

**FEATURE FOCUS:
THREATS TO WATER
QUALITY**

Starts on page 15

**WEF'S NEW
STRATEGIC PLAN**

Page 14

**RECOGNITION OF
EXCELLENCE**

Page 12

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Who are these people and what do they have in common? Find out on page 12.

TABLE OF CONTENTS

WEF SETS NEW STRATEGIC DIRECTION	14	PHARMACEUTICALS AND PERSONAL CARE PRODUCTS IN THE ENVIRONMENT	20
THREATS TO WATER QUALITY INTRODUCTION	15	PHARMACEUTICALS CAUSING CONCERNS	22
WRRF—OPTIMAL METHOD TO REDUCE TO_rCs AND PATHOGENS IN RECLAIMED WATER TREATMENT	17	REFERENCES RE: PUBLIC COMMUNICATIONS ON THREATS TO WATER QUALITY	23
OREGON’S STATEWIDE MUNICIPAL EFFLUENT SURVEY	18	CORVALLIS WWTP GOING FOR REAL-TIME DO COGENERATION UPGRADES PENCIL OUT?	29

DEPARTMENTS

From the President	5	Committee Focus—Public Education	26
Committee Focus—Safety	6	Committee Focus—Collection Systems	31
PNCWA Annual Conference	8	Section News	32
Committee Focus—POM	10	Committee Focus—Water for People	34
From the Office	11	Committee Focus—Membership	34
Committee Focus—Awards	12	Key Volunteers—Contacts	36
Committee Focus—Asset Management	25		

COVER PHOTO: CITY OF MERIDIAN WASTEWATER LABORATORY ANALYSTS CRYSTAL GREEN AND DEANA SMITH PREPARE DILUTIONS FOR JAR TESTING EXPERIMENTS. THE MERIDIAN WASTEWATER LABORATORY CONDUCTS BI-WEEKLY JAR TESTING TO HELP OPTIMIZE POLYMER AND CHEMICAL DOSING FOR THE CITY’S NEW CHEMICAL FEED SYSTEM CURRENTLY UNDER DESIGN AT THE WASTEWATER FACILITY. LABORATORY SUPERVISOR LAURELEI BALL NOTES THAT THE “EFFORTS IN THE MERIDIAN LABORATORY ARE A CRITICAL PIECE OF THE PROCESS WHICH IN TURN ENABLES THE WASTEWATER PLANT TO OPTIMIZE ITS PROCESSES IN EFFORTS TO HELP REACH SIGNIFICANTLY LOWER ANTICIPATED NUTRIENT, METALS, AND TOXICS LIMITS. WE ARE EXCITED FOR A PROPOSED LABORATORY EXPANSION IN THE COMING YEAR WHICH WILL ENABLE US TO MEET NEW LOW LEVEL DETECTION LIMITS, TEST FOR NEW PARAMETERS IN HOUSE, AND ACQUIRE ADVANCED INSTRUMENTATION FOR RUNNING MANDATED NPDES ANALYSES NOW AND IN THE FUTURE.”

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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PNCWA NEWSLETTER

To contribute an article, contact Sheri Wantland, 503.681.5111 or wantlands@cleanwaterservices.org. Submission guidelines are on pg. 11. 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, © 2012 Pacific Northwest Clean Water Association. Change of address inquiries should be directed to the PNCWA office.

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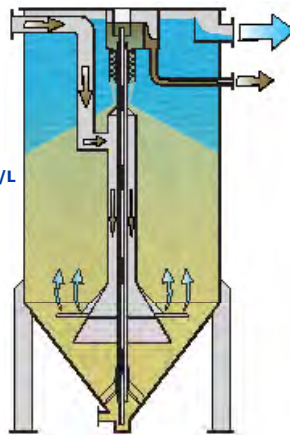
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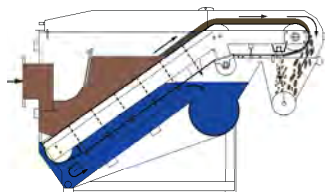
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Company Name	Website	Page
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Lemna Technologies	lemnatechnologies.com	39
Linko Data	linkodatasystems.com	4
Murray, Smith & Associates	msa-ep.com	32
PNCWA Job Board	pncwa.org	6
PNCWA Scholarship	pncwa.org	35
PNCWA Public Comm Camp	pncwa.org	26
Sprayroq, Inc.	sprayroq.com	27
Sprayroq, Inc.	sprayroq.com	31
Tetra Tech	tetrattech.com	39
Treatment Equipment Co.	treatmentequipment.com	16
Treatment Equipment Co.	treatmentequipment.com	28
WEF	watersworthit.org	24

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Sustainability Framework



PNCWA President
Cyndy Bratz
Brown and Caldwell

I was pleasantly surprised a few weeks ago to learn that the EPA had asked the National Research Council (NRC) to develop a Sustainability Framework for the EPA, and that the Framework is now complete. I have long thought that we need the right regulation (not no regulation), and that perhaps it could include a bigger picture view. The NRC recommended that EPA adopt as its sustainability paradigm the "Three Pillars" approach of "social," "environmental," and "economic" dimensions of sustainability as a well-recognized and established model.

This is the "Triple Bottom Line" familiar to many of us, which has proven its effectiveness in the US and globally.

Since the Sustainability Framework recommendations were issued recently, I anticipate that adoption and implementation will take time. Ultimately, this could be a tool to balance

environmental solutions (water quality solutions that do not adversely affect air quality, for instance). The Framework has the potential to mitigate harmful unintended consequences of decisions and to foster more imaginative and creative solutions to pressing problems. These solutions could include pollutant trading, infiltration (as an alternative to surface water discharge) and other alternatives which have been considered somewhat unconventional in the past.

In the recent past, EPA Director Lisa Jackson had described an ambitious list of priorities for EPA, including taking action on climate change, improving air quality, ensuring the safety of chemicals, protecting the nation's waters, and continuing to work for environmental justice. She describes the new Framework as an approach that will incorporate sustainability into the foundations of EPA.

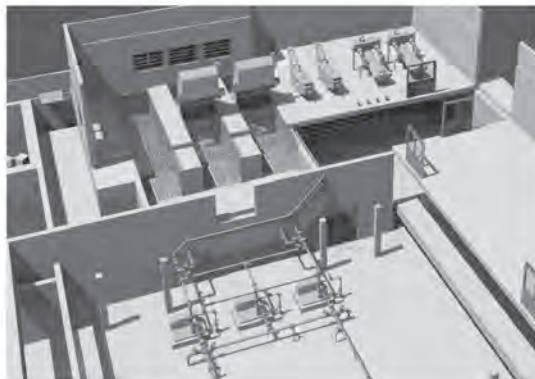
The report describes an intensive process called "sustainability assessment and management" that EPA can use to incorporate sustainability in specifically chosen activities and decisions.

Continued on page 10

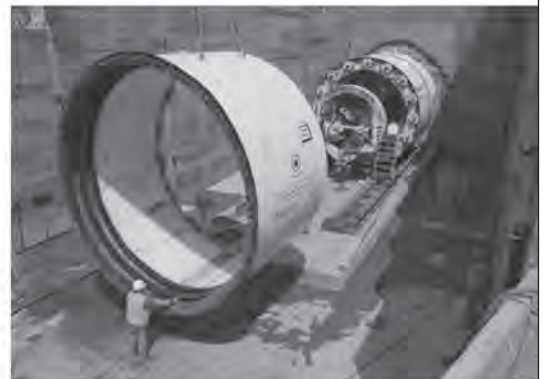
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Costs of workplace accidents and injuries, Part 2

Part 1 of this article was published in the last issue.

By Paul Proctor, Gresham WWTP/Veolia NA

“Every day in America, 12 people go to work and never come home. Every year in America, 3.3 million people suffer a workplace injury from which they may never recover. These are preventable tragedies that disable our workers, devastate our families, and damage our economy.”

—U.S. Secretary of Labor Hilda Solis, April 28, 2011 blog

Before OSHA, 38 workers lost their lives every day on the job. Today, that number is down to 12, but one worker death, one injury, or one illness is one too many. According to OSHA, workplace injuries will cost society \$128 billion in losses this year, which equals one-quarter of each dollar of pre-tax corporate profits. Indirect costs of injuries may be 20 times the direct costs. Indirect costs include: training and compensating replacement workers; repairing damaged property; accident investigation and implementation of corrective action; scheduling delays and lost productivity; administrative expense; low employee morale and increased absenteeism; poor customer and community relations.

A March 2010 Liberty Mutual Insurance company report showed that the most disabling injuries, those involving six or more days away from work, cost American employers more than \$53 Billion a year—over \$1 billion a week—in workers’ compensation costs alone.



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The 10 most frequently cited OSHA violations in FY2010, broadly categorized, were: scaffolding; fall protection; hazard communication; ladders; respiratory protection; control of hazardous energy (lockout/tagout); electrical wiring; powered industrial trucks; electrical systems design, and machines.

Workplace safety is a real bargain when compared with the vast expenses associated with a work-related accident. To protect the health of employees and the company's bottom line, develop and implement a workplace safety policy. Communicate to all employees that worker safety is important, is supported by management, and is valued by the entire organization.

The Voluntary Protection Program (VPP) initiative of 1982 was OSHA's first effort to encourage safety and health management programs and, restructured in 1996, is still in effect. The VPP provides official recognition of excellent programs, assistance to employers, and a cooperative approach among labor, management, and government. VPP recognition requires rigorous

attention to workplace safety by all personnel, and sites are approved based on their performance in meeting standards set forth in their written safety and health program.

Workplace injuries and illnesses are costly in financial and human terms. Each year employers and their insurers pay billions of dollars in workers' compensation benefits—nearly \$500 per covered employee! This is simply unacceptable. There is a direct correlation between investments in SH&E and its subsequent ROI.

Ultimately, leadership must recognize their duty to provide a safe and healthful workplace to those who work for the company or visit the worksite. It is unethical to risk someone's life and health in order to save money. A sound safety and health management program can help companies fulfill their moral obligation.

