastewater effluent discharge s can degrade the natural environment and reduce biodiversity. Endocrine disrupting chemicals and pharmaceuticals ("micropollutants") may pass through conventional treatment facilities at concentrations that cause harm to aquatic organisms. Accumulation of persistent toxic chemicals throughout the natural environment is unsustainable. Research is ongoing into the fate of micropollutants through treatment processes and their effect in the aquatic environment. If it is determined that concentrations must be reduced to protect the environment, the benefit of additional treatment processes should be weighed against (significantly) increased electricity consumption and the social effects of increased utility rates. Source control and commercial phase-out may be more sustainable approaches to biodiversity protection.

Utilities can increase their social sustainability through pro-active mentorship programs, which transfer skills and institutional knowledge from retiring workers to younger staff. Resiliency can be improved through cross-training, so that multiple people are trained to do any task.

Sustainable utilities need to balance capital and operations costs against the social and financial sustainability of their ratepayers. In the face of oil depletion, utilities may have increasing pressure to minimize rate increases simultaneous with increased expenses and pressure to improve environmental performance. To respond to these pressures, sustainable utilities must strive to minimize required inputs (of energy and money) while maximizing internal resources (electric generation potential, microorganisms and knowledgeable staff) to provide the best available service to customers and protection to the natural environment. Sustainability can be most simply defined as the ability to continue doing what you're doing forever.

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Adaptive Implementation Puts the Yakima Basin on a Sustainable Track

By Ryan Anderson, City of Yakima Wastewater Division and
Thomas E. Coleman, P.E., consulting engineer for the City of Yakima

Aerial view of the Yakima floodplain COURTESY OF TOM ELLIOT OF THE YAKAMA NATION WILDLIFE PROGRAM

Most wastewater treatment facilities face a similar challenge of balancing competing demands between replacing aging infrastructure, maintaining plant capacity and meeting increasingly stringent effluent limits. Facility managers and engineers at the City of Yakima's Regional Wastewater Treatment Facility (YRWWTF) realize that a proactive approach to this challenge is the only practical path forward for an organization whose goal is to protect the environment and protect its ratepayers from excessively high rate increases.

The Yakima River is impaired for pH, dissolved oxygen (DO) and temperature. These impairments are not caused by any one source of pollution or pollutants in the basin, but by the collective influence of nutrient loading, habitat degradation and stream flow impairments. The Washington Department of Ecology's (Ecology) approach to such impairments has typically involved setting very low nutrient and temperature limits for NPDES permit holders through the process of determining Total Maximum Daily Loads (TMDL). Loading limits are then assigned to the individual dischargers in what has been called a "standard implementation" of the TMDL. Standard implementation (SI) can work well if there is a high degree of certainty that if loads are reduced by X% that water quality standards will be met.

However, in a basin such as the Yakima where water quality impairments are the result of multiple stressors, are dominated by non-point source contributions, and result from broad source categories with diverse stakeholder interests there is a very high level of uncertainty that a standard implementation will result in the necessary water quality improvements.

Requiring NPDES permit holders to achieve very low phosphorus or nitrogen limits could cost tens of millions of dollars with little certainty that these limits would improve pH, DO and temperatures in the river. At the same time, SI TMDLs do not consider the global impacts of increasing reliance on energy, steel, concrete and chemical resources used to comply with locally applied permit limits. Recognizing this unique water quality challenge, Yakima Basin stakeholders are working with Ecology's Central Regional Office to develop an adaptive implementation (AI) approach. As Ecology learns more about the Yakima River's needs, they are supporting the conclusion that an SI TMDL may not be the most effective course of action to restore the local or global environment.

The guiding principle of adaptive implementation is that high levels of uncertainty can be most effectively addressed through a "learning while doing" approach. Under this AI approach, a water quality implementation plan would be prepared and initial control actions taken. Then there would be an ongoing assessment of the efficacy and

Continued on page 22

The guiding principle of adaptive implementation is that high levels of uncertainty can be most effectively addressed through a "learning while doing" approach.

costs of the actions, and revisions then made to the implementation plan, based on new analyses.

An AI approach can help direct investments into projects that cost effectively lower nutrient loading at point sources and nonpoint sources. At the same time, the process would identify floodplain, riparian zone and other ecosystem improvements necessary to improve water quality. The success of the AI process in achieving water quality improvement goals depends on the formation of a strong collaborative partnership of the stakeholders. The partnership must be committed to long-term monitoring and evaluation of water quality improvement measures to ensure that effective steps towards

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meeting multiple environmental objectives associated with cleaner water are being implemented.

Recently, the South Central Washington Resource Conservation and Development Council (RC & D) formed a new committee called the Yakima Basin Clean Water Partnership (YBCWP). RC&D broadly represents stakeholders in the Basin. Its member sponsors include cities, conservation districts and the Yakama Nation. The YBCWP was formed to address 303(d) listings sustainably and will serve as the forum for identifying the important first steps in this process.

The City of Yakima is one of the RC&D sponsors and a strongly committed supporter of the water quality partnership. Proactive steps which the City plans to implement at the YRWWTF over the next two years consistent with the AI approach include biological phosphorus removal and struvite recovery, anaerobic pretreatment of industrial wastewater, and floodplain restoration of city-owned property next to the river.

The floodplain restoration project will restore several ecological functions important to salmon recovery and water quality in the Gap to Gap reach of the Yakima River. The first phase of the project will restore functioning spring-brook habitat connected to the Yakima River. Spring-brooks return hyphorheic and other groundwater flow to the river and create year-round thermal refuge for juvenile salmon. The second phase of the project will involve continued establishment of native vegetation and creation of side channels. Some side channels may be in connectivity with surface flow and some will only be watered at their downstream points. Side channels, and their biological and chemical complexity, provide more habitat for juvenile Chinook and coho salmon as well as steelhead trout. They also serve as flow paths for surface and hyporheic flow, at various scales, that cause nitrogen and phosphorus attenuation. Side channels are important thermal buffers in river systems.

The third phase of the floodplain restoration project may occur if levies in the Gap to Gap reach are set back. This will allow for a better balance of material transport and storage, continued development of side channel and spring-brook features beneficial to salmon and water quality, and will also cause the river to migrate away from the YRWWTF through channel avulsion. The city would then discharge treated wastewater to its restored floodplain channels in order to ensure that the ecological features of its restoration project are maintained. As the efficacy of floodplain restoration is demonstrated, an ecosystem marketplace may be used to encourage even more restoration of ecological infrastructure.

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Aerial photo of Corvallis wastewater reclamation plant

Corvallis Nutrient Recovery from Wastewater

By Dan Hanthorn, Operations Manager, City of Corvallis

Since 1997, the City of Corvallis wastewater reclamation plant has accepted a total of 200 million gallons of leachate from the nearby Coffin Butte regional landfill site. The current leachate contribution to the plant averages 75,000 gallons per day. The original Corvallis 4.6 mgd dry-weather-flow treatment plant was constructed in 1955. It was upgraded in 1964 to 6.4 mgd with trickling filters, and upgraded again in 1978 to 9.7 mgd with the addition of the activated sludge process. In 2000, a separate 85 mgd combined sewer overflow treatment facility and new digester complex were built. The plant discharges to the Willamette River.

Leachate from Coffin Butte is very high strength, having an ammonia concentration greater than 1,200 mg/L ammonia. The leachate also contains a host of additional contaminants and is comparable to the highest strength examples of the material from landfills around the world, i.e. Tehran, Iran and Hong Kong, China.

The volume of leachate is restricted to 0.5 – 1.0% of daily plant flow due to high levels of 1) ammonia; 2) true color (6,300 platinum-cobalt units – very, very black!); 3) magnesium (enhanced struvite formation potential); 4) zinc (allowable local-limit head works loading); and 5) process control issues (low temperature ammonia toxicity and warm weather nitrification D.O. requirements).

Leachate tipped at Corvallis represents 65% of the leachate generated at the landfill. The balance is transported by tanker truck up to 450 miles to alternate treatment locations. The landfill has been looking for a solution to reduce logistics and stabilize expenses.

Recognizing that the City was competent in treating liquid waste in the way the landfill's core competency is managing solid waste, Coffin Butte was receptive to the City's proposal to provide leachate pretreatment services. Pretreatment of leachate enables the intake of greater volumes of the waste.

Beginning in April 2010, various pretreatment options were explored. Candidate pretreatment processes included: Ozone, Ostara, Liqui-Cell, air stripping, Sharon, AT3, Anammox, BNR, constructed wetlands and others. A Triple Bottom Line (TBL) analysis evaluated capitalization cost, O&M expense, energy and chemical requirements, process footprint, carbon footprint and operational considerations. The shakeout resulted in the selection of a two-step process that combined the Multiform Harvest struvite crystallizer process and Thermoenergy ARP (Ammonia Recovery Process). Both processes yield marketable fertilizer products (struvite pellets and 40% liquid ammonium sulfate) important to local agriculture.

