FUEL CELLS OFFER THE ULTIMATE GREEN ENERGY SOURCE FOR WASTEWATER TREATMENT

PAGE 4
NEW NAME . . . RENEWED COMMITMENT

82ND ANNUAL CONFERENCE & EXHIBITION

May 6-8, 2009
Renaissance Glendale Hotel & Spa
Glendale, Arizona

MARK YOUR CALENDAR

Coming Soon ... Conference Brochure and Online Registration
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February

5 AZ Water Southern Arizona Luncheon Program
   CAP in the Tucson Region
   11:30am registration, program at 12:00
   Hotel Arizona, Tucson, AZ
   Contact Joy Terry, joylynnterry@hotmail.com
   Online registration available at www.awpca.org.

10 AZ Water Phoenix Luncheon Program
   EDCs
   SRP Pera Club
   One Continental Drive, Tempe, AZ
   Contact Daniel Candelaria, daniel.candelaria@ch2m.com
   Online registration available at www.awpca.org.

18 Water / Wastewater Workshop
   Presented by the AZ Water Distribution Committee
   Scottsdale Center for the Performing Arts
   7380 E. Second Street, Scottsdale, AZ 85251
   Contact Kim McClure, kmclure@metrowater.com
   Online registration available at www.awpca.org.
   See flyer on pages 30-31.

24 AZ Water - Dealing With Changing Water Quality Seminar
   Presented by the Water Treatment Committee
   GateWay Community College, Center for Health Careers
   108 N. 40th Street, Phoenix, AZ 85034
   Contact Uday Gandhe, uday.gandhe@wilson-engineers.com
   Online registration available at www.awpca.org.
   See flyer on page 18.

March

5 AZ Water Southern Arizona Luncheon Program
   PCRWRD’s Odor Abatement Program
   11:30am registration, program at 12:00
   Hotel Arizona, Tucson, AZ
   Contact Joy Terry, joylynnterry@hotmail.com
   Online registration available at www.awpca.org.

10 AZ Water Phoenix Luncheon Program
   Water Infrastructure Sustainability Roundtable
   SRP Pera Club
   One Continental Drive, Tempe, AZ
   Contact Daniel Candelaria, daniel.candelaria@ch2m.com
   Online registration available at www.awpca.org.

18 Water / Wastewater Workshop
   Presented by the AZ Water Distribution Committee
   Pima Community College, NW Campus
   7600 N. Shannon Road, Building A - Rm 207, Tucson, AZ 85709
   Contact Kim McClure, kmclure@metrowater.com
   Online registration available at www.awpca.org.
   See flyer on pages 30-31.

April

2 AZ Water Southern Arizona Luncheon Program
   Topic & Speaker To Be Determined
   Hotel Arizona, Tucson, AZ
   11:30am registration, program at 12:00
   Contact Joy Terry, joylynnterry@hotmail.com
   Online registration available at www.awpca.org.

14 AZ Water Phoenix Luncheon Program
   Gilbert / Chandler Santan Vista WTP
   SRP Pera Club
   One Continental Drive, Tempe, AZ
   Contact Daniel Candelaria, daniel.candelaria@ch2m.com
   Online registration available at www.awpca.org.

22 Water / Wastewater Workshop
   Presented by the AZ Water Distribution Committee
   La Quinta Inn & Suites Flagstaff
   2015 S. Beulah Blvd., Flagstaff, AZ 86001
   Contact Kim McClure, kmclure@metrowater.com
   Online registration available at www.awpca.org.
   See flyer on pages 30-31.

May

5 AZ Water Annual Conference Golf Tournament
   TPC Champion Course, Scottsdale, AZ
   Contact Jay Bailey, jay@coombs-hopkins.com.

6-8 AZ Water 82nd Annual Conference & Exhibition
   AZ Water: New Name, Renewed Commitment
   Glendale Renaissance Hotel & Spa
   Glendale, Arizona
   Contact Debbie Muse, musegroup@aol.com.
   Online registration will be available in late February.

June

15- AWWA Annual Conference & Exhibition
18 ACE.09
   San Diego Convention Center
   San Diego, CA
   Contact www.awwa.org.
Technology at Work

A fuel cell is an electrochemical device that combines hydrogen fuel and oxygen from the air to produce electricity, and usable heat and water. Fuel cells operate similar to batteries, except that, unlike batteries, fuel cells do not require recharging and will produce electricity as long as fuel is supplied.

By converting the fuel to energy using an electrochemical process, fuel cells provide a cleaner, quieter, more efficient, and more reliable cogeneration solution than traditional combustion technologies.

Fuel cell plants operate on biofuels - gases from food processing, landfills, and wastewater treatment - in addition to natural gas, ethanol, diesel, and coal gas. The fuel flexibility offered by fuel cells can be an important benefit for facility owners and operators.

One of the key reasons for the recent increase in fuel cell installations is the maturing of fuel cell technology and the associated fuel treatment systems. The new generation of fuel cells is extremely reliable, only needing to be taken out of service every 18 months for maintenance/parts replacement. The availability of fuel cell power plants is now being demonstrated at 98 percent, making them an attractive alternative to competing technologies. In addition, life-cycle costs are competitive with other cogeneration technologies. This is due in large part to decreasing installation costs, dropping from $20,000/kW in 2000 to approximately $4,500/kW today.

**SUMMARY OF FUEL CELL ECONOMICS***

<table>
<thead>
<tr>
<th></th>
<th>No Cogeneration</th>
<th>750-kW Engine</th>
<th>460-kW Microturbine</th>
<th>900-kW Fuel Cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Annual Value of Digester Gas</td>
<td>$0</td>
<td>$332,000</td>
<td>$302,000</td>
<td>$653,000</td>
</tr>
<tr>
<td>Carbon Footprint Reduction</td>
<td>0%</td>
<td>20%</td>
<td>13%</td>
<td>35%</td>
</tr>
<tr>
<td>NOx Emissions, lbs/yr</td>
<td>1,211</td>
<td>6,513</td>
<td>1,811</td>
<td>436</td>
</tr>
<tr>
<td>CO Emissions, lbs/yr</td>
<td>3,913</td>
<td>15,519</td>
<td>1,989</td>
<td>1,652</td>
</tr>
<tr>
<td>Reduction in Energy Costs</td>
<td>0%</td>
<td>8%</td>
<td>5%</td>
<td>19%</td>
</tr>
</tbody>
</table>

*Data supplied by Eastern Municipal Water District, Perris, California, Moreno Valley Water Reclamation Plant Fuel Cell Facility.

Higher Efficiencies

Fuel cells offer the highest efficiency available for power generation at wastewater treatment facilities. Although fuel cells produce less heat than more traditional on-site generation systems such as microturbines and combustion engines, they are much more efficient in producing...
electricity. Higher electrical efficiency offers a significant advantage over traditional digester gas technologies where the supply of renewable digester gas is fixed. Higher efficiency means that 50 to 100 percent more electrical power can be generated with the same quantity of digester gas.

Higher efficiencies also translate to lower overall greenhouse gas generation. Fuel cell technology can nearly double the reduction in a plant's carbon footprint offered by other cogeneration technologies. Although digester gas must be disposed of and, as such, the same quantity of carbon dioxide is generated whether used in fuel cells or competing technologies, higher electrical generation potential offsets the need to generate power with non-renewable fuels.

In addition, when compared to other types of cogeneration equipment, fuel cells also generate approximately one-third the overall emissions of criteria pollutants such as nitrogen oxides (NOx), sulfur oxides (SOx), volatile organic carbons (VOCs), and particulate matter (PM).

**Permitting Benefits**

Lower emissions significantly simplify the air quality permitting process. Competing technologies are facing strict requirements with installation of selective catalytic reduction (SCR) and CO catalyst post treatment systems looming in the near future. Fuel cells produce NOx levels much less than 5 parts per million by volume (ppmv) without post treatment compared to other cogeneration technologies that produce NOx levels ranging from 10 to 50 ppmv.

This can result in emission reduction credits for some installations, as well as future benefits as air quality regulations become more stringent. For example, over the next five years, California’s South Coast Air Quality Management District will require both new and existing plants to produce power from digester gas as cleanly as they produce it from their primary power source. Meeting similar requirements may be a challenge for plants using combustion engines and turbines, particularly at older installations with less efficient equipment.

**Incentive Programs**

Wastewater treatment gas is a renewable fuel eligible for incentive funding for projects in 21 states. Moreover, in the past few years, government grants, loans, and tax incentives in California and elsewhere have helped offset the capital costs for fuel cell installations. The Energy Policy Act of 2005 and its amendments authorized $1.2 billion to be disbursed as zero-interest Clean Renewable Energy Bonds for renewable energy generation projects. To date, all funding has been allocated, but further funding is expected to be available in the future for fuel cells and other renewable technologies. In California, the Self Generation Incentive Program (SGIP) makes renewable-fueled fuel cells eligible for direct grants of $4,500/kW towards project costs, while competing technologies are not eligible. Other states offering significant financial incentives include Connecticut, Idaho, Pennsylvania, New York, and Montana. In Arizona, a few of the larger electrical power utilities are offering incentives to implement green energy systems of which digester gas to fuel cell technology is included. More states are expected to develop similar incentive programs in the near future.

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**Carollo’s Experience**

Carollo Engineers has been implementing this evolving technology for several clients. In fact, of the 16 U.S. fuel cell projects currently operating or being planned, designed, or constructed at wastewater treatment facilities, Carollo has been actively involved in all but four. Relevant examples include:

- **Tulare, California.** For the City of Tulare, Carollo developed the request for proposals for installation of a 900-kW fuel cell, qualifying Tulare for $600,000 in emission reduction credits and more than $4 million in incentives under California’s SGIP.

- **Perris, California.** Carollo provided a fast-track design for a 750-kW (1,500 kW ultimate capacity) fuel cell project for the Eastern Municipal Water District’s (EMWD) Moreno Valley Water Reclamation Facility and a 1,200-kW fuel cell facility for EMWD’s Perris Valley Regional Water Reclamation Facility. Both projects are currently under construction.

- **Turlock, California.** For the Turlock Irrigation District, Carollo conducted a feasibility study and prepared procurement documents for a new 1,200-kW fuel cell facility, construction documents for the complete cogeneration system, and all associated permit, interconnection, and grant applications associated with the project. The project is currently being installed.

- **Livermore, California.** For the City of Livermore, Carollo assisted the city in soliciting energy service providers evaluating multiple cogeneration technologies and ultimately implementing a 600-kW fuel cell facility at the Livermore Wastewater Treatment Plant. Carollo designed plant tie-ins. The service provider will design, build, own, and operate the facility, which is currently under construction.

Additional clients that Carollo is assisting in evaluating fuel cell technologies include: the cities of Davis, Modesto, and Visalia, California; Union Sanitary District, Union City, California; Monterey Regional Water Pollution Control Agency, California, the cities of Reno and Sparks, Nevada, and the Hillmar Cheese Company.
IN LATE AUGUST, we were made aware that a documentary had been developed by Penn State University. The documentary had been given the title of “Liquid Assets.” Both AWWA and WEF encouraged local state organizations including AZ Water to assist in getting this documentary aired over local public television stations. The gist of “Liquid Assets” is to bring the state of the water and wastewater infrastructure into public awareness. The goal was to help increase investment in our water and wastewater infrastructure so that we can maintain the robustness of our systems. With proper investment, we, the water professionals, can continue to provide the service to which we are committed for public health and welfare.

