KY/TN Water Professionals Conference 2011

Bios and Abstracts

Northern Kentucky Convention Center
July 24-27, 2011

Technical Pro Sunday, July 24

	Facility Tours -	1:00 - 5:00
	Meet and Greet in Exhibit Hall	5:00 - 7:00

Technical Program - Monday, July 25

	Welcome Breakfast	7:30 - 8:30
	General Session	8:30 - 10:00
	Break - Exhibit Hall	10:00 - 10:30
	Exhibit Hall Open	10:00 - 12:00 and 1:30 - 6:30
	Professional Poster Session 9:00- 3:00	

	Mtg. Rm 5	Mtg. Rm 6	Mtg. Rm 1	Mtg. Rm 2	Mtg. Rm 3	Mtg. Rm 4	Ballroom E	Ballroom D
	Session M7A	Session M8A	Session M3A	Session M4A	Session M5A	Session M6A	Session M1A	Session M2A
	Distribution	Collection Systems	MGMT	Nutrient Removal	Construction	SUSTAIN	REG UPDATE KY	REG UPDATE TN
10:30 AM	**Vince Monks** Maintaining Water Quality in Storage Tanks Through Optimized Management Strategies	**Kimberly Martin** Beyond Unit Prices: Using Site Investigations to Develop an SSO Corrective Action Plan that Will Work	**Dave Vogel** Leadership Comes in All Shapes and Sizes	**Clark Dorman** KY Nutrient Update	**Kyle Boyle** The Axis of New Trenchless Technology: Removing the Highland Acres Pump Station with a New Trenchless Boring Technology	**William R. Scalf, Jr., PE** Energy and Greenhouse Gas Impact Evaluation for Cardinal Hills Pump Station	**Julie Roney** Kentucky Drinking Water Program Update	**Saya Qualls** TN Wastewater/Clean Water Update
11:00 AM	**Jennifer Lind** Planning for Disaster: How Knox County Utilities Utilized Hydraulic Modeling to Develop an Emergency Operations Supply Plan	**Lori McIlvaine, EIT** Hidden Clauses and the Cost of Money: Lessons Learned in Negotiations and Implementation of Consent Decree Deliverables	**Leeann Williams** System Modeling for Integrated Water Resource Planning	**Saya Qualls** TN Nutrient Update	**Craig S. Parker, P.E.** Alternative Project Delivery: How KUB Used CM-at-Risk Approach to Accelerate Construction of Six Wastewater Storage Facilities	**Scott A. Hall PE** What Can I Do to Make My Pumping Station Green? Understanding, Selecting, and Incorporating Sustainability Design Concepts into	**Julie Roney** Kentucky Wastewater/Clean Water Act Update	**Alan Schwendimann** TN Drinking Water Update
11:30 AM	**Jan Routt** Using a Systematic, Measurable Criteria-based Approach to Optimize Drinking Water Distribution System Performance	**Wesley Sydnor** Assessing Your Floatables and Utilizing Creative Methods to Determine the Impacts to Water Bodies	**Jason D. Brooks** Wet-weather Wastewater Program Management	**Greg Youngstrom** OSANCO Nutrient Update	**Ron McMaine** An Uplifting Experience--Expansion of the Berea, Kentucky water plant	**Kelly Comstock PE** Protecting Your Most Valuable Asset in Water/Wastewater System Operations – Institutional Knowledge		
12:00 PM	Awards Luncheon -		12:00 - 1:30					
	Session M1B	Session M2B	Session M3B	Session M4B	Session M5B	Session M6B		
	Distribution	Collection Systems	Management	Nutrient Removal	Construction	Watershed Issues		
1:30 PM	**Paul Schumi** Asset Management in the Fast Lane for Water Distribution Systems: City of Houston	**C. Herschel Hall** Dry Weather Overflows - Analysis and Prevention	**Ed Wetzel** Indianapolis Completes a $2 Billion Municipal Water/Wastewater Utility Sale	**Ron Latimer** Designing for Reliable, Cost-Effective Nutrient Removal: Lessons Learned	**Bo Copeland** Reducing Check Valve Slam and Pressure Spikes at a Pump Station with Bladder Surge Tanks and Fast-Closing Check Valves	**Michelle Hatcher** Up the Creek with a Paddle: Performance of a Visual Stream Assessment on Non-Wadeable Streams		
2:00 PM	**Jeff Cruickshank** Increasing Distribution System Capacity: Bigger Pipes or More Pumps?	**Lori McIlvaine, EIT** Clearing Up The Fog: The Price of a Fats, Oils, and Grease Program	**John Perry** Non-Revenue Water Audits as a Top-Down Asset Management Approach to Increasing Revenue and Improving Performance	**Michael A Schober PE** Integrating Biofilm Activated Sludge for Biological Nutrient Removal	**Kristen Braden** Claims: How to Avoid or Mitigate Them	**Arthur C. Newby** Modeling the Cumberland River Using CE QUAL W2		
2:30 PM	**Z. Michael Wang** Using GIS and Water Quality Model to Analyze the Deterministic Factors for Lead and Copper Corrosions in Distribution Systems	**Stephen Lindsey** Breathing New Life into Venerable Old Stone and Brick Sewers with a Cured-In-Place Pipe Project Definitely Not for the Faint-Headed	**David K. Brauner** The Role of the National Infrastructure Protection Plan to the Water Utility Industry - Move down	**Adam Byard** Numeric Nutrient Criteria: Implications and Options for Utilities	**R. Kevin Kruchinski** Lessons Learned from the Startup of Kentucky American Water's Newest Treatment Plant	**Randy Stambaugh** Post Construction. Is your MS4 ready?		

	Competitions - Exhibit Hall	3:00 - 6:00
	Ice Cream Parlor - Exhibit Hall	3:00-4:30
	Exhibitor Reception - Exhibit Hall	5:00 - 6:30

	Awards Breakfast - 7:30 - 8:30						
	Exhibit Hall Open - 8:30 - 2:00						
	Student Poster Session - 9:00 - 12:00						
	Ballroom E	**Ballroom D**	**Mtg. Rm 1**	**Mtg. Rm 2**	**Mtg. Rm 3**	**Mtg. Rm 4**	**Mtg. Rm 5**
	Session T1A	**Session T2A**	**Session T3A**	**Session T4A**	**Session T5A**	**Session T6A**	**Session T7A**
	Collection System	Pub. Information	DWWR	FLOOD	Private Property	Watershed Issues	Industrial Pretreament
8:45 AM	**J. Pavoni & J. Hindenach** Devising a Triple Bottom Line Solution for Wastewater Collection, Treatment, and Disposal for a Lake Community	**Glen Thomas** Mobile Warming: Time to Embrace Mobile Technology	**Paul A. Stonecipher** Rehabilitation of Franklin's Raw Water Reservoir	**H.J. "Bud" Schardein** Climate Change and Flood Protection	**Kristen Benick** PEEKING INTO THE WORLD OF PRIVATE SOURCE I/I CONTROL - A CASE STUDY OF AN INTEGRATED APPROACH TO SSO CONTROL	**Jason Heath** Pathogens, Wet Weather, and Regulations for the Future of the Ohio River	**Jeffrey L Pintenich, P.E., BCEE, CHMM** NPDES Impoundment Risk Assessments Spawned by the Kingston, Tennessee December 2008 Ash Release
9:15 AM	**Brandon C. Vatter** Innovative Continuous Sewer Assessment Program (CSAP) Streamlines Proactive Asset Management	**Angela Akridge and Wesley Sydnor** Making an Impact with Creative Public Outreach and Education Initiatives	**Griff Machinski** Saving Ten Million Gallons of Water Loss Per Month	**Sonia Harvat** Metro Water Services Response to the May Flood in Nashville - Are you prepared for a crisis?	**Andy Lukas PE** Taking Private Property I/I Reduction from Pilot to Full Scale	**Mark Sneve** Existing Water Quality Standards and Wet Weather Compliance are Mutually Exclusive. Why Does This Have to be the Case?	**Pete Shack** Membrane bioreactors applied to treatment of landfill leachate
9:45 AM	**Ed Walker, P.E.** Water Quality Improvement on the Cumberland River using In-line Trash-trap Floatables Control at two CSO's	**Jeff Chatterton** Aw CRAP! Now what? Communicating in a Crisis.	**Thomas E. Dumm, PE** Implementing a Comprehensive Regional Water Supply Plan in the Duck River	**Martha Segal** Flooded with Questions:How Metro Water Services Customer Services Responded to the May 2010 Flooding	**Amanda Waters** Legal and Funding Issues Associated with Private Source Inflow and Infiltration Removal	**David Pyzoha, P.E.** Holistic Watershed Management	**Reinaldo Gonzalez . PhD,** Conductivity Reduction Feasibility Analysis at a Meat Processing Facility
10:15 AM	**15 Minute Break**						
	Session T1B	**Session T2B**	**Session T3B**	**Session T4B**	**Session T5B**	**Session T6B**	**Session T7B**
	CS	CUST SERV	BIOSOLIDS	FLOOD	MGMT	Watershed Issues	Industrial Pretreament
10:30 AM	**Eric Onderak** How do we match that? Developing a detailed model of the Nashville Combined System	**Susan Lancho and David Shehee** Improving Customer Satisfaction by Increasing Communications about the Quality of their Water	**Daniel W. Miller** Enhanced Solar Drying in the Midwest	**Ken Baker** Too Much Water Leads to Water Conservation in Nashville	**Jason Griffin** Water, Water, Everywhere, Nor Any Drop To Drink - The Creation of Tennessee's Newest Utility District	**Alanna Malone** Comparison of a Stochastic and Mechanistic Approach for Total Maximum Daily Load Development	**Jim Buckles, P.E..** Management of Deicing Stormwater
11:00 AM	**John Loechle** Lessons learned and evaluation of alternative real time control strategies in Louisville, Kentucky	**Scott Clark** Customer Service Tips and Tricks Round Table Discussion	**C. Michael Bullard** Evaluating Biosolids Management Alternatives in Northeast Tennessee: A Cooperative Masterplanning Effort	**Brent Fulghum** A Blessing in Disguise? Clarksville's Dewatering Operations after the Flood	**Lawrence P. Jaworski PE, BCEE** Looking into the Regulator's Crystal Ball: The Future of Wet Weather Treatment	**David Pyzoha, P.E.** Timing and Education is Everything in Adopting a Stormwater Management Utility	**Aaron Stephens** PCB Sleuthing: The science of being a wastewater collection system detective
11:30 AM	**Tim Kraus** Louisville Louisville MSDs Downspout Disconnection Program		**Mahyar Ghorbanian** Emmisions Comparison of Natural Gas Usage and Digester Gas Usage in Biosolids Drying	**Valorie Gilley / Tazio Qubeck** May 2010 Flood Recovery-Navigating FEMA Guidelines for Federal Assistance	**Ron McMaine** - Water For People Update	**Scott Hall** USEPA's Draft Ammonia Criteria - Role of Freshwater Mussels and Unique Implementation Issues	**Christine Brown** Quantifying Surfactant in Wastewater
	Lunch in the Exhibit Hall 12:00 to 1:30						

Technical Program - Tuesd uly 26

	Ballroom E	Ballroom D	Mtg. Rm 1	Mtg. Rr	Mtg. Rm 3	Mtg. Rm 4	Mtg. Rm 5	Mtg. Rm 6
	Session T1C	Session T2C	Session T3C	Session T4C	Session T5C	Session T6C	Session T7C	Session T8C
	CS	DIVERSITY	Drinking Water Water Quality	FLOOD	MGMT	Wastewater Process Operations	Industrial Pretreament	Sustain
1:30 PM	**Curt Courter** Wet Weather Disinfection Alternatives	**Mollie Bailey** Using Diversity To Better Serve Your Community	**Chris Bobay** A Water Quality Perspective on Regional Partnerships: Evaluation of Disinfection Practices and DBP Control	**M. Shannon Lambert** A Phased Approach to Flood Recover at the Central WWTP Biosolids Facility	**Ed Wetzel** **Surviving the Recession- An Owner's Perspective Round Table**	**Kevin Kennoy** Achieving Green Energy Management Solutions at Wastewater Treatment Facilities	**David Phillips** EPA Update	**Justin Gray** From Meter to Model and Gray to Green
2:00 PM	**Joe Herman** Addressing the Elephant in the Collection System: A Foolproof, Low Tech, Effective Method for Inspecting Large Diameter Trunk	**Priya Klocek** Yes, I am diverse. So what, lets get some work done?	**William B. Dowbiggin** Activated Carbon Use and the Latest on AWWA Standards for GAC and PAC	**Stephen H. King/Mike Crawford - City of Clarksville** Clarksville Flood Recovery-Steps Toward Recovery, Upgrades and dealing with the FEMA		**Daniel Gummersheimer** WWTP Energy Efficiency Improvements	**Byron Ross** Mercury 101 and Dental Amalgam	**Wesley Sydnor** Fulfilling Louisville's Consent Decree Requirements for Overflow Reduction by Right-sizing Gray Controls with Green Infrastructure
2:30 PM	**Jim Buckles P.E., BCEE** Site-Specific Calibration of Parshall Flumes		**David Shehee** Corrosion Control Optimization - It\\\'s more than Lead and Copper Results	**Kenneth R. Stewart III** Niagara Falls in Nashville: Catastrophic Failure of a Levee and Trunk Sewer		**Ron Latimer** Potential Pitfalls in Process Model Calibration and Application	**Byron Ross** Identifying pollutant sources in wastewater	**Charles D. "Chad" McCormick** Bridging the Green Infrastructure Gaps Between Combined (CSS) and Separate (MS4) Systems
	Break	3:00 - 3:15						
2:30 PM	Ice Cream Parlor	2:30 - 4:30						

