

On the Water Front

Rocky Mountain Water Quality Analysts Association

First Quarter 2013

Anammox Pilot Study

By Kimberly Cowan, MWRD

At the start of September of 2012, Metro Wastewater Reclamation District began work with the Copenhagen-based company Kruger, Inc. to install and monitor a pilot study involving a new and upcoming biological nitrogen removal process. The anaerobic ammonia oxidation process, a.k.a. Anammox, or in the case of Kruger's brand, Anitamox, utilizes a specific type of bacteria which converts ammonia directly into nitrogen gas in near anoxic conditions. This process cuts down the traditional nitrification - denitrification process of nitrogen removal to one single anaerobic step, which requires a fraction of the oxygen addition. Given that air blower electricity costs rate as the number one expenditure of nearly every nutrient-removal treatment plant, a reduction in aeration of this magnitude would have huge fiscal benefits. Pretreating a concentrated side-stream for nitrogen also takes a significant load off the regular aeration basins and helps prepare the plant for future decreases in discharge permit limits for nitrogen.

Whereas many companies have developed different methods to house and isolate the Anammox bacteria, Anitamox is the only process to utilize a moving-bed bioreactor. In this process, the bacteria are grown on millions of small pasta wheel-shaped biofilm pieces, and are thus given a stable footing for colonization while maintaining motility and breathability. Anitamox also has the added benefit of sustaining a secondary bacteria colony living on top of the Anammox, which oxidize additional ammonia into nitrite.

Upon beginning this pilot, The District sought to test this technology in the context of the unique chemical and geographical construct of the treatment plant. Testing the bacteria's ability to survive and perform in colder climates as well as ascertaining the efficiency of nitrogen removal given the actual



Anitamox biofilm full of bacteria goodness

composition of Metro's ammonia-heavy centrate. To expedite the process, Kruger shipped in thousands of biofilm pieces containing established cultures. Anammox bacteria is incredibly slow growing, and can take years to become fully established from scratch.

After nearly six months of testing, the results of the pilot project are impressive. Even given various stresses to the culture (low temperatures, over/under-aeration, centrate feed loading rate changes, mixing failure, etc.), the reactor maintained a solid 75-80% nitrogen removal rate throughout the pilot. In comparison, the current side-stream

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ammonia reduction process used by The District runs at roughly a 40% reduction rate. Furthermore, it was found that by reducing the percent fill of biofilms within the reactor (increasing the load per unit of bacterial surface area), the efficiency began to push 85-90% removal. The theory behind this is that by decreasing the biofilms, mixers can transfer more agitation energy and increase the flow of feed through the biofilms. This is an important finding, as it indicates that The District can effectively implement this side-stream process by retrofitting only one basin, rather than 1.5 or 2 basins.

As the pilot wraps up, Metro District engineers are compiling data to build a comprehensive profile of Kruger's Anitamox process. In order to compare deammonification technologies, Metro will participate in data sharing with treatment plants in the US and abroad which are currently running different Anammox methods in full scale or pilot capacities. When the Kruger pilot at Metro is completed, the bacterial cultures will be shipped to another treatment plant interested in running a deammonification pilot.

Estes Conference Hotel:

Rocky Mountain Park - Holiday Inn
(Connected to the conference center)

101 South Saint Vrain Avenue

Estes Park, CO 80517

Direct: 970-586-2332

Toll Free: 800-803-7837

Room Rate: \$79.99 for attendees,

Reserve by March 26 for this rate!

<http://www.rockymountainparkinn.com>

We understand a lot of you have to submit check requests to register for the conference. Please sign up on the website even if you are waiting for a check so we have an accurate head count early on.

Thank you!



Anammox pilot study side stream biofilm reactor at Metro Wastewater

Rocky Mountain Water Quality Analyst Association
2013 Water Quality Symposium
Estes Park Conference Center - Ballrooms ABC
April 26, 2013
8:00 a.m. – 3:30 p.m.