In the November 23, 2008 issue of the Parade Magazine (Sunday paper insert) a small article was published with the title “Our Crumbling Water Pipes.” In this article, the following quotes were included. “Fixing our nation’s water infrastructure will cost $277 billion according to the Environmental Protection Agency.” “There’s a big bill coming due according to Greg Kail of the American Water Works Association. We’re trying to sound the alarm now so that a very big concern doesn’t become a very big crisis.” We, in the industry, need to work together to encourage adequate investment in our water and wastewater infrastructure.

With the economic downturn (recession) that we are currently experiencing, the job of making adequate investment in our water and wastewater infrastructure becomes all the more difficult. Many of our water utilities are municipalities and counties, which are generally supported in their general funds by taxes. With taxes going down due to the economic conditions, agencies are cutting back on staff and expenditures. Even though their water and wastewater utilities are supported by revenues, City councils or County supervisors are reticent to increase water and wastewater rates due to political pressures. Without adequate utility rates, the water and wastewater utilities will be unable to invest adequately in their infrastructure to try to make up for lack of success in the past in keeping facilities up-to-date. The future is not looking bright unless we can do something to turn this around.

One of AZ Water’s branding statements reads, “Increasing the Financial Resources Dedicated to Water and the Environment.” This means, being advocates for appropriate and continued investment in water resources, watersheds, water quality, and water infrastructure as well as providing resources and training designed to help water and wastewater utilities constantly increase their efficiency.

As an organization, AZ Water is committed to working with Arizona’s utilities to make proper investments in their water and wastewater infrastructure. To accomplish this, we will need to step outside our comfort zones and enter the political arena. We will need to educate our political leaders about the need for proper investment, encourage them to set adequate rate structures to allow for proper investment and change the paradigm from political based to statesmen based and not focus on the short-term expediency. We need to encourage these leaders to serve their constituents over the long-term. This is not an easy task. Only with a strong commitment and “will” can we be successful in changing the paradigm.
DURING THE LAST half of 2008, AWWA has undertaken an extensive program to discern what values the membership can attribute or relate to when it comes to belonging to AWWA. Starting at ACE in Atlanta, many interviews were conducted with the attendees. Following those interviews, surveys were sent to the various sectors of the membership such as utility members, manufacturers, consultants, and most importantly, you the individual member. These surveys were sent to members via the internet and were completed by early November. Now the surveys are being compiled by the consultant overseeing this project.

To assist with the dissemination of all this information, an ad hoc committee was formed by the President of the AWWA, Mike Leonard. I was appointed to this committee as a board member of the association and we held our first meeting in early November (it was actually election-day and the meeting was in Washington, DC which is a story for another day!). Preliminary information based on the early surveys produced some interesting and enlightening information. While I can't share the information just yet, it is planned that all the results will be provided to the sections as well. As you might expect, the members of AWWA are getting old. One area of membership that has seen an increase is the Life Member – not necessarily a good thing but that also means there is a lot of institutional knowledge from all those years of experience.

Where all this is heading is that a briefing of the Board of Directors will be provided at the Winter Board meeting in Tucson. For those who may be interested in attending, it will be held on January 24 – 25th, 2009 at the Ventana Resort. Once the board has been brought up to speed with the information-to-date, the ad hoc committee will further define value statements for the various categories of the membership. At our first meeting, it became a bit overwhelming when you consider all the various categories of members and we were somewhat trying to tackle the big issue instead of starting small and working our way to the big picture.

Along with determining value statements for categories of membership, the committee is also tasked with evaluating options for membership structure. At this point, all options are on the table and I'm sure when we get to that point, I will be asking for input from the AZ Water Association's Board of Directors. All this work will eventually lead to a renewed focus on the value of the members of AWWA and how we can continue to grow in numbers as well as grow in the value of being a member. Initial time frame to have a recommendation before the board would be at ACE in San Diego. However, the committee feels this is such an important issue for the association that if need be, a recommendation would be delayed until all issues and concerns have been addressed.

One last thing … I'm not sure how many of you are aware, but one of our board members from AZ Water is running for election to serve as Director-at-Large for AWWA. The election will be held at the winter board meeting in Tucson and I want to wish Marie Pearthree all the success in the election. She would do well in serving the membership of AWWA and it provides an added benefit of having two directors from the Arizona Section.
So, what’s happening at the Water Environment Federation?  
Glad you asked! Below are just a few items of interest.  

Jim Pembroke, HDR Engineering; WEF Delegate, Arizona Member Association

WEF Forms Nutrient Task Force
The Water Environment has formed a nutrient task force to assist the U.S. Environmental Protection Agency (EPA) in its response to a Nov. 27, 2007, petition from the Natural Resources Defense Council (New York) regarding revising secondary treatment regulations, specifically to address limits for nitrogen and phosphorus. The work group, chaired by WEF Vice President Jeanette Brown (Stamford [Conn.] Water Pollution Control Authority) and Nancy Wheatley (independent consultant; Siasconset, Mass.) is working on a background document that will provide technical and cost information and should prove a valuable resource to EPA and the water quality sector.

For more information on WEF’s response, contact Kiri Kroner at kkroner@wef.org or (703) 684-7741. For background information on nutrient removal, see WEF’s Access Water Knowledge Nutrient Removal Resource Center at www.wef.org.

WEF Bulletins Moving to Electronic Format
Beginning in January 2009, Water Environment Federation technical bulletins are moving to an electronic-only format. This change—prompted by member survey data indicating a preference for electronic bulletins—will apply to Biosolids Technical Bulletin, Industrial Wastewater, Utility Executive, Water Environment Laboratory Solutions, and Water Environment Regulation Watch. The print editions of these bulletins no longer will be available.

As each new issue is published, subscribers will receive an e-mail notification with a link to the publication Web site, where they will be able to print and download the issue in PDF format. Benefits of the new electronic format include more timely publication delivery, online access to archives, and the ability to keep subscription rates flat despite dramatically increasing paper, printing, and postage costs.

Subscribers will receive more detailed information about how to manage their subscription benefits. Subscribers should update their e-mail addresses to ensure WEF has proper information on file to send e-mails announcing new issues. Update your e-mail addresses online at www.wef.org/membershipcareers/membershipinformation/renewmodifymembership/ or by contacting WEF Customer Service at csc@wef.org, (800) 666-0206 (within the United States and Canada), or (703) 684-2452.

WEF Technical Practice Committee Seeks Reviewers
The Water Environment Federation’s (WEF; Alexandria, Va.) Technical Practice Committee is looking for reviewers in the development of a new Manual of Practice on Information Technology in water and wastewater utilities.

Reviewers will be responsible for providing written comments at the outline and/or draft stages. If you are interested in participating as a reviewer; able to work closely with other WEF volunteers, the task force chair, and WEF staff; and able to dedicate expertise and time to ensure the development of a quality manual, contact Britt Sheinbaum at bsheinbaum@wef.org.

Get to Know “Water Heroes” on WEF’s Web Site
The Water Environment Federation (WEF; Alexandria, Va.) has launched the “Water Hero” section on its Web site. The first featured Water Hero was Dale Richwine, vice president at MWH (Broomfield, Colo.) in Portland, Ore. Richwine initiated the “Silent Heroes Program” at the Pacific Northwest Clean Water Association (Caldwell, Idaho), which earned the organization a WEF Member Association Achievement Award, presented in Chicago at WEFTEC.08 last month.

The WEF home page will feature five to six Water Heroes a month with photos and brief bios. These heroes are members who work every day to clean the world’s water. Recognizing these unsung heroes of clean water will help tell the story of the role WEF members
play in protecting public health and the environment. To see the Water Heroes section, go to www.wef.org/aboutwater/forthepublic/aboutwaterquality/waterheros.htm. To learn more about nominating a Water Hero, contact lkelly@wef.org.

Attention WaterBloggers, Join the Conversation on WEF's Web Site
The Water Environment Federation’s (WEF’s; Alexandria, Va.) revamped Web site also includes a new “WaterBlog” section. WEF members and other water quality professionals now have the opportunity to blog with their peers. The WaterBlog is hosted by water quality experts and features discussions about the latest ideas, trends, and news in the profession.

WEF President Rebecca West has been posting her thoughts about infrastructure investment on the blog, and WEF Water Reuse Committee Chair Don Vandertulip of CDM recently has blogged about new developments in purple pipes. Many other respected experts with important topics are in the pipeline for the 2009 WaterBlog. Go to www.wefwaterblog.blogspot.com to find out what's new, and start waterblogging today.

/ TRIVIA / Questions
(From the Office of the AZ Water Historian)

A. What is the use of a specific mud – found only in a New Jersey swamp – by all teams in the National and American Baseball Leagues?
B. In what year was the bicycle patented in the United States?
C. Coldest recorded day in history?
D. What was the name of the Architect who designed the Hopi House and the Bright Angel Lodge at the Grand Canyon?
E. Date the Sunset Crater was made a National Monument?

See answers on page 28
Call For Award Nominations

It is time again to identify fellow Arizona water/wastewater professionals and worthy projects for recognition at the 2009 AZ Water Association Annual Conference & Exhibition. Following is a brief listing of AZ Water Awards:

- Environmental Stewardship
- Outstanding Service
- Nathan Burbank Environmental Educator
- Quentin Mees Research
- Select Society of Sanitary Sludge Shovelers
- Gimmicks & Gadgets
- Operator of the Year (Large and Small Systems)
- Water Treatment
- Wastewater Treatment
- Water Distribution
- Wastewater Collection
- Plant of the Year (Large and Small Systems)
- Water Treatment
- Wastewater Treatment
- Water Distribution System
- Wastewater Collection System
- Operations Supervisor of the Year (Large and Small Systems)
- Water Systems
- Wastewater Systems
- Electrician of the Year
- Maintenance Mechanic of the Year
- Instrumentation Technician of the Year
- Water Project of the Year
- Wastewater Project of the Year
- Water Reuse Project of the Year
- Engineer of the Year
- Young Professional of the Year
- Laboratory Excellence
- Safety
- Scholarships

All award nominations are due on March 13, 2009, except for the Quentin Mees Research Award which is due January 14, 2009.

Award criteria, nomination forms, nomination due dates, and points of contact are listed on AZ Water’s web site www.awpca.org OR www.azwater.org.

The new web site is expected to be operational in February 2009. Questions can be directed to the Awards Committee Chair, Darlene Helm (602) 534-9138 or the Board Liaison, Teresa Smith-DeHesus (602) 381-4426.

Tri-State Seminar Changes Meeting Days

The Tri-State Seminar’s (TSS) Board of Directors voted last month to move the seminar meeting days to Tuesday, Wednesday, and Thursday. Please mark your calendars now to attend the 25th Tri-State Seminar, September 21-23, 2009 at the Primm Valley Resort in Primm Nevada.

A party to commemorate the 25th anniversary of Tri-State will be held Monday, September 20 and all pre-registered attendees are invited and will receive a special gift to celebrate the milestone.

More volunteers will be needed for the 25th Tri-State Seminar. Please won’t you consider getting involved? If interested, please contact Rick Buck, AZ Water Board Member and member of the Tri-State Seminar Board of Directors, kc7oct@hotmail.com.

AZ Legislative House Committee Members Announced

Speaker-elect Kirk Adams has announced the members of the 15 House standing committees for the 49th Legislature. Adams’s office also released the names of the members of the 2009-2010 statutory committees.