	Session T1D	SessionT2D	Session T3D	Session T4D	Session T5D	Session T6D	Session T7D
	Collection System	Young Professionals	Drinking Water Water Quality	FLOOD	SAFETY	EMERG	Industrial Pretreament
3:15 PM	**George E. Kurz P.E., DEE** Brentwood Moratorium Relief Validated, I/I Reduction Continues	**Bill Samuels** Engineer, Physicist, Lawyer... The life of Bill Samuels Jr. President and CEO of Makers Mark	**Jan C. Routt** Collaborative Research To Better Understand Impacts of Extreme Weather on Water Quality Approach and Prelimiary Results	**Dan Miklos** When Disaster Strikes	**Doug Kimbler** Do You Need a Haz Mat Team?	**Kati Bell** Emerging Contaminants at Risk, Regulations and Treatment Technologies	**Chuck Durham** Pretreatment Enforcement Case Studies
3:45 PM	**David White** Rehabilitation and Upgrade of the Lift Station 507 Storage Tank to a CSO RTB Facility		**Timothy Soward** Trends in Waterborne Disease Outbreaks in the US	**Doug Yarosz, PE** Nashville's (Not So) Dry Creek WWTP-Flood Recovery in the Wake of a 1000-Year Rain Event	**Todd Adams** Accident Investigaton for The Water/Waste Water Professional	**Jennifer Baldwin** Emerging Issues in Drinking Water Treatment: The ABCs	**Jennifer Dodd** Pretreatment Standards Review
4:15 PM	**Chris Horvath** Lessons Learned - Private Source I/I Removal		**George Garden** "Black Box" or Conventional Filter Replacement: Does Membrane Pretreatment Pay?	**Mike Callahan** - NOAA Perspective on Climate Change	**Henry Arellano** Confined Spaces	**Nora Kim, P.E.** Wastewater Disinfection: New and Emerging Technologies	**Pretreatment Certification Committee** Pretreatment Roundtable

4:30 PM	Young Professionals Social - Behle Street Café	4:30 - 5:30
6:00 PM	Member Celebration - Cincinnati Reds Game (7:05)	6:00 - 9:00

Technical Program - Wednesday July 27

7:30 AM	Continental Breakfast -	7:30 - 8:30
8:30 AM	Workshop - Microconstituents/Emerging Contaminants	8:30 - 12:00

FACILITY TOURS

Water
Treatment Plant Tour

Jeff Schuchter

Jeff Schuchter joined Northern Kentucky Water District in 2006 as a staff engineer. In 2010 he was promoted to construction administration engineer to focus on the NKWD's three advanced treatment projects. He received his Bachelor of Science in Civil Engineering in 2005 and a Masters of Civil Engineering in 2006 from the University of Louisville. Since 2006, Jeff has been a member of the Kentucky Society of Professional Engineers and the American Water Works Association.

Matt Piccirillo

Matt Piccirillo joined Northern Kentucky Water District in 2001 as a treatment plant operator, and was promoted to Plant Operations Foreman in 2006. He received his Class III water treatment plant operator's license in 2004 and Class IV in 2006. Since 2001, Matt has been a member of the Kentucky Water & Wastewater Operators' Association and the American Water Works Association. In 2010, he became the Secretary/Treasurer of the North Central Chapter of KWWOA.

We will be accommodating a 90-minute presentation and tour of Northern Kentucky Water District's Memorial Parkway Treatment Plant.

Upon arrival at the plant, NKWD personnel will have a short presentation covering the plant and its various upgrades through the years. They will also discuss the new projects currently under way; Granular Activated Carbon and Ultraviolet Disinfection. The group will then proceed through the operators' lab, filter building, chemical building, and Acti-Flo trains. Along the way, staff will point out other structures and processes on the property. Some of the tour will depend upon current construction of the new GAC building. If safety permits, and we are confident that it will, the group can enter the construction area and look at the makings of our newest processes and have further discussion.

Wastewater Treatment Plant Tour

John Martin, PE
GRW Project Manager

Years of Experience: 25 **Years with GRW:** 12

Education
B.S., Civil Engineering, 1986, Tennessee Technological University

Registration
Professional Engineer: KY, TN, OH

Qualifications and Similar Project Experience
Mr. Martin has extensive experience in the planning, design and construction administration of wastewater system engineering projects. In his 25 years as a sanitary engineer, he has served as either Project Engineer or Project Manager for over 35 projects which have included infiltration/inflow studies, sewer system evaluation surveys, Facilities Plans, and design of stormwater management systems, sanitary sewer collection systems, pump stations, force mains and wastewater treatment plants. He has also served as either Project Engineer or Project Manager for over 20 projects which have included design of water distribution, storage and treatment facilities.

Western Regional Water Reclamation Facility Plan, Western Regional Wastewater Treatment Plant, Sanitation District No. 1 of Northern KY - Project Engineer.

Western Regional Water Reclamation Facility, Sanitation District No. 1 of Northern KY - Project Engineer for design and Project Manager for construction management activities.

Wastewater Treatment Plant Upgrade (10 MGD, Fairfield, OH - Project Manager.

Wastewater Treatment Plant (3.3 MGD), Lawrenceburg, KY - Project Manager.

Southwest Interceptor Sewer System, Lawrenceburg, KY - Project Manager.

Western Trunk Interceptor, Lawrenceburg, KY - Project Manager.

Glenview Pump Station and Force Main, Lawrenceburg, KY - Project Manager.

West County Wastewater Treatment Plant Expansion (30 MGD), Louisville MSD - Project Manager.

Wastewater Facility Plan Update, Versailles, KY - Project Manager.

Sludge Management Treatment Facilities, Versailles, KY - Project Manager.

US 421 Sanitary Sewer Feasibility Study, Frankfort, KY - Project Manager.

Wastewater Treatment Plant Expansion (9.9 MGD), Frankfort, KY - Project Manager .

Sludge Management Treatment Facilities, Frankfort, KY - Project Manager.

Combined Sewer System Overflow Plan, Frankfort, KY - Project Manager.

Sanitary Sewer System Evaluation, Paris, KY - Project Manager.

Strodes Creek Wastewater Treatment Plant Solids Processing Facilities, Winchester, KY - Project Manager.

Strodes Creek Wastewater Treatment Plant Facility Plan Upgrade, Winchester, KY - Project Manager.

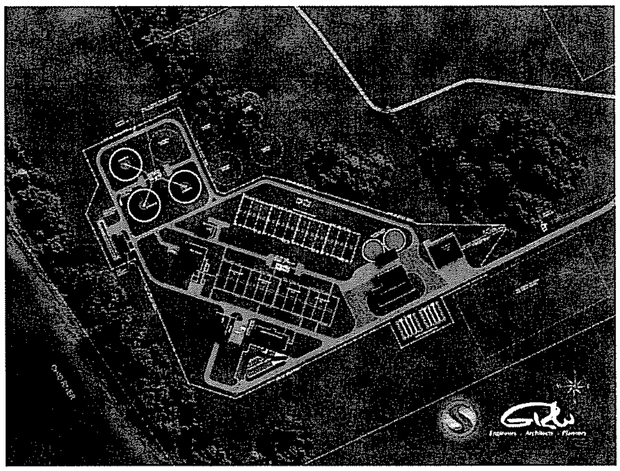
Midway Wastewater Treatment Plant (1.125 MGD), Midway, KY - Project Manager.

Wastewater Treatment Plant Facility Tour

Sanitation District No. 1 Western Regional Water Reclamation Facility (20 MGD)

The Western Regional Water Reclamation Facility (WRWRF) is a secondary plant located on a new 150-acre site in western Boone County. This plant has an initial design average flow of 20.0 million gallons per day (MGD) with projected future average flows of 30.0 MGD. The site layout and plant hydraulics were planned for an ultimate wet weather build out capacity of 60.0 MGD. The plant will be one of three major wastewater treatment plants in Sanitation District #1's three-county service area and will treat wastewater from Boone and Kenton Counties.

The WRWRF includes screenings removal by fine screens, centrifugal vortex grit removal, secondary treatment employing the contact stabilization activated sludge process with fine-bubble diffusers, final clarification and ultraviolet disinfection before the treated wastewater is discharged to the Ohio River. Sludge processing will include gravity belt thickening of waste activated sludge, aerated sludge storage and belt filter press dewatering before the sludge is hauled to a landfill for disposal.



The selection of the wastewater and sludge treatment processes was based on a detailed analysis of life-cycle costs as well as their environmental soundness and public acceptance. As a result, processes that are prone to produce odors (such as primary sedimentation and anaerobic digestion) were excluded from this plant even though their construction or annual O&M costs were attractive. For other processes that were selected but are potential odor sources (screening and grit facilities, sludge treatment areas), provisions are made to contain, capture and biologically treat odors when they are produced.

Ultraviolet light is used for disinfection because it costs less to build and use compared to other alternatives (chlorine, etc.) and it is safer to plant staff and neighbors. The selection of conventional secondary treatment without conventional upstream primary treatment represents a proven and cost-effective method to eliminate potential odor sources and reduce construction and O&M costs.

The WRWRF site includes eight buildings totaling 61,400 SF: preliminary treatment building (9,733 SF), sludge blower pump building (3,407 SF), plant effluent building (2,078 SF), sludge processing building (17,094 SF), blower building (9,409 SF), administration building (10,209 SF), maintenance building (8,761 SF), and picnic shelter building (705 SF). The administration building contains a lobby, reception area, offices, conference/classroom, control room, network room, laboratory, employee break room, shower/locker room facilities, and supporting mechanical and electrical spaces. The maintenance building contains a six-bay garage, fenced-in parts storage area, parts cleaning area, an office, supporting mechanical/electrical spaces, and a maintenance bay area equipped with an overhead monorail lift system.

Sustainable design features include pervious pavement, groundwater recharge, and rain garden into the site stormwater management.

MONDAY SESSIONS

Regulatory Update Kentucky

Session M1A

2011 KY-TN Water Professionals Conference
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Abstract: **Kentucky Drinking Water Program Update**

This presentation will provide current information on Kentucky's drinking water regulatory, capacity development and enforcement programs. It will also highlight other water-related programs that affect the overall operation of a drinking water system, such as KPDES permits and surface water classifications.

Abstract: **Kentucky Wastewater/Clean Water Act Update**

This presentation will provide current information on Kentucky's regulatory activities as they relate to the Clean Water Act, including permitting, floodplains, water quality initiatives and planning.

Presenter: **Julie W. Roney/KY Division of Water**

Julie serves as the state drinking water program coordinator for the KY Division of Water. She has been with the DOW since February 1999 in various roles in the drinking water program. Prior to joining the DOW, she held several management positions in the Water Quality and Production departments at Kentucky-American Water Company (from September 1987 through January 1999). She began her environmental career with Commonwealth Technology. Incorporated in March 1980 where she progressed from bench chemist/biologist to supervising the inorganic chemistry and microbiology labs. She has a Biology degree from the University of Kentucky, holds KY Class IVA and IVD operator certifications and is honored to be a past Fuller Awardee. In her free time, she enjoys good books, working in the garden and yoga.

Distribution

Session M1B

Paul Schumi is a Business Development Manager with Wachs Water Services and is an expert in distribution system asset management. He has worked with numerous utilities to implement distribution system efficiency programs across the country.

Some of the most recent programs Paul has been responsible for include American Water and cities like Houston TX, Fort Lauderdale FL and Melbourne FL.

Paul Schumi
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Asset Management in the Fast Lane for Water Distribution Systems: City of Houston (Final Report)

By

Sandeep Aggarwal, PE, City of Houston, Drinking Water Operations
Yvonne W. Forrest, City of Houston, Drinking Water Operations
Paul Schumi - Director, Wachs Water Services

The City's water transmission infrastructure was becoming less reliable. Aging infrastructure, coupled with tighter O&M budgets and deferred maintenance resulted in a series of large diameter water leaks and line failures. These situations became more serious when key isolation valves were found to be unreliable or worse, inoperable. This resulted in wider than necessary service interruptions and increased risk to repair crews and the public at large. Faced with these challenges, the City of Houston embarked on an aggressive and measureable program to upgrade the operability and reliability of its water system.

Starting with large, critical assets, the City of Houston developed applied asset management strategies to address problems with the backbone of the water delivery system - its large diameter transmission system. The end game is to put in place, processes that will result in predictable and dependable performance; a program that is well-defined, focused and will make a difference via real action - by DOING, rather than just studying the problem.

The City kick started this program by teaming with experts in large diameter valve assessment, maintenance and rehabilitation. The kick start produced immediate results by identifying areas of system weakness and began the important process of documenting and restoring "control points" (ie. valves) throughout the transmission system. While this program is a "kick-start", and delivers meaningful, real results, the processes created are sustainable for the long term. The program focuses on five principals.

The five program principals are:

1. Asset information,
2. Condition assessment,
3. Repair and restoration,
4. Equipment specific maintenance programs, and
5. Data management and access.

The City of Houston water system (fifth largest in the U.S.) serves a four-county, 600 square mile area. It consists of 7,400 miles of pipe, 144,000 valves and 55,000 fire hydrants. The large diameter transmission system is controlled by over 4,500 "control points" (ie. isolation valves) sized 16- to 96-in.

This technical paper and presentation will present the steps undertaken throughout this program by the City of Houston to create an efficient and reliable transmission system, including;

1) Establishing well-defined goals,
2) Identifying obstacles,

3) Developing budgets,
4) Organizing for success,
5) Procurement strategies for professional support, and
6) Future planning.

The presentation will also provide specific examples of problems and surprises discovered in the field and how these situations were resolved. It will also detail the results and status of the preventive maintenance program including:

1. Findings to date,
2. Actual versus anticipated results,
3. Comparisons with other major water systems, and
4. Anticipated future activities and program modifications.

Author and Presenter:
Paul Schumi, Director with Wachs Water Services. Mr. Schumi is an expert in water distribution system asset management. He has worked with numerous utilities to implement distribution system efficiency and sustainability programs across the country, including Houston, TX, Tampa, FL, Kansas City, MO, Baltimore, MD, Austin, TX, Fort Lauderdale, FL, Phoenix, AZ and San Antonio, TX.

Co-Authors:
Sandeep Aggarwal, P.E. is a Managing Engineer in the Drinking Water Operations Branch of the Public Utilities Department. Mr. Aggarwal has overall responsibility for the capital improvements, and O&M of the large diameter transmission system.