Initial bench top testing concluded the combined process strategy had the potential to: 1) reduce ammonia concentration by up to 90%; 2) significantly reduce color; 3) precipitate greater than 99% of dissolved zinc and copper; and 4) sequester magnesium, mitigating the potential to

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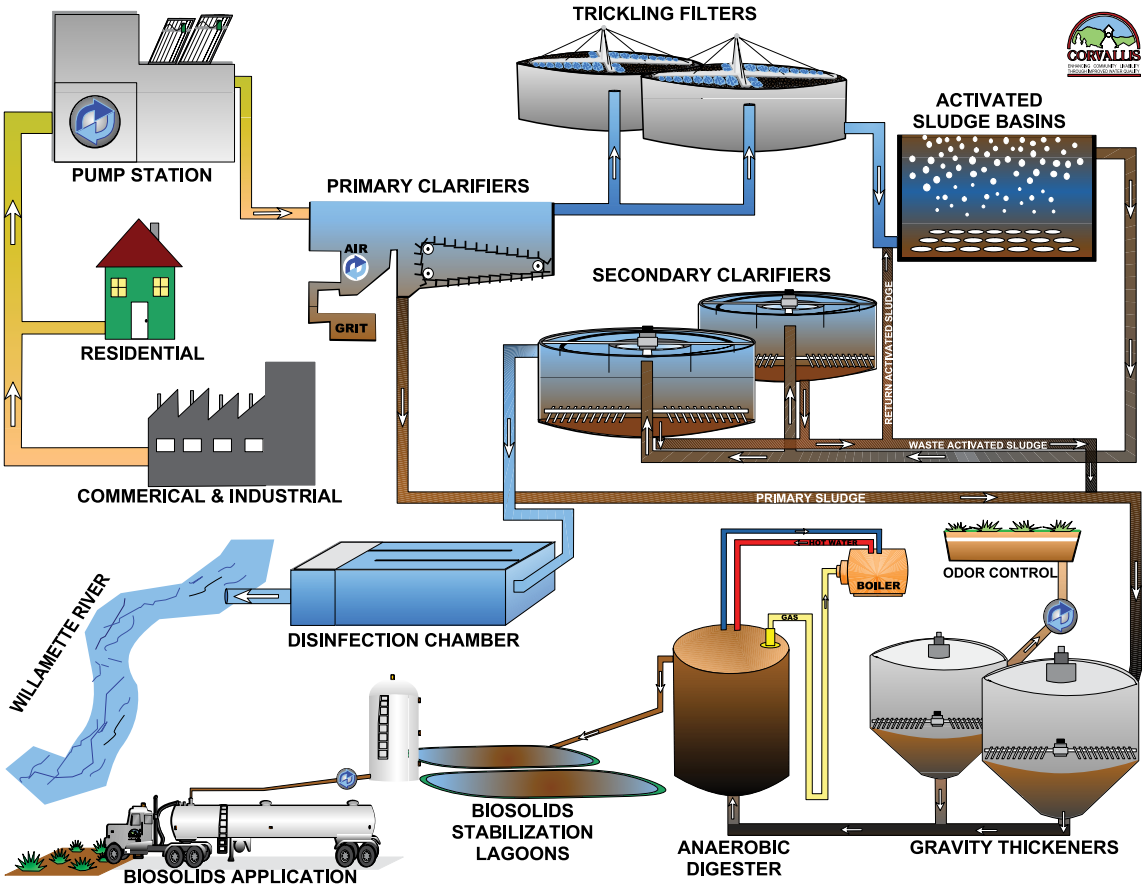

Corvallis WWRP schematic (does not show nutrient recovery)

CORVALLIS NUTRIENT RECOVERY FROM WASTEWATER

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form struvite deposits in treatment plant pipes and process structures.

The Multiform Harvest process crystallizes magnesium, ammonia and phosphorus to produce struvite pellets. Magnesium and ammonia occur in abundance in the leachate. The phosphorus necessary to produce struvite as well as additional ammonia is introduced by blending leachate with lagoonate (overflow from the biosolids gravity dewatering lagoon). After blending the lagoonate and leachate, pH is optimized to enhance struvite production and introduced into the Multiform Harvest crystallizer with a 20-minute average detention time. Struvite pellets are harvested regularly and the crystallizer overflow is processed to remove zinc and copper precipitates.

Following struvite crystallization and metal separation the process stream receives further treatment for ammonia recovery and color reduction in the Thermoenergy ARP process. Effectiveness of the ARP process relies on converting ionized ammonium into ammonia. The ammonium/ammonia equilibrium of the waste stream is shifted to favor ammonia by further adjusting pH and increasing the temperature. The ammonia rich stream is then sprayed into a vacuum chamber where the ammonia is flashed out of solution. After a short residence time of 6-15 minutes at a 15-30x recirculation rate the vaporized ammonia is condensed, concentrated and introduced to sulfuric acid to achieve the final fertilizer product, 40% liquid ammonium sulfate.

Through the two-step pretreatment process, very long chain organic molecules that impart a strong color signature to the leachate are broken down. Large molecules in the leachate are also resistant to biological degradation through the wastewater treatment plant's trickling filter/activated sludge secondary treatment process. The smaller, pretreated organic molecules are more accessible to biological treatment organisms and a significantly larger portion of leachate COD is expressed as treatable BOD5.

The pretreated flow is then released to the sanitary sewer for final treatment in the wastewater treatment plant. With removal of most magnesium, in-plant treatment systems are less prone to struvite fouling. The removal of 1,000 pounds/day of ammonia loading (35% reduction) to the wastewater treatment plant improves treatment process performance and reduces costs. Marketing of the two fertilizer products is expected to recover most of the leachate pretreatment system O&M expense.

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Installation of purple pipe

Meridian reclaimed water booster station

The City of Meridian Steps Up to Sustainability

By Mollie Mangerich, Environmental Division Manager, City of Meridian Public Works Department

The City of Meridian, Idaho has assertively stepped up to the challenges and dynamics of incorporating sustainability concepts into a variety of projects. From the construction of an LEED Silver certified City Hall and establishing a state-of-the-art wastewater treatment and reclamation facility, to establishing and staffing an Environmental Division within the Public Works Department —"Sustainability and Environmental Awareness" is a stated priority of city leadership. The Public Works Department has positioned itself strategically to emphasize financial and environmental sustainability in our program and project areas while including our customers in a wide variety of work groups and steering committees to help guide and support the way we manage our community's resources and waste products, and the services we provide.

Environmental sustainability and stewardship are within the City's current Comprehensive Plan, documenting a holistic approach to the protection, sustainable use and innovative approach to managing our natural resources. The Public Works Department has set forth the goal to create a WWTF that is self-sustaining, utilizing closed-looped systems to recycle and/or reuse 80 percent of the waste stream incorporating water reclamation, co-generation and nutrient recycling by 2030. With the City's award of an Energy Efficiency Block Grant, the Public Works Department has begun to:

1. Replace existing blowers at the WWTF with newer more efficient turbo blowers with an estimated energy savings of 250,000 kWh to 300,000 kWh annually (5% of WWTF energy use) with a potential annual costs savings of $48,000.
2. Replace street lights with more efficient LED lighting on main corridors resulting in a reduction of 75,000 kWh and an annual estimated cost reduction of $6,000 with an expected reduction of 31 metric tons in GHG emissions.
3. Install new lighting at the WWTF resulting in a potential yearly electricity savings of 70,000 kWh to 80,000 kWh and an annual cost reduction of approximately $5,000 to $6,000. This project is expected to result in a 29 to 33 metric ton reduction in GHG emissions.

The anticipated low phosphorus limit based on the Boise River TMDL has challenged Wastewater and Engineering staff to find a successful and sustainable strategy to meet pending new requirements while remaining within WWTF capacity and NPDES flow limits. A significant part of this strategy is the development and implementation of a city-wide reclaimed water program. Full implementation of this program will allow the beneficial reuse of 2.3 billion gallons of water by 2020. The city has successfully produced Class A reclaimed water after earning a city-wide permit for the following allowable uses:

- Irrigation
- Car Wash
- Toilet Flushing
- Dust Suppression
- Sewer Flushing
- Fire Suppression

We have prepared for the first commercial use of recycled water in Idaho at a car wash near a new I-84 interchange. Our reclaimed water program relies on partnerships, and the next partnership will be between the Idaho Transportation Department and the City to provide a reclaimed water system to be used for irrigation for the interchange and street landscaping as well as for private development beginning in May 2011.

We face myriad challenges in the production, distribution, treatment and reclamation of our water and reuse of its byproducts. Fortunately, our leadership supports us and has dedicated resources to planning and strategic development of modern and reliable facilities that emphasize financial stewardship and environmental sustainability for our customers.