As expected, returning lawmakers have been selected as committee chairs. Many incoming freshmen were delegated as vice chairs. Nearly all of the committees have a freshman for a vice chair. The new Appropriations Committee has shrunk to 13 members, with eight Republicans and five Democrats. Right now there are 17 lawmakers on House Appropriations. Meanwhile, Jim Weiers, a Republican from Phoenix, will be chairman of House Ethics, a statutory committee. On Dec. 4, Weiers was assigned as head of the new House Select Committee on Education Reform.
U.S. EPA Seeks Comments on Proposal

The U.S. Environmental Protection Agency (EPA) is seeking comments on its proposed guidelines to control the discharge of pollutants from construction sites.

The proposal would require all construction sites to implement erosion and sediment control best management practices to reduce pollutants in stormwater discharges, according to an EPA press release. To read the proposal, see www.epa.gov/ost/guide/construction. Comments must be received by February 26, 2009.

Submit comments, identified by Docket ID Number EPA-HQ-OW-2008-0465, through one of the following methods:

- E-mail: OW-Docket@epa.gov.

For more information, contact Enesta Jones at jones.enesta@epa.gov.
ADEQ's Operator Certification Program establishes guidelines to ensure that only certified operators make decisions about process control or system integrity that affects public health. The program establishes minimum standards for certification and recertification of the operators of community and non-transient non-community public water systems.

Operator certifications are classified into one of four grades by facility type, size, complexity and population served. The grade corresponds with the level of system complexity, with Grade 1 being the most simple and Grade 4 being the most complex. Operators are required to maintain their certification through participation in continuing professional education workshops and must be recertified every three years.

Operator Certification Examinations
ADEQ has contracted with one of our educational colleagues, Gateway Community College (GCC) to proctor Association of Boards of Certification (ABC) operator certification exams for all operator classifications and grade levels. GCC has the expertise, the testing facilities and the staff to proctor ABC exams that will maintain high professional standards for the Arizona industry. Check the ADEQ OPCERT web page for exam information, http://www.azdeq.gov/environ/water/dw/opcert.html.

GCC is charging $70.00 per exam, which is well within the middle range of current national exam fees and within the range of fees that were charged by third-party Arizona entities in 2002-2007. For registration, exam dates and exam locations, visit Gateway Community College (GCC) at http://environment.gatewaycc.edu.

ADEQ anticipates a smooth transition and an improved long-term approach to certification for water and wastewater operators in Arizona. ADEQ will be approaching other Community Colleges to inquire if they are interested in proctoring ABC exams.

Operator Certification Exam Study Guides
The Association of Boards of Certification web page will provide the Need to Know Criteria for Preparing for the Certification Examination. There are also Study Guides and Practice Exams at http://www.abccert.org/examinformation.html.

Operator Certification Identification Documentation
Effective Oct. 1, 2008, a person sitting for an exam for the purposes of obtaining a certified operators license must present appropriate identification. Such documentation includes, but is not limited to, an Arizona drivers license issued on or after Jan. 1, 1997, a United States Passport or a birth certificate issued in any state, territory or possession of the United States. For any questions concerning proper forms of documentation or other forms of acceptable documentation not previously mentioned, please contact Bill Reed, Operator Certification Coordinator, at wpr@azdeq.gov.

To receive updates by email follow the link provided below and open the subscribe banner bar at the top of the page, http://www.azdeq.gov.

Visit the ADEQ web page at http://www.azdeq.gov/environ/water/dw/opcert.html to access information on the following:

1. Workshop dates, training and stakeholder meetings related to drinking water and wastewater system operator certification and rules.
2. Information regarding Renewals, Reciprocity.
3. How to Become a Certified Operator.
ADEQ is offering **FREE** training at the following dates and locations. Earn your PDHs while you improve your skill in the topics offered.

January 8, 2009 – Phoenix  
January 27-28, 2009 – Phoenix  
February 10-11, 2009 – Sierra Vista  
February 12, 2009 – Phoenix  
March 3-5, 2009 – Tucson  
March 12, 2009 – Phoenix  
March 17-18, 2009 – Camp Verde  
April 9, 2009 – Phoenix  
April 14-15, 2009 – Wilcox  
May 5-7, 2009 – Camp Verde  
May 14, 2009 – Phoenix  
May 19-20, 2009 – Pinetop  
June 11, 2009 – Phoenix  
June 18-19, 2009 – Winslow

*note: dates listed are subject to change. Please visit [www.azdeq.gov](http://www.azdeq.gov) for official dates and locations.

The ERG program was developed to provide training and benefits to eligible, certified operators. However, any operator or community member may attend department-sponsored technical training.

Noah Adams, ADEQ, (602-771-4511, [nra@azdeq.gov](mailto:nra@azdeq.gov)) will address questions concerning workshops.

Space is limited so please pre-register ASAP!
Register online at: [http://www.OPSCERT-ERG.com](http://www.OPSCERT-ERG.com)
For registration questions please contact April Adams, Corporate Destination Services, at [april@corpdest.com](mailto:april@corpdest.com) or phone (602-482-1788) fax (602-482-2113).

**Special hotel room rates are available; however you must reserve rooms in advance and request the ADEQ rate.**
Entering and working in confined spaces is established as a hazardous activity and effective training needs to be accomplished as a means to help protect employees from these hazards. Some of the most frequently posed questions to consultants and training organizations have to do with what is needed in conducting training and how often the training is needed. Needs can be broken into the two categories of regulatory mandated and employer directed. Accomplishing training in accordance with federal, state or local requirements requires review of the published standards and general familiarity with formal language used in the rules and regulations. Employer directed training must meet the regulatory standards but will often incorporate additional requirements that create a site-specific, more effective training plan. After evaluation of the confined space training needs, a determination of what type of training must be completed. As confined space training is a very common safety topic, there is training available in many different medias. The table on the next page will address the pros and cons of these different types of training.

OSHA states, “The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.” (29 CFR 1910.145(g)(1). The training requirements for confined space entry operations are straightforward. After an employer has determined there are permit required confined spaces and whether or not employees will be allowed to enter these confined spaces, an appropriate training plan can be formulated. Employers do have the option of restricting employees from entering permit required confined spaces. If this is the determination made by the employer, there still remains a responsibility of the employer to make sure employees are trained at an awareness level about confined spaces in order to prevent employees from entering and working in these spaces. This training, sometimes considered an awareness level training, should address the following: the company's policy and confined space program limiting the employees' access to confined spaces and their hazards; recognizing the confined space warning and identification signs; changes in use or configuration of non-permit spaces could require that the space be reclassified as a permit required space; and finally procedures that address employees of other companies entering and working in the permit required confined spaces of the employer. When an employer determines employees will enter and work in permit required confined spaces, 29 CFR 1910.146(g) clearly outlines the requirements and specifics that must be addressed during training.

Employers that have established a need for a confined space program and accompanying employee training typically add additional requirements into the confined space training curriculum. These additional items are used to help create a more effective and site-specific training. While the regulatory requirements for training items address confined space entry operations in a general language, a company specific plan can thoroughly address specific hazards and work practices. An example of this is developing a site-specific, hazard specific confined space entry permit or using photographs of the company's confined spaces to clearing communicate the specific hazards employees may encounter during
confined space entries. The regulatory requirement for training addresses the following: a need for employee training before they are assigned duties involving permit required confined spaces; if there is a change in confined space duties; if there is a change in confined space operations that presents a hazard about which the employee has not been trained; or when the employer believes there have been deviations from the established confined space entry program or inadequacies in the employees’ knowledge or performance (29 CFR 1910.146(g)(2)(i) – 1910.146(g)(2)(iv)). With an employer directed program additional training requirements may be established such as an annual or biannual training. Another employer directed training requirement may be the development of instructional timelines appropriate to employee exposure to confined space operations. An example of this would be varying the length of training for different levels of employees depending on their specific duties or tasks involving confined spaces. Careful evaluation of an employee’s duties with regard to the level of appropriate training can be used as an effective tool to control costs associated with conducting training for larger organizations. Employers that choose to create site-specific training programs can benefit from increased productivity and fewer injuries when employees are proficient at conducting safe confined space operations. Selection of the most effective type of training should take effectiveness, durability and cost into consideration. Effectiveness addresses whether the training adequately focuses on the standard, hazards, employee exposure and is it practical to the company’s operations. Durability is the ability for the training to remain applicable over time. While cost should never be a primary factor in determining an approach to safety, the reality is that all organizations must consider cost when evaluating the type of training that will be selected for employees needing confined space (CS) training.

Employees who perform work in and around permit required confined spaces are exposed to unique hazards that require appropriate and effective training to help prevent incidents. Selection of this training can be accomplished by applying the regulatory standards or using the regulatory standards as a minimal outline for training and adding company, site-specific directives to increase the applicability of the training. Companies must balance the need to train their employees with the type and cost effectiveness of the selected type of training. While there are requirements for confined space training and different means to accomplish that training, the overall goal is to maintain a safe workplace. Additional benefits employers receive from conducting training can be reduced insurance and workers compensation expenditures, enhanced employee loyalty and increased productivity. Finally, it is important to remember that the federal regulatory standards should be viewed as the minimum requirements, establishing site-specific confined space training is highly recommended.

<table>
<thead>
<tr>
<th>TYPE OF TRAINING</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
<th>RATING (1-5, 5 High)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Videos/ DVDs</td>
<td>Cost effective. Allows for flexible scheduling of training based on employee available time.</td>
<td>No ability to ask questions. Not adaptable to company specific applications.</td>
<td>3</td>
</tr>
<tr>
<td>Computer Based Training</td>
<td>More interactive than video or DVD training. Scheduling flexibility for employees.</td>
<td>No ability to ask questions. Students have to be computer literate. Limited applicability to company specific situations.</td>
<td>3</td>
</tr>
<tr>
<td>Classroom Training</td>
<td>Allows for employer evaluation of employees comprehension of material through Q &amp; A. Best training forum for topic discussions and clarification of material for employees.</td>
<td>Cost is prohibitive to smaller organizations with small numbers of employees needing training. In-house trainer must be proficient in both training and subject matter</td>
<td>4</td>
</tr>
<tr>
<td>Hands-On Training/Mock Job Site</td>
<td>CS operations are equipment and procedure intensive activities. This type of training allows for simulations and group activities to replicate real task situations and allow for instructor to evaluate the proficiency of the employees.</td>
<td>Employees may be exposed to hazards during training. Controlled training environment may not be available for use.</td>
<td>5</td>
</tr>
<tr>
<td>Table Top Discussions</td>
<td>This type of training allows for simulations and group activities to replicate real task situations and allow for instructor to evaluate the proficiency of the employees. Employees’ proficiency with the use of CS equipment may not be evaluated.</td>
<td>Employees do not have opportunity to handle equipment that is needed during CS operations.</td>
<td>5</td>
</tr>
</tbody>
</table>
Safety Survey and Award Submittal

The purpose of the AZ Water Safety Awards Program is to recognize the efforts accomplished by Arizona utilities toward safe operating practices employed in water treatment plants, wastewater treatment or water reclamation plants, water distribution systems or wastewater collection systems. Submittal forms are available on the AZ Water website at www.awpca.org or www.azwater.org (new website online in February), by fax or email request through the Safety Committee.