You may contact Paul Proctor, a project manager at the Gresham WWTP at paul.proctor@veoliawaterna.com.

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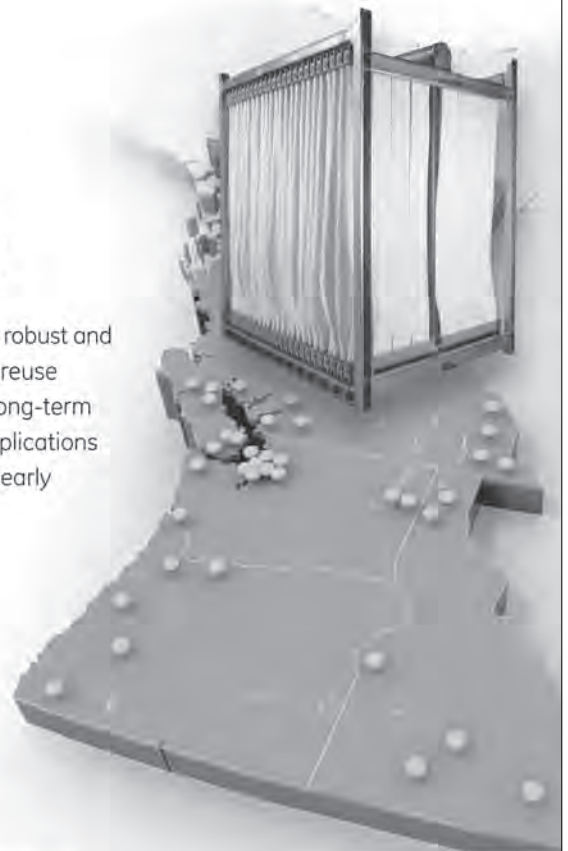
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PNCWA 2012

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The PNCWA2012 Annual Conference will be held at the Boise Centre Oct 21–24, 2012. *Sunset Magazine* named Boise one of the top 10 towns of the future. Urban and outdoorsy. Mountains and museums. Restaurants and rivers. Festivals and fresh air. Many find Boise to be a surprising blend—big enough to have all the comforts of a big city, yet small enough to make it easy to enjoy it all. The Boise Centre is close to the 25+ mile Greenbelt riverfront path (where downtown workers can bike or fly-fish over lunch hour) and to a very vibrant downtown cultural district filled with lively restaurants, boutiques and pubs. PNCWA conference attendees always find ways to enjoy themselves in Boise and decompress after days of highly focused training.

Mike Dettinger, USGS Research Hydrologist and Research Associate in the Climate Research Division of the Scripps Institution of Oceanography, will join us for Opening Session to discuss the topic of Climate Science and anthropogenic vs. natural causes. At press time we are waiting on confirmation of a second speaker who will narrow that discussion down to implications for utilities.

Following Opening Session, the PNCWA2012 technical program will offer the best comprehensive training under one roof in the Pacific Northwest for water/wastewater professionals. PNCWA is dedicated to preserving and enhancing the water quality in the states of Idaho, Oregon and Washington while promoting the

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October 21-24

Boise Centre

Boise, ID

professional development of our members and the technology needed to protect public health and the environment. The annual conference is a large contributor to fulfilling these parts of our mission.

OPERATORS PACKAGE REDEFINED

The Operators Track package will be expanded this year. In the past, this very economical package for operators included choice of a Sunday workshop, any training sessions on Monday including Opening Session, and the Monday evening Manufacturers Reception on the Exhibit Floor. In 2012, this offer has been changed so each operator will have a choice of which day of training sessions to attend. Instead of Monday as the only choice, operators can choose whether they will attend the conference on Monday, Tuesday or Wednesday. The conference committee decided to make this change based on the idea that it might benefit local plants to be able to send people on various days based on the needs back at the plant. Registration for this package (operators only) is just \$100 for both members and nonmembers.

START PREPARING NOW

Go to www.pncwa.org for lodging information. Registration information will be posted on the PNCWA website in mid-May and brochures will be in mailboxes in early June. Make your plans early to join us.

FUTURE CONFERENCE DATES

UPDATE YOUR CALENDARS!

We have changed some of the dates for future conferences—some for better weather and others to better correspond to WEFTEC dates.

2012	Oct 21-24	Boise Centre, Boise ID
2013	Sept 15-18	Riverhouse Convention Center, Bend OR
2014	Oct 26-29	Hilton/Vancouver Convention Center, Vancouver WA
2015	Oct 25-28	Boise Centre, Boise ID
2016	Oct 16-19	Riverhouse Convention Center, Bend OR
2017	Oct 22-25	Hilton/Vancouver Convention Center, Vancouver WA
2018	Oct 21-24	Boise Centre, Boise ID

What Works

By Bill Christie and Ben McConkey

We here at the Aberdeen WWTP have made quite a few major improvements in the past ten years or so and have learned many lessons. You have to use what you get, but not necessarily how it was designed to be used. For instance we installed a rotary screen thickener (RST) to thicken sludge from our gravity thickener before it goes to the anaerobic digester. We ran into many problems with both the sludge pumps and the pipes. What we discovered was that grease would build up in the lines and restrict flow causing increased pressure and a decrease in pump efficiency. We were only able to increase the raw sludge percentage by approximately one to two percent.

One of our operators suggested that we thicken digester sludge instead of raw sludge, and use the warm sludge to clear grease from the lines. We tried it and it worked great—so well, in fact, that never again will we thicken raw sludge prior to feeding it to the digester.

Some of the benefits: 1) We can control the solids percentage in the digester well enough to consider mechanical mixing which will allow an increase of average solids by double at least. 2) We get better performance from our RST by taking sludge that is about two percent and increasing it to around five to six percent. 3) The sludge that is reintroduced in the digester is at temperature and takes less energy to reheat.


We did notice a small decrease in the overall percentage of our cake but not a big impact. We attribute this to using the same polymer for the RST and the Screw Press. Overall, it falls on operators to make the best use of our equipment and to use our knowledge to maximize our plants' performance. After all that's why we make the big bucks!

FROM THE PRESIDENT


Continued from page 5

For example, the agency might decide to apply this process to new rules, programs, and policies, or to complex and important emerging issues such as the impacts of biofuels. EPA may develop a screening process that can guide agency managers in deciding whether a particular activity should undergo this assessment.


I remember the water quality of the Boise River before EPA was formed and discharge permits were implemented. Surface water quality has improved significantly in the last 50 years. I am optimistic that the new Sustainability Framework will be adopted and implemented by EPA, and that the process will help guide us toward smarter, more balanced solutions to our environmental issues.



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Nan Cluss

From the Office

By Nan Cluss, PNCWA Manager

Your PNCWA board members are a group of dedicated volunteers who each believe that giving of their time and effort to PNCWA is, well, worth their time and effort. They do this because they believe in supporting the organization's goals to promote water quality and to help members excel professionally. The board meets monthly—mostly by one-hour conference calls but also in person at meetings four times a year. There will be a call for nominations announcing open board positions in the next issue of the newsletter. Think about it. Talk with a current or past board member about their experience on the board. I'm guessing you'll find out it was an experience they are happy to have volunteered for.

There are two items recently approved by the PNCWA Board that I want to mention. One is that PNCWA has informed WEF that we would like to participate in the WEF Utility Partnership Program. Details will be forthcoming but, in short, this is a program that will allow utilities to pay one annual bill for WEF/PNCWA membership that provides member benefits to a certain number of listed employees and reduced WEF and PNCWA event registration benefits to all employees. Each package includes at least one free membership for a related public official as well. Details of this new WEF/PNCWA opportunity will be released soon.

The other item is that PNCWA is sending a delegate to Washington DC in March for the WEF/AWWA Water Matters Fly-In. In 2011, WEF and AWWA joined together to strengthen the voice of the entire water community on Capitol Hill. Over 150 people attended. With a number of issues the clean water and drinking water communities can take to Congress together—infrastructure investment, security, funding for water research, and more—the Fly-In presented an excellent opportunity to educate newly elected leaders as well as established ones on water issues. It also established a relationship for those leaders (and their staffs) to begin to understand that WEF and AWWA have experts on water quality in each of their states to reach out to when needed. The 2012 Fly-In will be the first that PNCWA participates in. Board member Mike Ollivant will represent PNCWA and seek to understand better how it works and if this seems to be an effort that we as an organization should continue to support. If so, the hope is that next year we would have members from each of our three states attending. Jack Dossier from the WEF member association in Georgia says that if we're not talking to our elected officials about water quality, someone else will. So although this isn't a lobbying event, it is a step to getting our voices heard.



PNCWA Newsletter Submission Guidelines

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

What Do These People Have In Common?

You've heard the saying, "The devil is in the details." Perhaps that is true, but water quality professionals know that there is also an equal and opposite kind of truth, and one that is even more important: "Success is in the details."

Whether it is an individual, a team of individuals, or a facility, success takes a lot of hard work, day after day after day. Making sure a lot of details are handled and accounted for, and making sure new knowledge, techniques and processes get applied, PNCWA members are the consummate water quality professionals.

Don't you think you (and PNCWA) should give them some recognition? Here are a few details on how you, by nominating an individual or a project for a PNCWA award, can make sure they get the recognition they deserve. Please participate. Nominations can be made online at www.pncwa.org/awards or if you need assistance email recognize-success@pncwa.org.

RECOGNIZING INDIVIDUALS

Lab Analyst—do you know an outstanding Lab Analyst whose performance, professionalism, and contributions to the water quality analysis profession is tops? Maybe they've developed innovative sampling techniques or solutions to a treatment, analytical or environmental

problem? How about involvement in community activities or public relations, or plain and simple his or her level of initiative and performance are beyond the call of duty? If you know someone like that you should nominate him or her for the WEF-PNCWA Lab Analysts Excellence Award!

WWTP Operator: Who is the most outstanding Treatment Plant Operator you know? If they are a WEF member and have been demonstrating sustained and ongoing contributions for at least five years to further and improve the field of treatment plant operations, then consider nominating him or her for the William D. Hatfield Award!