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Not Just for Milk Anymore: Pasteurization of Reclaimed Water in Ventura, CA

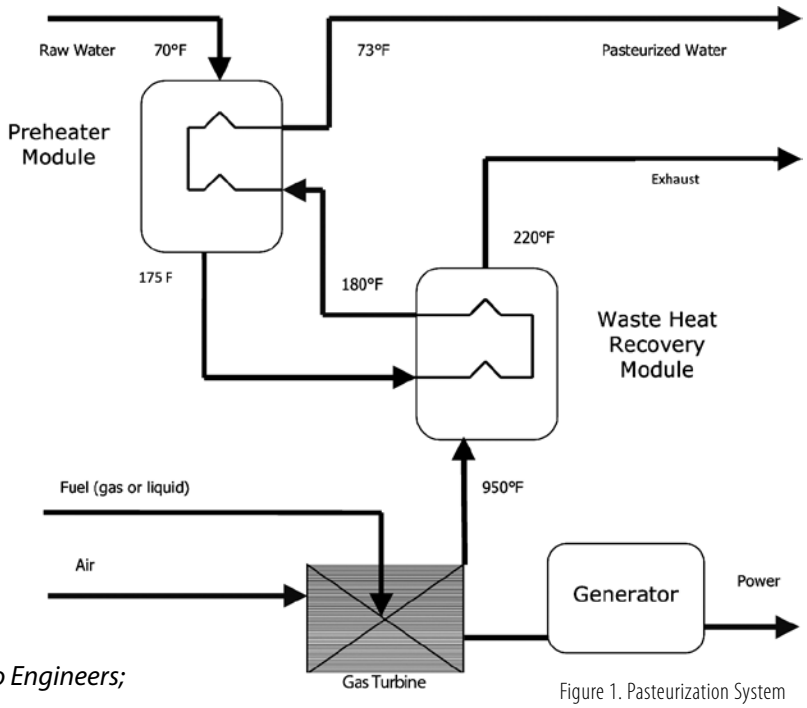

Figure 1. Pasteurization System

By Andrew Salveson, Carollo Engineers; Nitin Goel, Carollo Engineers; and Greg Ryan, Pasteurization Technology Group

Pasteurization has been widely used since the 1860s. Traditionally, this treatment process has been used to disinfect beer, wine and milk, but not water. This simple, cost-effective process has now been independently validated for the water reuse market by Carollo and approved by the California Department of Public Health. The economy of pasteurization is based upon the capture of a waste heat source (e.g., turbine exhaust, solar heat or cooling towers) and the transfer of that heat to the water for disinfection. Depending upon the production of digester gas, a wastewater utility can disinfect greater than 25 percent of their flow without any energy cost.

A nation-wide economic analysis has shown pasteurization to be the lowest-cost disinfection alternative both in terms of energy use and total cost in all but a few locations. In Ventura, California, the pasteurization system has the potential to profit the City (an income of $162,000 per year from operating pasteurization, as opposed to an expense of >$200,000 per year for operating UV disinfection). Because of these potential savings, Ventura is now constructing a pasteurization demonstration reactor (0.5 mgd) for long-term performance demonstration.

PASTEURIZATION OVERVIEW

Pasteurization is the process of heating a liquid to a high temperature under pressure and then cooling it immediately. Carollo Engineers performed the demonstration testing on behalf of the Pasteurization Technology Group (PTG) at the Laguna Subregional Water Reclamation Facility in Santa Rosa, CA.

This validation report was subsequently approved by the California Department of Public Health (CDPH) for reclaimed-water disinfection. The detailed performance testing required for CDPH approval is an exhaustive process that thoroughly documents the pathogen disinfection performance of a disinfection system over a wide range of operating conditions and water quality combinations. To date, only UV, ozone and now pasteurization have been approved based upon such detailed testing. Surprisingly, chlorination has been approved by CDPH but not using the same rigorous testing method as the other technologies.

ENGINEERING OVERVIEW

The patented PTG pasteurization system (Figure 1) uses plate-type (water-to-water) and stack-type (air-to-water) heat exchangers to recover and use waste-heat from other processes. The plate-type heat exchanger, or preheater module, transfers heat from the already disinfected (effluent) wastewater to the influent (feed) wastewater. The stack-type heat exchanger, or waste-heat recovery module, transfers the waste heat from the external heat source to the feed water. The external heat source can be turbine-exhaust heat, burner- (flare-) exhaust heat, hot water, or other forms

of heat. Following the waste-heat recovery module, in-line pumps are included to maintain a higher pressure (than the influent) on the effluent side of the system.

It is often intuitively assumed that pasteurization would not be cost-effective to heat wastewater to greater than 160°F, but this is demonstrably wrong. Leveraging the heat-capture capability of its various heat exchangers allows the PTG system to retain more than 96% of the reactor heat within the reactor. This means only a low 3°F to 5°F of energy input is required on a continual basis. The secondary benefit of the capture and maintenance of the heat within the reactor is that effluent temperatures are typically within 3°F of influent temperatures, so external downstream cooling is not needed.

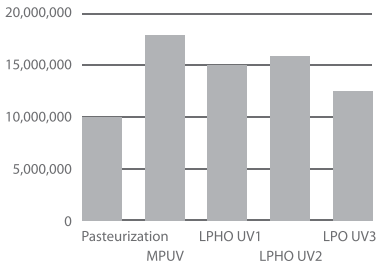

Figure 2. Net present worth for pasteurization and UV systems
UV = ultraviolet
MP = medium-pressure
LPHO = low-pressure, high-output

DESIGN CRITERIA

Pasteurization disinfection performance, as reported in the literature, is dependent on contact time and temperature. Low contact time coupled with high temperature is known as "flash pasteurization" and has proven to be very effective in the food industry.

CDPH specified the required performance criteria using the critical design parameters of temperature and contact time. The data indicated that the critical temperature to achieve 4-log MS2 disinfection was 176.4 F. CDPH rounded up the required temperature value to 180°F. The lowest contact time associated with 4-log MS2 removal was 7.7 seconds. Again, CDPH rounded up the required contact time to 10 seconds.

At Ventura Water Reclamation Facility (VWRF), waste heat could be recovered either from the combustion of digester gas or from the combustion of an imported energy source (natural gas). In terms of design parameters, the contact time and temperature requirements set by CDPH (10 seconds contact time, 180°F minimum temperature) were used for both scenarios. The analysis showed that the cost of importing natural gas and burning it in turbines to generate electrical energy and waste heat was significantly less than the cost of UV disinfection. Substituting digester gas for natural gas further reduced the cost. The natural gas would fuel a single turbine, providing 1.06 MW of power and enough heat to disinfect 14 mgd of water. Less-expensive gas burners would then be used to generate the additional heat needed to treat the remaining portion of the flow 7 mgd for a total capacity of 21 mgd.

ECONOMICS

The VWRF analysis showed a marked cost difference between pasteurization and UV disinfection (to replace the existing chlorination/dechlorination system). The VWRF analysis was based upon an average flow of 12 mgd and a peak flow of 21 mgd. California's tertiary recycled-water standard was used to set the disinfection goals. One full train of redundancy was provided for each process. The net present worth (NPW) is shown below (Figure 2), with pasteurization shown as significantly less expensive. The cost estimated was based, in part, on the following assumptions: an energy cost of $0.11/kW-hr, a conservative natural gas cost of $4.50 per million Btu, a labor rate of $50/hour, a life-cycle of 20 years, and an inflation rate of 4.5%.

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Wastewater Treatment Plants—Big Green Machines

By Janet Gillaspie, Executive Director, Oregon Association of Clean Water Agencies (ACWA)

Wastewater treatment plants are big green machines—using physical and biological processes to turn polluted water into clean, recycled water. The local wastewater treatment plant should be at the core of any community's sustainability program. But more can be done to improve the sustainability aspects of the wastewater treatment plants in the Pacific Northwest. Opportunities to become more sustainable include:

- Renewable power production
- Energy efficiency
- Purchasing and using green cleaners
- Buying electronic devices designed to reduce toxics
- Collecting rechargeable batteries, electronic equipment, cell phones and paints for recycling
- Reducing pesticide use by changing landscaping practices
- Meeting "green" standards for vehicle fleet maintenance
- Substituting treated wastewater for potable water use, where possible

Renewable Power Production: The huge amount of energy it takes to treat sewage should be the first focus for improving sustainability of a wastewater treatment plant. A study completed for the Oregon Association of Clean Water Agencies, the *ACWA Energy Independence Project* (June 2008), concluded that wastewater treatment plants can be energy independent by applying best-in-class energy efficiency techniques, along with deploying available renewable energy sources. Some renewable energy sources like biogas generators or solar P/V installations are cost effective now for Oregon wastewater utilities served by investor-owned utilities. Accepting Fats, Oil & Grease (FOG) or segregated, clean green waste with tipping fees and increasing biogas production can actually generate dollars for wastewater utilities. Technologies such as some solar installations, wind or microturbines will be cost-effective as electricity prices continue to increase. The report includes detailed information on energy efficiency and evaluates seven of the most prominent renewable energy technologies for wastewater plants. The report is posted on the ACWA web site at *www.oracwa.org*. The report was completed for ACWA by Kennedy/Jenks Consultants, and funding was provided, in part, by the Energy Trust of Oregon.

Energy Efficiency: Stay tuned for the Winter issue of the PNCWA newsletter for more details and tips on energy efficiency. The first place to start is an up-to-date energy audit. In Oregon, contact your public power electric utility (PUD, co-operative or municipal owned utility) or check online at *http://www.bpa.gov/energy/n/industrial/facilties.cfm*; for wastewater utilities served by Pacific Power or PGE, find your local service provided at *http://energytrust.org/public-sector/incentives/water-wastewater-treatment-facilities/equipment-upgrades/*. Energy audits for wastewater utilities are provided free and additional incentives are available.