Yvonne W. Forrest, is the Senior Assistant Director of Drinking Water Operations. Ms. Forrest has over 10 years of utility system operations and management experience.

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Biography:

Jeff Cruickshank (Crook-shank) is a Life Member of AWWA and was a contributing author of M32, AWWA's manual of practice for Computer Modeling of Water Distribution Systems. He has more than 30 years of experience modeling nearly 70 water systems. Jeff manages Hazen and Sawyer's Greensboro, NC, office, which specializes in hydraulic modeling, and frequently works with the Nashville office. He has a degree in Civil Engineering from Michigan Tech and is a registered professional engineer in several states.

Abstract for 2011 Kentucky/Tennessee Water Professionals Conference

Title: Increasing Distribution System Capacity: Bigger Pipes or More Pumps?

Submitted by: Jeff Cruickshank, PE
Hazen and Sawyer

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Meg Roberts, PE
Hazen and Sawyer

Abstract:

The City of Kingsport, Tennessee, expects water demand to increase in the future. Projections for 2030 showed demand increasing by nearly 20 percent, corresponding to a maximum day demand of 22.5 mgd. With proposed improvements, the water treatment plant will have sufficient capacity.

However, the existing pumps cannot supply the projected demand. Even though firm capacity was 23.5 mgd based on the pump nameplates, the city's hydraulic model predicted lower flows because of friction losses.

At the required flow of 22.5 mgd, the model calculated nearly 60 feet of friction losses between the water plant the controlling elevated tank, requiring the pumps to develop a total dynamic head (TDH) of 260 feet. The existing pumps were designed for TDHs ranging from 204 feet to 240 feet. With the largest pump out of service, the model showed that the two remaining pumps could not supply the projected maximum day demand.

To solve this problem, one option was to install additional pumps or replace the existing pumps and motors with new units designed for the higher TDH.

An alternative solution was increasing transmission main capacity so that the required pumping head dropped below the design TDH of the existing pumps.

Hydraulic modeling analyzed the problem and helped the city formulate a master plan that will provide projected flows.

This presentation may show other utilities how to analyze pumps and transmission mains for the purpose of increasing distribution system capacity.

Dr. Wang is a vice president with Hazen and Sawyer, P.C.. He has more than 20 years of experience designing, modeling, testing water and wastewater treatment plants, as well as water supply systems and wastewater collection systems. He holds both bachelor and master degrees in environmental engineering. He also holds a doctoral degree in Civil and environmental engineering from North Carolina State University. Dr. Wang is a member of AWWA and WEF. A registered professional engineer in North Carolina, Virginia and five other states, he is also a board certified (Diplomatic) environmental engineer by the American Academy of Environmental Engineering. He currently serves on AWWA's Engineering and Computer Applications committee, which is in the process of updating M32, Distribution Network Analysis for Water Utilities.

Abstract for: 2011 KY/TN Water Professionals Conference

Title: **Using GIS and Water Quality Model to Analyze the Deterministic Factors for Lead and Copper Corrosions in Distribution Systems**

Authors: Z. Michael Wang, PhD, PE, BCEE, Hazen and Sawyer
Kenneth Waldroup, PE, City of Raleigh Public Utilities Department
Hugh A. Devine, PhD, North Carolina State University
Wayne Zhang, PhD, PE, Hazen and Sawyer

Main Presenter: Z. Michael Wang
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Subject of Paper: Water Distribution, Regulatory Compliance

Abstract:

Various physical and chemical characteristics of a water distribution system can provide favorable conditions for lead or copper leaching. Extended based on a study performed at NCSU using spatial analysis and geo-statistics analysis to test for the hypothesis on lead leaching and water ages, and the influence of other water quality parameters, this study applied the geographic information systems (GIS) and the hydraulic model of distribution systems, to test the hypothesis about the influences of pipe material, pipe age, water age, and other water quality parameters on lead/copper leaching. Results of the study indicate that higher levels of first-draw lead/copper concentrations most likely occur in the building built between 1970 and 1986, with copper plumbing systems. A long water age to the building and high water temperature will also likely contribute to the lead leaching into the tap water. Lead leaching and chloramine decay appear to be correlated, however, switching the disinfectant from chloramine to free chlorine during the annual "burn out" period chloramines did not accelerate the lead leaching.

The study is expected to provide utilities with an overview of using spatial and temporal methodology to test the influences of hydraulic and water quality parameters on lead leaching in water distribution systems. This paper intends to show the audience that with the methodology, utilities will be able to have a better understanding of the causative factors behind the lead leaching in distribution systems, and use their scarce resources to focus on high probability areas for lead leaching.

Regulatory Update Tennessee

Session M2A

Saya Qualls is the Chief Engineer for the Tennessee Division of Water Pollution Control. Previously, she managed the division's Permit Section. She is responsible for coordinating the functions of the permitting and municipal facilities sections. Saya also serves as a senior water policy manager within the Department of Environment and Conservation.

From 1992 to 1998, Saya worked in the Division's Municipal Facilities Section as the lead municipal permit writer. During this time, she led the development of Tennessee's Watershed Approach to permitting, monitoring and assessment.

Saya has also worked in the private sector for Martin Marietta Energy Systems in Paducah, Kentucky and for GSEE Environmental Consultants in LaVergne, Tennessee. She received a Bachelor of Science degree in chemical engineering from the University of Kentucky in 1985 and is a registered professional engineer in the State of Tennessee. Saya has been a member of the Water Environment Association for 20 years including serving on the Board and is currently the TN delegate.

2011 KY-TN Water Professionals Conference
July 24-27, 2011
Northern Kentucky Convention Center

Presenter: **Saya Qualls, Tennessee Department of Environmental and Conservation**

Abstract: **Tennessee Wastewater/Clean Water Update**

This presentation will provide current information on Tennessee regulatory activities as they relate to the Clean Water Act, including permitting, floodplains, water quality initiatives and planning.

Alan Schwendimann has served as Director for Tennessee's Division of Water Supply for one year. He has had the honor of working with the Tennessee Department of Environment and Conservation for a total of 16 years and served as Director for the Division of Ground Water Protection for 3 years prior to his current role. He has a Bachelor of Science degree in Environmental Science from Middle Tennessee State University.

2011 KY-TN Water Professionals Conference

July 24-27, 2011

Northern Kentucky Convention Center

Presenter: **Allen Schwendimann,**
Tennessee Department of Environment and Conservation

Abstract: **Kentucky Drinking Water Program Update**

This presentation will provide current information on Tennessee's drinking water regulatory environment. It will also highlight other water-related programs that affect the overall operation of a drinking water system

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Collection Systems

Session M2B

2010 Water Professionals Conference
Session T3D
Title: "Watch Your Assets: Asset Management as a Tool and a Mindset"

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CREDENTIALS

Registered Professional Engineer

EXPERIENCE

4.03 – Present	Engineer Knoxville Utilities Board
1.99 – 1.03	Engineer Vaughan and Melton Consulting Engineers, Inc.
4. 89 – 12.98	Environmental Protection Specialist Tennessee Department of Environment and Conservation

EDUCATION

Undergraduate

Bachelor of Science – Civil Engineering
Tennessee Technological University

Graduate

Master of Science - Environmental Engineering
University of Tennessee, Knoxville

2011 KY/TN Water Professionals Conference Abstract

Dry Weather Overflows - Analysis and Prevention

The Knoxville Utilities Board (KUB) entered into a Consent Decree with the State of Tennessee, City of Knoxville, EPA and Tennessee Clean Water Network in February, 2005. The primary goal of the Consent Decree was the elimination of sanitary sewer overflows (SSO) from the wastewater system. As a result of the consent decree KUB established the PACE10 program. PACE10 is a 10-year program that includes numerous construction projects and other programs whose intent is to eliminate SSOs.

As KUB enters into year seven of the PACE10 program, there has been an 87 percent decrease in wet weather or capacity related SSOs. However, dry weather overflows have only seen a reduction of 44 percent over the same period of time. In order to achieve the goals set forth by the Consent Decree, KUB needed to determine the causes for these overflows and implement any necessary program changes to address dry weather overflows.

KUB began to analyze all of the overflow data from 2003 to 2010. The analysis showed that dry weather overflows occurred around 70 times per year. First, the overflows were also mapped to determine if any geospatial relationship existed as part of the cause of the dry weather overflow. Further analysis determined that the majority of dry weather overflows could be grouped into the following categories:

- Blockage related overflows – roots, grease and debris in gravity sewers
- Pipe failures – pipe collapses or structural problems in gravity sewers
- Pump failures -- mechanical/electrical failure of pump stations or residential grinder pumps
- Construction related overflows – By-pass pumping or other situation that occurred during construction activity

All of this information was evaluated and conclusions were made about possible ways to prevent dry weather overflows from occurring.

This presentation is about the dry weather overflow analysis that KUB performed and the results that came from this study. Upon reviewing the data, several programs were created or revised to attempt to decrease the number SSOs. This presentation will also discuss the implementation of these programs and the effects they are having on the number of dry weather overflows.

Prepared by:

C. Herschel Hall
Sharon Shadwick

TETRA TECH

Lori L. H. McIlvaine, EIT

Project Engineer

Ms. McIlvaine joined Tetra Tech in August 2009. A mechanical engineer in training, she is interested in efficiency, energy, the environment, and humanitarian service, and has developed skills with Visual Basic, AutoCAD, and ArcGIS. At Tetra Tech, her responsibilities include client-interfacing in water, wastewater, and stormwater projects. Additionally, she represents the Engineering and Architecture Services group in Tetra Tech's Sustainability Council.

EXPERIENCE

Drinking Water / Wastewater

Blue Grass Army Depot, Madison County, Kentucky, 2009-Present – Manages the Depot's repair work order system, including tracking repairs, managing funds, and communicating with subcontractors. Also assists the project manager with management of the rest of the water and wastewater system at the Depot, including developing engineering solutions to environmental issues and preparing reports.

Industrial Pretreatment Program Management

Industrial Pretreatment Management Program, 15 Significant Industries, Winchester Municipal Utilities, Winchester, Kentucky, 2009-Present – Assists Winchester Municipal Utilities with management of their industrial pretreatment program, including producing monthly reports for the industries, maintaining the database of data, permit writing, and other support tasks.

Industrial Wastewater

CMOM Development and Implementation, Winchester, Kentucky, 2009-Present – Assists Winchester Municipal Utilities with development, tracking, and implementation of CMOM programs in response to EPA Consent Order.

Fats, Oils and Grease (FOG) Program, Winchester, Kentucky, 2009-Present – Assists Winchester Municipal Utilities with establishing and implementing a FOG Control program to address WMU's Consent Decree. The program addresses permitting, risk ranking, inspections, and best management practices.

Stormwater

On-Call Environmental Services Contract, Blue Grass Airport, Lexington, Kentucky, 2009-Present – Assists the project manager in the management of aircraft deicing fluids, stormwater monitoring and reporting, Integrated Spill Plans, and permit management.

On-Call Environmental Services Contract, Louisville Regional Airport Authority, Louisville, Kentucky, 2009-Present – Assists the project manager in the management of aircraft deicing fluids, stormwater monitoring and reporting, the Integrated Spill Plan, and permit management for both Louisville International Airport and Bowman Field.

Education:

Bachelor of Mechanical Engineering (BME), University of Dayton, 2008

Registrations/Certifications:

Fundamentals of Engineering (FE) Exam, NCEES

Permit Required Confined Space Entry

Professional Affiliations:

Pi Tau Sigma, International Mechanical Engineering Honor Society

Order of the Engineer

Water Environment Federation

Office:

Lexington, Kentucky

Years of Experience:

Since 2005

Years with Tetra Tech:

Since 2009

Other - Civil

Wadsworth City Engineering Department, Wadsworth, Ohio, 2005 – As an engineering intern, Ms. McIlvaine worked on organizational projects; planned road paving in AutoCAD; and assisted with surveying.

Other – Mechanical and Project Management

Salud del Sol, Inc., Nicaragua and the U.S., June 2008 to Present – As Founder and Executive Director of this nonprofit, Ms. McIlvaine is developing a solar autoclave to sterilize medical instruments using only energy from the sun. The solar autoclave is being developed through partnerships with the University of Dayton (UD), Massachusetts Institute of Technology (MIT), and Grupo Fenix, an international NGO located in Nicaragua. While the research and development is facilitated by members of Salud del Sol, the production of the solar autoclave will be housed by a group of entrepreneurial women, Las Mujeres Solares, living and working in the rural community of Sabana Grande de Totogalpa, Nicaragua. The Salud del Sol team has won first place in the UD Business Plan Competition, as well as second place in the Development Track of the MIT 100K Competition. At the cross-section of social entrepreneurship, renewable energy, and international healthcare, Salud del Sol is working to fulfill the mission of empowering communities in Nicaragua with the opportunity to improve their own healthcare systems while supporting sustainable development that creates jobs for members of these communities.

Ethicon Endo-Surgery, Inc., Cincinnati, Ohio, 2006–2007 – As an R&D co-op, Ms. McIlvaine developed and conducted mechanical tests; wrote engineering studies and protocols; and led a reliability study that increased product marketability in emerging markets of the developing world.

Grupo Fenix, NGO, Nicaragua, 2006 – As an engineering intern, Ms. McIlvaine improved and tested solar cookers; acquired experience in appropriate technology and renewable energy; and resided with a host family without running water or electricity.

Clearing Up the FOG: The Price of a Fats, Oils, and Grease Program

Michael Flynn, General Manager, Winchester Municipal Utilities; Lori McIlvaine, EIT, Tetra Tech, Inc.

What are the true costs of a Fats, Oils, and Grease (FOG) program? Many cities are implementing FOG programs, costing utilities thousands of dollars. The industries in these cities are subject to strict and expensive FOG regulations. A FOG program based on risk rankings can make the costs more reasonable than a one-size-fits-all type of program. This abstract summarizes a comparative study of the costs and benefits, to both the food and beverage industry and the utility, of one such program. Winchester Municipal Utilities (WMU), a small utility in central Kentucky, was required to enact a FOG program as a result of a Consent Decree by the EPA. The program was implemented in 2009 and will be in place indefinitely, subjecting the food and beverage industry to permitting as a condition of continued sewer service. The FOG program impacts all Food Service Establishments (FSEs) in Winchester – 113 businesses and organizations – but the impact on each FSE is based on its risk of producing grease.