Volunteer Service to PNCWA...there are so many individuals who have given so many hours, and made such a difference in what PNCWA has been able to turn around and offer all of its members and the profession as a whole. Who do you know that is always there, waiting to take on that next task, ready to lead? Organizational leadership, committee service, consistent and long standing activities as a member of

PNCWA...those are the earmarks of someone who should be nominated for the Arthur Sidney Bedell Award.

Get the idea?

Here are some more.

Individual Distinguished Achievement Award—recognition as a result of distinguished service rendered in the interest of pollution abatement, and who has contributed fundamentally and practically to the advancement of the industry

Young Professional Award—demonstrated contribution to enhancing the activities of PNCWA, PNCWA Committees, and/or contributions to improvement in knowledge and performance in the water quality field

Lyman Ketcham Award—outstanding contributions in the field of wastewater collection system maintenance and operation. It is the equivalent of the Hatfield Award, except for collections systems personnel

Operator of the Year and Collections Operator of the Year (OYA/COYA)—

Sections in Idaho, Oregon and Washington may nominate to their Region an outstanding Operator and a Collections System Operator to be recognized by PNCWA. The Region selects the winner. The award represents outstanding job performance of regular duties, and individual or collective accomplishments of an experimental, developmental or innovative nature. Must be a section member. Nomination deadlines vary depending on state.

RECOGNITION FOR MUNICIPALITIES OR FACILITIES

Municipal Water Protection Award—control or prevention of water pollution through building public understanding and cooperation and then following through with construction of pollution abatement facilities and/or reduction of pollutant discharges

Sustainability Award—projects that showcase sustainable design elements such as renewable energy generation, greenhouse gas emission reductions, transformation of waste to products, habitat enhancement, and much more!

Excellence in Water Reuse Award—to recognize recycled water programs that are moving the concept of water reuse forward in the Pacific Northwest region

Safety Awards: Professionals know that the very definition of getting the job done is getting it done safely. If clean water is the resource on which our stakeholders all depend (it is), and for which we all work in support of (we do), it is people and organizations working cooperatively and safely in the service of water quality that PNCWA is all about.

George W. Burke, Jr. Award—encourages active and effective safety programs in municipal and industrial wastewater



Top row past award winners, left to right

Melissa Demsky and Tom Burns, Veolia Water NA, accept the George W. Burke Award for The City of Vancouver, 2007;

Joe Whisler, City of Lincoln, Oregon, WWTP Operator of the Year, 2004 (In 2005 he went on to receive the William D. Hatfield Award);

Lorisa Watkins, West Sound Utility District, Bremerton, WA, Lab Analyst Excellence Award, 2009;

Jack Bennion, CH2M HILL OMI (City of Twin Falls), Individual Distinguished Achievement Award, 2010

Bottom row past award winners, left to right

Jeff Massie, accepting the Municipal Water Protection Award for City of Marysville, WA;

Kristi Nelson, HDR, Young Professional of the Year, 2009;

Doug Pettinger, accepting the Excellence in Water Reuse Award for Glanbia Foods (Gooding, ID), 2006;

Kim Ashmore, City of Centralia, Lyman Ketcham Award, 2009;

Victoria Boettcher, Clackamas County WES, Lab Analyst Excellence Award, 2007

facilities. The documented and illustrated safety program and safety record of the facility for the preceding calendar year are the primary criteria for the award.

Safety Awards—no lost time accidents divisional awards are given out to facilities with no lost time accidents of 5, 10, 15, 20, etc. years, and certificates in recognition of one year zero lost time are also presented. Applications should be based on statistics from the previous calendar year.

There are over 1,500 PNCWA members. Help us find those individuals and projects we can honor at PNCWA2012. While the nomination process is confidential, PNCWA will announce the award winners prior to the conference and exhibition. Everyone will have plenty of advance notice so they will know to come to celebrate the success of friends, colleagues, and community.

NOMINATIONS

for awards may be made by members through an online form through **June 15** and are online at www.pncwa.org/awards.

** Only WEF and PNCWA members receive the awards for individuals (with the exception of OYA/COYA). If you know someone who you think deserves this kind of recognition, but they aren't a member, then we want them as a member! Invite that person to become a member or better yet sponsor them to become a member and to come to PNCWA2012!*

Mission

Provide bold leadership, champion innovation, connect water professionals, and leverage knowledge to support clean and safe water worldwide

Vision

WEF - essential to water professionals around the world

Guiding Principles

Leadership *\inspire and champion responsible water policies and practices*

Stewardship *\serve the public and the environment through promotion of clean and safe water worldwide*

Collaboration *\work across the water sector to achieve results*

Integrity *\uphold the highest standards of ethics and excellence*

Passion *\pursue our mission with unwavering commitment to clean and safe water for all*

Critical Objectives

Drive Innovation in the Water Sector

Enrich the Expertise of Global Water Professionals

Increase Awareness of the Value of Water

Drive Innovation in the Water Sector

Provide bold leadership for water sector efforts to help communities address water challenges and benefit from the value of their renewable resources

- ✚ Champion sector-wide initiatives to improve water services through innovative practices.
- ✚ Facilitate the identification and implementation of breakthrough concepts to support resource recovery
- ✚ Apply holistic water management approaches to infrastructure development and renewal.
- ✚ Inspire and support a movement toward an energy-positive water sector.
- ✚ Link leading edge research to the practical implementation of innovative technologies and practices

Enrich the Expertise of Global Water Professionals

Advance WEF's platform for knowledge exchange among global water professionals

- ✚ Position WEFTEC as the principal global water event.
- ✚ Deliver enhanced and relevant, cutting-edge education and training to a broad spectrum of members and water professionals.
- ✚ Expand WEF's global knowledge platform through a broadened membership.
- ✚ Implement integrated and innovative content delivery channels.
- ✚ Connect water professionals around the world to the value of WEF membership, through enhanced use of technology.

Increase Awareness of the Value of Water

Expand WEF's commitment to public advocacy for clean water and public health

Inspire respect for water and water professionals

- ✚ Promote and participate in global water policy discussions, leveraging WEF's unique position as an unbiased knowledge source.
- ✚ Engage WEF members and Member Associations in advocacy programs to support and enhance the impact of their efforts.
- ✚ Deliver timely and reliable information on legislative and regulatory developments to WEF members.
- ✚ Amplify WEF's voice in the global water sector and with the public.
- ✚ Instill the value of water and underscore the importance of the water profession.
- ✚ Advance WEF's commitment to holistic and innovative approaches to solving water challenges.

WEF Sets New Strategic Direction

Water Environment Federation (WEF) President Matt Bond reported the WEF Board of Trustees and staff worked throughout 2011 to evaluate all facets of WEF; give every WEF member the opportunity to provide input through surveys, focus groups, and interviews; and develop a future direction that responds to the needs of the water sector and WEF members. Our planning was extremely successful due to an enthusiastic, willing, and able Board of Trustees; excellent WEF staff leadership, especially our new Executive Director Jeff Eger; and great data from our consultant-assisted process. The result of our efforts is a new, bold strategic direction for WEF.

Our vision: **WEF—essential to water professionals around the world.** This captures our aspiration to be an indispensable and vital part of your career.

Our mission statement: **WEF's Mission—to provide bold leadership, champion innovation, connect water professionals, and leverage knowledge to support clean and safe water worldwide.** This illustrates how our strengths will be applied to our commitment to protect public health.

Our critical objectives: **Drive innovation in the water sector, enrich the expertise of global water professionals, and increase awareness of the value of water.** This will focus WEF on achieving the vision and mission.

Read the Strategic Plan (left) and send your comments or questions to Matt Bond at WEFPresident@wef.org

Threats to Water Quality Introduction



By Mark Poling, Clean Water Services and PNCWA President Elect

One thing the last 25 years has shown us, thanks to continued improvements in analytical chemistry, is that everything is everywhere. It's just a matter of concentration. The challenge we face as water quality professionals is not to resist or fight these new developments, but to embrace them and intelligently discern what to do with this new information. In the following articles you will see that many efforts so far have focused on identification. Some things we know already—keeping pharmaceuticals out of the waste stream is a much better approach than trying to remove them as micro contaminants. In other areas, our challenge will be to help educate the public on wise use of chemicals such as pesticides and cleaners as well as the promotion of safe alternatives. As an industry we must continue to investigate and understand the sources of these contaminants of emerging concern as well as their implications for people and the environment.

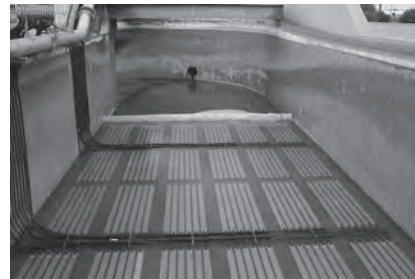
We thank the contributors for their articles about Oregon's statewide survey for toxic pollutants in municipal wastewater effluent, a study on wastewater treatment removal of pharmaceuticals and personal care products by EPA and Ecology, a WaterReuse Research Foundation study on reducing toxic organics and pathogens in reclaimed water, and source control such as drug takeback programs.

You may contact Mark Poling at polingm@cleanwaterservices.org.

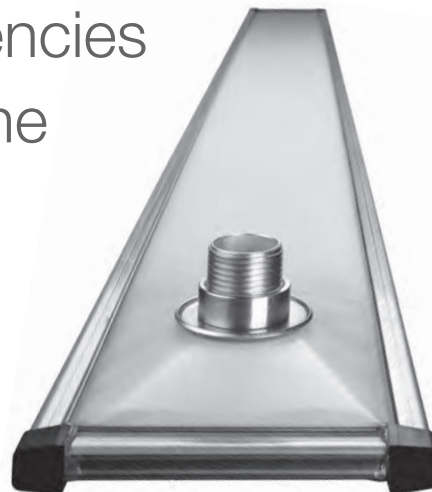
AEROSTRIP DIFFUSERS

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Aberdeen	2003	La Center	2009
Alderwood	2009	Port Orchard	2003
Anacortes	2011	Port of Sunnyside	2004
Arlington	2010	Richland	2005
Blaine	2009	Spokane	2010
Bremerton	2001	Tenino	2009
Gig Harbor	2008	Washington Beef	2010
Grants Pass	2003	Winlock	2007



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WRRF—Optimal Method to Reduce TOrcs and Pathogens in Reclaimed Water Treatment

By Andrew Salveson, PE, Jeff Bandy, PhD, Keith Bourgeois, PhD, PE; Carollo Engineers

The WaterReuse Research Foundation (WRRF) Project 02-009 evaluated a wide range of conventional and emerging technologies for their ability to cost-effectively reduce various hormones, pharmaceuticals, and pathogens in secondary effluent. The project was funded by the WRRF, the U.S. Bureau of Reclamation, and the Southwest Florida Water Management District. Substantial financial and in-kind support was also provided by utilities and manufacturers. The team included researchers from Duke University, the University of Colorado at Boulder, the U.S. Department of Agriculture, and Carollo.