Please return forms to:  
Fax: 480-649-2897  
Mail: Workplace Safety Specialists  
1122 S. Greenfield Rd, Ste. 104  
Mesa, AZ 85206  
Email: johnb@WorkplaceSafetySpecialists.com

A. General Information (Please select all that apply)

☐ Water Treatment ☐ Water Distribution System ☐ Wastewater Treatment ☐ Wastewater Collection System

Facility Name(s): ___________________________  Avg. Flow: ___________  Pop. Served: ___________

Facility Grade(s): ___________________________  Safety Manager/Representative: ___________________________

Address: ____________________________________  State: AZ  Zip Code: ___________

City: ___________________________  Phone: ( ) ___________________________  Fax: ( ) ___________________________

E-Mail: ____________________________________

B. Safety Program Information

<table>
<thead>
<tr>
<th></th>
<th>Does your facility have a formal safety program?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does your facility have a safety committee?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>Does your facility have a designated safety officer/representative</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>Does your facility have a safety awards program?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>Does your facility have a formal program for disciplinary action of safety infractions?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>5</td>
<td>Does your facility have a formal training program for safety related topics?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>6</td>
<td>Does your facility conduct routine inspections to identify safety concerns?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>7</td>
<td>Does your facility have a working relationship with the local emergency service agency?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>8</td>
<td>Comments</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Safety Committee Contact Info: John W. Bannen / ph: (480)649-2851 / email: johnb@WorkplaceSafetySpecialists.com
C. Safe Work Practice Information

<table>
<thead>
<tr>
<th>This information is for the full calendar year.</th>
<th>Water Treatment</th>
<th>Distribution</th>
<th>WW Treatment</th>
<th>WW Collections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of full time employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of part time employees (if any please</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Answer next question)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man-Hours per year for part time employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of accidents that resulted in time off</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Restricted duty. *</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of work days lost. Include restricted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>duty. **</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of treated injuries with ZERO lost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>workdays***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DEADLINE FOR SUBMISSION IS March 6, 2009

Safety Committee Survey

1. Would you like to see a safety award not awarded bases solely on injury/incident statistics but objective safety program information such as: training program, innovation, employee involvement, etc.  _____ yes  _____ no

2. Please rank the following safety topics as potential safety training seminars conducted through the AZ Water Association Safety Committee Outreach.

<table>
<thead>
<tr>
<th>Please Rank #1-#10</th>
<th>Safety Topic/Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incident Reporting/Accident Investigation</td>
</tr>
<tr>
<td></td>
<td>Temporary Traffic Control/Flagging</td>
</tr>
<tr>
<td></td>
<td>Confined Space Entry Training</td>
</tr>
<tr>
<td></td>
<td>Trench and Excavation Competant Person Training</td>
</tr>
<tr>
<td></td>
<td>Fall Protection</td>
</tr>
<tr>
<td></td>
<td>Safety Program Implementation/Employee Involvement</td>
</tr>
<tr>
<td></td>
<td>Defensive Driving/Fleet Management</td>
</tr>
<tr>
<td></td>
<td>Ethics in Safety/Enforcing Safety Programs and Initiatives</td>
</tr>
<tr>
<td></td>
<td>Chemical Handling (Please List type</td>
</tr>
<tr>
<td></td>
<td>Emergency Response Planning</td>
</tr>
</tbody>
</table>

3. Would you or anyone you know like to become more actively involved in the AZ Water Safety Committee? Please provide your contact information and a member of the current committee will be in contact with you.

__________________________________________________________________________

__________________________________________________________________________

Thank you for your participation.

Safety Committee Contact Info: John W. Bannen / ph: (480)649-2851 / email: johnb@WorkplaceSafetySpecialists.com
Water Treatment Committee Seminar Series
Dealing with Changing Water Quality

Tuesday, February 24, 2009

GateWay Community College
Center for Health Careers Education Auditorium
Room CH1106
108 N. 40th Street, Phoenix, AZ 85034

AGENDA

8:30 a.m. - 8:55 a.m. Registration
8:55 a.m. - 9:00 a.m. Welcome: Uday Gandhe, Wilson Engineers Chairman, AZ Water Association, Water Treatment Committee
9:00 a.m. - 9:30 a.m. Arizona Water Resources Challenges
Paul Westerhoff, Arizona State University
9:30 a.m. - 10:00 a.m. Perspective of a Wholesale Provider
Paul Hendricks, CAP
10:00 a.m. - 10:30 a.m. Impacts of Climate Change on Water Quality
Chuck Graph, Arizona Water Institute
10:30 a.m. - 10:45 a.m. BREAK
10:45 a.m. - 11:15 a.m. Emerging Contaminants and What is ahead of us ???
Dr. Shane Snyder, Southern Nevada Water Authority
11:15 a.m. - 11:45 a.m. Parts per Trillion and Beyond: Detecting present and emerging contaminants in drinking water
Randy Gottler, City of Phoenix
11:45 a.m. - 12:15 p.m. Oxidation Technologies
Greg Bradshaw, HDR
12:15 a.m. - 12:45 p.m. LUNCH BREAK
12:45 p.m. - 1:30 p.m. Panel Discussion
1:30 p.m. - 2:00 p.m. Chlorine Dioxide
Amlan Ghosh, MPI
2:00 p.m. - 2:30 p.m. DBP Control Options: Optimization and Implementation
Michelle De Haan, DSWA
2:30 p.m. - 3:00 p.m. Full Scale Testing of Bromate Mitigation Strategies
Linda Bezy-Botma, City of Peoria and David Eberle, MPI
3:00 p.m. WRAP UP
Water Treatment Committee Seminar Series
Dealing with Changing Water Quality

Tuesday, February 24, 2009

GateWay Community College
Center for Health Careers Education Auditorium
Room CH1106
108 N. 40th Street, Phoenix, AZ 85034

REGISTRATION FORM

Note: use this form or register on-line at www.aw pca.org or www.azwater.org
(the new web site should be available sometime in January)

Attendee Name: ____________________________________________
Organization: ______________________________________________
Address: ____________________________________________________
Phone: __________________ Fax: ________ E-mail: ________________

Registration Fee:

☐ AZ Water Member: $60
☐ Non-Member: $90 (includes 1-year free AZ Water membership)

Payment:
Check (made payable to AZ Water)
Credit Card Payment (Mastercard and VISA accepted)

Credit Card Number: ___________________________ Exp. Date: ____________

Cardholder’s Name: ____________________________________________

Mail Registration and Payment to:
Monica Flores
Wilson Engineers, LLC
9633 S 48th Street, Suite 290
Phoenix, Arizona 85044
Tel.: (480) 893-8860 Fax: (480) 893-8968

Valuable Professional Development Hours are available. You may be eligible to receive up to 5 PDHs!
Water Treatment Grades 1 & 2
1. In water filtration plants, how are filter production rates measured?
   A. gpm
   B. gpm/sq ft
   C. mgd
   D. mgd/sq ft

2. What is the minimum chlorine residual required for compliance with microbial standards for Giardia and viruses?
   A. 0.2 mg/L
   B. 0.3 mg/L
   C. 0.4 mg/L
   D. 0.5 mg/L

3. How many gallons per day of 12% sodium hypochlorite, with 1.0 pound per gallon of chlorine, are used to treat 13.83 million gallons of water at a dosage of 1.6 milligrams per liter (parts per million)?
   A. 100 gals/day
   B. 170 gals/day
   C. 218 gals/day
   D. 500 gals/day

4. How much water will a basin hold if it is 64 feet long, 23 feet wide, and 11.5 feet deep?
   A. 16,928 gallons
   B. 100,000 gallons
   C. 126,600 gallons
   D. 141,200 gallons

5. Most of the particles removed during the filtration process in modern large water filtration plants with granular media are considerably smaller than the pore spaces in the media.
   A. True
   B. False

Water Treatment Grades 3 & 4
1. If a 16-inch diameter main is flushed at 3.25 feet per second, how many gallons per minute is being used?
   A. 500 gpm
   B. 1,000 gpm
   C. 2,000 gpm
   D. 4,000 gpm

2. Which of the following is the correct formula for calcium hypochlorite?
   A. HTH
   B. CaCl2
   C. NaOCl
   D. Ca(OCl)2

3. A reservoir that measures 48 feet in diameter and contains 21.5 feet of water. How long will it take to empty this reservoir when draining at a rate of 700 GPM?
   A. 7.0 hours
   B. 8.34 hours
   C. 9.84 hours
   D. 12.3 hours

4. The quality of source water supplies influences the types of treatment needed but does not affect the ultimate consumers.
   A. True
   B. False

5. What is the feed rate in pounds per day (ppd) of a chlorinator at a well pumping 1.6 MGD if the dosage is to be 0.8 mg/L?
   A. 1.28 ppd
   B. 4.25 ppd
   C. 8.34 ppd
   D. 10 ppd

Water Distribution Grades 1 & 2
1. A standpipe is defined as a tank that stands on the ground and has a height greater than its diameter.
   A. True
   B. False

2. If water flows uphill in a water main, the hydraulic grade line will slope upward in the direction of the flow.
   A. True
   B. False

3. If a pump is filling a 250,000-gallon tank at a rate of 695 gallons per minute, how long will it take to fill?
   A. 2.125 hours
   B. 4.04 hours
   C. 6.0 hours
   D. 8.34 hours

4. If a residential water meter has 2 monthly readings of 32465 ccf and 32489 ccf, how many gallons of water were consumed in one month?
   A. 2,400 gallons
   B. 17,950 gallons
   C. 20,016 gallons
   D. 83,400 gallons

5. What is the chlorine demand if 3.7 ppm of chlorine is added to water and a residual of 0.8 mg/L is obtained?
   A. 2.9 ppm
   B. 4.5 ppm
   C. 3.7 mg/L
   D. It cannot be determined.
Wastewater Collection Grades 1 & 2

1. Open or leaking joints are necessary for root intrusion in collection systems.
   A. True
   B. False

2. The proper sequence for testing atmospheres in a confined space is:
   A. Combustible gases, oxygen content then toxic gases.
   B. Combustible gases, toxic gases then oxygen content.
   C. Oxygen content, combustible gases then toxic gases.
   D. Toxic gases, combustible gases then oxygen content.

3. If wastewater is being pumped through a 6-inch force main at a flow of 400 gallons per minute (GPM), what is the velocity of the wastewater in the line in feet per second (fps) presuming the main runs full?
   A. 6.8 fps
   B. 8.34 fps
   C. 13.24 fps
   D. 196 fps

4. Caution must be taken when using hydraulic cleaning methods to avoid:
   A. Cutting tree roots and killing trees.
   B. Flooding homes.
   C. Overloading hydraulic capacity of downstream treatment plant.
   D. Washing large amounts of grit down the sewer.

5. At what depth is shoring required for excavations?
   A. 3 feet
   B. 4 feet
   C. 5 feet
   D. 6 feet

Wastewater Collection Grades 3 & 4

1. The most important point for right-angle pump gear drive is to have the proper:
   A. Torque on the nuts and bolts.
   B. Location of the pump in the wet well.
   C. Lubrication for the gears.
   D. Start and stop elevations.

2. If electrical ammeter readings are higher than expected, the high current could produce:
   A. Motor running more efficiently than design.
   B. Irregular meter power usage readings.
   C. Lower horsepower output than expected.
   D. Overheating and damage to equipment.

3. What is the capacity in gallons of a wet well if the high operating level is 20 feet above the bottom and the diameter of the wet well is 5.5 feet?
   A. 605 gallons
   B. 1250 gallons
   C. 1825 gallons
   D. 3229 gallons

4. If chlorine in the form of sodium hypochlorite is added to a manhole with a flow of 3.8 MGD at a dosage of 20 ppm as chlorine, what is the feed rate of the sodium hypochlorite in gallons per hour? Assume the sodium hypochlorite contains 0.5 pound of chlorine per gallon of sodium hypochlorite.
   A. 8.34 gallons/hour
   B. 26.4 gallons/hour
   C. 52.8 gallons/hour
   D. 100 gallons/hour

5. Parts of the body of wastewater collection system operators most frequently injured by accident are:
   A. Arms.
   B. Backs.
   C. Fingers.
   D. Legs.