The study details the program implementation costs to the utility, as well as the economic benefits. Unique to WMU's FOG program, each FSE is ranked according to its risk of grease: high, medium, or low. WMU personnel must inspect each FSE on a schedule according to their risk ranking: twice a year for high-risk FSEs, once a year for medium-risk FSEs, and once every five years for low-risk FSEs. Assuming an increase of ten FSEs per year, and taking into account program costs, FSE fees, and utility savings in FOG-related operations and maintenance costs, the FOG program was not immediately profitable for WMU, representing a loss of $55,000 for the first three years. However, the study estimates that WMU will break even annually once there are no more implementation costs. For cities that are experiencing excessive costs from grease-related sewer complications, such a program makes good economic sense.

The study also identifies the costs to Winchester's FSEs of all three risk levels. For a high-risk facility with an internal interceptor, the costs are estimated to be $2,500 over a three-year period, but the savings are estimated at up to $10,000 per year in sewer complications and the cost of additives. Because of the variable requirements based on risk ranking, the FOG program imposes a very low cost-burden on low-risk FSEs. Medium-risk FSEs have many of the same costs as high-risk FSEs, so the burden is greater on these facilities, which account for 9% of the industry. The FOG program is definitely economically sensible for high-risk FSEs who discontinue use of expensive additives or who have a history of sewer backups due to grease, estimated to apply to 20% of the facilities in Winchester.

A blanket approach, in which all of the FSEs are treated as high-risk, would have been unreasonably costly. WMU's risk-based implementation lessened the burden of its FOG program on both the utility and most FSEs.

SPEAKER BIO

NAME: STEPHEN E. LINDSEY

TITLE: SENIOR PIPELINES REHABILITATION SPECIALIST

COMPANY: JACOBS ENGINEERING GROUP INC., NORCROSS, GEORGIA

TITLE OF PRESENTATION: WHAT EVERY SYSTEM OWNER SHOULD KNOW ABOUT CURED-IN-PLACE PIPE

SHORT PERSONAL RESUME SUITABLE FOR INTRODUCTION:

Mr. Lindsey has over 25 years of experience in the Trenchless Technologies industry and serves as Jacobs' Senior Sewer Rehabilitation Specialist. His previous experience as the Assistant Division Manager of Improved Technologies Group, LLC, a full-line trenchless pipeline and infrastructure rehab company, and as Regional Coordinator for Insituform Technologies of North America, the largest trenchless technology transfer company in the world, and General Manager for Southern Pump Manufacturing Co., Inc., a multi-facility manufacturing and distribution firm.

He has worked primarily with municipalities and large industrial complexes across the US in the contract negotiation, planning and implementation of large scale environmental infrastructure utility projects with emphasis on trenchless and other non-disruptive methodologies, as well as heavy effluent bypass scenarios. He has developed, coordinated and implemented all phases of project planning and management, to include environmental remediation and social impact studies, subsequent analysis, and conclusive critical path recommendation.

In addition, he has been responsible for several prime infiltration and inflow (I&I) reduction projects across the Southeastern US and has been credited with successfully meeting performance outcomes in both small and large-bore sewer and drainage basins. He has also conducted numerous training sessions relative to all aspects of I&I reduction efforts to include: System Evaluation, Prioritization, Process & Asset Allocation, and Construction Management.

"Breathing New Life into Venerable Old Stone and Brick Sewers with a Cured-In-Place Pipe Project Definitely Not for the Faint-Hearted"

Stephen E. Lindsey
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ABSTRACT

The Patton Street and 17th Street Sewer located in Covington, Kentucky is an atypical outfall line constructed of brick/stone and mortar dating back one hundred years. Sewers of this type are sometimes found in towns and cities along the Ohio and Mississippi Rivers and have commonly deteriorated due to several similar factors.
Over time, joining mortar used to construct the sewer was no longer in place from effluent abrasion, effects of sewer gasses, shifting soils, surface loading and a general breakdown due to age. The loss of mortar had resulted in displaced and missing brick and/or stone and had compromised structural integrity. In addition, since the configuration of the sewer allowed for the backup of river water into the sewer, deterioration was further exacerbated by the continual "percolation" of silts in and out of the sewer through missing mortar voids and missing brick and/or stone as the river rose and fell. That this circumstance was on-going was borne out in the fact that several sinkholes had appeared along the sewer runs which were subsequently repaired by the system owner, Sanitation District No, 1 (SD1) of Northern Kentucky.

KEYWORDS

Cured-In-Place Pipe, (CIPP), Sewer Rehabilitation, Infiltration & Inflow (I&I)

THE PROBLEM

The materials compromising the makeup of the hose pipes presented major challenges to designers and project planners. In addition, the configuration of the sewers runs were not exactly known and the sewers contained more than one hundred service laterals in less than 1,800 linear feet of pipe. The interior surface of the host pipe would make the proper identification of services and their reinstatement after CIPP installation nearly impossible. If all this wasn't bad enough, the inevitable rise of the Licking River imposed a timetable for construction from which there could be no deviation. A promise made had to be a promise kept.
While there are many avenues of obtaining Cured-In-Place pipe, it was evident that the Patton Street project would require more expertise and effort in design, planning, construction and management than many either possessed or would be willing to exercise to complete this very difficult job.

THE PRESENTATION

Our presentation will include a case study of the difficult aspects of the Patton Street project. We will present videos and photographs which will take the audience inside this uniquely constructed sewer and discuss the problems encountered and our thought process in developing a strategy to bring about a successful outcome. Many viewers will simply not believe that the project was ever undertaken and will be astonished at the incredible reconstruction that was accomplished.

Management

Session M3A

Dave Vogel Bio

Dave Vogel is currently the Vice President of Customer Service and Distribution for the Louisville Water Company. Mr. Vogel is a graduate of the University of Maryland where he received a Bachelor of Science Degree in Mechanical Engineering, as well as an MBA. Prior to joining the Louisville Water Company in 2007, Mr. Vogel spent 15 years with E.ON U.S., most recently as the Vice President of Retail and Gas Storage Operations. He is currently a Board member of the local American Red Cross and is a graduate of Leadership Louisville and Leadership Kentucky.

Leadership Comes in All Shapes and Sizes

Leadership is in many ways more of an art than a science. Various styles and techniques exist and they can all lead to success when it comes to leading an organization. In this session. Dave Vogel will share his common sense thoughts on the attitudes, behaviors. and practices that can be used to succeed in leadership, management, and everyday life. He will cover a variety of topics and experiences from his 18-year career in the utility industry. This lighthearted session is a good way to reenergize your attitude and/or change your perspective while having a few laughs along the way. In an industry so heavily focused on the technical side of the business, this is a good way to step back and focus on the people side of things.

Dave Vogel is currently the Vice President of Customer Service and Distribution for the Louisville Water Company. Mr. Vogel is a graduate of the University of Maryland where he received a Bachelor of Science Degree in Mechanical Engineering, as well as an MBA. Prior to joining the Louisville Water Company in 2007, Mr. Vogel spent 15 years with E.ON U.S., most recently as the Vice President of Retail and Gas Storage Operations. He is currently a Board member of the local American Red Cross and is a graduate of Leadership Louisville and Leadership Kentucky.

Leeann Williams, P.E.
CDM

Leeann is a project engineer for CDM in their Nashville, Tennessee office. She received her bachelor's degree in Civil and Environmental Engineering from Tennessee Technological University and her master's degree in Environmental Engineering from Vanderbilt University. Leeann has been with CDM for 5 years, with a focus on water resources work including master planning of stormwater and wastewater systems.

Jamie Lefkowitz
CDM

Jamie has her B.S. and M.S. in Water Resources and Environmental Engineering from Villanova University. She works primarily in water resources planning and management, with a focus on integrated resource planning and watershed studies, and is experienced in hydrologic, water quality, and water systems modeling.
Jamie has been with CDM for 3 ½ years in the Cambridge corporate headquarters, working with the water resources division.

System Modeling for Integrated Water Resource Planning

Leeann Williams, CDM, 210 25th Avenue North, Suite 1102, Nashville, TN 37203

Jamie Lefkowitz, CDM, One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139

Mark Hilty, City of Franklin, Tennessee

Integrated Water Resource Planning is increasingly being recognized as an efficient, reliable method for developing long term plans encompassing all the water resource systems within a community, region, or larger watershed area. The City of Franklin, Tennessee, is using an Integrated Water Resource Plan (IWRP) method to evaluate and select a set of plans that consider not only the Harpeth River, tributary streams, water distribution, wastewater collection, water reuse, and stormwater, but also the critical concept of how all these systems interact and affect each other.

Phase I of the City of Franklin's IWRP used the STELLA software to simulate the water resource systems at a high conceptual level. STELLA is a dynamic and graphical tool used to simulate interactions between and within subsystems that are part of a larger interconnected system. Using the Harpeth River as the focal point, each water resource system was built into the STELLA interface to simulate the flow of water into the City, through the distribution system, to wastewater treatment, and back to the river or to a reuse destination. Data from river gauges, flow monitors, treatment plants, and existing plans and studies were included to develop a reliable representation of the City of Franklin's service areas. Once the existing system baseline model was developed, identified options and alternatives for each system were added to the modeled environment in order to be evaluated. Each individual option may be turned on or off, or adjusted as desired; using this method, an option within one system could be seen to have an effect on one or more other water resource systems.

This presentation will show how water resource systems may be evaluated together using an example in the STELLA software, and consideration of how a single project (or group of projects) affects the integrated system and provides valuable insight to future planning.

Jason Brooks

Program Manager

Brown and Caldwell

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Jason Brooks brings more than 13 years of experience to Brown and Caldwell in his role as Infrastructure Program Manager in the company's Nashville office. He has an extensive background managing water and wastewater infrastructure and engineering programs for municipal utilities. His expertise includes planning, construction and operation of utility facilities, as well as information management and technology.

As a manager for the Knoxville Utilities Board (KUB), Jason was responsible for process improvement, engineering solutions and project delivery for a $500 million consent decree wastewater program. The program included the rehabilitation of 165 miles of infrastructure and 35 MG of equalization storage, plus pump station and wet weather treatment upgrades.

Under Jason's leadership, KUB achieved consent decree compliance with U.S. EPA Region IV and met customer and community expectations through a significant reduction in sanitary sewer overflows.

Jason understands utilities needs from the inside out, and shares Brown and Caldwell's commitment to solutions that are scientifically sound, sensitive to the environment, and add value to the community.

Jason D. Brooks

Career Progression

Knoxville Utilities Board
Present. Manager, Wastewater Collection Systems

- System improvement manager for 1300 miles of collection system and 65 pump stations
- Rehabilitation of 175+ miles of collection system pipes ranging from 8" – 54" diameter
- Construction of 35 MG of wastewater storage tanks and associated pump stations
- Upgrade of over 20 wastewater pump stations

1998 -- 2002: Management Analyst, Organizational Development and Process Improvement
1996 – 1998: Student Intern

Education

Maryville College	***BA, Mathematics, May 1997***
University of Tennessee, Knoxville	***BS, Civil Engineering, August 2008*** ***MS, Civil Engineering, August 2010***
Tennessee Technological University	***Master Business Administration, 2005***

Associations

Water Environment Federation, KY/TN WEA
American Society of Civil Engineers

Professional Certifications

Engineer Intern, TN Certification No. 26818

Wet-weather Wastewater Program Management

We just got our Consent Decree…now what?

Jason D. Brooks
Knoxville Utilities Board (KUB)

Communities and municipalities are facing significant challenges as EPA steps up enforcement actions regarding management of wastewater systems during high flow (wet-weather) events. The initial concern is typically, "how we will pay for all of the required improvements?" However, that concern is quickly followed with, "how will we manage all of the work so that the deadlines are met, penalties are avoided, costs are managed, and our customers remain satisfied with our services?" Some municipalities turn to outside assistance entirely, some chose to perform the work with internal staff entirely, and some have chose a hybrid approach with a mix of internal staff and outside consulting assistance. This paper will compare and contrast these approaches from the perspective of the owner, as well as lay out some of the components of Program Management including but not limited to development of a management structure for the following:

- developing and delivering the wet-weather improvement program,
- meeting the administrative deliverables,
- establishing a procurement approach,
- developing and managing the budget,
- building the design and construction team,
- informing the public,
- collecting system and asset data,
- managing the construction and its effects on the community.

KUB is in the seventh year of a $530M wet-weather improvement program to reduce sanitary sewer overflows and improve wet-weather treatment capacity at two of the larger wastewater treatment plants (WWTP). Improvements to date have included 22MG of wet-weather storage, 150 miles of sewer upgrades, and 20 pump station improvement projects. Additional improvements will continue on the collection system at rate of 1.5 – 2.0% replacement annually along with additional storage of 12MG. Improvements at the WWTPs are underway to add new processes for peak weather flows that will eliminate the need for blending operations. KUB operates four WWTPs and approximately 1300 miles of collection system serving the City of Knoxville and portions of Knox County.

Management

Session M3B

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Education: B.S. Civil Engineering, Lafayette College. Easton, PA
M.S./Ph.D. Civil Engineering, Lehigh University, Bethlehem. PA

Registrations: Professional Engineer in four states plus NCEES certification

Dr. Wetzel is responsible for the Water and Waste Resources Division of SAIC (formerly R.W. Beck). SAIC is an $11 billion per year, 45,000 employee organization that provides technical and business consulting services to federal. state and municipal governments and industrial clients worldwide. Dr. Wetzel's group provides water, wastewater and solid waste consulting services to primarily municipal and state clients throughout the U.S.

Dr. Wetzel has managed a variety of projects for municipal clients. Projects include water treatment process studies, water quality investigations, privatization studies, utility acquisitions, rate and connection fee studies, bond reports, resource recovery facility feasibility study, manhole rehabilitation, sewer system modeling, wastewater reuse and wastewater treatment plant design and performance evaluation. He is contributing author to the Water Environment Federation's Manual of Practice No. 8, *Design of Municipal Wastewater Treatment Plants*.