Advanced oxidation processes (AOP) were evaluated based on disinfection capacity and ability to oxidize organic pollutants. Ozone (O₃) and UV with and without H₂O₂ provided “fair” to “excellent” disinfection of a range of

pathogens (Table 1). The TiO₂/UV process is also expected to perform equally well, but at a higher cost. The other technologies tested had one or more pathogen groups in which performance was deficient.

The major findings of this study were as follows:

- Free chlorine provided substantial virus and bacteria destruction and had mixed results for destruction of chemical constituents. Chloramination provided substantial destruction of bacteria, but not virus and chemical constituents.
- Peracetic acid (PAA) can be a substitute for chlorine if coliform bacteria are the primary target, though PAA performance for other targets was limited.
- Ultrafiltration (UF) and microfiltration (MF) are proven barriers to most of the microorganisms tested in this study.
- UV and O₃ are robust disinfectants, with particularly high effectiveness against parasitic protozoa for UV and viruses for O₃. Adding H₂O₂ had no consistent impact on disinfection.
- Ozonation mitigates the overall estrogenic effect of EDCs, but reacts slowly with NDMA, TCEP, and other compounds with electron-withdrawing characteristics. Addition of H₂O₂ improves performance.
- UV photolysis is an especially important component of UV/H₂O₂ when target compounds are photoliable (e.g., NDMA and triclosan). Where direct photodegradation is not effective, hydroxyl radicals can destroy target compounds.

You may contact Andy Salveson at asalveson@carollo.com.

Table 1. Qualitative Review of Disinfection/Oxidation Technologies for the Removal of TOrcs and Pathogens^a

Technology	Bacteria	Viruses	Protozoa	Chemical Constituents and TOrcs
UV	++	+	++	–
O ₃	++	++	–	++
UV/H ₂ O ₂ AOP	++	++	++	++
O ₃ /H ₂ O ₂ AOP	++	++	–	++
Free Chlorine	+	++	--	+/-
NH ₂ Cl	+/-	–	--	--
TiO ₂ /UV	++	+	untested	+
PAA	+	--	--	–

Key: ++ excellent; + very good; +/- good; – fair; -- poor.

^a Performance is for typical reclaimed water dose values tested for this project.

Oregon's statewide municipal effluent survey

By Lori Pillsbury, Oregon Department of Environmental Quality

As a result of public concern over toxic pollutants in Oregon's environment, the Oregon Legislature passed Senate Bill 737 in 2007. This bill required the Oregon Department of Environmental Quality (ODEQ) to identify persistent pollutants, assess their presence in Oregon's wastewater treatment plant effluent and explore ways to reduce pollutants detected above certain levels in effluent through pollutant reduction plans.

To begin this undertaking, ODEQ convened a scientific workgroup to address the questions posed by the legislation. The result of this workgroup's effort was development of the Priority Persistent Pollutant List or

the P3 list. The 118 pollutants on this list represent several chemical classes including combustion by-products, flame retardants, legacy chlorinated pesticides, metals, pharmaceuticals and ingredients in personal care products. All the pollutants on the list were required to meet the definition of toxic and either persistent or bioaccumulative, as set forth in the statute. This definition excluded toxic chemicals that did not meet the chemical properties of persistence or bioaccumulation, for example, some currently used pesticides and pharmaceuticals.

In order to assess the presence of these pollutants, ODEQ worked closely with the 52 large municipal wastewater treatment facilities in the state that have dry weather design flow greater than one million gallons per day. These facilities are located throughout the state of Oregon and represent a range of treatment technologies, population sizes, effluent flow rates, and wastewater inputs. Personnel from the facilities carried out two sampling events in 2010: one in summer and one in fall. ODEQ required two sampling events in an attempt to capture seasonal variations due to hydrologic conditions, as well as seasonal use patterns.

Because no commercial laboratory had the capacity to analyze wastewater for the range of chemicals on the P3 list, the ODEQ laboratory in Hillsboro, OR, analyzed the samples using both existing and newly developed methods. In addition to analysis for the P3 listed chemicals, the analytical instruments also included analysis for additional chemicals that are routinely

included in ODEQ's Toxics Monitoring Program. In total, 406 different chemicals were investigated using 15 different analytical methods and six different instrumental technologies.

Overall, the laboratory detected 114 of the 406 chemicals in at least one sample (28%). Of the 114 chemicals detected, 33 of these are on the P3 list. Five communities were required to develop reduction plans for chemicals (one at each facility) on the P3 list that were detected in their effluent above a threshold level set by the ODEQ's Environmental Quality Commission. No detections were measured for two groups of chemicals, polychlorinated naphthalenes and dioxins/furans.

The most frequently detected classes of chemicals were fecal and plant sterols, pharmaceuticals, and metals. Fecal sterols (cholesterol and coprostanol) are natural by-products of human digestion and thus were detected at every facility. Plant sterols are also potentially the result of human digestion but may also occur as a result of certain industrial activities. The detected pharmaceuticals are consistent with other studies of wastewater effluent and include an anti-histamine, an anti-convulsant, and analgesics among others.

Flame retardants, polybrominated diphenyl ethers (PBDEs), are another class of chemicals that were detected. At least one flame retardant occurred in all but one facility's effluent. Similar to PCBs, these chemicals persist in the environment and bio-accumulate in the food chain. Their occurrence has

IMAGE USED UNDER CREATIVE COMMONS FROM ARTESCIENZA



John Day River, Oregon

been documented by ODEQ and others in Oregon and worldwide in a variety of media including fish and osprey eggs. Despite their widespread occurrence, the levels of flame retardants measured in effluent were below the threshold levels.

Unique to this study, current use pesticides were commonly found in the effluent samples. These included residential and commercial products. Their presence in the effluent samples may be from a variety of sources including consumer use, infiltration into the conveyance system, as well as use at the wastewater facility or in industrial inputs to the facility. This class of compounds showed some seasonal variations.

Overall, this represents a large dataset and the efforts of many people. It is a unique survey of wastewater effluent in Oregon. However, it is limited in that it does not include potential contributions from other point sources or non-point sources. It is not a comprehensive look at the sources of pollutants to Oregon's environment, but it does provide valuable information about one part of the story.

Existing large municipalities' requirements under Senate Bill 737 are satisfied relative to monitoring and development of a subsequent plan. ODEQ is currently looking into the next steps of the program, particularly when and if it will require municipalities to conduct future effluent screening. In the future ODEQ expects to have discussions with municipalities regarding any subsequent work related to persistent pollutants.



ODEQ's ongoing Toxics Monitoring Program continues to investigate the occurrence of a wide range of toxic chemicals in Oregon's surface water, fish and sediments across the state.

Senate Bill 737 information is at <http://www.deq.state.or.us/wq/SB737/index.htm>

ODEQ's Toxics Monitoring Program <http://www.deq.state.or.us/lab/wqm/toxics.htm>

You may contact Lori Pillsbury at pillsbury.lori@deq.state.or.us. Lori is the Point Source Projects Coordinator, Laboratory & Environmental Assessment Division, Oregon DEQ.

Pharmaceuticals and Personal Care Products in the Environment

By Melanie Redding, L.H.G., Washington Department of Ecology



Pharmaceuticals and personal care products (PPCPs) are anthropogenic contaminants that are widely present in the environment due to the universal, frequent, and cumulative usage by multitudes of individuals. Large quantities of pharmaceuticals are used to treat and cure diseases and other medical conditions. PPCPs enter the environment primarily as they pass-through the body or are improperly disposed in toilets, sinks and the trash. Generally, conventional wastewater treatment plants do not effectively remove PPCPs. Low concentrations of PPCPs have been detected in surface water, groundwater, marine waters, soils, sediments, and drinking water.

Because many of these chemicals are endocrine disrupting compounds, carcinogens, or toxic chemicals, there is concern about the effects of these chemicals at low concentrations in the environment. Scientists and policymakers do not know the full effects on wildlife and human health, as it is unclear how the unintended exposure to low concentrations of multiple chemicals may affect an organism or an individual.

PPCPs include prescription and over-the-counter drugs, diagnostic agents, nutraceuticals and excipients made for humans and animals (veterinary, livestock and aquaculture). Personal care products are a wide variety of products that individuals use every day to take care of themselves: shampoo, deodorant, toothpaste, lotions, make-up, after-shave lotions, hair dyes, anti-dandruff shampoos, teeth whiteners, sunless tanning products, colognes and fragrances. Of more than 10,500 chemicals used in personal care products, only 11% have been tested for safety in the United States.

PPCPs enter the environment primarily by being washed off the body, excreted by humans, and disposed down the drain or in the trash, and also from livestock, agriculture, pets, and aquaculture. Humans typically excrete 50% to 90% of the active ingredients in ingested drugs as unmetabolized pharmaceuticals or metabolites. It is estimated that consumers dispose of 25 to 33% of pharmaceuticals because they are unused or expired, which end up in a landfill or municipal wastewater treatment facility, on-site sewage system or reclaimed water treatment facility. PPCPs then enter the environment as treated discharge or landfill leachate.