07:30 a.m. – 08:25 a.m.	Registration -Continental Breakfast Visit Vendors
08:25 a.m. – 08:30 a.m.	Welcome Stephen Ellis - RMWQAA President
08:30 a.m. – 09:30 a.m.	Whole Effluent Toxicity Testing Shannon Phelps, SeaCrest Group
09:30 a.m. – 10:00 a.m.	Stream TMDL's (Total Maximum Daily Loads), are they the Solution to Pollution? Paul Hindman, Urban Drainage & Flood Control District
10:00 a.m. – 10:45 a.m.	Break - Visit with Vendors
10:45 a.m. – 11:30 a.m.	The One World, One Water (OWOW) Center for Urban Water Education & Stewardship: A New Approach to Water Education in Colorado Tom Cech, MSU Denver
11:30 a.m. – 12:00 p.m.	The Amazing Climate of Colorado Zach Schwalbe, Colorado Climate Center at CSU
12:00 p.m. – 1:30 p.m.	Lunch - Ballroom E,F Visit Vendors & Vendor Prizes 'Analyst of the Year' Award
1:30 p.m. – 2:15 p.m.	TBD Lisa Voytko, City of Fort Collins
2:15 p.m. – 2:45 p.m.	TBD TBD
2:45 p.m. – 3:15 p.m.	Break & Vendor Prizes—Visit with Vendors
3:15 p.m. – 3:30 p.m.	Closing - RMWQAA Grand Prize Drawing

Please Submit a Separate Registration Form for Each Attendee

Name: _____ Date: _____
 Address: _____

 Email Address: _____
 Phone Number: _____
 Employer: _____
 Title/Position: _____

Check the Appropriate Registration:

- \$15 membership only
- \$75 member symposium registration
- \$90 non-member symposium registration (\$15 membership + \$75 symposium registration)
- \$90 member renewal & symposium registration
- \$10 late fee (REQUIRED if registering after April 15, 2013) Remember your Taxes!

Make checks payable to **RMWQAA** and include with registration form.

The day will include giveaway prizes, games, lunch, snacks, and tons of educational fun!

Look for updated Conference information on our website at www.RMWQAA.org

Register By Mail
 RMWQAA
 PO Box 29407
 Thornton, CO 80229-0407

Register Online
www.rmwqaa.org
 Paypal accepted
 with additional fee

Changing Phases: East Meets West

Ian Myers, Metro Wastewater



Ian Myers (with his cousin) moved from Vermont to Colorado to explore the west.

Welcome to RMWQAA, Ian Myers! He's not only the newest Analyst I at Metro Wastewater, he's a new resident of Colorado as well! Ian moved all the way from Burlington, Vermont to explore the great western states and meet new people. As a new Metro employee, Ian is learning all the basics as he gets to know his way around the plant site. He already has several daily permit-required analyses under his belt, including pH, total suspended solids, and total solids. His Analyst I duties also include sample collection and preservation.

Ian currently lives in Golden, but his hometown is Plattsburgh, New York. He moved to Vermont to attend Saint Michael's College. During college he worked for the Vermont Streams Project. While working there, he performed rapid bioassessment of stream sites, collected and identified macroinvertebrates, and compiled a database of his results.

Following his graduation in 2009, he worked for Tetra Tech (formerly Clancy Environmental) as a microbiologist for over three years. At Tetra Tech he specialized in water quality analyses including Giardia/Crypto detection, microscopic particulate analysis and UV disinfection studies. Professionally, Ian would like to build on his knowledge of water quality. He expects to improve his understanding of the water industry by transitioning from drinking water to wastewater.

In his spare time Ian enjoys home brewing (a different kind of science!), cross country road trips and visiting local breweries. One of his goals is to continue exploring Colorado and the surrounding states. His other interests include skiing, sailing, hiking, music concerts, and spending time with family and friends.

Ian's education, work experience, and outgoing personality make him an outstanding addition to Metro, as well as RMWQAA! Look for his friendly smile next time you're dropping off samples. We're glad you migrated west, Ian!

Rockets, Fracking, and Blue Green Algae?, Oh Yeah!

By Adele Rucker, Aurora Water

What do you get when you mix about 420 student projects and 110 enthusiastic volunteer judges? A wonderful and interesting Denver Metro Area Science and Engineering Fair, of course. Young mathematicians and scientists from 6 Colorado counties competed for a chance to go to the State Science Fair at CSU and maybe get to the International Science Fair.

These are not your average 9 planet; oh I'm sorry there are 8 now, solar systems made from Styrofoam balls. No volcanoes with baking soda reaction chambers. Many of today's youth are in touch with the world around them and the problems facing them particularly environmental problems. Not only are they looking at ways to make current processes more efficient, they are also inventing new processes. Here are a few project titles as an example:

- Rocket Design part 3: Exploring How Vortex Generators Affect Boundary Layer Airflow
- The Perfect Pond
- Colorado, What's in Your Water?
- Does Fracking Cause Earthquakes?
- Algae as Biofuel?