Wastewater Treatment Grades 1 & 2

1. Preliminary treatment (pretreatment) takes place in the collection system before wastewater reaches the treatment plant.
   A. True
   B. False

2. What is the volume of a sedimentation basin 75 feet in diameter and 14 feet deep?
   A. 61,800 gallons
   B. 78,750 gallons
   C. 150,000 gallons
   D. 462,400 gallons

3. Where does the term “activated” come from in the activated sludge process?
   A. Air is activated in the process.
   B. Power must be activated to operate the process.
   C. Sludge particles are teeming with bacteria, fungi, and protozoa, thus activated.
   D. Activated carbon is utilized in the process.

4. In waste treatment ponds, the effluent should leave the pond:
   A. At the surface over weirs.
   B. Just below the surface with a scum baffle around the outlet.
   C. From the bottom of the pond.
   D. Through evaporation off the surface.

5. How many ppm of chlorine is applied to a flow of 4.6 MGD if the chlorine scales indicate a usage of 525 lbs over 24 hours?
   A. 1.0 ppm
   B. 8.34 ppm
   C. 13.7 ppm
   D. 114 ppm

Wastewater Treatment Grades 3 & 4

1. The principal difference between step-feed aeration and conventional aeration is that in step-feed aeration the incoming waste is introduced in slugs at the tank inlet.
   A. True
   B. False

2. Calculate the weight of solids in an aeration basin that is 45 feet in diameter and 14 feet deep with a suspended solids concentration of 2,200 mg/L.
   A. 2,200 lbs
   B. 3,100 lbs
   C. 4,000 lbs
   D. 4,900 lbs

3. What is the surface hydraulic loading rate in gallons per day per square foot (gpdpsf) for a basin with an influent flow of 2.5 MGD and the basin is 55 feet in diameter and 12 feet deep?
   A. 6.4 gpdpsf
   B. 834 gpdpsf
   C. 1,050 gpdpsf
   D. 12,635 gpdpsf

4. What is the percent removal of a basin if the influent BOD is 237 mg/L and the effluent BOD is 82 mg/L?
   A. 155%
   B. 82%
   C. 65%
   D. 35%

5. A graduated cylinder measures liquid volumes more accurately than beakers but less accurately than burets.
   A. True
   B. False

By Ted Bailey, City of Mesa
ted.bailey@mesaaz.gov

January 2009 21 AZ WATER ASSOCIATION
AZ Water Association Presents:
The Monthly Luncheon Series Events

**Tuesday, January 13, 2009**
**Topic:** Key Considerations in Operational Water System Modeling  
**Presented By:** Pranam Joshi and Ramesh Narasimhan, NCS  
**Register By:** January 2, 2009

**Tuesday, February 10, 2009**
**Topic:** Endocrine Disruptors in Wastewater  
**Presented By:** Dr. Bob Arnold, U of A  
**Register By:** January 30, 2009

**Tuesday, March 10, 2009**
**Topic:** Water Infrastructure Sustainability Roundtable  
**Presented By:** TBD  
**Register By:** February 27, 2009

**Tuesday, April 14, 2009**
**Topic:** Santan Vista WTP Start-up  
**Presented By:** Black & Veatch  
**Register By:** April 3, 2009

**Time:** 11:45 am - Registration  
Noon - Lunch

**Location:** SRP Pera Club  
1 East Continental Drive  
Tempe, AZ 85281

**Cost:** $20/person for members  
$25/person for non-members

**Contact:** Daniel Candelaria  
daniel.candelaria@ch2m.com  
(480) 377-6220

For More Information:  
Please Register Online at the AWPCA Website under “Upcoming Events”  
http://www.awpca.org

Special Thank You to our Flyer Sponsor  
Kiewit Western Co. (602) 437-7678  
Water/Wastewater Infrastructure
HISTORIAN’S REPORT

Sometimes its good to look back on the evolutionary development of our key utilities such as potable water systems. Such an endeavor gives us the chance to realize just how far we’ve come over the past 5000 years or more. The best (and, often the most surprising) is the recognition of how far we’ve yet to go!

WATER HISTORY:
Key Infrastructural/Scientific Events Through the Years

Earliest Need for Water: From the beginning of time, mankind and ancient civilizations have recognized the importance of water in support of life and health.

Water Storage Wells: Water stored in wells and distributed via simple channels at ground surface; Jericho, Israel – 5000 BCE. Later on, hollow tubes started to be used for conveyance … Egypt used hollow palm tree trunks and China and Japan used bamboo trunks. In more modern times clay, wood and then metal pipes started to be used for water conveyance and distribution.

Mohenjo-Daro (modern day Pakistan): City of 50,000 people in the Indus River Valley … considered by historians to be the birth place of “sewers” – 3500 BCE.

Early Purification of Water: The Greeks were aware water could be purified by boiling and that filtration made water look better – 2000 BCE.

Egyptians: Used alum to cause suspended particles in water to settle out – 1500 BCE.

Distribution Systems Began: Construction of “qanats” (gently sloping tunnels) into hills to collect ground water; they, in turn, drained the water by gravity to open channels and on into towns … Persia – 700 BCE.

Greek Scientist Hippocrates: Hippocrates invented the first cloth bag filter for water. He believed that if water tasted and smelled clean, it must be healthful for human consumption. His invention, called the “Hippocratic sleeve” is recognized as one of the first domestic water filters; following boiling, the water was poured through the cloth filter (“sleeve”) – 500 BCE.

Carthage (Tunisia): The Phoenicians developed one of the more advanced water conveyance/storage (cisterns) systems of its time – 400 through 146 BCE. Carthage fell to the Romans in the Third Punic War (146 BCE).

Roman Aqueducts: Several built between 312 BCE and 455 AD to bring water into City of Rome. Longest one (57 mi.) had only 

continued on page 24
7 mi. of it above ground … the Aqua Marcia Aqueduct. In 300 AD, Rome’s system of aqueducts was delivering water into the City at the rate of 300 gal/capita/day. The Roman Empire fell in 375 AD.

**Machu Picchu:** Incan engineers constructed water distribution systems/fountains – 1450 AD. Many of the channels still carry water.

**Dark Ages (approx. 450 AD – 1500 AD):** Little development in water systems (sources, distribution or treatment) development; instead, the people’s main concern was “basic survival”.

**Revitalization of Efforts to Clean Water:** Sir Robert Bacon began experimenting with a form of sand filtration to remove salt from sea water. Although his efforts were not successful, his work sparked a revival of experimentation in water treatment – 1627 AD.

**Age of Enlightenment (16th through 18th centuries):** Philosophers discussed the natural rights of all humanity. French scientists (approx. 1550) proposed that every French household install a sand filter to provide them with clean water. 100 years later, government officials in the United Kingdom noted that every home in the kingdom should be provided with filtered water.

**Microscope:** Zaccharias Janssen (and his son, Hans) experimented (1590 AD) with glass lens in a tube – to magnify objects; their work was the forerunner of the modern day telescopes and microscopes. Approximately 100 years later (1690 AD), Anton van Leeuwenhoek improved upon Janssen’s work and was able to reach magnifications of up to 270 times that of the original object’s size. Leeuwenhoek was the first person noted to have actually seen microorganisms in water – using his microscope.

**First US Waterworks:** Formed in 1652 in Boston, MA to distribute water (via wood log pipe) for fire fighting and domestic use; incorporated over 15 mi. of wood (hemlock) log water pipe (3” and 5” ID).

**First Use of Cast Iron Pipe:** Gardens of Versailles, France. Installed in mid – 1700s; stayed in service until early 1920s. Philadelphia, PA was the first US city to use cast iron pipe for water distribution – 1804.

**First Treated Drinking Water Supply for an Entire City:** Paisley, Scotland in 1804. Paisley’s system utilized slow sand filters for treatment – designed by Robert Thom, a scientist of the Scottish Enlightenment.

**Paris, France’s Water Treatment Plant:** Paris’ water plant allowed the water to set under quiescent conditions (to help settle out particulate matter) for 12 hours before being filtered through beds of sand and charcoal (filter media had to be changed out every 6 hours) – early 1800s.

**England - First (Slow) Sand Filters:** Developed by Englishman James Simpson and patterned somewhat after Robert Thom’s design – 1827; many historians consider Simpson’s achievements to be one of the most significant advances in Public Health history.

**Crotan Aqueduct:** Constructed to bring water in to New York City – comprised of a 41 mi. long system of open channels, 16 tunnels, 114 culverts and a bridge over the Harlem River – 1850’s.

**Progress:** Cholera was proven by Dr. John Snow (England), utilizing a microscope, to be a water borne disease; realized by linking the source of an outbreak of illness in London to a public well (Broad Street) that had been contaminated with sewage – 1855. The Broad Street Pump had a reputation for its water having good taste and quality. Snow’s discovery proved again that taste and visual clarity does not necessarily always mean the involved water is pure. The English soon began utilizing chlorine to disinfect water supplies.

**Water Tunnels (Chicago, IL):** Water was brought into City of Chicago from Lake Michigan via a twin tunnel system (2 mi. long). The first tunnel was completed in 1869 and utilized a 3’ wide, 138’ tall standpipe (to equalize pressure in the mains in the City). The building that housed the standpipe (Chicago Water Tower), up until 1906, was spared from the great Chicago Fire of 1871 and stands yet today. Initially, coal fired steam engines powered the pumps that drew water from the tunnels for distribution into/through the water mains of the City.

**Louis Pasteur:** Through his “germ theory”; he was able to illustrate how microscopic organisms could transmit disease through media such as water – 1880s.

**Rapid Sand Filters:** Thom’s and Simpson’s slow sand filters worked but, they were large and required frequent/extensive cleaning. The growing need for clean water caused the design (in the US) of rapid sand filters – ones cleaned by powerful streams of water; as such, bettering the filter’s efficiencies and capacities - late 1800s, early 1900s.

**Early Water Treatment Facilities in the United States (Early 1900’s):** Emerging knowledge indicated that the ability of water to convey pathogens was directly related to the level of turbidity present. As such, most of the early treatment systems in the US worked to lower the water’s level of turbidity – thereby also removing disease causing microbes; ones that caused typhoid, dysentery and cholera. Slow sand filtration was the process used early on; followed shortly by the use of rapid sand filters. The use of rapid sand filters; and, soon thereafter, combined with the use of chlorine as a disinfectant,
is considered by many to be the most significant public health advances in the twentieth century.

**Sanitary and Ship Canal – Chicago:** In 1900, the Main Channel of the Sanitary and Ship Canal opened; reversing the flow of the Chicago River. The 28 mile, 24 foot deep, 160 foot wide drainage canal, built between Chicago and the Town of Lockport was designed to allow water in the River to (instead) flow from Lake Michigan, to dilute sewage that was being dumped from the City into the river and, to then convey it away from the City (and, away from its primary source of drinking water; Lake Michigan) towards the Mississippi River; and not into Lake Michigan (as had been the case up until 1900). At that time, it was the largest municipal earth-moving project ever done.

**Water Softeners:** Water softeners using sodium ions to replace water-hardening minerals in the water were first introduced into the water treatment market - 1903.