The fate of PPCPs in the environment is complex. Thousands of chemicals are used in the manufacture of a wide variety of PPCPs, not all are similar chemically, and they react differently to treatment processes. The individual chemical structure dictates whether a PPCP will biodegrade, volatilize, degrade into metabolites, or whether it will concentrate and persist in the environment. Numerous environmental studies document the presence of PPCPs in surface water, groundwater, and sediments. The literature also documents impacts to wildlife from the direct exposure to PPCPs, including impacts to vultures, fish, and alligators.

The treatability of PPCPs depends upon the physicochemical properties of each compound of interest and the specific set of treatment processes. Some treatment processes efficiently remove some chemicals, but are ineffective at treating others. Others merely remove the chemical from one media and transfer it to another without destroying it, such as nonylphenol that settles out of water but is partitioned into sludge that if applied to land is available for transport to surface or groundwater. Typical treatment processes include adsorption, filtration, volatilization, photodegradation, biodegradation, chemical alteration, and plant or animal utilization. Some effectively reduce some pharmaceuticals down to very low levels, while other pharmaceuticals remain resilient. No single treatment process effectively removes 100% of the PPCPs.

ECOLOGY/EPA STUDY ON WASTEWATER TREATMENT REMOVAL OF PPCPS

In 2008, Washington Department of Ecology and the US Environmental Protection Agency conducted a study to characterize PPCPs at five municipal wastewater treatment plants. The goal was to look at a range of treatment processes and their effect on PPCP removal. This study

The fate of PPCPs in the environment is complex. Thousands of chemicals are used in the manufacture of a wide variety of PPCPs, not all are similar chemically, and they react differently to treatment processes.

compared untreated wastewater, treated wastewater, reclaimed water, and biosolids.

The study found PPCPs in all samples in concentrations comparable to other studies. Overall, conventional secondary treatment reduced 21% of the 172 organic compounds to below detection levels. Advanced nutrient removal and filtration technologies reduced the number of compounds detected by 53%. A total of 20% of the 172 compounds were found only in the biosolids, suggesting that some PPCPs can concentrate in solids. None of the wastewater treatment technologies removed all of the compounds. These resilient compounds include carbamazepine, fluoxetine, and thiabendazole. The results of this study indicate that a higher level of wastewater treatment with nutrient removal may also be successful in reducing PPCPs.

For safe disposal of PPCPs, do not flush leftover, unwanted or expired drugs. Instead, take them to a pharmacy take-back program. If a take-back program is not available, remove medicines from their original containers and mix them with an undesirable substance such as kitty litter or coffee grounds. Place this mixture in an impermeable container and put it in the trash. Consumers can find information about Washington's drug take-back program at:

<http://www.medicinereturn.com/>

RESOURCES:

Pharmaceuticals and Personal Care Products in Municipal Wastewater and Their Removal by Nutrient Treatment Technologies <http://www.ecy.wa.gov/biblio/1003004.html>

“Results of a Screening Analysis for Pharmaceuticals in Wastewater Treatment Plant Effluents, Wells, and Creeks in the Sequim-Dungeness Area”

<http://www.ecy.wa.gov/biblio/0403051.html>

Study Underway: Analyzing Pharmaceuticals and Personal Care Products in Effluent and Groundwater at Three Reclaimed Water Facilities.

Quality Assurance Project Plan: Analyzing Pharmaceuticals and Personal Care Products in Effluent and Groundwater at Three Reclaimed Water Facilities
<http://www.ecy.wa.gov/pubs/1103103.pdf>

Quantification of pharmaceuticals, personal care products (PPCPs), and perfluorinated chemicals (PFCs) in the marine sediments of Puget Sound (Washington, USA).

<http://www.ecy.wa.gov/biblio/0903121addendum1.html>

<http://www.ecy.wa.gov/pubs/1103051.pdf>

You may contact Melanie Redding at mkim461@ecy.wa.gov.



Pharmaceuticals Causing Concerns

By Will Perry, Public Health/Seattle and King County



USGS scientists use a variety of microbiological and chemical methods to evaluate the microbiological quality of water. In this photo, a USGS scientist prepares to analyze bacterial DNA extracted from water samples. Photo Courtesy U.S. Geological Survey.

On the national stage and around the region, pharmaceuticals in the environment have been getting increasing buzz over the last decade. The landmark study that sparked the issue, done by the U.S. Geological Survey, found that more than 80 percent of 139 streams tested in 30 states were contaminated with organic wastewater contaminants, including pharmaceuticals. Although found at low-levels, typically down in the parts per billion range, studies in the lab and the field are finding that these pharmaceuticals can be linked to physiological and behavioral effects in aquatic organisms.

Prescription and over-the-counter drugs enter our environment in two ways: 1. Excretion from our bodies: Humans and animals pass drugs or drug metabolites through their bodies and then these chemicals pass through septic systems or wastewater treatment plants. 2. Direct disposal to sewers or trash: As much as a third of all medicines sold are never taken.

our environment from each of these two pathways. While new technologies, such as membrane reactors, are being developed to remove some of these contaminants, no one technology will remove them all, and it would take decades and billions of dollars to upgrade the nation's wastewater plants with these new technologies. Source reduction programs to keep waste pharmaceuticals out of the wastewater system are an economical approach that can be implemented now.

In addition to the environmental concerns, pharmaceuticals are now associated with an alarming surge of human tragedies. In many states, Washington included, drug overdoses are now the leading cause of injury death, and the drugs involved are often synthetic opiates such as Vicodin and Oxycontin. Addiction and abuse is increasingly associated with prescription drugs—they're easy to obtain and many people, particularly teens, think that legal drugs are safer than illegal. Accidental poisonings have also sky-

The landmark study that sparked the issue, done by the U.S. Geological Survey, found that more than 80 percent of 139 streams tested in 30 states were contaminated with organic wastewater contaminants, including pharmaceuticals.

These medicines can enter the environment when flushed down toilets or sinks because they are not effectively removed or degraded by septic systems or wastewater treatment processes. Medicines thrown in the trash retain their biological and chemical activity, and may eventually end up in the environment. In areas with large amounts of rainfall, leachate from landfills is collected in liners and pumped to wastewater treatment plants, which cannot effectively remove all medicines. Numerous studies have detected pharmaceuticals in wastewater plant effluent and biosolids.

No one knows exactly how much of the prescription and over-the-counter medicines enter

rocketed, and, again, pharmaceuticals are often involved.

These environmental and public health concerns have spurred many communities to set up pharmaceutical take back programs. Some European countries have been doing this for decades and a comprehensive program has been operating up in British Columbia for about 15 years. Many of these return sites are in pharmacies, the location that consumers prefer because of the convenience. However, pharmacies can't legally accept controlled substances, those drugs regulated by the Drug Enforcement Administration due to their potential for abuse and addiction. Law enforcement agencies can

legally accept those drugs, and many have started programs to accept unwanted medicines from their communities. Typically, collected medicines are stored and transported securely, and destroyed by high temperature incineration.

Though the number of take back sites continues to grow, it's not a case of "problem solved." Current programs lack reliable funding and the volume of collected medicines keeps growing. This has prompted calls for drug producers to fund medicine collection program or the "product stewardship" approach, as seen in Canada and several other countries around the globe. Legislation to establish industry-funded state programs has been attempted in several states, including Washington and Oregon, but opposition from the powerful pharmaceutical lobby has stymied those efforts to date.

RESOURCES

In Washington the Take Back Your Meds Coalition works to establish a statewide medicine return program. Their website at <http://www.takebackyourmeds.org/> includes a locator to help

find medicine return sites. The "Resources" page includes a useful overview- "Pharmaceuticals in the Environment."

The Oregon Association of Clean Water Agencies posts the location of return sites in that state at <http://www.oracwa.org/news.php?NewsID=713>. OACWA led a statewide stakeholder process to address the issue - that group's summary report is available at http://www.oracwa.org/downloads/drugtakeback-rpt_0907.pdf.

The Idaho Office of Drug Policy has a website with advice on setting up a community medicine take back event - http://www.oracwa.org/downloads/drugtakeback-rpt_0907.pdf.

REFERENCES

1. Kolpin, D.W., et al., 2002, Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000, *Environ. Sci. Technol.* 36:1202-1211.

Will Perry is a health and environmental investigator for Seattle and King County Public Health. You may contact him at william.perry@kingcounty.gov.

FOR INFORMATION ON COMMUNICATING ABOUT SOME OF THESE THREATS TO WATER QUALITY:

Talking Substance About Detection... or Naming the Substances We Detect?

By Emily Callaway and Linda Macpherson with science communicator and author Jenifer Simpson

Available online at www.pncwa.org in the Spring 2010 PNCWA Newsletter Water Reuse issue

WERF REPORT:

Communication Principles and Practices, Public Perception, and Message Effectiveness

Related to Human and Environmental Health Effects with a Focus on Trace Organic Compounds

Principal Investigators:

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Edward G. Means III
Malcolm Pirnie, Inc.

Project Team:

Jozee Adamson, *Decision Research*
Elisabeth L. Hawley, *Malcolm Pirnie Inc.*
Linda Macpherson, *CH2M HILL*
Paul Slovic, *Decision Research*

Visit www.werf.org and click on Search Research Publications & Tools. PDFs of the Executive Summary and of the Final Report are available at no cost. Refer to: Stock No. CEC2C08

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The Water Environment Federation is committed to spreading the word about the importance and value of water and the work you do every day.

You are vital to this effort, and we appreciate the feedback you provided to help us develop the campaign. Stay tuned to www.WatersWorthIt.org for exciting things to come and to learn more about how you can be a voice for water.

Tell a friend, tell a neighbor, tell the world what water's worth to you.

Planning and Scheduling Basics

By Marc W. Yarlott, PE, Chair of PNCWA Asset Management Committee

Before starting my career with Veolia Water, I was an assistant project manager on two large water/wastewater construction projects where my focus was to bring together manpower, tools/machines, and materials to construct the facilities. After transitioning to facilities maintenance, I realized the focus is similar with the main difference being the size of the specific tasks. For several years I struggled to convince staff that the strategies we used to plan and schedule work in construction would also work in facilities maintenance.