Purchase and use green cleaners: How to sort out the various "green" claims by product manufacturers, especially for cleaning products? Easy—specify the eco-certification programs that have committed to incorporating Oregon''s Priority Persistent Pollutant inventory into their chemical screening and ranking programs. Wastewater utilities should specify that all soaps and cleaners meet one of these standards:

- EPA—*Design for Environment*
- Eco-Logo
- Good Guide with a product score for the environment over 8.5
- Coastwide Laboratories—*Sustainable Earth series*

If outside cleaning services are used, work with the contractor to ensure they are selecting cleaners and soaps that meet these standards. Hand sanitizers are common around treatment plants. Select alcohol based cleaners, NO Triclosan.

Buy electronic devices designed to reduce toxics: A green ranking system has been created by the US Green Electronics Council. The Electronic Product Environmental Assessment Tool (check) ranks electronic devices including computers, laptops and monitors for specific environmental standards. Many electronic devices participate in this program. To reduce toxics in electronic devices, specify "gold" or "silver" for any new electronic purchases. An inventory of registered devices is available at *http://www.epeat.net/Companies.aspx*

Collect rechargeable batteries, electronic equipment, old cell phones and paints for recycling: Rechargeable batteries, old electronic equipment, out-of-date cell phones and unused paint can all be collected and properly recycled for free in Oregon. For many communities where proper recycling procedures are not in place, the toxic metals, flame retardants and other toxics in these waste streams ends up back at the wastewater treatment plant years later as landfill leachate. Here are some good resources:

- Free rechargeable battery recycling at *www.call2recycle.org*
- Electronic recycling programs in Oregon at *\www.deq.state.or.us/lq/ecycle*
- Paint recycling in Oregon at *www.paintcare.org*

Reduce pesticide use by changing landscaping practices: Pesticides cause water quality problems throughout the Pacific Northwest. Wastewater utilities can be leaders in their communities by promoting the use of Integrated Pest Management for landscaping around the treatment plant and pump stations, and ensuring that contracted landscaping services meet the Eco-Biz standards (Portland, Oregon only). Round up unwanted and unused pesticides for proper disposal to ensure that worker safety and water quality are not impacted by spills or unintentional improper disposal. See *www.ecobiz.org*

Meet "green" standards for vehicle fleet maintenance: The Eco-Biz program for automotive repair services ensures contracted vehicle fleet services meet specific environmental performance standards (Oregon only). Outside of Oregon, the practice checklist is a useful tool to ensure fleet maintenance practices are top notch. See *www.ecobiz.org*

Substitute treated effluent for potable water, where possible: Reducing potable water use at the treatment plant saves money and improves sustainability. Where possible, substitute recycled treated effluent for outdoor cleaning and other washing where potable water quality standards are not needed.

Summary: Wastewater treatment plants are big, green machines and through thoughtful facility planning and easy-to-achieve revisions to everyday practices, even higher sustainable goals can be met.

The Oregon Association of Clean Water Agencies (ACWA) is a private, not-for-profit professional association of Oregon's wastewater treatment and stormwater management utilities, along with associated professionals. Its 125 members are dedicated to protecting and enhancing Oregon's water quality. You may contact Janet Gillaspie at gillaspie@oracwa.org

Sustainability at Work and at Home

Larry's organic garden

Larry at work

By Larry Littrell, Lake Stevens Sewer District

There is a lot of talk in the industry about sustainability. It seems to be a very popular buzzword. While we have been focused as an industry on being more sustainable the very essence of what we do has always been to care for the earth and preserve what many would call our most precious resource, water. If you ask several people what sustainability is you will get several different answers, but I think everyone agrees it is the ability to continue our efforts to keep our water safe while at the same time limiting our negative effects and resource consumption.

The more we realize the importance of our role as protector of the waterways we can't help but be influenced in our private lives. When we spend so much time at work trying to figure out how to deal with endocrine disruptors and lower our phosphorus levels, how can we continue to contribute to the problems in our personal lives? Sustainability has slowly worked its way into my home and life. I began growing an organic garden two years ago and purchase most of what I can't grow at local farmers markets instead of buying produce that has been trucked hundreds of miles and adds to the carbon footprint. Recycling and composting are also great ways to decrease your "footprint."

As you search for ways to limit power consumption at work, do you start wondering how practical a solar panel would be for your own home? The fact is, we cannot and should not separate the environmental concerns of our occupation from our private lives. We should integrate our continuing efforts to improve the world we live in.

Although carbon credits and saving money are important, for many of us sustainability is about being good stewards of what we are entrusted with and leaving this planet to our children and grandchildren in as good or better shape than we experienced.

Can we spend our lives as protectors of the environment, but not share our knowledge with our neighbors and, more importantly, our own children? How has your life and the environment been positively affected by your occupation?

Larry Littrell is vice president of PNCWA's NW Washington Section. You may contact him at llittrell@lkstevenssewer.org

Streamside Restoration: A Viable and Less Costly Option for Regulatory Compliance

Volunteers plant native trees to restore stream banks and create shade critical for healthy wild fish habitat on the Salmon River near Portland, OR.

As state regulatory agencies set water temperature limits for wastewater treatment facilities and other NPDES permit holders, permittees are looking for practical solutions to minimize the effect of clean, but warm water entering rivers and streams. Historically, temperature regulations meant expensive new facilities to cool the water before entering a stream—but today, conservation organizations and regulatory agencies are working toward a more ecologically beneficial approach to compliance.

In the state of Oregon, regulatory agencies and environmental organizations have built a system in which cities can restore streamside shade in places critical for fish to rest, rear and spawn instead of cooling water directly at a treatment facility's point of discharge. In other words, the increase in overall stream temperature from the facility's effluent is offset by cooling water naturally by planting trees upstream.

So how does the system work? Over the past five years, these organizations have been working on the science to calculate and quantify the benefit that planting trees provides to streams. Regulator-approved protocols can now quantify these benefits into registered "credits" that can be purchased by facilities to comply with temperature—and soon nutrient—regulations. Planting trees upstream not only provides a more natural solution, but in every case the cost to facilities has been one third to one half of a cooling tower, with numerous secondary benefits, such as trees for bird and other species habitat, reducing carbon in the atmosphere, stabilizing banks to control sediment and controlling runoff from agriculture and roads.

With regulator-approved metrics and infrastructure in place to ensure transparency and credibility of this compliance option, facility managers might ask how to actually get the projects done. To remove this uncertainty for municipalities, The Freshwater Trust, an Oregon-based not-for-profit, will finance all project costs on the front-end, and then sell the measured, quantified ecological benefits, or credits, to facilities to meet compliance requirements. With the Department of Environmental Quality set to write permits for this natural compliance solution, cities should consider restoring stream banks as a way to reduce thermal loading.

For more information, please contact David Primozich, Director of Ecosystem Services, The Freshwater Trust, 503-434-8033, primozich@thefreshwatertrust.org.

What Works!

By Dick Finger, Plant Operations and Maintenance Committee

Despite what the calendar says, it has been a spring to forget. I am willing to bet that everyone is looking forward to (or at least hoping for) summer's arrival with warm sunny weather and outdoor activities. Unfortunately, warm summer weather brings with it an increase in odor production and odor complaints. There are lots of ways to control odors and thus odor complaints. Some involve capital expenditures for odor control facilities or chemical addition to the collection system to prevent odor production, but in some cases there are simpler, less complex solutions. Mark Smith of Brown and Caldwell provided one that is simple and elegant, but is site specific and will not work in all cases.

The problem was associated with an 8-inch lateral line that connected into an interceptor at a manhole junction. A misaligned sewer downstream was causing air back-pressurization through the manhole into the approach sewer, forcing the odorous air back up the lateral where its release was creating an odor problem. Rather than attempting to ventilate the interceptor and scrub the ventilated air, a simple check-valve (flapper) made of a very flexible rubber conveyor belt material was installed. It allowed flow to enter the interceptor, but prevented the pressurized air from migrating back up the lateral line to where it could result in an odor complaint. Fortunately, the manhole was located in an area with very little foot traffic, so the likelihood of creating odor complaints at the manhole due to the presence of the flapper was minimal.

The photos show the flap valve as it is installed in the interceptor, and a close-up of the flap valve installation. If you have a similar situation, this might be a quick and effective solution with minimal expense. Many thanks to Mark for this idea.

We are always looking for good ideas to highlight in "What Works!" so feel free to submit your ideas by email and I will be happy to work with you on an article.