The students have projects that cover every area of science. One young man explored a good use for cyanobacteria to improve air quality. A young lady invented a mouth wash to relieve dry mouth in patients with oral cancer. Another student envisions solar panels with photovoltaic action to make them more efficient. Some students are even running analysis on South Platte water. (Don't worry your job is safe.) Without a doubt, these tweens and young adults definitely turned up the wow factor.

If you ever get the chance to judge a science fair you should. You don't have to be a scientific expert to ask a young person to explain their project to you; they don't know if you are an expert or not. Their enthusiasm is contagious and you are guaranteed a great time.



Just a couple of the outstanding poster presentations from students.

Meet our new Newsletter Team

Effie Ginsberg and Richard MacAlpine, MWRD

Effie has worked for Metro Wastewater Reclamation District for almost 12 years and was recently promoted to Analyst II. Her lab experience combined with her degree in PR (with a marketing minor) makes her perfect for a newsletter co-chair. She likes combining science with creativity and fun.



Effie married her husband, Zach, a year and a half ago and bought a house last summer in Aurora. They don't have any pets or kids right now, but they like both and that's something they are working on. Effie loves Colorado, but admits she doesn't like snow.



Richard is a Laboratory Supervisor at Metro Wastewater and has been at Metro for about 7 years. Rich has an undergraduate degree in Environmental Conservation and an M.S. in Environmental Science with an emphasis in Water Quality, both from the University of Colorado. Rich lives in Broomfield and enjoys

going on adventures with his beautiful daughters, travel (especially to Latin America), cooking, hiking, and jumping into frozen mountain streams (only when things really need shaking up!)

Have you been thinking about getting involved in some fun events this year?

Well, here are just a few to start with.

For more events, search for an activities calendar on a city website near you.

Broomfield - Paper Shredding Event

April 13, 2013 9 a.m. - 2 p.m. Bring your confidential tax, medical, and bank forms for safe and secure destruction. For details contact Shirley Garcia 303-438-6329

Fruita, CO - Look for info on Mike the Headless Chicken Festival in May along with other fun stuff!

http://www.fruita.org/documentsrec/2011EVENT_CALENDAR.pdf

Highlands Ranch - Renew the Ranch: April, 20th 2013 9:00 am - 12:00 pm. Join your neighbors and help clean up the natural open space areas in HR. Contact Stacy Simonet ssimonet@highlandsranch.org or 720-240-4909.

<http://highlandsranch.org/wp-content/uploads/2013/03/RenewTheRanchFlyer.pdf>

The **City of Golden** is partnering with the [Center for ReSource Conservation](http://www.ConservationCenter.org) to provide a **free** seminar on the must have plants for your Xeriscape Garden at the Golden Community Center. Thursday, April 18, 2012 6:00-8:00 p.m. Open to anyone www.ConservationCenter.org, or call 303-999-3820 x217.

Colorado Springs - Earth Day Walk - Saturday, Apr 20 8:30a to 3:30p

5K or 10K, walking@falconwanderers.org, Penny, 494-9188, Julie, 231-9643.

Aurora - Inaugural Race for Open Space 5K run/walk slated for April 20 along Sand Creek Regional Greenway followed by the Earth Day Festival at Bluff Lake Nature Center. www.runningguru.com.

Southern Colorado Great Cloth Diaper Change - Join us as we attempt to surpass the current Guinness World Record for the most babies changed into a cloth diaper at one time. Saturday, Apr 20 9:30a to 1:00pm - [Chapel Hills Mall Colorado Springs, CO](http://www.gcdc2013cs.eventbrite.com) Please visit www.gcdc2013cs.eventbrite.com

City of Fort Collins - Earth Day Tree Planting, Saturday, April 20, 9 a.m.-noon. Natural Areas Department! Registration is required. call 970-416-2815 or email naturalareas@fcgov.com to register.