Recently, I had the good fortune to attend “Doc” Palmer’s (<http://www.palmerplanning.com/>) planning and scheduling training at a Veolia project. He brought together all the good practices I’d learned in the construction industry with some very simple applications to the facility maintenance discipline. Doc spent 30 plus years working in a unionized municipal power generation facility and developed a no-nonsense approach to the basics of planning and scheduling that can be done on paper or with a computerized maintenance management system.

The business case for larger facilities is very simple. One planner can provide planning services for 30 maintenance technicians that can result in the effectiveness of 47 maintenance technicians. Yes, you read that right—one planner can effectively add 17 technicians. Doc has worked with many other organizations since publishing his book, *Maintenance Planning*

and *Scheduling Handbook* in 1999 and confirmed these results across a variety of municipal and private organizations.

Each planned maintenance activity should have a job plan or task description with the following elements: list of possible parts, sequence of estimated steps, craft or skills, and hours required. This may sound difficult, but Doc demonstrated how to write this kind of plan in five minutes. The key is to save the plan and then improve it based on feedback from the technicians who complete the work.

Doc found that equipment in need of repair has a 50% chance of needing additional repairs within one year and an 80% chance of needing repairs within five years. The saved and improved job plans will produce further savings and efficiencies as typical repairs become well-documented and the “tricks” are written down for the next person assigned to the task. This improved effectiveness has allowed Doc’s maintenance teams to in-source projects previously given to contractors, which has significantly reduced operating, maintenance, and capital costs at his utility.

Once the crafts and hours needed are identified, it’s easy to schedule the work. Doc provides a simple paper worksheet to determine how many staff hours are available for the week and then make assignments so that 100% of their time could be dedicated to work orders. Emergencies are sure to come up, but

the team needs to stay focused on the designated work. In Doc’s experience, companies that implement this strategy work through their backlog in several weeks and move on to improving maintenance strategies with Reliability Centered Maintenance (RCM) or some other advanced approach.

I highly recommend a quick evaluation of your maintenance team using a few simple Key Performance Indicators (KPIs):

1. Track backlog, even by Work Order (WO) count, to determine if it is growing or decreasing.
2. Compare the time to complete a WO against its priority to determine if the most important items are done faster than non-priority work.
3. Evaluate how many “emergency” WOs are completed each week.

If you have an increasing backlog that you never get to, or that all WO priorities are completed in about the same amount of time due to “emergency” work, you probably need Doc’s help. Doc presents his training at various venues through the year, or you can find the information in his *Maintenance Planning and Scheduling Handbook* available from Amazon.

Marc Yarlott is the AGAM Project Manager - Technical Direction Group (TDG) for Veolia Water North America in Redmond, OR. You may contact Marc at marc.yarlott@veoliawaterna.com.



Public Communications Camp:

Tools to engage, motivate and reassure your community

April 12, 2012

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8:30-8:45 Welcome

**8:45-9:45
How to Talk Sustainability**

Leslie Carlson, Carlson Communications

How do we move people from belief and opinion to action? For the past 20 years, statistics have shown that fewer and fewer Americans rank climate as an important issue. Come hear about the latest research in what works (and what doesn't) when talking about climate and sustainable behavior.

**9:45-10:30
School-based outreach—our youngest stakeholders**

Lois Cohen, Lois D. Cohen Associates

Hear about a time-tested way of generating great media coverage for your projects and involving segments of the community that might not have otherwise been engaged. Learn how the School-based Outreach Program works as a powerful strategic tool—both for high-impact and low-impact projects.

10:30-10:45 Break

**10:45-11:30
Stormwater Education: Creating a program that works**

Megan Hanson, City of Portland

Find out how students create and treat wastewater in their classroom, re-design a model neighborhood using green stormwater infrastructure, brainstorm CSO solutions, and hit the streets—and roof tops—to tour Portland's green stormwater facilities. Also find out about Futures Working for Clean Rivers, a new environmental career education program.

**11:30-12:15
It's a Bird, it's a Plane, it's a...Meeting?**

Tacy Steele, City of Hillsboro

Clark Kent vs. Superman. One dresses and acts in a way that is more compelling than the other. How about applying the same concept to mandatory public meetings? Hillsboro Water has been transforming meetings into more attractive functions for a couple of years now; and though it requires more work than a quick trip to a phone booth, staff, elected officials and even the media agree that the results have been worth the effort.

12:15-12:45 Lunch

**12:45-1:30
Celebrate your successes and get help for your glitches**

Melissa Sandoz, Columbia Slough Watershed Council

Wondering how to get more community members involved with your outreach? Learn from others and share resources on events, websites, promotion, sponsors, and partners. Your needs will drive this discussion, which could include: free email marketing tools, using social media to create connections, events that people jump to attend, cultivating partnerships, and free website development programs.

**1:30-2:15
Using TV personalities to tell your story: "Do the Right Thing" media campaign**

Bruce Sussman, Koin Local 6-TV

Hear about the "Do the Right Thing" multi-year campaign designed to influence viewers' behaviors and attitudes regarding watershed health. Since campaign inception in September 2008, over 1,200 messages have run on the Portland metro's Koin Local 6 in local news, entertainment programs and CBS prime time programs including 60 Minutes, CSI and Survivor.

**2:15-3:00
Building a water resources outreach program from the ground up**

Heather Slocum and Kim Kagelaris, City of Albany

How do you meet the water resources (stormwater, water conservation, wetlands, riparian planting, etc.) outreach challenge? Learn how to start with some basic steps to tailor locally appropriate strategies to your audiences, both internal (staff) and external (citizens). Find out how the City of Albany has directed limited resources to raise awareness of water quality and conservation opportunities.

3:00-3:15 Break

**3:15-4:15
'Serious Play': Understanding and Involvement Using Building Toys**

Martha Bean, RESOLVE

Learn how how pint-size building materials (think Legos®, Tinker-toys®, K'nex® and PlayDough®) are 'play things' that can be extraordinarily useful in the serious business of involving stakeholders in complex public decision making. Learn how scientists, engineers and technical professionals can be highly effective communicators when using techniques that draw upon their own experience and "culture".

4:15-4:30 Wrap Up

To register, please visit the PNCWA website at pncwa.org

Corvallis WWTP Going for Real-time

By Brad Musick, Wastewater Solutions, Inc.



The Corvallis Wastewater Treatment Plant embraces the changes and advantages that technology offers. This progressive municipal treatment plant has evolved into a “resource recovery” facility that currently treats leachate, farms struvite, and takes in biodiesel waste.

The Corvallis plant has three ZAPS LiquiD units placed at plant influent, primary effluent, and final effluent that provide real-time ammonia, nitrite/nitrate, E. coli, chlorine, and BOD information.

Continuous monitoring has shed light on the “hidden world” not captured in 24-hour composite sampling, which results in averaging of information and hides the true variability of the treatment plant. The Corvallis treatment plant primary treatment operation is not as steady-state as once thought. At night when the flow is low, the colloidal solids containing BOD settle in the primary and the removal rate is exceptional. When flow picks up in the morning, the colloidal solids that had settled in the primary are flushed into the secondary system creating a very large BOD loading spike that lasts an hour or two.

Also, comparisons before and after the primary clarifiers showed that the ammonia concentration increased through the process. This is indicative of septic primaries in which organic nitrogen trapped in the settled solids is fermented and converted into ammonia nitrogen. Having this information enabled plant staff to make better operational changes in regard to secondary operation and primary sludge removal. Corvallis is working to get the continuous monitoring devices approved by EPA for permit reporting. It is estimated the utility could save \$250,000 per year in laboratory costs if approved. Though the continuous monitoring of plant parameters is valuable, the highest value of real-time data is increased control capabilities.

“The ZAPS LiquiD unit steadily cranks out information like a refrigerator cranks out cold.”

—Dan Hanthorn, Operations Manager, Corvallis WWTP

A lot of plants over-chlorinate to ensure meeting their E.coli permit limit, and then must use more dechlorination chemical to meet the chlorine residual limit. By continuously measuring E.coli (tryptophan) in real-time on the plant effluent, it is possible to minimize the chlorine and dechlorination chemicals or UV energy required to meet permit. It is estimated that a lot of plants could reduce disinfection chemicals by as much as 20% and still be assured of meeting their E.coli goals.

Dissolved oxygen (DO) probes do a good job of working with aeration blowers to maintain DO set points and minimize aeration energy. However, the addition of real-time measurement of BOD, ammonia and nitrite/nitrate provides even more precise blower control and can further reduce energy. For example, a plant that doesn’t have to nitrify can utilize the measurement of nitrite/nitrate to control blowers and stay out of nitrification and, at the same time, be assured they are meeting their BOD permit limit. Plants that have ammonia limits can use the real-time information to minimize blower operation and still be assured of being below the ammonia permit limit.

Measurement of nitrite/nitrate coming out of biological selectors is also important to the control and management of the selector. For anoxic selectors, the information can be used to control mixed liquor recycle rates and to determine the number of selector zones that are required for proper treatment. The door has been opened to better, more available, and more reliable information. It will only open wider as time progresses.

You may contact Brad at jbmusick@comcast.net.

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Do Cogeneration Upgrades Pencil Out?

By Dana Devin-Clarke and Bill Meloy, Brown and Caldwell & Tom Suttle, City of Medford

Cogeneration or combined heat and power (CHP) can provide benefits to wastewater treatment facilities by using an internal combustion engine to generate both electricity and useful heat simultaneously. As of June 2011, CHP systems were installed in 133 WWTPs in 30 states representing 437 megawatts (MW) of capacity nationwide (EPA, 2011). Of these, 104 facilities use digester gas as the primary fuel source.

California boasts the largest number of sites supporting cogeneration, while Oregon comes in second, and Washington is fourth in the nation. Most CHP systems at wastewater treatment facilities utilize biogas produced as a result of anaerobic digestion as fuel to generate electricity and heat. Electricity can be used at the plant or sold to a utility company and the heat can be used to meet work space or process (digestion) heating demands. An adequate and reliable supply of sufficient process heat is critical to the anaerobic digestion process. It is common for treatment plants to select and operate CHP systems with the production of onsite electrical power generation as the primary benefit; however, production of heat is also an important benefit. Depending on the plant's needs, heat can also be used to produce chilled water via absorption chillers for building space cooling. For optimum performance, digester-gas-fueled CHP systems generally require fuel pretreatment to remove impurities such as hydrogen sulfide and siloxanes. In addition, moisture removal is also required.