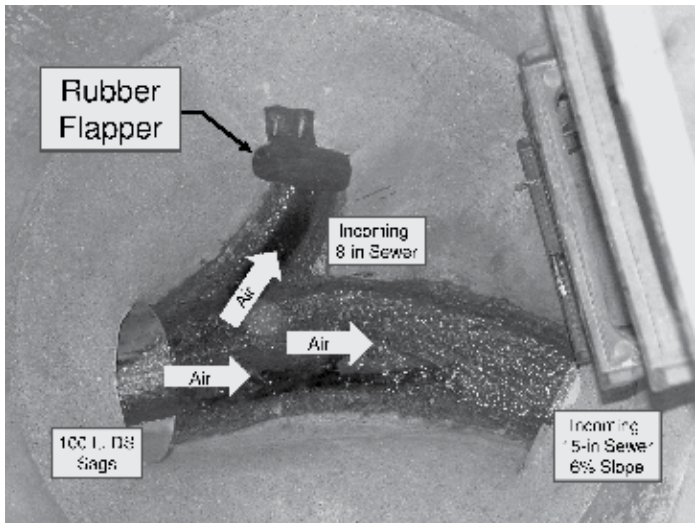
You may contact Dick Finger at dick.finger@att.net

Plant Operations and Maintenance Committee Webinar

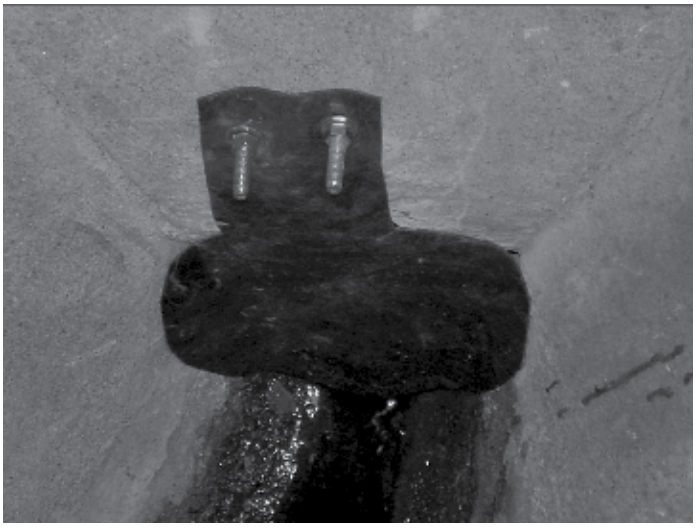
OPTIMIZING PRIMARY TREATMENT FOR WET WEATHER:

Thursday, July 14
.2 wastewater specific CEUs (requested)
See *www.pncwa.org* for details

Only one registration needed per station—all verified attendees at a station can request CEUs



Flap valve installed in the interceptor



Close-up of the flap valve installation

Tom Helgeson

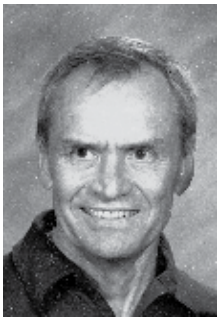
Jennifer Belknap Williamson

On The Move

Tom Helgeson transferred to the Tri-Cities office of CH2M HILL as Business Vice President, Area Manager and Water Business Group Operations Leader. As the Client Portfolio Manager for the Yakima Valley, Mid-Columbia River Basin, southeastern Washington and northeastern Oregon, he serves as the primary client contact for the firm in the region. Prior to this, he filled similar roles for the firm's Tampa Florida office. Tom served as Speaker of the House of Delegates for the Water Environment Federation and is a past president of the Florida Water Environment Association. Tom was recently elected to serve as president of the Yakima Valley Section of PNCWA and he is Pre-conference Workshop Co-chair for the PNCWA2011 Conference. Tom and his wife reside in Kennewick.

Jennifer Belknap Williamson recently joined the City of Gresham as the Watershed Division Manager in the Department of Environmental Services. Jennifer will be directing the activities of the City's stormwater utility and natural resources program as well as assisting with implementing the City's new internal Sustainability Plan. She will continue to serve as the Chair of the Sustainability Committee for PNCWA.

In Memory of Larry Esvelt



Dr. Larry Allen Esvelt, principal partner of Esvelt Environmental Engineering LLC of Spokane WA, passed away on April 25, 2011. His contributions to the field of environmental engineering as a researcher and process engineer were significant. He was registered as a professional engineer in seven states, certified as a Class IV operator and sanitary engineer, and a WEF member since 1964. He served on the Board of Directors of the Accreditation Board for Engineering and Technology (ABET) and traveled around the county and eventually to various locations around the world for ABET, the engineering professional body responsible for accrediting university engineering programs. He served on numerous professional organizations and advisory committees including: Water Environment Federation, American Society of Civil Engineers (where he was past Inland Empire Section President), American Water Works Association, Water Reuse Advisory Committee for Washington State Department of Health, Member and Chairman of the Washington State University Civil and Environmental Engineering Advisory Board, and the Gonzaga University Engineering Design Advisory Board. He received the Inland Empire Section ASCE Engineer of the Year Award, Spokane County Aquifer Protection Award, and Washington State University Alumni Achievement Award. Equally important, he was a good friend to those that worked with him and a great role model for those he mentored.

Art McCarty—The Loss of a Beloved WWT Professional

Arthur J. McCarty died on April 7. Art worked for the City of Bremerton for 19 years and was loved by everyone. The small wastewater community lost an old soldier with Art's passing. He took pride in his work at the wastewater treatment plant, and he loved the people he worked with each and every day. He served in the military in his earlier years.

He enjoyed traveling, especially to Hawaii each year. The highlights of these trips were spending time with family and friends and he especially enjoyed swimming with the turtles while in Hawaii. Arthur, better known as "Buddy," is survived by his wife, Lynda, of 37 years; 3 children, Robert, Sandra and Matthew; two grandchildren, Tyler and Alli and numerous family members. He will be missed not only by family and friends but also by co-workers whose work lives were enriched by his attitude and his presence.

Remembering Warren Westgarth

Warren Westgarth receiving the Arthur Sidney Bedell Award

Dr. Warren Westgarth, a crusader for water quality in Oregon, died on March 24, 2011. He was a lifetime WEF member, 1969 Arthur Sidney Bedell Award recipient for extraordinary personal service to PNCWA, 1979 PNCWA Individual Distinguished Achievement Award recipient, Five S member and PNCWA historian. Warren held degrees in Civil, Public Health and Sanitary Engineering and a Ph.D. from University of North Carolina. He retired in 1981 from his position as Director of Laboratories and Applied Research Division at the Oregon Department of Environmental Quality (DEQ). Warren served on many professional committees, Governor's Task Forces and chaired the Bull Run Advisory Committee and Water Quality Advisory Committee.

In addition to PNCWA activities, he was instrumental in establishing Oregon's system for continuing education credits and served on the Oregon Environmental Services Advisory Council (OESAC) which said, "OESAC is forever indebted to Dr. Warren C. Westgarth for his tireless efforts in guiding the council from its inception as an ad-hoc committee in 1969 until he retired in 2006."

Warren married Norma Rose Nevins in 1944 and had two children. After Norma died in 1976, he married Hazel Stock and they lived in Beaverton, Oregon. An Army veteran, Warren designed the Veterans Memorial on SW Watson managed by Beaverton American Legion Post #124. Warren loved to teach and he wrote hundreds of poems for every occasion. He wrote, "I am a dedicated servant of God and country." He is survived by his son, Walter Westgarth of Vancouver, WA, his daughter, Christine Christensen of Clackamas, OR and stepson, Riley Stock of Prineville, OR, sister, Ruth Yeamans of Portland, OR and three grandchildren and eight great-grandchildren.

Editor's note: Warren liked to call and chat about PNCWA affairs, and always impressed me with his vast knowledge, vivid ideas and vibrancy. When I visited his home in 2002 to pick up some of the PNCWA memorabilia he'd collected over the years, I was struck to see that he was lovingly caring for his ill wife but was as excited as ever about PNCWA, OESAC, the veteran's memorial and his other projects. Recently, when I told my colleague Debra Gorman that Warren had passed, she recalled that he was instrumental in getting her involved in PNCWA (PNPCA then) and that Warren encouraged women in the water environment professions because he thought they would advance the changes that were needed. How many of us owe a debt of gratitude to Warren for advancing the profession, our careers, and the future of water quality? As Debra said, "Warren will be missed but he will not be forgotten."

PNCWA ENVIRONMENTAL STEWARDSHIP SCHOLARSHIPS

2ND Annual Scholarship Silent Auction
to be held at PNCWA2011 Annual Conference

WAYS TO DONATE

- Donate a standard silent auction gift.
- Have a creative side? Donate an art piece.
- Make a cash donation at www.pncwa.org on the Scholarship link (on left of homepage).

To donate items, email Steve James at sjames@jub.com

Cash donations are fully tax deductible. Donated auction items are tax deductible at Fair Market Value.

By Nan Cluss, PNCWA Manager

Nan Cluss

Although PNCWA continues to branch out, the annual conference is still our main event. There have been two major transitions regarding the conference in the last few years. One is the choice of a Bend-Vancouver-Boise rotation through 2018. The other is a consistent conference brand. Both have been mentioned in different forums before but here's some background on how and why each came about.

The idea of sending out an RFP and entering into contracts with three venues (one in each state) for three conferences each over the course of nine years was introduced to the board in 2006. Better bargaining status, less annual need for negotiations, defined costs early on and ongoing familiarity with specific venues for conference planning tasks all contributed to the board's decision to move forward with the idea. In early 2007 an RFP went out to over two dozen convention bureaus and facilities known to be able to handle our space requirements. Based on responses received, and with a table of comparative information reviewed and discussed at length, the board's decision was a rotation of Bend-Vancouver-Boise. The info below shows the future dates and locations. Each of these venues has had very successful conferences to date.

As for conference branding, in the past a new theme and logo were developed for each year's annual conference but professional guidance (and using WEFTEC as an example) suggested otherwise. The suggestion was to clarify what the conference is about and what attendees can expect their experience to be and to develop a brand with a logo that is constantly recognizable as that event. After many suggestions and deliberations, the board chose the following brand:

PNCWA 2011
Building Professional Excellence in Water Quality™

Building Professional Excellence in Water Quality™ is what we strive for as an organization with the annual conference and what attendees are supported in by participation. Hope you'll join us this year in Vancouver on September 18–21 to do just that.