**Disinfection in the United States:** With the influence of Abel Wolman, chlorine (sodium hypochlorite) was used for the first time in the US as the primary disinfectant for drinking water – @ the Jersey City Waterworks in Jersey City, New Jersey – 1908. The biggest obstacle that had to be overcome before the chlorination of drinking water was implemented was to convince the public that it was okay to add an otherwise poisonous chemical to the drinking water in order to improve public health!

**Activated Sludge Process:** In 1913, chemists in Birmingham, England developed a process whereby air was bubbled through the biomass of sewage; then, after letting the mixture settle, the resulting effluent water was much cleaner. In 1916, this new activated sludge treatment process was put into operation in Worcester, England. In 1923, construction began on the first large scale activated sludge facility – on Jones Island, just off the shore of Lake Michigan at Milwaukee, WI.

**First Government Regulations:** US Public Health Service was the first to set standards for the bacteriological quality of drinking water – 1914.


**Bardenpho Process (1980’s):** James Barnard, a South African engineer, developed a WW treatment process that removed nitrates and phosphates from sewage without the use of chemicals. Known as the Bardenpho Process, it converts the nitrates in the activated sludge to nitrogen gas, which when released, removes a high percentage of the suspended solids and organic material.

**2001:** Of the more than 250 million people in the US in 2001, approximately 90% of them receive their water from community water systems.

**2006:** Throughout the world, water-borne diseases were estimated to have caused 1.8 million deaths in 2006; 1.1 billion people still lacked proper drinking water while over 2 billion still lacked adequate sanitation.
Young Professionals Committee 2008 Review!

The AZ Water Association Young Professionals Committee had a successful year in 2008! Highlights of the year included:

- Facilitating technical presentations geared toward young professionals at the Annual Conference and hosting a Technical Luncheon Seminar Series on Industry Approaches to Sustainability
- Providing networking opportunities for area young professionals and students
- Organizing the annual Bowl-a-Thon and Kickball Game
- Supporting university student groups at Arizona State University, University of Arizona, Northern Arizona University, and Gateway Community College
- Organizing the Fresh Ideas contest and selecting a winner to represent Arizona at the AWWA Annual Conference in Atlanta, Georgia
- Selecting and recognizing AZ Water Association scholarship recipients
- Reaching out to elementary and middle school students through the Engineer’s Day at the Arizona Science Center and the Future Cities Competition
- Sponsoring selected Arizona YPs to attend the national YP Summit at WEFMAX in Austin, Texas
- Supporting the local Water for People fundraising efforts

Committee Chair Laurel Passantino and Vice-Chair Patrick Goodfellow would like to thank all the volunteers, participants, and sponsors that made these events possible. Look for 2009 AZ Water Association Young Professionals events in the YP e-news or the next installment of the newsletter.

The Young Professionals Committee announces new leadership for 2009. After a year of service as the vice-chair, Patrick Goodfellow of CDM is becoming the Committee Chair. Jacqueline Shaw of Malcolm Pirnie will be the Committee Vice-Chair.

If you have any questions about the Young Professionals Committee or would like to be added to the Young Professionals e-news mailing list, please contact Patrick Goodfellow at goodfellowp@cdm.com or Jacqueline Shaw at jshaw@pirnie.com. For more information on the Southern Arizona YP Group, please contact James Collins at jcollins@pirnie.com.

Water For People Committee Update

For more information about the Water For People Committee, visit our website at www.arizonawaterforpeople.org. We are always looking for volunteers. Help us plan our spring event, silent auction at the AZ Water annual conference, annual golf tournaments, fall hike-a-thon and/or El Tour de Tucson!

Sonoran Spa Event
Every Other Month - Tucson

The Sonoran Spa, located at Westward Look Resort in Tucson, AZ will be holding fundraising events for Water For People every month starting in February. Spa services will be provided on a specified day in exchange for a $50 per person donation that would directly benefit Water For People. Advance registration is required, please contact the spa directly at (520) 297-1151.

4th Annual Silent Auction
May 6th and 7th – Glendale, AZ

Water For People will once again hold their Silent Auction in the Exhibitor Hall at the AZ Water Annual Conference, starting at the opening of the conference on Wednesday, May 6th and ending at 11:00 a.m. on Thursday, May 7th. Donations of auction items will be very gratefully accepted. Contact Andrea Odegard-Begay at 602-797-4654 (aodegard@pirnie.com) for more information and keep an eye out for those numbered balloons in the Exhibit Hall!

Calling All Kiwanians And Rotarians

Are you a Kiwanian or Rotarian? If you are, the Water For People Committee would like to hear from you! Please send an email to Andrea Odegard-Begay (aodegard@pirnie.com) identifying your club name and district. We would like to arrange a Water For People presentation at your club meeting as we embark on an ambitious program to forge a stronger partnership between Water For People and both Kiwanis International and Rotary International here in Arizona. We want to get the word out to Kiwanis and Rotary Clubs throughout Arizona about Water For People and we need your help!

Water Corps

Learn more about Water For People’s new in-country volunteer program by visiting www.waterforpeople.org/water_corps.html. Water For People is seeking skilled volunteers to assist with program monitoring, evaluations and mapping. Volunteers are self-nominated and an application form can be found online. If you have any questions, feel free to contact Katie Hammer (khammer@greeley-hansen.com) or David Christiana (dchristiana@cox.net) who both recently returned from Water Corps assignments.

Reuse Committee Happenings

John P. Kmiec, Reuse Committee Chair, Tucson Water

The year 2008 was a year of transitions with the Reuse Committee. Half way through the course of the year, our Chairperson, Jon Risinger, decided to take a position with an engineering firm in New Orleans. We wish him well.

Throughout the year, the Reuse Committee has met to continue the advancement of the Reclaimed Water Site Inspection Program. For those of you who are not aware, the Reuse Committee has been working on various issues that will eventually assist utilities in providing guidance and developing
monitoring techniques for the reclaimed water purveyor and reclaimed water end users. The principle programs that we are continuing to work on are the development of the Reclaimed Water Site Inspector and Specialist training programs. These programs were conceived a couple of years ago by the Reuse Committee members as an appropriate way to prepare the reclaimed water purveyor and the reclaimed water end use customer for the safe and compliant use of reclaimed water. The main focus of this eventual program will be the development of a site inspector guidance manual to be used for training purposes. Currently, several members of the Reuse Committee are working on a national site inspector guidance manual that is actively being developed by the WateReuse Association. When this manual is produced (hopefully by the end of 2009), the Reuse Committee members will then embark on creating an Arizona-specific training program for the safe distribution of reclaimed water to all types of end users.

The other major happening of 2009 will be the joint WateReuse Arizona – AZ Water Association Reuse Water Conference to be held July 30th and 31st in Flagstaff. This cooperative conference between these two agencies will be filled with presentations on all the important topics currently affecting the reclaimed water world from microconstituent monitoring, distribution and treatment techniques, and program development. In addition, presentations on rainwater harvesting and graywater reuse are also scheduled to be discussed.

Please mark your calendars for this conference. It is expected to be a great one, again!

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E-mail: kflanagan@miscowater.com
AZ Water will award scholarships to undergraduate and graduate students at Arizona colleges and universities pursuing studies related to water, wastewater, or environmental resources. Scholarships will be awarded as determined by the selection committee. Applicants must be students during the 2009 academic year. U.S. citizenship is not a requirement.

Scholarship applications will be available online in **Late January 2009** and winners will be selected in **Late March 2009**.

**For more information, please contact:**
Jeanne M. Jensen, E.I.T.
2355 East Camelback Road, Suite 700
Phoenix, AZ 85016
jjensen@dswa.net
602.217.1012

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**TRIVIA Answers**

(From the AZ Water Historian on page 9)

A. The feldspar rich clay from the bottom of a New Jersey swamp (exact location is kept a secret) is used (after debris is filtered out and a “magic” ingredient is added) to “rub-down” new baseballs before they are ever used in a MLB game. Each team receives two 3 pound containers of the mud at the beginning of each season – a one year’s supply. The mud started being used in 1938 and has been used by MLB ever since. It is called “Lena Blackburne Baseball Rubbing Mud”.

B. 1819; by W.K. Clarkson Jr.

C. 21 Jun 1983 @ Vostok Station in the Antarctic; - 128.6 degrees F

D. Mary Elizabeth Jane Colter (born 4 April 1869; died 8 Jan 1959).

E. 26 May 1930.
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Indianapolis, IN - Savage, MN
2009 AZ WATER DISTRIBUTION COMMITTEE PRESENTS
WATER / WASTEWATER WORKSHOP

Agenda

7:30 – 7:55 a.m. Registration
7:55 – 8:00 a.m. Introductions
8:00 – 9:00 a.m. Water System Bac-T Sampling – Chris Hill, Metro Water District
9:00 – 10:00 a.m. Backflow & Cross Connection Control in Arizona – Mark Titus, Tucson Water
10:00 – 10:15 a.m. Break
10:15 – 11:15 a.m. Reclaimed Water Site Inspection & Irrigation System Conversions
   – Mark Titus, Tucson Water
11:15 – 12:00 p.m. Lunch (provided)
12:00 – 1:00 p.m. Asset Management / Program Driven Maintenance Programs for Water Systems
   – Stephen Dean, Tucson Water
1:00 – 2:00 p.m. Water Reservoir Inspections, Steel Storage Tank Maintenance, & Water
   Quality Considerations – Matt Tasch, Utility Service Company
2:00 – 2:15 p.m. Break
2:15 – 3:15 p.m. Meters Are Your Cash Registers – Dan Yeo, Arizona Water Company
3:15 – 4:00 p.m. Questions and Discussion
   Distribution of Certificates and PDHs – Total of 6 PDHs

WATER DISTRIBUTION COMMITTEE MEMBERS

STEPHEN DEAN, CHAIR – CITY OF TUCSON
LARRY BROWN – ANM EQUIPMENT / MILLER ENGINEERING
KENNETH MORGAN, CITY OF PHOENIX
DAVE PETTY – CITY OF SCOTTSDALE
JERRY POSTEMA – CITY OF GOODYEAR
FRED RIOS – ARIZONA WATER COMPANY (GLOBE/MIAMI)
STEVE RUPPENTHAL – CITY OF AVONDALE
MATT TASCH – UTILITY SERVICE COMPANY
2009 AZ WATER DISTRIBUTION COMMITTEE PRESENTS
WATER / WASTEWATER WORKSHOP

TIME: 8:00 a.m. – 4:00 p.m.

LOCATIONS-DATES: Scottsdale February 18, 2009
Tucson March 18, 2009
Flagstaff April 22, 2009

COST: $55.00 Per Person (Morning Refreshments and Lunch Provided)

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Speakers will Provide Expert Workshop Presentation Material on:
Bac-T Sampling Procedures, Backflow/Cross Connection Control, Reclaimed Water Site Inspection & Irrigation System Conversion, Asset Management/Program Driven Maint. for Water Systems, Water Reservoir Inspections/Steel Storage Tank Maint. & Water Quality Considerations, and Meter Applications.

Space Is Limited. Registration begins: January 1, 2009

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January 2009 31 AZ WATER ASSOCIATION
Prescott Valley Receives 2008 Pisces Award

The U.S. Environmental Protection Agency’s (EPA) Region 9 office has presented its 2008 Pisces Award to the Town of Prescott Valley in Yavapai County for the last phase of its wastewater treatment plant.

EPA Region 9 gives the Pisces award each year to outstanding clean water projects. WIFA had nominated Prescott Valley for the EPA award.