Dr. Wetzel has represented various governments in valuation, due diligence investigations and negotiations for the purchase of private utilities. Acquisitions have been both by negotiated agreement and condemnation, with settlements ranging from $3 million to $2 billion in transaction value.

2011 Water professionals Conference
Abstract Submittal

Title: Indianapolis Completes a $2 Billion Municipal Water/Wastewater Utility Sale

Category: Management

Author: Edward D. Wetzel, Ph.D., P.E.
Senior Vice President
R.W. Beck, Inc., an SAIC Company

Abstract:

The current economic crisis has city and county governments scrambling to provide essential services and capital needs under scenarios of reduced tax revenues and user fee collections, and a number of governments are looking to their most valuable assets—the water, wastewater and storm water utilities—as possible sources of funds. Since most government-owned utilities operate as enterprise funds, there are often limitations on how much revenue can be provided to a host government through payments in lieu of taxes (PILOTs) or other fund transfer mechanisms.

Gregory Ballard became Mayor of Indianapolis in January 2008, and began the process of fulfilling his campaign promise of repairing the City's roads and bridges without raising taxes. After conducting an evaluation of alternative approaches, the monetization of the City-owned waterworks and wastewater utility systems was determined to be the best approach for generating up to $500 million of cash for the needed transportation improvements. The combined systems serve approximately 1 million people with total revenues of about $380 million. At the time, the waterworks and wastewater utilities were facing their own challenges, with capital needs exceeding $5 billion, including a Consent Decree from the U.S. Department of Justice for improvements to the combined and sanitary sewer system totaling over $1.5 billion.

Decisions regarding how best to monetize large utility assets while optimizing system operations and prioritizing capital needs were non-trivial. The City initiated a request for Expressions of Interest in July 2009 to solicit ideas from utility operators, engineering firms, program managers, contractors and other municipalities. Interviews were conducted with eight of the respondents to further evaluate the alternative approaches. In parallel, R.W. Beck prepared a Fair Market Value appraisal of the systems and determined the value at between $1.9 and $2.2 billion.

The City ultimately entered into a Memorandum of Understanding with Citizens Energy Group, a Public Charitable Trust, and operators of the local gas, steam and chilled water utility systems in March 2010. Selling the assets to Citizens had two primary advantages over other solutions:

- No need to refinance the $1.5 billion in existing debt; and
- The synergies offered by operating multiple utilities, with a projected annual cost savings of $40 million to the rate payers.

Upon approval of an Asset Purchase Agreement and closing of the transaction, Citizens has agreed to:

- Provide $263 million in two cash installments;
- Assume $1.47 billion in existing utility debt;
- Accept increased PILOT payments through 2039 with a net present value of approximately $170 million; and
- Allow the City to retain cash held in the Wastewater System's Sanitation General Fund with a current value of $65 million.

The utilities will be regulated by the Indiana Utility Regulatory Commission, and transition planning is underway.

NON-REVENUE WATER AUDITS AS A TOP-DOWN ASSET MANAGEMENT APPROACH TO INCREASING REVENUE AND IMPROVING PERFORMANCE

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CREDENTIALS

Registered Professional Engineer (TN, MS)

EXPERIENCE

2008-Present	Sr. Project Manager/Client Service Manager CH2M HILL Knoxville, TN
1995-1998	Principal Williford, Gearhart, and Knight, Inc. Clinton, MS

EDUCATION

Undergraduate
B.S. Civil Engineering
Virginia Military Institute

Graduate
M.S. Civil Engineering
Mississippi State University

Title: Non-Revenue Water Audits as a Top-Down Asset Management Approach to Increasing Revenue and Improving Performance

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In July 2007, legislation was enacted in Tennessee that requires utilities to submit water loss percentages with their annual audit reports. The same legislation required the Comptroller of the Treasury Utility Management Review Board to set a limit of acceptable water loss and to investigate utilities whose water loss was excessive. Recently, the board has established 35% as the benchmark for excessive water loss and will soon begin the process of investigating those utilities that exceed the benchmark. There remains uncertainty as to how implementation of this new law will unfold. Investigation and enforcement standards are not specifically defined and there are intentions to adopt new water audit and reporting procedures among the agencies involved.

However, what is certain is that an accurate and well-structured water audit is a powerful top-down asset management tool. Water utilities have the opportunity to substantially increase revenues by reducing the quantity of Non-Revenue Water (NRW). There are proven methods and tools that can help to identify sources of NRW and successful approaches to increase revenue, reduce expenses and preserve a vital resource by helping utilities improve accuracy in measuring water use, decrease payment delinquencies and mitigate water loss.

Non-Revenue Water (NRW) is the difference between the amount of water entering a utility's water system minus the total amount of water paid for by customers. There are three categories of NRW: unbilled authorized consumption, apparent losses, and real losses. Examples of unbilled authorized consumption include system flushing by the utility and filling of fire fighting tankers. Apparent losses, which result in lost revenue, are a result of water theft, meter inaccuracies, meter reading errors and data handling errors. Real losses, which result in increased production costs, come from leakage or overflows from the system's infrastructure up to the point of the customer meter.

Some NRW reduction efforts, such as in-depth field investigations and line replacement programs, can be quite costly. When developing a NRW reduction strategy, it is best to take a holistic approach and identify problem areas with the greatest consequence. This can best be achieved by a water audit which is a cost-effective means to identify the low hanging fruit. The water audit will allow for prioritizing of how and where to realize quick returns on investment.

The presentation will focus on 1) elements and structure of a water audit, as defined by the AWWA Manual M36, 2) strategies to identify and prioritize NRW reduction efforts that maximize efficiency and return on investment, and 3) a review of several case study examples of successful water audit initiated NRW reduction programs.

David K. Brauner leverages his extensive experience in serving as CDM's corporate resource for the comprehensive array of emergency management services and subject matter expertise relative to the Robert T. Stafford Disaster and Emergency Assistance Act, the Disaster Mitigation Act of 2000, and the National Response Framework. His background includes executive leadership roles within the United States Department of Homeland Security and the Federal Emergency Management Agency in areas spanning preparedness, response, recovery and hazard mitigation. Mr. Brauner is a graduate of the Louisiana State University Paul M. Herbert School of Law, where he earned his Juris Doctor and Master of Laws degrees. Brauner served as a member of the Staff Judge Advocate to the Commandant of the United States Marine Corps. He has also served as a civilian Administrative Law Judge.

The Role of the National Infrastructure Protection Plan to the Water Utility Industry

David K. Brauner, CDM, 1515 Poydras St, Suite 1350, New Orleans, LA 70112, braunerd@cdm.com

In January 2002 and through Homeland Security Directive Number Seven, President George Bush ordered the development of the National Infrastructure Protection Plan (NIPP), and integral to the NIPP is the "Critical Infrastructure and Key Resources" (CI/KR) program. Within the contexts of the programs, the NIPP serves to demonstrate the direct exposure of the nation's most essential functions and recitals are given to clearly document the array of CI/KR assets and the cascading effects of a failure brought on by an incident of national significance.

Water and water management systems represent one of the 18 assigned sectors and are assigned a corresponding network of Federal departments and agencies and state and local government "consortia" operating together within the CIKR network. Within the realm of water and wastewater, the NIPP and CIKR serve to deter threats, mitigate vulnerabilities, and minimize consequences to the water systems within a given jurisdiction. In performing these functions, the foundational elements rest in risk analysis and a corresponding management framework, which, operating concurrently, serve to sustain the process for combining consequence, susceptibility, and threat information so as to produce an assessment of national and sector risks.

The presentation will further illustrate the premier posture of the water and wastewater sector within the more refining aspects of the United States Department of Homeland Security's National Infrastructure Protection Plan and the finer elements of its Critical Infrastructure and Key Resources operatives.

Nutrient Removal

Session M4A

Clark Dorman BIO:

I am a graduate of Indiana University, Kentucky Natural Resources Leadership Institute, KY Mediation Center, and the Louisville Urban Environmental Leadership Institute. I have participated in the KY Certified Managers Program and am in the prolonged process of completing my thesis/masters at U of L in Environmental Education/Management. The goal of my thesis is to identify commonality between environmental ethics and Christian land stewardship ethics.

I have had a diverse career of public service and environmental protection beginning with the US Navy. I began my environmental career with the Division for Air Quality as an inspector out of the Frankfort Regional Office. I have worked as a facilitator, educator, and compliance/technical advisor through the KY Business Environmental Assistance Program, KY Pollution Prevention Center and as a graduate/teaching assistant at Blackacre State Nature Preserve.

My management experience includes Assistant Director for the Kentucky Waterways Alliance, Salt River Basin Coordinator, Production Supervisor for Pegasus Industries (an unexpected, but enlightening career diversion), Class Leader-US Naval Apprenticeship School, and owner/mediator of Dorman Mediation,

Along the way I've had a few odd jobs to subsidize my income:
-sports writer for a newspaper,
-personal assistant for an author
-recycling coordinator/trash hauler
-foster/adoptive parent recruiter
-forklift operator
-grounds keeper
-Christmas tree trimmer

Participation in the Kentucky Foster/Adoptive Program resulted in my proudest accomplishment; the father of 8 incredible and challenging children.

I currently am active locally in Shelbyville with the Clear Creek Trailblazers, Clear Creek Conservation Trust, Red Orchard Park Nature Center Development Committee, and Earth Day at Red Orchard Park.

KY Nutrient Criteria Development and Reduction Strategy

Summarize the nutrient problem nation-wide and in Kentucky

Identify the number impaired lakes, stream miles nationwide and KY

Address how Designate Uses are affected

Outline economic and social costs of nutrient problems (water treatment costs, lost tourism dollars, reduced recreation opportunities, loss of stream ecosystem services)

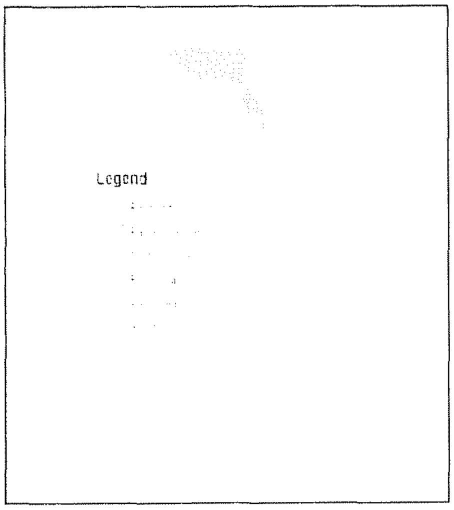
Discuss EPA's push for numeric standards – rationale (assessment, TMDL targets, permit limits)

Florida standards for wadeable streams: reference site approach

Nutrient Watershed Region (NWR)	Instream Protection Value Criteria	
	TN (mg/L)	TP (mg/L)
Panhandle West	0.67	0.06
Panhandle East	1.03	0.18
West Central	1.65	0.49
Peninsula	1.54	0.12
North Central	1.87	0.30

Concentrations are annual geometric means not to be surpassed more than once in a three-year period

Map of EPA's stream classification by NWRs used in final rule.



KY's development of wadeable streams bioregional nutrient guidelines: Multiple lines of evidence

- Stressor-response relationships (macroinvertebrates and algae)
- Reference stream nutrient ranges
- Nutrient ranges for sites with "passing" Macroinvertebrate Bioassessment Index
- Regionally relevant literature values for adverse effects or trophic status

Draft wadeable streams **bioregional nutrient guidelines** for Kentucky:

Bioregion	**TN (mg/L)**	**TP (mg/L)**
Mountains	0.65	0.03
Miss Valley - Interior River Lowland	1.40	0.07

Pennyroyal	1.40	0.05
Bluegrass	1.20	0.10*

(Insert map)
Numbers are similar in magnitude in many cases to FL regional criteria. While our approach has added benefit of weighing more lines of evidence our datasets are much weaker (less confidence that the nutrient ranges are fully described by the data available – most data from summer baseflow conditions). Still, if EPA were to promulgate criteria for KY, the numbers would very likely be similar to these.

Challenges in translating general guidelines to numeric standards

- Local factors important in predicting actual effects on uses
- Local factors important in determining expected natural inputs

Better nutrient standards are an important tool in reducing nutrient-related problems in surface waters. The current narrative standards have not prevented impairment of the uses and have not provided clear targets for restoration of uses.
Establishing numeric criteria for instream concentrations is the prevailing approach to improving standards, but this is just a step in the process.

Nutrient Reduction Strategy
KY-wide strategy to reduce nutrients through multi-dimensional approach.

Gaps: Research Areas and Data Needs

Saya Qualls is the Chief Engineer for the Tennessee Division of Water Pollution Control. Previously, she managed the division's Permit Section. She is responsible for coordinating the functions of the permitting and municipal facilities sections. Saya also serves as a senior water policy manager within the Department of Environment and Conservation.

From 1992 to 1998, Saya worked in the Division's Municipal Facilities Section as the lead municipal permit writer. During this time, she led the development of Tennessee's Watershed Approach to permitting, monitoring and assessment.

Saya has also worked in the private sector for Martin Marietta Energy Systems in Paducah, Kentucky and for GSEE Environmental Consultants in LaVergne, Tennessee. She received a Bachelor of Science degree in chemical engineering from the University of Kentucky in 1985 and is a registered professional engineer in the State of Tennessee. Saya has been a member of the Water Environment Association for 20 years including serving on the Board and is currently the TN delegate.

2011 KY-TN Water Professionals Conference

July 24-27, 2011

Northern Kentucky Convention Center

Presenter: **Saya Qualls, Tennessee Department of Environmental and Conservation**

Abstract: **Tennessee Nutrient Update**

The intent of this presentation is to summarize the nutrient problem nation-wide and in Tennessee. The presentation will discuss the quantity of impaired water bodies and address how Designate Uses are affected. Economic and social costs of nutrient problems (water treatment costs, lost tourism dollars, reduced recreation opportunities, loss of stream ecosystem services) will be outlined. It is intended to discuss EPA's push for numeric standards and how Tennessee will approach such standards (assessment, TMDL targets, permit limits, etc.).