FUTURE CONFERENCE DATES/LOCATIONS:

Hilton Vancouver Washington
- 2011: Sept 18–21
- 2014: Sept 21–24
- 2017: Oct 22–25

Boise Convention Center
- 2012: Oct 21–24
- 2015: Oct 4–7
- 2018: Oct 21–24

The Riverhouse—Bend Oregon
- 2013: Sept 15–18
- 2016: Oct 16–19

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PNCWA 2011

Building Professional Excellence in Water Quality™

Annual Conference & Exhibition
September 18-21
Hilton Vancouver
VANCOUVER, WA

Monday Morning - September 19

7:00 - 5:30	Registration						
8:30 - 10:00	Opening Session						
10:00 - 10:30	Break & Ops Challenge Viewing Time						
10:00 - 3:00	4-Person Operations Challenge						
	Session 1A **Phosphorus Removal**	Session 2 **CSOs & Wet Weather Treatment**	Session 3 **Stormwater**	Session 4 **Collection & Pump Systems**	Session 5A **Research**	Session 6A **Operations**	
10:30 - 11:15	**Implementing "Next Level of Treatment" at Spokane's Riverside Park Water Reclamation Facility** *Lars Hendron, City of Spokane* *Mark Esvelt, Esvelt Engineering*	**Challenges and Approaches to Siting CSO Control Facilities** *Kevin Dour & Dennis Eckhardt, Tetra Tech & Shahrzad Namini, King County*	**Lessons Learned from Eighteen Years of Disconnecting Downspouts in Portland, Oregon** *Amber Clayton, City of Portland*	**Sustainable Design of Buried Pipelines** *Sri Rajah, HDR*	**Assessing the Likelihood of Pathogen Transport in Groundwater** *Russell Mau, WA Dept of Health*	**O&M Energy Efficiency Ideas for Wastewater Treatment Plants** *Walt Mintkeski*	
11:15 - 12:00	**Optimizing Sludge Fermentation to Improve Biological Phosphorus Removal Reliability** *Li Lei, CH2M HILL*	**Developing Best Estimates for Combined Sewer Overflow (CSO) Control Volumes to Meet NPDES Requirements through Flow Monitoring, Automated Calibration, and Long Term Simulations** *Robin Joanne Lee, Brown and Caldwell*	**Assessing Stormwater Program Implementation Effectiveness** *Robbin Finch, City of Boise*	**Careful Planning Assures Sewer Capacity in Vancouver, WA** *Lakshmi Priya Dhanapal & Heather Stephens, Kennedy/Jenks Consultants*	**Forward Osmosis - Reverse Osmosis Process Offers a Novel Hybrid Solution for Water Reuse and Desalination** *Carl Lundin, CDM*	**Tri-City WPBP MBR Performance Certification** *Michael Trent, Clackamas WES*	
Monday Afternoon - September 19							
12:00 - 1:15	PNCWA Business Luncheon						
1:15 - 2:00	**Spokane County's Wastewater Program to Meet the Most Restrictive TMDL in the Nation** *Dave Clark, HDR*	**Portland's 2011 CSO System Operations, Objectives & Optimization** *Virgil Christopher Adderley City of Portland*	**Clean Water Services' Watershed Approach to Hydro-Modification** *Jadene Stensland, Clean Water Services*	**Before It's Too Late: Development of a Force Main Prioritization and Inspection Program** *Steven Drangsholt, HDR*	**Single-stage Deammonification MBBR Process for Reject Water Sidestream Treatment: Start-Up Strategy and Carrier Design** *Hong Zhao, Kruger, Inc*	**Counterfeit Electrical Components Can Destroy Equipment, and Kill** *Grant Van Hemert, Schneider Electric*	**Bonus Poster Session** 1:15 - 2:45
2:00 - 2:45	**CASE STUDY: You want Struvite to be my friend? Design and Construction Implementation of a Phosphorus Recovery Process** *Jeffrey M. Lindgren, Black & Veatch*	**Portland's CSO Program Construction Challenges** *Paul Thomas Gribbon, City of Portland*	**Boardman Creek Basin Initiative: Strategic Planning to Restore Clean Flowing Streams** *Brett Arvidson Oak Lodge Sanitation District*	**Evaluating Alternatives for Interim Capacity Improvements At the Sherwood Sewage Pump Station** *Mike Carr, Murray, Smith & Associates*	**Benchmarking Wastewater Treatment Sustainability** *Usama Zaher Washington State University*	**Oh Crud! – Inspection and Permitting of Mobile Washers** *Jeff Skinner, CCCSD CA*	
2:45 - 3:00	Break & Ops Challenge Viewing Time						
	Session 1B **Inflow & Infiltration**				Session 5B **Water Quality**	Session 6B **Biosolids and Digestion**	
3:00 - 3:45	**Case Study in Inflow and Infiltration Abatement: Sump Pump Disconnection & Pipe Rehabilitation Pilot Project** *Joe Dvorak, Clean Water Services*	**Disinfection and Dechlorination of CSOs** *Jeffrey Lundt, King County WA*	**Stormwater Facility Retrofit and Performance Optimization Program** *Paul Fendt, CDM*	**Evolution of Real-Time Control Strategies to Achieve Sewer System Efficiencies** *Edward Speer, CDM*	**The Efficiency of Wastewater Processes in Reducing a Suite of Indicator Trace Organic Compounds** *Tanja Rauch-Williams, Carollo Engineers*	**Thicker is Better - Bend Digester Mixing Part Two** *Michelle Burkhart, CH2M HILL*	
3:45 - 4:30	**Cochran Basin I&I Reduction Effectiveness for the City of Spokane Combined Sewer Overflow Program** *Beryl L. Childs, AECOM*	**UV Disinfection for Treatment of Stormwater** *Jennifer Muller, Trojan Technologies*	**Development of a New Water Quality Best Management Practice for Roadway Runoff** *Paul Bucich & Charles S. Wisdom, Parametrix*	**Evaluating Self-Cleaning in Existing Sewers Using the Tractive Force Method** *Paull Mitchell, ADS*	**Ambient Water Quality Conditions Study in the Columbia River - Determining Critical Seasonal Periods for Receiving Water Ammonia Toxicity** *David J. McBride Cosmopolitan Engineering*	**Return on Investment from Anaerobic Digester Upgrades: Case Studies from Wastewater Treatment Facilities that Switched to Large Bubble Gas Mixers** *Sudhakar Viswanathan Infilco Degremont*	**Vancouver Plant Tour** 2:45 - 5:00
4:30- 5:15	**Infiltration & Inflow: Source Identification in Semi-Arid Climates** *Dennis Galinato Murray, Smith & Associates*	**Finding a Winning Solution to Reduce Seattle Waterfront CSOs** *Vicki Sironen, HDR*	**Collaboration to Consistently and Efficiently Evaluate the Effectiveness of Proprietary Stormwater Treatment Systems for Pollutant Removal and Long Term Maintenance** *Paul R. Wirfs OR Dept. of Transportation*	**Clean Water Services Dawson Creek Pump Station and Force Main** *Scott Woodbury, Clean Water Services* *Todd Perimon, Carollo Engineers*	**South Puget Sound Dissolved Oxygen Study** *Andrew T. Kolosseus WA Dept of Ecology*	**Taking the Fog out of FOG** *Heather Stephens Kennedy/Jenks Consultants*	
5:00 - 7:00	Manufacturers Reception—Exhibit Hall						
7:00 - 8:00	Monday Night Dinner						
8:00 - 9:30	Monday Fun Night						