CHP systems can provide the following benefits for a utility:

Efficiency: CHP avoids transmission and distribution losses that occur when electricity travel over power lines from utilities.

Reliability: In some cases, CHP provides a continuous source of electricity and thermal energy regardless of what is occurring

on the power grid, avoiding any negative impacts from power outages.

Environmental: CHP reduces emissions of greenhouse gases and other air pollutants by offsetting the plants dependence on energy generated from fossil fuels.

Economic: While the payback period is variable, CHP will provide cost savings on energy bills.

The economics of cogeneration implementation vary due to several factors including the cost of plant electrical power, engine-generator, and support system capital cost, gas conditioning system capital costs, maintenance costs for the entire system, and value of the space required for the system. In the past, CHP systems have been thought to be cost-effective only at treatment plants with capacities in excess of 10 million gallons per day (mgd). Some would argue that CHP can be economical for 4 to 5 mgd plants depending on the ability of the treatment plant to receive and condition alternative feedstocks such as fats, oils, and grease (FOG) that can enhance biogas production.

Because of long payback periods, some projects require funding assistance. CHP challenges can include the following factors:

- In most cases, engine-generator and heat recovery equipment has a high capital cost.
- In some cases, gas conditioning costs nearly equal the engine-related costs.
- In some parts of the U.S., the cost for electricity is low.

THE MEDFORD EXPERIENCE

The Medford Regional Water Reclamation Facility (MRWRF) provides service for a population of approximately 130,000 and supports an average daily flow of 15.6 mgd. The engine currently used by MRWRF was manufactured in 1974 and was

Table 1. Number of Digester Gas Wastewater CHP Systems and Total Capacity by State

State	Number of sites	Capacity (MW)
AR	1	1.73
AZ	1	0.29
CA	33	62.67
CO	2	7.07
CT	2	0.95
FL	3	13.50
IA	2	3.40
ID	2	0.45
IL	2	4.58
IN	1	0.13
MA	1	18.00
MD	2	3.33
MI	1	0.06
MN	4	7.19
MT	3	1.09
NE	3	5.40
NH	1	0.37
NJ	4	8.72
NY	6	3.01
OH	3	16.29
OR	10	6.42
PA	3	1.99
TX	1	4.20
UT	2	2.65
WA	5	14.18
WI	5	2.02
WY	1	0.03
Total	104	189.8

installed at the facility in 1988 to utilize gas produced from new digesters. The engine uses rich-burn technology with poor fuel economy and produces high emissions levels compared to other engines using current technology. Two anaerobic digesters at MRWRF currently produce an estimated average of 230,400 cubic feet per day (cf) of digester gas that is used to fuel the existing 36-year-old, 340kilowatt (kW) Waukesha cogeneration unit. The existing engine has been recently overhauled but had fuel-related problems and is now shut down due to the failure of the generator.

The digester gas contains significant amounts of moisture, hydrogen sulfide,

Continued on next page

Continued from previous page

and siloxane. These contaminants are detrimental to engine operation and need to be removed because they cause increased maintenance. The proposed project includes digester gas conditioning and pressurization to prepare the digester gas for consumption by the new high-efficiency, low emission engine.

In 2009, the MRWRF commissioned an analysis of energy production technologies that could be used to help the facility further obtain energy independence. The technologies investigated include internal combustion engines, cleaning and selling the gas, fuel cells, micro-hydro, photovoltaic solar arrays and enhanced digestion. The recommended alternative based on Medford's evaluation criteria was a new cogeneration system. The decision was based on the City's prior experience with internal combustion engines, eligibility for grant funding, potential to offset heat and power, and emissions reductions by using modern lean-burn engines.

The new system designed for the MRWRF included an upgrade to a 750-kW Waukesha unit and installation of gas conditioning and pressurization equipment. While a FOG receiving station was not included at this time, the new engine was sized to allow for one in the future. The total estimated project cost for the new engine and associated gas treatment equipment was roughly \$3.7 million, which included engineering and administration costs. The project was recently advertised and bids were received resulting in a construction

cost of \$2.99 million. Consulting fees added \$300,000 resulting in an overall project cost of \$3.3 million.

INCENTIVES FUND MORE THAN 40 PERCENT OF CONSTRUCTION COST

The MRWRF Cogeneration Project would have a payback period of approximately 28 years based on the capital required for design and construction and the electricity savings assumed for the new engine. While there are reasons for a sustainable project such as a CHP system, such a long payback period often prevents these types of projects from moving forward. For the MRWRF Cogeneration Project, several incentive programs were explored that could significantly decrease the payback period by directly reducing the project's construction cost.

The Oregon Department of Energy's Business Energy Tax Credit (BETC) program provides assistance to "those who invest in energy conservation, recycling, and renewable energy resources." CHP falls under the renewable energy resources category and qualifying projects can receive a tax credit up to 50 percent of the eligible project costs. In this case, the City applied for \$1.2 million in tax credits, which is slightly less than half the project cost. The MRWRF Cogeneration Project was selected to receive BETC funds, but only a certain percent of the funds awarded under BETC are realized. Public utilities must use the "Pass-through option" to realize their tax credit and MRWRF anticipates receipt of approximately \$840,000 for their tax credit.

The Energy Trust of Oregon (ETO) helps fund projects that use organic wastes (biomass) to generate renewable power. ETO works closely with a utility to determine an adequate incentive to ensure a project's feasibility in exchange for green Renewable Energy Certificates (REC). One REC is equal to 1 MWh of power generated from an eligible renewable source and they can be traded on the open market. The ETO awarded Medford approximately \$450,000 for its cogeneration project.

The receipt of these incentives reduced the payback period for the Medford Cogeneration Project from 25 years to approximately 15 years as illustrated in Figure 1. The \$1.29 million in incentives received equates to approximately 43 percent of the total construction cost. Without these types of incentives, securing support for CHP projects would be difficult.

REFERENCES

Brown and Caldwell, 2010. Evaluation of Combined Heat and Power technologies for Wastewater Facilities. http://www.cwwga.org/documentlibrary/121_EvaluationCHPTechnologiespreliminary%5B1%5D.pdf

EPA, 2011. Opportunities for Combined Heat and Power at Wastewater Treatment Facilities: Market Analysis and Lessons from the Field. http://www.epa.gov/chp/documents/wwtf_opportunities.pdf

You may contact Dana Devin-Clarke at dclarke@brwnclad.com.



Figure 1: Cost Comparison for the Medford Cogeneration Project with/without Incentives

The Quest for Quality

By Mac Smith, PE, KPFF Consulting Engineers

Quality: Everyone seems to want more quality of life, have more quality time, high environmental quality, and so on. I have recently been thinking more about maintaining and improving quality in my design projects. The main character in Robert Pirsig's autobiographical novel *Zen and the Art of Motorcycle Maintenance* believes that quality is indefinable, but people know it when they see it. While this may be true in some fields, it is not particularly useful for improving the engineering design process. The same could be said about quality in organizations.

Webster's dictionary definition of quality is "superiority; excellence; as a person of quality." This seems too narrow and stilted for the way it is used in the workplace. Many organizations have books on quality in the design process, for example *Quality in the Constructed Project, a Guide for Owners, Designers and Constructors* as published by the Americans Society of Engineers. These publications may have their place, but in many cases local codes, standards, rules and specifications drive design.

The design team on the project that I am currently

working on employs a self imposed rigorous quality assurance/quality control (QA/QC) program for each formal progress submittal to the owner. A specialty consultant with expertise in QA/QC programs is included on the design team and prepares a manual defining protocols to be followed by all disciplines in the QA/QC program. The manual includes responses to comments received from previous submittals, drawings, specifications, calculations, design criteria, and sustainability checklists plus a narrative on design criteria and codes used specific to the 30, 60, 90, and 100 percent submittals.

The checker must be an engineer who has not been involved in the project design and has responsibility for checking all documents. Each check drawing in the set is marked with a check stamp that is signed after the following actions: submitted by the designer, marked up by the checker, returned to the designer for concurrence, sent to the drafter for drawing updates and sent to the design lead for approval. All of these documents are uploaded to the project management web site.

Normally the QA/QC consultant performs an audit interview with each discipline for the 60 and 90 percent submittals. Only after these steps are completed are the submittal documents sent to the owner.

While the design team may chafe at times under the

prescriptive nature of the QA/QC requirements, it is safe to say that the process does improve the quality of the contract documents, and ultimately a better product for the owner.

You may contact Mac at mac.smith@kpff.com.

Who Is Rocky?

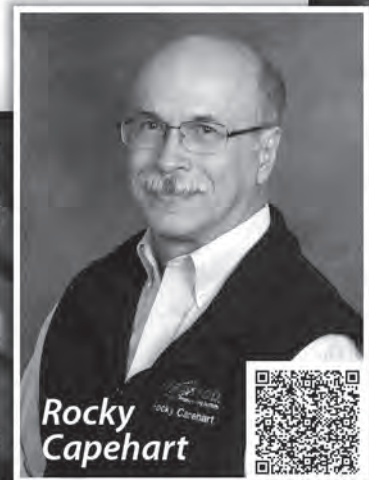
“I've been involved in the consulting engineering side of the wastewater industry for about 30 years. It seems like Rocky has been an ever-present part of that world, and I consider him to be the consummate wastewater industry professional. He is accessible, knowledgeable, responsive, friendly and honest, and he is able to communicate his knowledge to others well. Rocky understands the "real world" of aggressive sewer environments, and he knows what it takes for protective coatings to serve well under those conditions. That makes him a valuable resource for designers, contractors, applicators, and owners alike.