Greg Youngstrom is an Environmental Specialist with the Ohio River Water Sanitation Commission. He has a B.S. in Biology from Bowling Green State University. Greg has worked in both government and industry for 20 years. With ORSANCO he directs the nutrients program which deals with both local and national issues, from development of water quality standards to representing the Ohio River Basin to the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force.

Regulation and management of nutrients in the Ohio River is a top priority for ORSANCO. We have been collecting and analyzing data to develop numeric nutrient criteria for the mainstem of the Ohio River since 1999. While simplistic methods will generate criteria, we feel they are not scientifically defensible. Current efforts are toward a weight of evidence approach which correlates in-stream nutrient concentrations to macroinvertebrates and algae.

To help manage nutrients within the basin ORSANCO has partnered with the Electric Power Research Institute (EPRI) to develop a nutrient trading program in the Ohio River Basin. This program is the largest trading program ever attempted and involves steering committees from the WWTP community, power utilities, agriculture, regulatory agencies, and environmental advocacy groups. ORSANCO is leading the formation of the WWTP steering committee, which will help formulate the program rules.

Nutrient Removal

Session M4B

Mr. Ron Latimer is a Senior Associate with Hazen and Sawyer. He has a Bachelor's in Civil Engineering and Master of Science in Environmental Engineering from Georgia Tech. He has over 15 years of experience in wastewater treatment plant design including study, optimization, and design of numerous wastewater treatment plants with specialization in BNR/ENR process design and modeling.

He is currently leads the BioWin process modeling group for Hazen and Sawyer and provides company-wide process support and review. Mr. Latimer has performed or provided oversight of BioWin process modeling including field testing, calibration and application of the model for process design and optimization at over 30 BNR/ENR facilities.

Designing for Reliable, Cost-Effective Nutrient Removal: Lessons Learned

Authors: Ron J. Latimer, P.E., Ronald L. Taylor, P.E., and Paul Pitt, P.E., Ph.D.

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Wastewater treatment plants have been required to meet stringent effluent limits for total nitrogen and total phosphorous for the past five years in the Chesapeake Bay drainage basin within Maryland, the District of Columbia and Virginia, and for the past ten years in the Neuse River Basin in North Carolina. Depending on plant location and flow increases, plants in these areas are required to meet total nitrogen limits between 3.0 and 8.0 mg/l and total phosphorous limits between 0.18 and 2.0 mg/l. This significant experience in designing, starting up, and optimizing operations at these plants provide important "lessons learned" that can be applied to the design and operation of reliable, cost-effective nutrient removal in Pennsylvania.

Examples of some of the lessons learned include: the importance of equal flow splitting and self-regulating flow control to biological and sedimentation process units, the need to address foam generation and provide for removal from the plant, the benefits of providing flexible aerobic, anoxic and anaerobic mass fractions, importance of DO control and minimizing DO carryover with internal recycles and post anoxic zones, the impact of analyzing and controlling recycle streams, the value of a plant specific cost-benefit analysis of chemical feed versus basin volume, supplemental carbon addition experience, the impact of properly performing nutrient analyzers, the need to accommodate wet weather flows and methods for handling low temperatures.

This paper will present examples of the above lessons learned using actual plant case studies based on full scale plant performance, upsets, special sampling results, and plant modeling efforts at BNR and ENR plants.

Michael A. Schober, PE
Senior Vice President
Buchart Horn, Inc.

Bachelor of Science in Civil Engineering
Villanova University 1984

Years of experience - 26

Mr. Schober is Senior Vice President of Buchart Horn's Environmental Services Group. His responsibilities include over-site of various disciplines including water, wastewater, land development, geographic information systems, landscape architecture, planning and industrial waste. Mr. Schober is also responsible for overall financial goals, business development, employee retention and employee recruiting, quality control and quality assurance, workload and strategic planning.

Mr. Schober currently is serving as President of the Board for the Pennsylvania Municipal Authorities Association (PMAA), an organization representing water, wastewater, solid waste Authorities in Pennsylvania through training and legislative initiatives.

Licensed Professional Engineer in

- Pennsylvania
- Maryland
- West Virginia
- Tennessee
- Louisiana

Positions with Professional and Civic Organizations – past and present

- President- Pennsylvania Municipal Authorities Association (Present)
- President – White Rose Toastmasters Club (Past)
- Secretary / Treasurer – Columbia Municipal Authority (Present)
- Region 4 Director – Pennsylvania Municipal Authorities Association (Past)
- President – Eastern Pennsylvania Water Pollution Control Operators Assoc. (Past)
- Chairman, Public Education Committee – Eastern Pennsylvania Water Pollution Control Operators Assoc. (Past)
- Chairman of the Board – Housing Development Corporation MidAtlantic (Present)
- Board Member – Columbia Catholic Housing for the Elderly (Present)
- President – White Rose Toastmaster Club (Past)

Awards

- Leonard M. Glass Memorial Award presented by the Chesapeake Water Environment Association in recognition of engineering achievements demonstrating the highest degree of merit and ingenuity in the design of wastewater treatment facilities at Conococheague, MD.

- George J. Schroepfer Medal presented by the Water Environment Federation for excellence in the application of economics in the design of wastewater facilities.

Integrating Biofilm Activated Sludge for Biological Nutrient Removal

Michael A. Schober, PE

Introduction

Springettsbury Township owns and operates a 15 MGD regional WWTP incorporating conventional activated sludge for removal of BOD and ammonia. Surface aeration provides the needed oxygen and mixing. The process is followed by clarification and chlorine gas disinfection prior to discharge.

New effluent limits, designed to reduce degradation of the Chesapeake Bay, required the plant to significantly reduce total nitrogen and phosphorus discharges. Given the size of the facility, the Township was expecting a significant project, additional tanks, higher operational costs and additional debt. The Township prepared a facilities plan which considered several alternatives to reduce nutrients and selected a technology that would not require the construction of additional tanks.

The Biofilm Activated Film process is based on attached growth biofilm principles of biological wastewater treatment. The core of the processes is the biofilm carrier elements or media. While the biofilm is fixed to the media, the media is thoroughly mixed within a reactor and retained in the reactor. The reactor contains both free-floating biomass (activated sludge) and biomass attached to the media. The free-floating biomass passes through the reactor, is settled and recycled back to the reactor. The media and attached biofilm remain in the reactor. Therefore, the mixed liquor concentration in the reactor is very high and capable of increased nitrogen removal. Since the media remains in the reactor, the final clarifiers do not see the corresponding high solids loading.

This paper will address the myriad design considerations necessary to successfully implement this technology. This includes influent screening requirements, aeration and mixing requirements, mixed liquor screening, and aeration controls. The paper will also discuss the construction process, maintenance of plant operations during construction, and the lessons learned during construction and start-up. Additionally, operating results will be discussed and evaluated.

Numeric Nutrient Criteria: Implications and Options for Utilities

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CREDENTIALS

Registered Professional Engineer (TN)

EXPERIENCE

2005-Present	Project Engineer CH2M HILL Knoxville, TN

EDUCATION

Undergraduate

B.S. Biosystems Engineering
The University of Tennessee

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Many states in the southeast have already implemented or are in the process of developing numeric nutrient criteria for all water bodies including lakes & reservoirs, rivers and streams, estuaries, and wetlands. Numeric nutrient criteria are anticipated by Tennessee local utilities in 2012. The intent of this legislation is to limit excessive nutrients in water bodies which can inhibit fish and other aquatic life and lead to a decrease in aesthetic conditions.

Some Municipal Separate Storm Sewer Systems (MS4s) and National Pollutant Discharge Elimination System (NPDES) permitted facilities may be uncertain how to deal with the upcoming criteria. MS4s may have to concentrate on nonpoint sources to keep more nutrients from reaching water bodies to control nutrient levels within water bodies. In addition, NPDES permitted facilities may require updates to existing operations or capital improvements to comply with these new regulations..

While these uncertainties exist, there are options for utilities to help them meet or address the pending nutrient criteria in their watersheds. In many cases, the use of new analysis or due diligence on existing data will put dischargers ahead of the game when quantitative limits are set. Using watershed assessments, water quality modeling, site specific criteria studies, and use attainability.analysis utilities will be able to assess sources and the most appropriate measures to meet pending limits. A watershed approach that considers all nutrient sources, including both point and non point sources, may be the most viable option considering compliance requirements and cost.

For example, permits that are issued on a watershed basis could provide a mechanism for implementing more cost-effective technologies and management practices to anticipated nutrient loading requirements. Water quality credit trading has also been proven across the country as an effective way to meet nutrient requirements; both point to point and point to non point source trading programs have been implemented. Credit trading also encourages early and meaningful collaboration and cooperation among key stakeholders and may support earlier implementation of the recommended nutrient reductions.

The presentation will focus on nutrient sources, pollutant suppressing technologies, and provide a review of several case studies enacting cost-effective solutions for nutrient management.

Contruction

Session M5A

Kyle Boyle

I joined Sanitation District No.1 of Northern Kentucky in January 2007 after graduating from the University of Kentucky. I currently work as a Project Engineer in the Capital Improvements Program. My daily duties consist of managing various capital projects including pumps stations, collections system improvements, and outside maintenance contractors.

THE AXIS OF NEW TRENCHLESS TECHNOLOGY

REMOVING THE HIGHLAND ACRES PUMP STATION WITH A NEW TRENCHLESS BORING TECHNOLOGY

Kyle J. Boyle, Jim Turner, P.E., Brandon C. Vatter, P.E. – Sanitation District No. 1 of Northern Kentucky

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ABSTRACT

The Highland Acres Pump Station (HAPS) Removal Project was one of the last projects associated with the Northern Kentucky Sanitation District No. 1's (SD1) Western Regional Collection System. During large wet weather events, when the capacity of the HAPS was exceeded, the PS would overflow into a small creek. According to SD1's Pump Station Overflow Elimination Plan as part of its consent Decree, the overflow was required to be eliminated by December 31, 2010. The alternative selected to eliminate the overflow was to eliminate the HAPS through a new gravity sewer and convey the flows downstream where capacity was available.

Varying topography of the area, a meandering stream, and existing wet well elevations made the design of the elimination sewer challenging. The final design included a section of sewer to be constructed by traditional jack & bore trenchless methods (15" pipe at 1.3% slope inside of a steel casing pipe) due to close proximity to the I-71 / I-75 Right- of -Way and residential houses. However, due to the flat slope of the sewer the maximum inside diameter of the steel casing pipe was not specified and was allowed to be selected by the Contractor to accommodate the final trenchless technology selected. The most responsive bidder approached SD1 about using a new trenchless technology, Vermeer's AXIS Guided Boring System, in lieu of jack & bore. Further research showed that this system was a hybrid mix between traditional jack & bore and horizontal directional drill (HDD) that utilizes the best of both applications and would be a perfect fit for this project. The AXIS machine is laser guided for accuracy, includes a vacuum unit to remove spoils, has a smaller overall footprint compared to other trenchless arrangements, and can provide more efficient pipe installation times.

The contractor proposed the AXIS system in partnership with Vermeer and Midwest Mole and agreed to take all of the risk to install the pipe with traditional methods should the new technology not be successful. The project turned out to be a win-win for all parties involved. To date, the Highland Acres' bore is the largest (outside diameter) and longest (~506 LF) to be done with the AXIS Guided Boring system in rock substrate. After the 13.75" cutter bore was completed, 15" HDPE DR 11 pipe was pulled into the 19.25" reamer hole using the AXIS machine. Due to the majority of the bore being in rock, there were concerns about the vacuum's ability to pull such a dense mixture of bentonite and rock fragments. However, the viability of the technology was quickly confirmed when the machine averaged 14 feet per hour when cutting and 8 ft per hour during the reaming process.

The AXIS machine provided a significant time savings allowing the project to stay on schedule. The contractor estimated traditional jack & bore installation would take 2 months; the AXIS system was able to install the pipe, start to finish, in 4.5 weeks. The overall length of the gravity sewer installed was approximately 1,062 feet of 15 and 18 inch pipe. The project was successfully completed and the HAPS was eliminated about two weeks ahead of schedule of the Consent Decree deadline.

THE AXIS OF NEW TRENCHLESS TECHNOLOGY

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Alternative Project Delivery Case Study: How KUB Used CM-at-Risk Approach to Accelerate Construction of Six Wastewater Storage Facilities

Presenters: **Craig S. Parker, P.E., Gresham, Smith and Partners**
G. Dwayne Frye, P.E., Knoxville Utilities Board

Craig S. Parker, P.E.

Craig is a Principal with Gresham, Smith and Partners and manages the Knoxville Office. Craig has over 20 years' experience in project management, engineering design, and construction of water and wastewater infrastructure projects. Since 2004, Craig's primary role has been project manager for KUB PACE10 program wastewater storage and pumping facility projects. Since 1990, Craig has personally managed more than 75 design and construction projects totaling over $100 million.

Craig is a 1990 graduate of Tennessee Technological University with a BS in Civil Engineering, a 2005 graduate of Auburn University with a Masters degree in Environmental Engineering, and a Registered Professional Engineer in TN, GA, KY, and OH.

G. Dwayne Frye, P.E.

Dwayne is a Senior Project Engineer in KUB's Collection Systems Improvement Department and a key member of the KUB PACE10 program team. Dwayne is a Registered Professional Engineer and a Certified Class IV Wastewater Plant Operator. Dwayne is also a Past-President of the KY-TN WEA (1993-94) and served as the Local Arrangements Co-Chair in 2008, 2002 & 1994.