PNCWA 2011

Building Professional Excellence in Water Quality™

www.visitvancouverusa.com Vancouver USA Regional Tourism Office

www.pova.com Portland Oregon Visitors Association

Tuesday Morning - September 20

7:00 - 5:30	Registration						
7:00 - 8:00	Operators Breakfast						
	Session 7 **Public Education & Involvement**	Session 8 **Instrumentation and Controls**	Session 9 **Energy Recovery and Efficiency**	Session 10 **Biosolids and Digestion**	Session 11 **Planning for Sustainability**	Session 12 **Plant & System Operations**	
8:00 - 8:45	**How Voluntary Participation Can Affect the Success of a Program** *Martha L. Burke, Seattle Public Utilities*	**Value of Online Instrumentation for Wastewater Treatment Plant Operation** *Mario Benisch, HDR*	**Low Head Hydroelectric Projects at Pacific NW Wastewater Treatment Plants** *Terry Stulc, Trindera Engineering*	**City of Camas' New Sludge Belt Dryer Facility** *John Wilson, Gray & Osborne*	**Building a Legacy: Integrated Water Resources Management in Damascus, Oregon** *Emily Callaway, CH2M HILL*	**Will Your Wastewater Facility Meet Your Long Range Operations and Maintenance Needs?** *Ron Kohler & Bob Swarner King County*	EXHIBIT HALL
8:45 - 9:30	**Public Involvement? A Key to Your Wastewater System Success** *Mark Holtzen, JUB Engineers*	**Why Wait for Effluent Grab Sample Results? Find out Now What's Hitting You Up Front! An Overview of On-line, Nitrogen Analyzer Technologies for Wastewater** *David Kopchynski Parametrix*	**Developing and Implementing Energy Management Programs at a Wastewater Utility** *Frank Dick, City of Vancouver WA*	**Sustainability Comparison of Class A and Class B Biosolids Technologies** *Dana Devin-Clarke, Brown and Caldwell*	**Building on Lessons Learned for Expanding the Next Phase of the Groundwater Replenishment System** *James Clark, Black & Veatch*	**Chemical and Energy Procurement Options for a Utility** *Steve Walker, Carollo Engineers*	
9:30 - 10:30	Break - Exhibit Hall						
10:30 - 11:15	**Stormwater Education: Creating A Program That Works** *Megan M. Hanson, City of Portland*	**Lessons Learned Implementing Multi-Media for Telemetry and SCADA** *Terry Stulc, Trindera Engineering*	**Demonstrating WERF's CHEApet: A new powerful energy tool for WWTPs** *Matt Noesen, CH2M HILL*	**Renewable Energy Production from Anaerobic Digestion of Food Waste** *Cale Andrew McPherson, CDM*	**Innovative Sustainability Analysis for Wastewater Facilities Planning** *Dave Clark, HDR*	**Determining the Long & Short Term Costs of Pump System Efficiency** *Joe Edwin Evans, Pump Tech*	**PNCWA Section Exchange** 10:30- Noon
11:15 - 12:00	**Developing Relationships, Empowering Communities, Public Involvement, and Siting Wastewater Facilities in an Urban Environment** *Andrew Lee, Seattle Public Utilities*	**Life-Cycle Cost Effectiveness, High Availability, and Disaster Recovery of SCADA Systems Through Virtualization** *Mike Karl, CH2M HILL*	**Blowing Your Money Away: Combining New Technology with an Energy Savings Grant to Retrofit Aeration Systems at a Fraction of the Cost** *Jeffrey Zahller, HDR*	**Installing Roof-Mounted Draft Tube Mixers in Floating Cover Digesters** *Catherine Drummer Brown and Caldwell*	**Defining Sustainable Water Management in Calgary Through Truly Integrated Water Resources Planning** *Guy Carpenter, Carollo Engineers*	**The Myths of Empty Bed Residence Time in Biological Odor Control** *Bonno Koers, Azzuro*	
12:00 - 1:15	Networking Lunch						

Preconference Workshops, Sunday Sept. 18

Earn up to 2.4 CEUs (requested) for Sun. through Wed.

Green Stormwater Infrastructures: Now that they're in your system, what do you do with them?

Sunday Sept. 18 10:00 AM–1:00 PM followed by tour of local facilities from 1:00 PM–4:00 PM

Coordinators

Mark Poling, Clean Water Services
Carrie Pak, Clean Water Services
Lynne Chicoine, CH2M HILL

Inventorying and Reducing Your Organization's Carbon Footprint: A How-To Guide

Sunday Sept. 18 10:00 AM–5:00 PM

Sponsored by: PNCWA Sustainability Committee

Speakers:

Sally Brown, Ph.D., University of Washington
Dana Devin-Clarke, Brown and Caldwll
Sarah Deslauriers, Carollo Engineers
Steve Fancher, City of Gresham, OR
Dawn Lesley, Kennedy/Jenks Consultants
Jennifer Belknap Williamson, City of Gresham, OR

Optimizing the Performance and Capacity of Your Secondary Clarifier

Sunday Sept. 18 1:00 PM–5:00 PM

Sponsored by: PNCWA Plant Operations and Maintenance Committee

Speakers:

Dick Finger, Seattle Metro/King County (retired)
Randall Samstag, Carollo Engineers
Edward Wicklein, Carollo Engineers

Nutrient Removal in Practice

Sunday Sept. 18 9:00 AM–5:00 PM

Speakers:

Ryan Anderson, City of Yakima
James Barnard, Black & Veatch
Nate Cullen, Clean Water Services
Glen Daigger, CH2M HILL
Henryk Melcer, Brown and Caldwell
JB Neethling, HDR
Rod Reardon, Carollo Engineers
TBD, City of Boise

Schedule Highlights:

Sunday: 4 Preconference Workshops, Community Service Project, Open to All Ops Challenge, Meet and Greet
Monday: Opening Session, Tech Sessions, Poster Session, 4-person Ops Challenge, Plant Tour, Mfr Opening Reception
Tuesday: Operators Breakfast, Exhibit Hall, Tech Sessions, Plant Tour, Section Exchange, Micro-Brew Tasting, Awards Banquet
Wednesday: Plant Tour, Tech Sessions

Tuesday Afternoon - September 20								
12:00 - 1:15	Networking Lunch						EXHIBIT HALL	
	Session 13 **Utility & Asset Management**	Session 14A **Collection & Pump Systems**	Session 15A **Water Quality - TMDLs**	Session 16 **Odor Control**	Session 17A **Climate Change and GHG**	Session 18 **Advanced Wastewater Treatment**		
1:15 - 2:00	**Financial Sustainability to Support Utility Missions** *Edward John Cebron, FCS Group*	**Challenging Access and Site Constraints at City of Redmond Pump Station No. 1** *Adam Schuyler, BHC*	**Septic System and Non-Point Source Pollution: A Tale of Two TMDLs** *Jim Fisher, Clackamas County WES*	**Large Diameter Outfall Drop Structure Ventilation Analysis in Los Angeles, CA** *Mark Smith, Brown and Caldwell*	**Conducting GHG Analyses and Integrating Results into Decision-Making in the Wastewater Field** *Jennifer Belknap Williamson* *City of Gresham*	**Till Death Do Us Part? Marrying Old and New Technology: Expanding the West Boise WWTF UV Disinfection** *Matt Gregg, Brown and Caldwell*		La Center Plant Tour 1:15 - 3:45 — Bonus Session on SSOs 3:00 - 5:15
2:00 - 2:45	**What is CMOM and Why Should You Care?** *Mary King, City of Portland*	**Challenges and Approaches to Underwater Open-Cut Pipe Installation** *Kevin Goss, Tetra Tech*	**Idaho Antidegradation Implementation Procedures Increase Protection for High Quality Waters** *Robbin Finch, City of Boise*	**Good Neighbor Policy: Making Advanced Odor Control Efficient and Effective When You Have No Room for Error** *Jeffrey Zahller, HDR*	**Climate Change: What does it mean for your WWTP?** *Sarah Anne Deslauriers* *Carollo Engineers*	**Implementation of an Integrated Fixed-Film Activated Sludge Process for Secondary Treatement - Bend WRF** *Bill Leaf, CH2M HILL*		
2:45 - 3:00	Break - Exhibit Hall							
		Session 14B **Water Reuse**	Session 15B **Water Quality - Temperature**		Session 17B **Membranes**			
3:00 - 3:45	**Seattle Public Utilities' Practical Approach to Sewer Cleaning Schedule Optimization for SSO Reduction** *John R. Evans, HDR*	**Reclaimed Water - The Next Phase** *Patrick Skillings, Skillings Connolly, Inc.*	**Overcoming Barriers to Comply with a Temperature Limit** *Larry Rupp, Keller Associates*	**Addressing Odor Nuisance Without Creating a Noise Nuisance** *Grizelda Sarria, Tetra Tech*	**The Evolution of MBR Design to Minimize Capital Cost and Optimize Energy Efficiency** *Adrienne Menniti, CH2M HILL*	**High Rate Sidestream Treatment Provides Multiple Benefits** *Jyh-Wei (Al) Sun, CDM*		
3:45- 4:30	**Enhanced Decision Support Tools Help Maximize Value** *Lynne Chicoine, CH2M HILL*	**Tailored Effluent to Fit End Use** *Peter Schauer, Black & Veatch*	**Sustainable Solutions for Temperature Compliance** *Jason Smesrud, CH2M HILL*	**Odor Control Management Strategies & Field Experience** *Brett Converse, JUB Engineers*	**Technology Evaluation and Membrane Pilot Study to Achieve Low-Level Phosphorus Limits for Barrie, Ontario** *Rip Copithorn, GHD*	**Nitrogen Removal at King County Wastewater Facilities** *Peter Carter, King County*		
4:30 - 5:15	**Funding Opportunities for Stormwater and Wastewater Projects** *David Dunn, WA Dept of Ecology*	**Water Reuse Pilot Using Membrane Filtration in Spokane, WA** *Michelle LeBaron, AECOM*	**Indian Creek TMDL - Determination of "Natural" Temperature Conditions** *Craig B. Anderson* *Murray, Smith & Associates*	**When "Green" Really isn't Greenest: A Design Employing Inorganic Biofilter Media Restores Confidence and Advances Biofilter Technology, While Saving Cost and Energy** *Aaron Collett, City of Springfield, OR*	**Retrofitting an Existing Treatment Plant with MBR Technology – Challenges and Results** *Tom Giese, Kennedy/Jenks Consultants*	**Meeting New Nitrate and Color Requirements at a Ski Resort Wastewater Treatment Plant** *Lynn Williams, Brown and Caldwell*		
5:15 - 7:00	Beer Tasting - Exhibit Hall							
7:00 - 9:00	PNCWA Awards Banquet							

Tuesday Afternoon Bonus Session on SSOs
3:00 PM – 5:15 PM
Sponsored by PNCWA Collection Systems Committee

WEF Washington Update: Report from EPA SSO/Wet Weather Workshop *Bob Matthews, CDM*
Portland, Oregon's SSO Reporting: Lessons from Training for Proper Reporting *Matt Criblez, Portland BES*
Reporting SSOs in the Pacific Northwest: The Member State's Perspective on Reporting Requirements *Collection Systems Guest Panel*

Facility Tours—preregistration required

City of Vancouver's Marine Park and Water Center *Monday Sept. 19 2:45 PM–5:00 PM*

City of La Center Water Reclamation Facility *Tuesday Sept. 20 1:15 PM–3:45 PM*

Durham Advanced Wastewater Treatment Facility *Wednesday Sept. 21 8:00 AM–12:00 NOON*

Ops Challenge—Ops Challenge will be held separately from the Exhibit Hall. The Sunday Meet & Greet will be the time for the anyone-can-join-in, fun competition and the 4-person competition will be held on Monday from 10:00 AM-3:00 PM. Breaks will be scheduled in the Ops Challenge area for viewing the competition.