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Section NEWS

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

The **Western Washington Northwest Section** has had some big changes. Our last meeting of 2011 included adopting an updated set of bylaws. We also had some changes in our board. Gil Bridges moves to Past-President and becomes Western Washington Regional Director, Larry Littrell moves to President, Donovan Sheppard was elected as Vice President. Debbie Allen (treasurer), Tamara Adams (secretary), Ed Griffenberg and Ray Pickens

all remained in their respective positions. We are working on a lot of exciting events for the coming year. In the works for this year is a Scholarship offering, a leadership workshop and a barbeque in addition to four regular section meetings. It looks like a busy 2012. We look forward to serving our members this year.

The **Yakima Valley Section** is under construction! That's right, after years of dwindling membership our Section is growing. We recently started a web

page on the PNCWA website <http://yakimavalley.pncwa.org> that offers a 2012 training schedule and "sign up", meetings, links to facilities associated with the Yakima Valley Section, and our Constitution and By-Laws. In future months, we plan a photo gallery, a link to a fantastic newsletter that is created monthly by one of our experienced wastewater professionals, and much more. This new communication tool will be a way to get information to our wastewater community and hopefully increase our membership! Thanks PNCWA for having this option available for the Sections!


SWIOS welcomes new vice president Colby Armstrong, Kuna, Idaho WWTF. In February, SWIOS held a successful class on Introduction to Programmable Controllers presented by Steve Thomsen of Advanced Control System at the Meridian WWTF. Our next class will be in April on Pump and Pipeline Hydraulics presented by Joe Evans of PumpTech in Garden City. Idaho licensing rules for water and wastewater operators are changing in July. Notable changes include 1:1 experience for education substitution is allowed, 50% mandatory post high school education is no longer required, the "stair step" progression is removed, responsible charge time is removed from lab analyst licensing, and lab experience


can be substituted for operating experience and vice versa for up to 50% of the required experience. Please visit our website at <http://swios.pncwa.org> for the rule changes, upcoming CEU classes, conferences, membership, and sponsorship information.

Olympic Peninsula and Northwest Sections are co-sponsoring the Biological Nutrient Removal seminar on March 21 at Edmonds Conference Center, great classes for operators and managers with speakers from HDR. We will also see you on June 7 at the always impressive Bremerton plant for another round of training featuring Poppy Carre from Ecology with professional growth and certification information, and Jason Nelson of Line-X to explain all facets of protective coatings. Mark your calendars and don't miss these excellent trainings.

Thanks to UBOS (Umpqua Basin Operators Section) for the very generous \$500 donation to the PNCWA Scholarship Fund. That brings the UBOS donation total to \$600!

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W3QLAS Process Control Workshop, March 26 - 29



The Western Washington Water Quality Lab Analyst Section (W3QLAS) of PNCWA will offer its 13th training workshop March 26–29 in Port Angeles, WA. The “Process Control Workshop” will address activated sludge and anaerobic digestion with instructors Woodie Muirhead, Tom Chapman and Rick Kelley. Students will learn about

the principles of the activated sludge process, process control techniques, monitoring equipment, and troubleshooting of the

wastewater treatment process, biological nutrient removal, selectors, and more. They will also learn the operation of anaerobic digesters, dewatering equipment and techniques. Upon completion of this class students will be proficient at interpreting lab results, troubleshooting treatment processes, predicting plant loadings and the effects of changing WAS and RAS rates, dissolved oxygen levels, as well as identifying the role of microorganisms in the aerobic treatment process. The class features a site visit, and new textbooks are included in the registration fee. Completion of this workshop earns 3.3 CEUs or 2.0 college credit hours. For more information please contact Jeff Young at 360-417-4845 or jyoung@cityofpa.us or see the registration flyer at www.pncwa.org.

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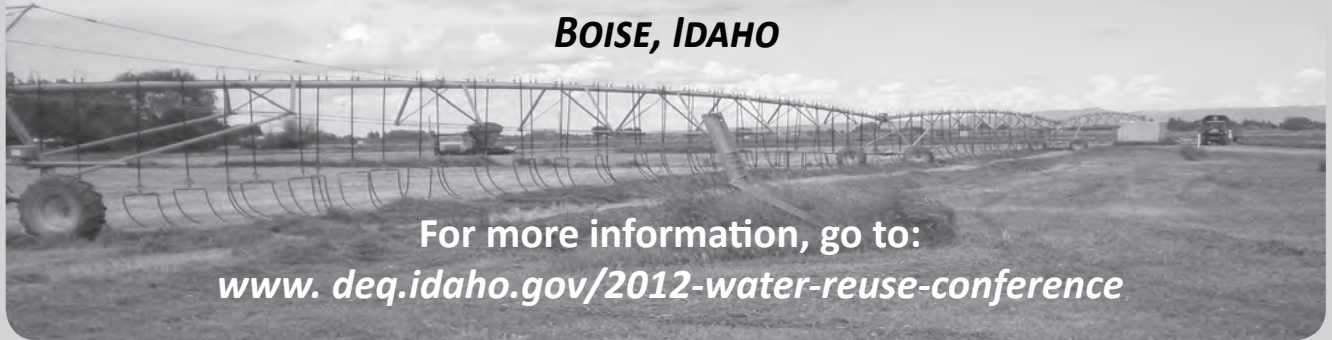
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Tuesday, April 17, 2012 (8:00 a.m.–5:00 p.m.)

- Idaho Water ReuseDEQ
- Direct Potable Reuse: Has it's time come?George Tchobanoglous
- Nutrient Removal Treatment and Effluent ReuseDavid Clark
- Permitting the Obvious? A Recycled Water Success Story in Hermiston, OregonMark Cullington
- Panel Discussion: Treated Water in Irrigation Canals, Drains and LateralsMark Cullington, Jack Harrison, Norm Semanko, Dave Tuthill
- Public Acceptability of Recycled Water: Getting the Cognitive Sewage Out After the Physical Sewage is GoneCarol Nemeroff
- No Sweetener in Your Stormwater, But What about Your Reclaimed Water?Hal Schmidt
- The Value of Reuse: Tucson Water's Reclaimed Water ProgramJohn Kmiec
- Backflow Cross Connection and Reuse WaterAlan Wilder
- Operators Panel Discussion: Reuse Will Change Your Life as an Operator: Monitoring, Reporting and Challenges with Reuse
- Reception: Meet guest speakers; hors d'oeuvres will be served

Wednesday, April 18, 2012 (8:00 a.m.–5:00 p.m.)

- Public Engagement and Wastewater Reuse: "You Want to Put Poopy Water Where?"Dan Adams
- Nampa: Wastewater Options, Public Outreach and Education CampaignSteve Burgos and Rosemary Curtain
- Water Reuse Farm Operation Realities and Comparison of Hawaii to Idaho Water Reuse Operational IssuesKen Windram
- Converting Industrial Process Water into High Quality Drinking Water for Food Processing ReuseAlbert Goodman
- Moving Away from the Well: Wastewater Reuse Projects at a Potato FacilityJohn Kirkpatrick
- Water Reuse Case StudiesGeorge Tchobanoglous
- Non-Growing Season Reclaimed Water Land TreatmentMichael Murray
- Estimating Growing Season Hydraulic Loading Rate Using AgriMet DataBrad King
- Irrigation of Highways with Reuse WaterMary Grace Pawson
- City of Meridian Reuse Water and Highway IrrigationClint Dolsby

Registration Fee: \$145 before April 10, 2012
Breakfast and lunch included both days

Agenda subject to change

PNCWA Environmental Stewardship Scholarships

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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.

Turning Wine into Water for People



The WFP committee is calling on all PNCWA oenophiles to dig into the recesses of their secret wine cellars and donate a bottle or two of the “good stuff” for a fundraiser at the fall conference. The committee is planning two fun raffles—at the Sunday meet and greet and at one other evening event. Raffle ticket holders whose names are drawn will get to pick a bottle from the collection of wines all disguised in plain brown paper bags. Among those bottles will be some special vintages. Donations of all types of wine are gratefully requested.

If you have wine to donate or have connections to wineries, wine stores or others who could be persuaded to make a donation, please contact Irene Wall at Irene.wall@tetrattech.com.

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. PNCWA is your professional organization—your source for training, networking and professional growth.

Rod Anderson,
Lake Chelan Reclamation District
Jim Bachmeier,
Thurston County Water Waste
Donald Ballantyne, Degenkolb Engineers
Alex Bargmeyer,
Murray, Smith & Associates
Joe Benson, City of Pullman
Ian Besaw, Murray Smith & Associates
James Costello, City of Dayton

John Deleo, Deleo Consulting Group
Anthony Delgadillo, Student
Jeffrey Hart, Student
Paul Hartwig, City of College Place
Susan Hildreth,
King Co WW Treatment Division
Eric Johnston, City of Oak Harbor
Sandra Kilroy,
King County WW Treatment Division
Terry Long, City of Tacoma

Aaron Markham, Larch Correctional Center
Bobbie McCoy, HDR Engineering
Franklin McCray,
City of Moscow Wastewater
Micheal McKamey, Beaver Equipment
Eric Neumeyer, City of Yakima WWTP
Dominic Pontarolo, Student
Eric Shea, Green River Community College
Vicki Sironen, HDR Engineering
Jerry Snyder, Orengo Systems Inc

Ryan Spiers,
Alternative Wastewater Systems
Matthew Steiner, CH2M HILL
John Suveg, City of Tacoma
Dennis Teller, Meridian Water Dept
Dan Wahlgren, City of Forks
John Waynetska, CH2M HILL
Bruce Wickard, City of Pullman
Peiran Zhou, Student

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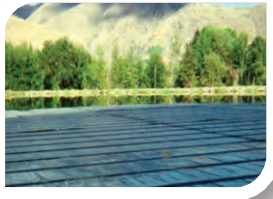
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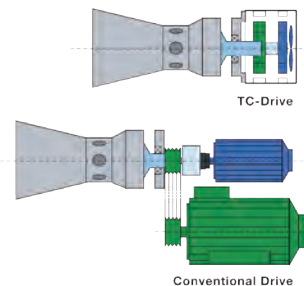
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