Abstract

Alternative Project Delivery Case Study: How KUB Used CM-at-Risk Approach to Accelerate Construction of Six Wastewater Storage Facilities

Craig Parker, P.E., Gresham, Smith and Partners
Dwayne Frye, P.E., Knoxville Utilities Board

When faced with the challenge of constructing four wastewater storage facilities with a combined storage volume of 21.25 million gallons on an accelerated schedule as part of their EPA mandated PACE10 Program, the Knoxville Utilities Board (KUB) elected to seek an alternative to the traditional design/bid/build method of project delivery. Ultimately, the decision was made to engage a qualified construction manager to deliver the projects via the CM-at-risk delivery method. Following a qualifications based CM selection process, the initial four storage facilities, which were constructed as part of KUB's efforts to reduce the occurrence of sanitary sewer overflows in the collection system, were delivered via CM-at-risk where the CM was allowed to self-perform all work for which it was qualified. The self-performed work included excavation, reinforced concrete, process piping, and equipment installation. The four projects were designed, constructed and commissioned in 30 months at a total construction cost of $47 million. KUB expressed a high degree of satisfaction with the performance of the CM and with the CM-at-Risk delivery method.

Subsequent to the construction and commissioning of the four overflow abatement storage facilities, KUB faced a similar challenge of constructing two additional storage facilities with a combined storage volume of 12 million gallons to provide wastewater treatment plant peak flow equalization. The CM delivery method was considered highly effective for accelerated delivery of the initial four facilities and still favored over conventional design/bid/build; however, KUB wanted to encourage a higher degree of cost competitiveness on the two additional facilities. To achieve this goal, KUB again solicited and ultimately selected a CM via a qualifications based selection process. Unlike the previous delivery method, however, the selected CM was required to competitively bid all of the work. The CM was allowed to bid on work for which it was qualified, but ultimately the bid process resulted in the performance of all construction by subcontractors rather than the CM itself. The two facilities are scheduled to be fully operational in June 2011 at a total construction cost of $37 million.

The presentation will provide a brief overview of the Knoxville Utilities Board (KUB) PACE10 Program and the vital role of off-line wastewater storage facilities in helping KUB achieve and maintain compliance with the U.S. EPA Consent Order, which mandated a significant reduction in sanitary sewer overflows (SSOs). The decision by KUB to pursue CM-at-Risk as the preferred method of storage project delivery and the qualifications based process by which the CM firm was selected will be described. A brief description of the CM-at-Risk project delivery method will be provided, along with a description of the CM's scope of services for both the initial four CAP/ER facilities and the subsequent two CCP equalization facilities. A comparison of CM-at-Risk to traditional Design/Bid/Build project delivery will be presented, as well as advantages and

disadvantages of CM services agreements that allow the CM to self-perform all work for which it is qualified vs. agreements that require competitive bidding of the work and, potentially, performance of the work by contractors other than the CM itself.

Ronald C. McMaine, P.E.

Mr. McMaine began working with Bell Engineering in 1978. He has worked with more than 50 water systems. These systems have ranged in size from a few gallons per minute up to 24 million gallons per day. Project scopes have included operations assistance, planning, plant and distribution system design, hydraulic analysis, and system evaluation. Prior to coming to Bell Engineering he had six years of experience in two water systems, including three water treatment plants. His specialties include bringing water treatment plants into conformance with Safe Drinking Water Act requirements, especially disinfection by-products. He is currently chair of the Water For People committee.

EDUCATION

B.S. Mathematics, Michigan State University minor: chemistry, physics, geology
M.S. Civil Engineering, University of Kentucky

Registrations

Professional Civil Engineer, Kentucky
Professional Sanitary Engineer, Kentucky
Professional Engineer, West Virginia,
Class IV Water Plant and Water Distribution System Operator, Kentucky

Societies

American Water Works Association, KY-TN Section
(Life Member)

Kentucky Water and Wastewater Operators Association

Abstract: 2011 WPC Northern Kentucky

Title: Sustainability and Transparency—the Water For People Approach

Authors: Candace Vannasdale, Chair Elect—Water For People Committee
Ron McMaine, Chair—Water For People Committee

Sustainability and transparency have become more than slogans for the water/wastewater industry. Sustainability is promoted, mandated, and to a certain extent, funded by government agencies, and is an important consideration for any responsible organization. Transparency is more and more important as organizations seek to gain and maintain credibility in their dealings.

For the developing countries served by Water For People (WFP), the problems of non-sustainability and lack of transparency are often magnified. Realizing that no one benefits if these problems remain unaddressed and hidden, WFP has developed approaches for both issues that are successful and can be applied to systems in Kentucky and Tennessee.

This presentation describes those approaches. WFP believes enduring water and sanitation solutions can be achieved when key local role players--private sector, civil society, and government—are supported in a way that enables them to understand and act responsively and support community water supply and sanitation development. WFP works with local organizations to train communities and schools on the water cycle, water pollution, water source protection, reforestation and composting.

Sustainability issues also include cost effectiveness and ease of operation and maintenance. This presentation discusses the procedures for engineering and operational decisions, and engineering details of selected processes for both water and wastewater. Financial, managerial, and technical decisions are made by all the role players to assure the system is operated effectively, maintained regularly, repaired as needed, and eventually replaced. Success is not based upon who is helped today, but who is still being helped at checkpoints over the next ten years.

For transparency, WFP developed FLOW (Field Level Operations Watch), an Android mobile phone application that captures data on water points and sanitation programs in eleven different countries. The data is automatically compiled and uploaded to Google Earth, so it is free and available for anyone to see and use. Data may include photos or video, with information on water quantity and quality. This presentation will describe the technology used and the short term and long term value of the information.

In summary, this presentation describes the sustainability and transparency procedures for the WFP, and in so doing, gives water and wastewater utilities in Kentucky and Tennessee a different perspective that helps them achieve the capacity development goals of a sustainable, transparent utility.

Construction

Session M5B

Title: Reducing Check Valve Slam and Pressure Spikes at a Pump Station with Bladder Surge Tanks and Fast-Closing Check Valves

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CREDENTIALS

Registered Professional Engineer (Ohio)

EXPERIENCE

8/2007 – Present	Senior Principal Engineer Hazen and Sawyer, P.C. Cincinnati, Ohio
1/2002 – 8/2007	Senior Engineer Butler County Department of Environmental Services Hamilton, Ohio
5/1995 – 1/2002	Staff Engineer Butler County Department of Environmental Services Hamilton, Ohio
1/1994 – 5/1995	Project Engineer JDJ&A, Inc. Hamilton, Ohio
10/1993 – 1/1994	Construction Inspector JDJ&A, Inc. Hamilton, Ohio

EDUCATION

B.S. Chemical Engineering
University of Illinois at Urbana-Champaign

REDUCING CHECK VALVE SLAM AND PRESSURE SPIKES AT A PUMP STATION WITH BLADDER SURGE TANKS AND FAST-CLOSING CHECK VALVES

Main Author:
Bo Copeland, P.E., Hazen and Sawyer
11311 Cornell Park Dr., Ste. 135, Cincinnati, OH 45242
Phone: 513-469-2750, Fax: 513-469-2751
bcopeland@hazenandsawyer.com

Sanitation District No. 1 of Northern Kentucky (SD1) provides wastewater collection & treatment in Campbell, Kenton & Boone Counties. A critical facility in southern Kenton County, the Lakeview Pump Station (PS), is a wet well-dry well PS with 8 centrifugal pumps (4 parallel sets of 2 pumps in series) with a capacity over 21 MGD & over 3 miles of 30" force main (FM). This system operates at discharge pressures in excess of 200 psi. Two 7,500 gallon bladder surge tanks and four fast-closing check valves were installed in 2009 to eliminate vacuum conditions and vapor cavity collapse in the FM and to control high surge pressures in the PS. Specialized instrumentation was installed with the project to allow precise monitoring of the surge tanks' performance and system pressures. While monitoring showed that the project had successfully addressed the problems, check valve slam and pressure spikes in the PS piping resulting from pump trip events continued to exceed the design performance criteria.

Hazen and Sawyer (H&S) worked with SD1, the contractor and equipment manufacturers to identify the causes of the check valve slam and to make and test several modifications in an effort to maintain the pressure spikes associated with check valve slam within the specified design criteria. H&S identified two key contributors to the excessive conditions: The surge tanks were discharging at a higher flow rate than predicted, and the check valves were closing slower than anticipated. Ultimately, a combination of check valve modifications (to close the valves faster) and operational adjustments to dampen the initial discharge rate from the surge tanks brought the pressure conditions in the PS and FM within the specified limits.

This project demonstrates a successful approach to trouble-shooting and correcting excessive pressure spikes in a demanding, high-pressure application with bladder surge tanks and fast-closing check valves. It teaches important lessons on the implementation of surge improvements, including the importance of coordination among all involved parties and the value of performance monitoring. Perhaps, most notably, this project shows that, although modeling can be an invaluable design tool, reality can present surprises that require traditional engineering skills and tenacity—and even trial and error—to resolve.

2011 KY/TN Water Professionals Conference
Education Program Proposal

Speaker Contact information

Kristen Braden – can be reached at 614.487.1335 or kbraden@hrgray.com

Speaker Bio Information:

Kristen Braden, PE, Construction Project Manager
Kristen E. Braden provides construction management on public construction projects as well as construction claims management and resolution services for H.R. Gray, Inc. in Columbus, Ohio. Ms. Braden has a Bachelor of Engineering degree in Civil Engineering from Vanderbilt University, a Master of Science degree in Engineering from the University of Texas and a Juris Doctor degree from the University of Cincinnati.

Kristen Braden has been a guest speaker at the 2010 Ohio Parks and Recreation Association Annual Conference, 2008 Kentucky/Tennessee Water Professional Conference as well as the 2008 Ohio Parks and Recreation Association Annual Conference. Kristen also spoke at the 2009 Lower Colorado River Authority as well as the Primavera: 2007 Annual Conference with the topic "Claims: If I Can't Avoid Them, How Do I Get Through Them Unscathed?"

2011 KY/TN Water Professionals Conference
Education Program Proposal

Speaker Contact information

Kristen Braden -- can be reached at 614.487.1335 or kbraden@hrgray.com

Title: Claims: How to Avoid or Mitigate Them

Description *(one paragraph):*

Construction projects rarely progress in an ideal fashion. Weather conditions, changes in plans and specifications, and unforeseen site conditions are just a few of the challenges that can throw a project off course – and lead to claims. In this session, participants will review and discuss the claims process including claims avoidance, mitigation, the importance of communication and documentation, and the valuable role of a claims consultant in the entire process.

Needs Identification *(What is the issue? One paragraph):*

When dealing with claims on a construction project, it is important to take proactive measures. By doing so, an organization will save both time and money. To save time in the claims process, an organization must have continuous review of the schedule. Knowledge of the day-to-day changes and events will help a firm identify potential claims. Also, the firm will be able to identify the activities or events that have caused a delay or acceleration. Identifying claims early will help an organization collect and create the proper documentation to win [illegible] claim. Early identification also allows timely and proper notice pursuant to the contract requirements. To mitigate or minimize impacts on a project, identify ways the project can make up for lost time and money.

Learning Outcomes:

Participants will:

1. Understand the key to avoiding claims on your project is to have a complete and thorough knowledge of the contract requirements.
2. Understand the importance of communication and documentation in the process of mitigating claims.
3. Understand the role of a claims consultant who has extensive experience and familiarity with construction documents to review the contract before the project begins.

Program Outline *(include detailed outline of session):*

What is a claim?
How do I avoid claims?
Claim avoidance
Claim mitigation process
What is a claims consultant?
Why hire a claims consultant?

R. Kevin Kruchinski
Operations Supervisor
Kentucky American Water

PROFESSIONAL OVERVIEW

Profession: Utility Management

Position in firm: Operations Supervisor

EDUCATION

Sullivan University, Masters of Business Administration, Lexington KY 2008-2011 (currently attending)
Western Kentucky University, Utility Management Professional, Bowling Green KY 2006-2007
University of Kentucky, B.S. Natural Resource Conservation and Management, Lexington KY 1997-2001

PROFESSIONAL HISTORY

2009 to Present	Kentucky American Water, Operations Supervisor
2006 to 2009	Kentucky American Water, Operations Specialist
2004 to 2006	City of Danville Kentucky, Assistant Superintendent Water Plant
2003 to 2004	City of Danville Kentucky, Treatment Plant Operator
2001 to 2003	City of Danville Kentucky, Geographic Information Systems Specialist

KEY EXPERIENCE

Following his graduation from the University of Kentucky in 2001, Mr. Kruchinski earned his Class IVA Treatment license in 2004 and his Class IV Distribution license in 2007. He has experience within both the water and wastewater utility industries, working within and managing class IV through class II water and wastewater plants along with their associated distribution and collection systems. He has experienced nearly every facet of work that occurs within the utility industry including sample collection, meter reading, SCADA installation and troubleshooting, water and wastewater treatment optimization, main break repairs, new customer taps, customer service calls, employee coaching, construction management, as well as developing and managing operations and capital budgets.

PROFESSIONAL CERTIFICATIONS

Kentucky Class IVA Treatment License
Kentucky Class IV Distribution License
Utility Management Professional Certificate

DETAILED SUMMARY

August 2009 to Present: Kentucky American Water Operations Supervisor
As Operations Supervisor, Mr. Kruchinski is responsible for the operations, maintenance, and oversight of Kentucky American's newest production facility, Kentucky River Station 2. Kevin was involved in the design of the project in 2007 providing operational knowledge and understanding to the team. Mr. Kruchinski began working full time at the plant while the facilities were under construction in 2009. He has hired six highly qualified employees to operate the facility which went live late in the summer of 2010. Mr. Kruchinski is involved in numerous external events including the Owen County Science Fair, Kentucky River Clean Sweep, McConnell Spring's fundraisers, the Owen County Chamber of Commerce and he is an active member of the Water Users Advisory Council for the Ohio River Sanitation Committee (ORSANCO).

April 2006 to August 2009: Kentucky American Water Operations Specialist
As Operations Specialist, Mr. Kruchinski assumes responsibility for operations, maintenance, and management for his respective areas. He originally started work within the Central District in Lexington where he was involved with operations at the Richmond Road facility. Here he was responsible for capital construction projects related to the water plant as well as internal and external properties management. Mr. Kruchinski was working within Kentucky American's Northern Division when he was promoted to Operations Supervisor. He was responsible for a class III water plant, a class II wastewater plant and the respective distribution and collection systems. He has aided in the training and development of staff within the district and further aligned operations with the Lexington office. He represented the production department in design aspects of KAW's newest treatment plant north of Frankfort. Mr. Kruchinski represented Kentucky American Water at numerous events including Reforest the Bluegrass, Kentucky River Clean Sweep, McConnell Springs fundraisers, Owen County Science Fair, and the Owenton Chamber of Commerce.