Earn up to 2.4 CEUs (requested) for Sun. through Wed.

Operators—Read this!

Operators Breakfast—The Operators Breakfast is offered at no extra cost for *operators* but registration is required.

Annual Conference & Exhibition
September 18-21
Hilton Vancouver
VANCOUVER, WA

PNCWA 2011

Building Professional Excellence in Water Quality™

Deadlines:

- Conference registration early bird rates through August 16
- Preregistration ends Sept. 9

Wednesday Morning - September 21							
7:00 - 1:00	Registration						
	Session 19A **Phosphorus Removal**	Session 20 **Innovative Planning & Approaches**	Session 21 **CSOs & Wet Weather Treatment**	Session 22 **Plant and System Operations**	Session 23 **Energy Recovery & Efficiency**	Session 24A **Operations**	
8:00 - 8:45	**Enhanced Wetlands Treatment of Non-Point Sources: A Sustainable and Cost Effective Alternative Approach to Meet Increasingly Stringent Phosphorus Limits** *Steve Burgos, Brown and Caldwell*	**Wastewater Treatment in 2062.... What does that look like?** *Lydia Holmes, Carollo Engineers*	**10 Years of Operational Experience on High Rate Clarification (HRC) for Remote Combined Sewer Overflow (CSO) System** *Matt Crow, CDM*	**Real-time Characterization of Aqueous Organic Matrix Using Hybrid, Hyperspectral Optical Measurement** *Sanjai Tripathi, ZAPS Technologies*	**Ammonia Nitrogen Recovery and Biomethane Production from Anaerobic Digestate** *Dennis Burke, EEE Inc.*	**Maxmizing Performance of Wastewater Lagoons** *Heather Hecht, Lemna*	**Durham Plant Tour** 8:00-Noon
8:45 - 9:30	**Spokane RPWRF Low Level P Pilot Studies – Final Performance Outcomes** *Mark Esvelt, Esvelt Engineering*	**Whither Wastewater?** *David Jenkins, David Jenkins Assoc.*	**Combining an Electrical Power Transmission System with Combined Sewer Overflow (CSO) Conveyance and Storage: Strange Marriage?** *Brian Hemphill, HDR*	**Oxidation Ditch Modifications to Increase Capacity and Performance** *John Wilson, Gray & Osborne*	**Heat Extraction from Plant Influent/Effluent: "Pumped-up Heat Pumps"** *Bo Vestergaard-Hansen Brown and Caldwell*	**Optimizing Your Drying Beds Using Geotextile Containers** *Randall Wilcox, WaterSolve LLC*	
9:30 - 10:15	**Evaluation of a Tertiary Membrane Filter (TMF) Demonstration Pilot to Achieve Ultra-Low Effluent Phosphorus Concentrations** *Karen Bill, HDR*	**Is It Sewer or Not?** *Rick Fuller, City of Tacoma*	**Integrating Existing Assets into a New CSO Control System** *Greg Humm, Brown and Caldwell*	**Impact of Waste Biological Solids from Satellite Plants on the Perfomance of Primary Sedimentation Tanks** *Lazaro Eleuterio, HDR*	**Construction of a Food Waste Digestion Facility in Portland Oregon** *John McKinney, Columbia BioGas*	**The Spokane County Regional Water Reclamation Facility Biological Startup** *Terry Dokken, CH2M HILL-OMI*	
10:15 - 10:30	Break						
	Session 19B **Stormwater**					Session 24B **Pretreatment Programs**	
10:30 - 11:15	**Oregon Municipal Stormwater Permits and New Directions** *Angela Wieland, Brown and Caldwell*	**Making a $200 Million Decision in Tough Economic Times** *Craig Anderson Murray, Smith & Associates*	**Using Flow Monitoring to Understand CSO Structure Performance** *Lisa Tamura, HDR*	**Centrate Treatment Using Ultrafiltration and Reverse Osmosis** *Dale Richwine, Richwine Environmental*	**Energy Savings at the City of Edmonds Wastewater Treatment Plant Effluent Pump Station** *Adam Schuyler, BHC Consultants*	**Development of Local Limits for Sulfate Discharged to a Municipal Wastewater Treatment Plant** *Jay Swift, Gray & Osborne*	
11:15 - 12:00	**Funding a Storm Water Program: Utility Rates, Fees and Begging** *Gregory L. Seegmiller, JUB Engineers*	**Characterizing VFA Sources to Optimize Treatment at the Post Point Treatment Plant** *Anne Conklin, Carollo Engineers*	**Use of Spatial Rainfall Variability for CSO Facility Design at Spokane, WA** *Kiana Eller, AECOM*	**Getting to Yes. Collaborative Headworks Design at Durham AWWTF** *Lynne Chicoine, CH2M HILL*	**Energy Recovery Enhances Wastewater Treatment Sustainability** *Jyh-Wei Sun, CDM*	**Fats, Oils and Grease (FOG) Control Programs: Overview and Resources** *Charles Johnstone, City of Everett WA*	
12:00 - 1:00	CEU Forms Turn In						

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Conference Headquarters Hotel

Hilton Vancouver Washington
301 W. 6th Street, Vancouver WA 98660
360.993.4500
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- 100% non-smoking facility
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- Cutoff date for special group rates: August 15
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Additional Accommodations

Red Lion Hotel Vancouver (at the Quay)
100 Columbia Street, Vancouver, WA 98660
360.694.8341
www.redlion.com/vancouver

- On the river – 5 minute walk to the Hilton Vancouver
- Breakfast Buffet, free parking
- Group code is "Pacific Northwest Clean Water Association"
- Cutoff date for group rates: August 19

The Heathman Lodge
7801 Northeast Greenwood Drive, Vancouver, WA 98662
360. 254.3100 877.201.3335
www.heathmanlodge.com

- 15-minute drive to Hilton Vancouver
- Limited shuttle service to the Hilton Vancouver available
- Group code is "PNW Clean Water Association "
- Cutoff date for group rates: August 19

See important lodging details at www.pncwa.org

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Welcome to new members of PNCWA!

The people listed below have become members of PNCWA since our last issue. The list represents both WEF/PNCWA new members and transfers from other Member Associations to PNCWA as well as new PNCWA-only members. Welcome to all of you. Let us know how we can best serve your needs and interests and how you would like to be involved.

Steve Arnst
Susan Baker
Anthony Benavidez, CH2M HILL
Terry Birch, City of Medford
John Bishop, City of Ontario
John Bowman, Lake Haven Utility District
Sumerall Clinton, Pierce County
Mike Clowdus
Kerri Deal
Machelle Dumaine
David Eberle,
BSU Environmental Finance Center
Jason Frei, City of Clarkston
Juan Gallegos, City of Medford
Lloyd George, City of Tacoma
Phillip Gettman, City of Medford
Michael Gieseke
Wayne Gresh, Carollo Engineers
Jared Gunderson, City of Driggs
Wes Ison, City of Clarkston
Doug Jenkins, City of Nampa
Gary Martindale
Michael McCarthy, City of Clarkston
Timothy McClain,
Lake Haven Utility District
Jerry Mellinger, Oak Lodge Sanitary District
Dale Nixon
Matt Pease, Staheli Trenchless Consultants
Dimas Prasetya
Christopher Roth, Pierce County
Barry Sarin, CDM
Daniel Scarpine,
Aquarius Environmental LLC
Leila Sermek, Stantec Consulting Intl Ltd
Marietta Sharp, Washington State ECY
John Simonds, CH2M HILL
Larry Smith, City of Tacoma
Christopher Stoll,
Kennedy/Jenks Consultants
Kristin Van Andel
Chris Waarvick, City of Yakima
Jeff Wall, Slayden Construction Group
Stephany Wei
Cally Whitman
Kurt Wiseman

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Clean Water Association
P.O. Box 1075
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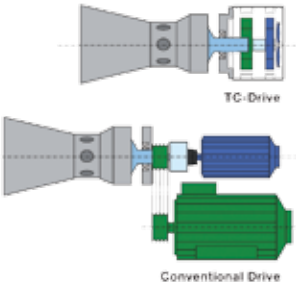

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