The project, which was funded by WIFA, has increased the capacity of Prescott Valley’s wastewater treatment plant from 2.5 million to 3.75 million gallons a day. Changes to the plant’s ditches, filters, disinfection system, and other parts of the infrastructure have also saved money and resulted in Class A+ effluent, the highest grade for reclaimed water. In addition, the town will be able to sell its effluent, which makes it possible to afford piping in drinking water from the Big Chino aquifer, 30 miles to the north.

EPA officials and WIFA Chairman Steve Owens presented the award plaque to representatives of the Town of Prescott Valley at a recent WIFA board meeting.

In addition to Chairman Owens, attendees at the ceremony included Laura Bose, Senior Policy Advisor and Water Division Lead for Arizona at EPA Region 9; Neil Wadsworth, Utilities Director for Prescott Valley, and Mark Kieren, Utilities Operations Manager for Prescott Valley, along with WIFA staff and board members.

WIFA Awards Design Loan for B & C Colonia in Yuma County

The Yuma County Improvement District recently closed a $300,000 low-interest, three-year loan with WIFA for the design of a new wastewater collection and conveyance system for the Avenue B & C Colonia Improvement District, an unincorporated area northwest of Yuma.

The new system will move wastewater to the City of Yuma’s Figueroa Avenue Water Pollution Control Facility. Almost all of the improvement district’s 5,000 residents rely on septic tanks and cesspools, which lead to complaints about odors and backups. The tanks and cesspools could endanger the groundwater, and the nearby Colorado River.

The WIFA loan is one piece of a $1 million project that also will be financed by a $500,000 grant from the Border Environment Cooperation Commission and a $200,000 grant from North American Development Bank. The grants were contingent upon the district acquiring the WIFA loan.

Earlier this year, WIFA awarded the district a $35,000 technical assistance grant for a design concept and a $4,000 grant in 2004 for formation of the improvement district.

Rural Water Infrastructure Finance Authority-RWIC working with ADEQ Water Section Programs

The Rural Water Infrastructure Committee-RWIC is currently working with the ADEQ Water Quality Division, Drinking Water Section Programs Unit in providing training, operator certification, the Monitoring Assistance Program (MAP) and capacity development to small rural communities. Technical Assistance is also provided by way of system evaluations and operation and maintenance packages. For more information, please contact Kathy Stevens—Capacity Development Coordinator at kds@azdeq.gov or visit www.rwic.az.gov.
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:: Aqua-Aerobic® MBR MEMBRANE BIOREACTOR
- Provides enhanced biological nutrient removal via time-managed sequential aeration in a compact footprint.
- Direct filtration of MLSS with PURON® submerged membranes achieves solids removal to submicron levels.

:: AquaDisk®/AquaDiamond® CLOTH MEDIA FILTERS
- Aqua’s cloth media filters, featuring OptiFiber® cloth media, are ideal for reuse/recycle applications and offer added benefits of low backwash rates, less operator attention and maintenance, and a small footprint.

With disinfection, Aqua-Aerobic Systems’ technologies are specifically designed to achieve Arizona’s Class A+ Reclaimed Water requirements.

FOR MORE INFORMATION CONTACT:

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The Reuse Specialist
41355 N. Desert Winds Dr. | Cave Creek, AZ 85331
Ph 480.488.3009 | Fax 480.488.2525
Email john@iessouthwest.com | Web www.iessouthwest.com
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A water sector utility needs resources and personnel quickly in a utility emergency. The Arizona Water/Wastewater Agency Response Network (AZWARN) is a mutual aid network of water sector utilities bound by a common mutual aid agreement. The purpose of the AZWARN Agreement is to have a legal arrangement with many water sector utilities in place, prior to emergencies. This allows an immediate response to crisis-stage requests, contacts in many utilities, and avoids losing time in legal negotiations between jurisdictions.

Arizona is one of 35 states with intrastate WARN agreements, participating in the National WARN consortium. American Water Works Association in conjunction with the Environmental Protection Agency sponsors the national forums. In Arizona the AZ Water Association, with training funds from Arizona Department of Environmental Quality (ADEQ), has sponsored the Arizona chapter called AZWARN.

In Arizona 12 public utilities have signed the intrastate agreement in Arizona, submitting signed Mutual Aid Agreements to the AZWARN Chairperson. Two more public utilities in Arizona indicate they have obtained council approval to join AZWARN and are in the process of submitting paperwork. In addition, six more water sector utilities have indicated that they are in process of getting approval from their respective authorities to join. The Rural Water Association (formerly Arizona Small Utilities Association) became an Associate member of AZWARN. The partnership of AZ Water and the Arizona Rural Water Association in promoting AZWARN gives added energy to the mutual aid network in Arizona.

Recently, the Arizona Division of Emergency Management reached out to include AZWARN representatives in the newly forming NIMS Credentialing Workgroup, which will discuss NIMS credentialing requirements for Public Works and the Water Sector. This, as well as an invitation to participate in a newly forming Critical Sector Council sets a solid framework for making sure that the Water Sector perspective is heard by Emergency Managers and Security Sectors.

An ADEQ funded Emergency Management Planning workshop was held in Yuma on September 20, 2008 with good participation from area operators. It was hosted by the City of Yuma water utility, with a dynamic presentation by Kathleen Carroll on past utility emergencies. Three more Emergency Planning workshops are planned by ADEQ in 2009. The ADEQ sessions will include an update on AZWARN and continue to expand the education on emergency management for water sector participants [see www.azwarn.com].

An Arizona semi-annual meeting of AZWARN members was hosted by Flagstaff Water Utilities in September. At that time subcommittees were formed to begin work on grant sources, creating an operational manual and working on the associated emergency management materials. There were volunteers from many water utilities to work on the projects: staff volunteered from Phoenix, Metro Water, Tucson Water, Avondale, Prescott Valley, Yuma and Pima County. Yuma staff provided ideas and samples of brochures, calendars and posters for the AZWARN network to be distributed at events and meetings. Phoenix staff took the lead on writing an Operational Manual. Phoenix, Tucson Water and Flagstaff have been exploring funding sources for training and creating an autonomous AZWARN website. The current chairperson was retained and Steve Shepard of Metro Water was elected Vice-Chair. Members decided to meet quarterly until major materials are developed and the fundamental structure established. The next AZWARN members meeting will be hosted by the Metro Water District in Tucson on February 20, 2009. For more information feel free to contact Jean Voelkel: (520) 740-6500, jean.voelkel@wwm.pima.gov or Steve Shepard: (520) 575-8100, sshepard@metrowater.com
Water For People
Hike-a-Thon

With over 140 hikers and 15 volunteers, this year’s hike at Phoenix South Mountain Park was our largest yet! We donated thousands of dollars to Water For People, and we couldn’t have done it without you.

Thank You
For Your Support!

Greeley and Hansen
carollo
Malcolm Pirnie
AZ Water Association
Young Professionals
Season’s Greetings

The Water For People Committee would like to express its appreciation to all the AZ Water supporters who helped to spread goodwill, safe water and adequate sanitation in 2008 - don't miss our 2009 events:

Volleyball Tournament  March 21st
Mini-Golf Tournament  April 18th
AZ Water Annual Conference Silent Auction  May 6th and 7th
Phoenix Golf Tournament  June 27th
Southern Arizona Golf Classic  August 29th
Hike-A-Thon  November 7th
El Tour de Tucson  November 21st
Request For Sale (Rfs 08-07)
Water Treatment Ultra Filtration Plant

The City of Glendale, Arizona is offering for sale a complete ultra filtration plant, rated at one million gallons per day. The plant includes the following components:

- **Raw water feed system.** Includes one course and one fine prefilter, 20 hp raw water pump and strainer.
- **Feed system.** Includes an 8000 gallon feed tank, 25 hp feed pump, magmeter.
- **Filtration system.** Includes support rack with 24 L1B35 filtration modules, 50 hp recirculation pump, electrical control cabinets, 15,000 gal. water tank.
- **Backwash system.** 125 hp backwash pump, 3700 gal. waste tank, magmeter.
- **All associated piping and valves.**

The minimum bid is $4000.00. The successful bidder will be responsible for removal and transport from the water treatment plant.

For more information, or to request a bid package, call 623-930-2752 or download at HTTP://www.glendaleaz.com/warehouse/bidopp. The bid will close March 6, 2009.

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**WATER TREATMENT GRADES 1 & 2**

**WATER TREATMENT GRADES 3 & 4**

**WATER DISTRIBUTION GRADES 1 & 2**

**WATER DISTRIBUTION GRADES 3 & 4**

**WASTEWATER TREATMENT GRADES 1 & 2**

**WASTEWATER TREATMENT GRADES 3 & 4**

**WASTEWATER COLLECTION GRADES 1 & 2**

**WASTEWATER COLLECTION GRADES 3 & 4**

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AZ WATER ASSOCIATION 38 January 2009
I’m 400,000 jobs waiting to happen.

Today, more than $10 billion in drinking water infrastructure projects are shovel ready and can be underway as soon as funds are committed. These projects would put more than 400,000 Americans to work on aging water mains, leaking pipes, treatment plants, pump stations, storage reservoirs, elevated tanks, security safeguards and other needs. This critical work would improve our economy, our environment, and our quality of life for years to come.

Create jobs today and invest in America’s future. Support drinking water infrastructure funding in economic recovery legislation.

For more information, please contact the American Water Works Association at 202.628.8303 or visit awwa.org/jobcreation
I was recently reading from a chapter out of a Dr John Maxwell book on The 21 Irrefutable Laws of Leadership. The topic that caught my attention was on the Law of Priorities.

I am personally struggling with too many good things in my life. I do not know if you have ever felt that you needed to focus to elevate your effectiveness. Well I am at that stage.

The books states the following that I trust will help each of you as it has helped me:

Leaders never get to a point where they no longer need priorities.

**DOING WHAT COUNTS... COUNTS THE MOST!**

If you are busy that does not mean that you are achieving, but it sure feels like it sometimes. If we are not careful we fill our days with activities but not accomplishments.

If you prioritize it forces you to think ahead. To know what is next and what is important. It also helps you do things you do not want to do, but know that you should do.

Have you ever chosen a comfortable choice rather than the choice that results in the most progress or accomplishment?

The first thing each of us must do is to define reality. As you consider this year and the coming year consider the following:

Look at last year's schedule and commitments and see if they match your value system relating to faith, family, friends, and your future goals for your life. If they do, GREAT. If they do not start today to outline your future priorities.

The KEY is to focus on the top 20% of activities, friends, customers, etc. in terms of their importance to you. This will give you an 80% return on your investment. Imagine where you will be next year at this time.

There are three “Rs” when it comes to Priorities:

1. **What is Required?** What must I do that no one else can or should do? If you are doing something that does not fit this criteria, stop doing it an or delegate it.

2. **What Gives the Greatest Return?** Work in your areas of strength. Just because you can do something does not mean you should spend your time on it if it is not the things that you do the best. Replace your marginal activities with activities in your strength zone.

3. **What Brings the Greatest Reward?** This means personal satisfaction in most cases. In some cases it relates to monetary rewards, but that is not my primary recommendation. There are many things that catch the eye, but few that catch the heart. What are the “Fire Lighters” in your life? Passion provides the fuel that keeps you going.

When you re-prioritize you will have to no doubt quit something. Choose wisely what you keep doing, since you are not where you want to be, unless you change something you will not change anything!!

Making the tough decisions based upon your LIFE PRIORITIES will lead you to your own personal SUCCESS AND FUN.