Drinking Water Regulation Update

By Hope Dalton, Tri-County Health Department

The Engineering Section of the Water Quality Control Division (WQCD) has been working with stakeholder groups to update the 1997 version of the State of Colorado Design Criteria for Potable Water Systems (Design Criteria) since last August. The Design Criteria will have nine chapters. A workgroup of stakeholders will draft each chapter. A tenth workgroup reviews each chapter to look at the guidance for applicability to a small or very small drinking water system. Of note is the creation of a design review matrix. A public water system can use the matrix to determine if a full and complete design submittal is needed, if an in-kind application can be used instead of the full package, or if submittal is not required. A draft of Chapter 1 and the Design Review Matrix is available on the WQCD website; just search for “design criteria update” and the first link should be correct.

If you enjoy very technical discussions about pumps, tanks, chemicals, baffling, etc. that get heated at times but end well, then you will enjoy the workgroups...plus the work is almost done. A final draft is expected by May. For more information on the project or to participate in a workgroup, contact Tyson Ingels at 303-692-3002 or via email at: tyson.ingels@state.co.us

Following a similar timeline, the WQCD is revising the current Colorado Primary Drinking Water Regulations (CPDWR) for readability. Upon completion the CPDWR should be easier to comply with and understand. There will be shorter sentences, consistent terms and definitions, and no more typographical errors, reference areas, and outdated requirements. Requirements that should

be outdated but aren't will remain. Stakeholder meetings have been held since August.

Some of the reorganization comments have resulted in lively debate. One heated debate is the decision regarding should each rule be its own regulation or should the CPDWR remain as one regulation. The general consensus thus far seems to be to break the regulation into three regulations: Regulation 12 focused on surface and groundwater, Regulation 13 focused on chemical and radiological contaminants, and Regulation 11 every other item i.e. sanitary surveys, Consumer Confidence Reports, exemptions, etc. Although the Advisory Group meetings have ended, stakeholders can continue to provide comment throughout the spring with a final draft prepared in June. The hearing before the Water Quality Control Commission is expected to be in November 2013. For more information, contact Julie Kreyche at 303-692-3405 or via email at: julie.kreyche@state.co.us

Looking for a Job?

We have several new job postings on the website. Check it out!

WWW.RMWQAA.ORG

What are you up to RMWQAA?

We are always looking for input from our members, both professional and personal. Got stories? Photos? Send them our way!

Email Effie Ginsberg:
eginsberg@mwr.dst.co.us

Earth Tips:

Use recycled wrapping paper for gifting. Buy giftwrap made from recycled products and use ribbon or string that can be reused and won't tear the paper. Remember presents wrapped in the old comics from the newspaper?

From
1001 Ways to Save the Earth

Fun For a Good Cause

RMWQAA Members Give Back to the Community (and get dirty too)

In addition to making the world a cleaner, healthier place through their work, RMWQAA members are finding ways to share their generosity while having fun. Not only are there annual blood drives, and Earth Day river cleanups, there are some creative and challenging ways to make a difference too!

Last October, SACWSD did the Cherry Creek Watershed Eco-trek Relay, and according to Stephen Ellis, will most likely do it again this year. The relay is no small feat! It's approximately 50 miles in length, and brings a team of five to ten people from the top of the watershed down into the reservoir at Cherry Creek State Park by biking, walking, and running through Douglas and Arapahoe counties, and the cities/towns of Franktown, Parker, Centennial, Aurora, and Greenwood Village. Along the way, team members bike, run, walk, or paddle through some very special terrain, indicative of the varied ecosystems within a watershed. The Cherry Creek Stewardship Partners organization has been actively promoting effective stewardship of the Cherry Creek watershed since 1999, and this was the 7th running of the Eco-trek relay. Visit <http://www.cherry-creek.org/> for more information about the watershed. Get a team together and look for information coming soon about the 2013 event!

Last summer MWRD employees participated in some undead fun at the Run For Your Lives Zombie Infested 5K obstacle course that benefits the American Red Cross. The event is held throughout the United States, and was here in Colorado for the first time in 2012. You can register to be a Zombie and chase after runners, risk your life and run the



Effie Ginsberg from Metro Wastewater reminds you of the rules of surviving zombies as a participant of the Run For Your Lives event last year.

race, or both! Professional makeup artists transform the living into zombies, complete with a gruesome dousing of fake blood. This year the event is June 29 at the American Safari Ranch in Fairplay. Find more information: <http://www.runforyourlives.com/>

Let us know what you and your organization are doing! We are always looking for the fun side RMWQAA members, and please send photos as well!



Brenda Olivas and Suzanne Renter of MWRD, along with other eager walkers, get some zombie behavior training.

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Vice President/Conference - Adele Rucker

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