Seek out whatever you can be #1 or #2 at. Get out of your comfort zone. Carve out a time to revisit your new priorities. This is your only life. There is no reply. When you do this you will help others and in doing so, help yourself.

I am honored to share my perspective on “SUCCESS and FUN”. I hope to hear from you, contact me at phendricks@cox.net if I can be of assistance to you.
Arizona Water Reuse 2009 conference
July 30 - 31
Flagstaff, Arizona

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AZ WATER MONTHLY LUNCHEON DOOR PRIZE SPONSORSHIP OPPORTUNITIES

It’s time to reserve your spot for the Monthly Luncheon Door Prize Sponsorship. Sponsoring companies will be highlighted each month at the luncheon event. Each of those firms will receive recognition by providing a door prize valued at $50 at the corresponding AZ Water Association (AZ Water) Monthly Luncheon Meeting.

Don’t miss your chance! The cost is $100 which includes the following: A payment contribution of $50 and one $50 door prize or gift certificate to be raffled at the corresponding AZ Water Monthly Luncheon Meeting.

Your check should be payable to AZ Water. Send checks and gift certificates to: Brown and Caldwell, Attn: Sean O’Connell, PE, AWPCA Luncheon Chair, 201 E. Washington St., Ste 500, Phoenix, AZ 85004. Contact Sean at (602) 567-4014 or by email at soconnell@brwncald.com. Thank you for supporting the AZ Water Association.

Pipe Tapping Teams Wanted!
Janet Brown, Metro Water District

The AZ Water Safety Committee is currently seeking pipe tapping teams to participate in this year’s Pipe Tapping Competition, to be held at the BBQ during the 2009 AZ Water’s Annual Conference in Glendale, AZ. This year we saw three teams answer the call and two were rewarded with a trip to Atlanta, Georgia to compete nationally. We are hopeful that many other Arizona water utilities will put together a men’s or women’s team so that we can highlight the skills needed to do a manual tap, while we have a great time watching and competing. Teams who participate will find that the effort of putting a team together will breed camaraderie, teamwork, increase physical fitness, and will provide a great deal of satisfaction.

Arizona teams who compete with the fastest time will find themselves with an opportunity to attend the 2009 ACE Conference, this year to be held June 14-18 in San Diego, CA. There, they will meet many other teams from water utilities around the country, and internationally.

If you are interesting in joining the fun next year, please notify John Bannen at Workplace Safety, e-mail address: johnb@workplacesafetyspecialists.com, or phone number (480) 649-2851 by February 15, 2009. If you would like to talk with any of last year’s teams for pointers on the competition, please contact Janet Brown at jbrown@metrowater.com, or (520) 877-1194.

Form a team and we’ll see you in May!
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Pedal With Purpose!

On Saturday, November 22, thousands of cyclists took to the streets of Tucson to ride 35, 67, 80 or 109 miles in the University Medical Center El Tour de Tucson, presented by Diamond Ventures ("El Tour"). El Tour promotes "Wellness on Wheels" for those participating and benefits several non-profit organizations that promote wellness in their work.

Seventeen cyclists from this year's El Tour participated in Pedal With Purpose!, raising funds and awareness for Water For People. Water For People became an official beneficiary of El Tour in 2007. Over the last two years, the event has netted nearly $15,000 for Water For People. Organizers see room for growth - in Arizona and beyond. This year Tim Rowe, USGS in Carson City Nevada joined the Pedal With Purpose! team. At the pre-ride dinner for 30 riders, sponsors and volunteers, event chair Dennis Rule announced his hope to double participation in each of the next two years. It's a fun-filled, one-of-a-kind event, so SAVE THE DATE and join the crowd next year: Saturday, November 21, 2009.

Visit www.pedalwithpurpose.org for details and more information.

Thanks to this year's volunteers: Art Castro, Asia Philbin, Dennis Rule, Denny Hildreth, Fernando Molina, Ilene Grossman, Lisa Lesny, Michael McCasland, Ralph Marra, Vikki Hibberd.

Thanks and congratulations to this year's riders:

James Brown, Guy Carpenter, Ilene Grossman, Ralph Marra, Alan Obrien, Kristin Pearthree, Marie Pearthree, Genevieve Pearthree, Philip Pearthree, Asia Philbin, Michael Pratt, Catherine Preble, Timothy Rowe, Deborah Rule, Dennis Rule, Philip Saletta, Kyle Valkenburg

Special thanks to Dennis Rule, the event Chair, for recruiting riders and sponsors while coordinating with El Tour staff, and to Vikki Hibberd, who arranged for a delicious pre-ride dinner, sponsored by SAWUA, and recruited fellow students and instructors from Cortiva Institute to provide well-deserved massages to the weary riders in the Hospitality Tent sponsored by CH2M Hill.
The Young Professionals Committee hosted their 4th annual Kickball Picnic on November 14th, 2008. The "Seasoned Professionals" teamed with the Young Professionals for a fun filled night of kickball, food, and drinks. A fabulous time was had by all 40+ participants!

“Seasoned” Professionals keeping up with the YPs

YP in Training

YPs ready to take the field

Looking to further your career through continuing education?

Attend a WEF Specialty Conference and earn Professional Development Hours (PDHs) in Technical Sessions, Continuing Education Units (CEUs) at Workshops, and Contact Hours for participating in Facility Tours. Educational credits make your attendance extremely valuable in maintaining certification as an operator or professional engineer.

Mark Your Calendars and Reserve Your Space at These Upcoming WEF Specialty Conferences!

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The Utility Management Conference 2009
February 17 – 20, 2009
New Orleans, Louisiana

Collection Systems 2009
Conference: April 19 – 22, 2009
Exhibition: April 20 – 21, 2009
Louisville, Kentucky

AWWA | WEF
Information Management and Technology Conference and Exposition
March 1 – 4, 2009
Charlotte, North Carolina

Disinfection 2009
Exhibition: March 1 – 2, 2009
Atlanta, Georgia

Residuals and Biosolids 2009
Conference: May 3 – 6, 2009
Exhibition: May 3 – 5, 2009
Portland, Oregon

Please visit www.wef.org for complete program descriptions.
WATEREUSE ARIZONA
CALL FOR AWARDS

Nominations are due April 30, 2009

Awards will be presented at the
Water Reuse 2009 Conference
July 30 – 31, 2009, Radisson Woodlands Hotel
Co-sponsored by
WateReuse Arizona and AZ Water Association

LARGE AND SMALL PROJECTS OF THE YEAR AWARDS

Description
Focus on reclaimed water quality, reclaimed water uses, treatment plant capacity and flows,
public education contributions to the community, efficiency, etc. (Large: greater than 5.0 MGD,
Small: less than 5.0 MGD)

Criteria
- Include a maximum of three pages of supporting documentation
- Include one picture of project or nominee

PUBLIC EDUCATION PROGRAM OF THE YEAR AWARD

Description
Describe components of water reuse public education programs including curriculum,
classroom instruction, tours, and how the outreach enhances a better appreciation of water
resources, management, and conservation.

Criteria
- Include a maximum of three pages of supporting documentation
- Include one picture of project or nominee

STUDENT SCHOLARSHIP

Criteria
- One page resume, including name, university, email address, phone number, degree you
  are pursuing and estimated graduation date.
- Two page written description of your interest in Arizona water reuse issues and how your
  personal history and future plans relate to that issue.
- Judged on achievement in chosen area of study, background and career goals in water
  and water reuse, creativity, and writing ability.

AWARD OF MERIT

Presented at the discretion of the Awards Committee

Please submit all entries to: Bradley M. Hill, RG.
City of Flagstaff, Utilities Department
211 W. Aspen Avenue, Flagstaff, AZ 86004
bhill@ci.flagstaff.az.us
2009 AWWA Research Symposium
Emerging Organic Contaminants

February 12-13, 2009  Omni Austin Hotel, Downtown, Austin, Texas

Early registration pricing has been extended until February 6, 2009!

The last AWWA Research Symposium on Emerging Organic Contaminants was held more than three years ago. A great deal of interest and new work has been generated in the area since then. Regulatory activities are increasing the importance of several organic contaminants. The need for water utility professionals to learn more on the occurrence, treatment, and health effects of these emerging contaminants is growing. Media coverage of these issues has heightened concerns from the public. Utilities are faced with unique challenges regarding analytical methods and treatment options for these unregulated contaminants.

This symposium is expected to bring the attendees up to date with the status of these contaminants from various perspectives, including regulatory status, novel developments in analytical methods, and risk assessments for human health.

<table>
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<th>Registration Type</th>
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<td>Full Conference</td>
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<td>Speaker</td>
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</tbody>
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The Symposium will showcase pioneering research on the occurrence, treatment, analytical techniques and public communication regarding organic contaminants.

Topics will include
- Pharmaceuticals and personal care products in drinking water
- Draft Contaminant Candidate List 3
- Treatment of emerging organic contaminants
- Risk assessment communication

Who Should Attend
- Water professionals involved in research
- Regulators
- Water consultants
- Academic researchers

Interested in attending? See full conference details at www.awwa.org/conference/research. For more information, please contact Customer Service at 1.800.926.7337.
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AZ Water Association Membership Form

This information will be added to our database and used to inform you of opportunities specific to your needs. Your contact information will also be used in our annual membership directory. If you do not want this information published in our annual directory, please check here □.

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Check here if you are a current member of: □ AWWA     □ WEF

Please help us serve you better by indicating the categories that best describe your business/industry, environmental focus, job title, and field services (if one is more prominent than another, please indicate so).

### BUSINESS INDUSTRY

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- □ public owned municipal or special district, water, wastewater treatment system or plant processing > 1mgd
- □ public owned municipal or special district, water, wastewater treatment system or plant processing < 1mgd
- □ administration and/or enforcement of government environment programs administration of public health programs

**PRIVATE ENTITY**
- □ private or investor owned facility
- □ private industrial systems
- □ consultant
- □ contractor
- □ manufacturer (equipment or representative)
- □ distributor (equipment or representative)

**OTHER ENTITIES**
- □ educational institutions (all components)
- □ research laboratory
- □ other __________________________

### FIELD SERVED

- □ water supply only
- □ wastewater only
- □ both industries
- □ other __________________________

### ENVIRONMENTAL FOCUS

- □ wastewater
- □ water
- □ process water
- □ ground water
- □ solid waste
- □ storm water
- □ pollution prevention
- □ residual/biosolids management
- □ coastal, river, lake ecology/surface water
- □ toxic & hazardous materials
- □ public education / information
- □ instrumentation/automation controls
- □ other __________________________

### JOB TITLE

- □ EXECUTIVE: commissioner, board member, city manager, mayor, president, vice president, owner, partner, director
- □ MANAGEMENT: division head, section head, manager, chief engineer, comptroller, etc.
- □ ENGINEERING/NON MANAGERIAL: civil engineer, mechanical engineer, environmental engineer, planning manager, field engineer, system designer
- □ SCIENTIFIC/NON MANAGERIAL: chemist, biologist, biophysicist, researcher, analyst, etc.
- □ PURCHASING: purchasing agent, procurement specialist, buyer
- □ OPERATIONS: foreman, operator, maintenance, crewman, service representative, etc.
- □ MARKETING & SALES-NON MANAGERIAL: market analyst, marketing representative, sales representative, etc.
- □ STUDENT
- □ RETIRED INDUSTRY REPRESENTATIVE
- □ OTHER __________________________

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□ Individual Annual Membership – $40  □ Student Annual Membership – $15

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