July 2004 to April 2006. City of Danville Assistant Superintendent Water Plant
As Assistant Superintendent, Mr. Kruchinski was responsible for the day-to-day operation of a 10 mgd water treatment facility. He was directly responsible for maintaining the budget, ordering chemicals, completing all compliance and monitoring reports, and managing a major electrical and SCADA upgrade. Mr. Kruchinski was instrumental in modernizing and improving Danville's water plant, including the purchase of their first computer for record keeping and compliance reporting.

July 2003 to July 2004: City of Danville Water Treatment Plant Operator
As an operator, Mr. Kruchinski was responsible for the production of quality water to meet customer demand. Duties included record keeping, sample collection, adjustments to chemical feed settings, and lab analysis.

R. Kevin Kruchinski
WPC Abstract
12/22/10

2011 Kentucky-Tennessee Joint Professionals Conference Abstract

Lessons Learned from the Startup of Kentucky American Water's Newest Treatment Plant

Kentucky American Water started a new conventional water treatment plant late in the summer of 2010. Kentucky River Station II at Hardin's Landing is a 20 million gallon a day, surface water treatment facility situated on Pool 3 of the Kentucky River between Frankfort and Owenton. I intend to briefly discuss the history of the project, design concepts, construction, and startup of the facility. The presentation will primarily focus upon what we did right, what we did not do right, and what I would do differently given a similar situation.

Sustainability

Session M6A

WILLIAM R. SCALF, JR., PE

EDUCATION

Bachelor of Civil Engineering, University of Kentucky, 1975

REGISTRATIONS

Licensed Professional Engineer: Kentucky

RESPONSIBILITIES

- Director of Frankfort Sewer Department responsible for all aspects of collection and treatment of sanitary and combined sewage for the City of Frankfort Kentucky. Facilities include a 9.9-MGD treatment plant, 55 sewage pump stations and maintenance of 6 flood pump stations with an annual operating budget of approximately $13,000,000. The Department has a staff of 46 responsible for all aspects of conveyance and treatment of wastewater.
- Collection system, having served the community for over 100 years, includes over 225 miles of pipes of various sizes with 23 miles of combined sewers.
- Responsible for negotiating and currently overseeing implementation of State Consent Judgment that will result in an investment of over $75,000,000 in the collection and wastewater treatment system of Frankfort.

PROFESSIONAL MEMBERSHIPS & ASSOCIATIONS

American Society of Civil Engineers - Member
National Society of Professional Engineers - Member
Society of American Military Engineers – Fellow
Water Environment Federation - Member

Energy and Greenhouse Gas Impact Evaluation for Cardinal Hills Pump Station

Frankfort Sewer Department, Kentucky
Presenter: William R. Scalf, Jr., PE, Director

WELCOME TO
FRANKFORT
CAPITAL OF KENTUCKY

The Frankfort Sewer Department, in collaboration with O'Brien & Gere, has developed an inventory of energy and greenhouse gas (GHG) impacts associated with renovations conducted at its Cardinal Hills Pump Station. In September of 2008, the Cardinal Hills Pump Station underwent a renovation project that improved pump performance and capacity, including the use of variable speed drives to increase energy efficiency.

Since renovation, weather-normalized electricity intensity has decreased by 0.34 kWh/thousand gallons per inch rainfall. The City of Frankfort receives an average of 47.24 inches of rainfall annually. Cardinal Hills Pump Station has pumped an average of 39,234 thousand gallons annually since renovation. Multiplying the above values together yields:

- An average of approximately 630,000 kWh saved annually.
- Based on the USEPA SRTV eGrid subregion CO_2 emission factor (1510 lb CO_2/MWh), this corresponds to 434 metric tons of CO_2 avoided annually. The latter corresponds to avoiding annual emissions from approximately 87 U.S. passenger cars.
- Based on a unit price of grid electricity of $0.06/kWh, this corresponds to an annual savings of approximately $38,000.

In addition to assessing the impacts of the September 2008 renovation project, this evaluation also provides a baseline against which to compare pump station performance following a planned Inflow and Infiltration (I&I) project that is anticipated for 2011. The average weather-normalized electricity intensity after the September 2008 renovation is 0.27 kWh/thousand gallons pumped per inch of rainfall, based on 2008-2010 data. This will serve as the baseline against which to compare post-I&I pump station performance.

In addition, because the I&I project will result in reducing the quantity of water treated at the wastewater treatment plant (WWTP), this benefit has also been quantified through analysis of WWTP energy use. From 2007 to 2010, the WWTP used an average of *2.110 kWh of electricity per thousand gallons of flow*. For reference, this is on the lower end of the range for U.S. WWTP facilities (1.100-4.600 kWh per thousand gallons treated; California Energy Commission, 2005). With respect to the future I&I project, for every thousand gallons of pumping avoided at the Cardinal Hills pump station, the WWTP will avoid approximately 2 kWh of electricity usage.

Overall, energy cost savings achieved from the Cardinal Hills Pump Station project can serve as a model for other municipal wastewater treatment facilities. The GHG emissions reductions achieved by the renovation also contribute to the City of Frankfort's target set under the U.S. Mayors Climate Protection Agreement.

PRESENTER
Scott A. Hall, P.E.
Brown and Caldwell

PAPER TITLE
What Can I Do to Make My Pumping Station Green? Understanding, Selecting, and Incorporating Sustainability Design Concepts into your Everyday Wastewater Facilities

CREDENTIALS

- Registered Professional Engineer

EXPERIENCE
3/96 – Present
Brown and Caldwell
Current Title: Associate

EDUCATION

- Undergraduate
  B.S. Civil Engineering
  Georgia Institute of Technology

EXPERIENCE SUMMARY
Scott has 15 years of experience in the planning, design and construction of both water and wastewater facilities. This experience includes water and wastewater treatment plant and pumping station design, hydraulic modeling, master planning, operations support, and construction management projects. He specializes in the hydraulic analysis and hydraulic design of pumping station and treatment plant systems, including hydraulic transient (water hammer) analysis of pipelines to evaluate and design surge control strategies.

Scott Hall is the Manager of ENVIRON's Ecotoxicology Group in Brentwood, Tennessee. He oversees the aquatic toxicology laboratory, and various projects related to industrial effluent discharge compliance. Specific expertise relates to conducting toxicity identification evaluations, biological and water quality assessments, and deriving site-specific discharge limits for toxics. Mr. Hall has a Masters Degree in Aquatic Toxicology and over 20 years experience consulting to various industries in areas related to NPDES permit compliance.

AREA OF CONSIDERATION | TOPIC

Wastewater and Water Environment | Sustainability

PAPER TITLE

What Can I Do to Make My Pumping Station Green? Understanding, Selecting, and Incorporating Sustainability Design Concepts into your Everyday Wastewater Facilities

PRESENTER

Scott A. Hall, PE

Brown and Caldwell

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Atlanta, GA 30328

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P. 770-673-3611

COORDINATION CONTACT

Donna Corlew CPSM, FSMPS

Brown and Caldwell

501 Great Circle Road, Suite 150

Nashville TN 37228

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P. 615-250-1270

ABSTRACT

What would a 'green' pumping station look like? Can sustainable design concepts be applied to traditional wastewater facilities like pumping stations? What about LEED certification? These are all questions that Nashville Metro Water Services (MWS) asked recently during the design of the Whites Creek Pumping Station Improvements project.

In 2007, Nashville established an ordinance encouraging sustainability and the use of LEED practices throughout the metropolitan area. Since that time, LEED practices have been applied at a number of new facilities—but never to an everyday water or wastewater facility, such as a pumping station. At the direction of the Mayor, Brown and Caldwell explored with MWS staff a wide range of sustainable design concepts that could be incorporated into the new station design. In particular, the team explored:

- Onsite alternative power generation (focusing on solar power options)
- Sustainable HVAC options (focusing on geothermal cooling systems)
- Sustainable building materials and construction methods
- Energy efficient equipment selection
- Sustainable project evaluation/rating methods including LEED Certification

In a series of workshops, the team considered the feasibility, cost, and benefits of each of these elements, finally arriving at a set of sustainable design components that would result in a showcase facility for MWS while not breaking the bank! This presentation details the various sustainable design concepts explored by MWS, along with an overview of the LEED certification process, focusing on its application to unmanned environmental facilities such a pumping station where many of the typical sustainability approaches are not applicable. Elements of particular relevance include:

- Overview of the LEED process and various certification levels
- The LEED point tracking process and its impact on the design process.
- Strategies for attaining you LEED project goals
- Special construction phase tracking and documentation requirements

The presentation will include several case studies that illustrate various degrees to which these approaches are applied including the Four Mile Run Pumping Station which will achieve LEED Silver certification.

(2,209)

PRESENTER
Kelly Comstock, P.E. BCEE
Brown and Caldwell

PAPER TITLE
Protecting Your Most Valuable Asset in Water / Wastewater System Operations – Institutional Knowledge

CREDENTIALS

- Registered Professional Engineer
- Board Certified Environmental Engineer

EXPERIENCE
06/2006 - Present
Brown and Caldwell
Current Title: Vice President

EDUCATION

- Undergraduate
  B.S. Environmental Engineering
  The University of Central Florida, 1994
- Graduate
  M.S. Environmental Engineering
  Georgia Institute of Technology, 1996

EXPERIENCE SUMMARY
Mr. Comstock has 16 years of experience in the planning, design, and construction of municipal water and wastewater treatment, conveyance, and storage facilities. He has extensive experience with assisting utilities in facility optimization, technology evaluation and implementation, and capital improvements. He is a technical expert in pilot studies and testing for filtration plants as well as in the design of disinfection systems. He conducted pilot testing, predesign, and final design for several of the largest drinking water systems in the Southeast. Mr. Comstock has extensive experience with advanced drinking water treatment technologies including ozone, UV disinfection membrane filtration, and Magnetic Ion Exchange Resin treatment.

AREA OF CONSIDERATION | TOPIC

Wastewater and Water Environment | Sustainability

PAPER TITLE

Protecting Your Most Valuable Asset in Water / Wastewater System Operations – Institutional Knowledge

PRESENTER

Kelly Comstock PE

Brown and Caldwell

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Atlanta GA 30328

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COORDINATION CONTACT

Donna Corlew CPSM, FSMPS

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Nashville TN 37228

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P. 615-250-1270

ABSTRACT

Preservation of the institutional knowledge of a water / wastewater utility is imperative in order to keep a utility operating efficiently. The issue of knowledge retention is becoming critical, as our infrastructure ages and workforce demographics shift. The environmental movement, development of the USEPA, and passing of the Clean Water Act in the 1970s created tremendous growth for our industry, but many of the workers that entered our industry at that time are now retiring and taking critical information with them. The issue of knowledge retention is quickly becoming one of the top issues facing the water and wastewater industry. The 2009 AWWA State of the Industry Report survey indicates that 20% of operators and 30% of supervisors will retire in the next 5 years. However recruitment for new positions remains to be a challenge, as 82% of the systems surveyed indicate it continues to be difficult to replace operators.

This paper will focus on an innovative tool that can be used to aid in the knowledge retention process—the use of an Operations Management System (OMS). An OMS is a low-cost, web-based information management system designed to facilitate the creation, capture, and management of operations information, data, policies, operations and maintenance manual information, system data, and operational procedures. It is open platform that is highly flexible and customizable. The OMS system is simple, allowing operators to easily update, customize, and maintain information on a day-to-day basis without having to rely on specialized software or database experts. The OMS is dynamic, with flexibility to interface with existing databases, O&M manuals, LIMS, and SCADA systems a utility may already have in place. It also has advanced searching capabilities and security access options to help control access and efficiency of use. The use of an OMS can help keep important system and operations procedures and data in a readily accessible location, while allowing for easy modification. A utility that uses an OMS can take the collective institutional knowledge and operational information residing in a group of its individual employees and create a system easily accessed by all current and future employees of a utility.

(2,262)

Watershed Issues

Session M6B

Michelle Hatcher is an environmental engineer with over seven years of experience. Michelle graduated from the University of Central Florida in Orlando, Florida, and began her career working with CDM in Los Angeles, California. Michelle currently works on water resources, water, and wastewater projects after moving to the CDM Nashville office in 2008. Michelle is an active member of WEF and sits on the Students and Young Professionals Committee, Residuals and Biosolids Committee, and the Municipal Wastewater Treatment Design Committee. Michelle is also involved with the Kentucky/Tennessee Water Environment Association organization and sits on the Young Professionals Committee, and is helping to plan and coordinate the 2011 Young Professional Summit in Lexington, Kentucky.

Up the Creek with a Paddle: Performance of a Visual Stream Assessment on a Non-Wadeable Streams

Michelle Hatcher, CDM, 210 25th Ave. North, Suite 1102, Nashville, TN 37203

Bobby Allen, P.E., City of Memphis Stormwater Coordinator, 2714 Union Avenue Extended, Suite 625, Memphis, TN 38112

The City of Memphis, assisted by CDM, performed a visual stream assessment for the Wolf River and its watershed within the urbanized portion of the waterbody. The Wolf River has a pathogen TMDL developed for several sections of the River within the City limits; and therefore as required by TDEC, is required to be surveyed/assessed every 5 years. This assessment required the development of a non-wadeable visual stream assessment protocol that utilized a combination of various guidance documents for both wadeable and non-wadeable streams. The visual assessment was performed through a combination of canoe access within the River to allow for appropriate investigation of the banks with follow-up via foot reconnaissance to verify potential areas of concern and collect required additional data. After the assessment was completed, the collected data was compiled into an evaluation report to assess the overall health of the River and watershed and provide a baseline for continuing assessment in the future. The primary objective of the assessment was the identification and prioritization of stream impairment sources and identification of potential BMPs and corrective measures to remedy the identified priority areas.

This presentation will describe the protocol development, coordination with TDEC and other regulatory agencies, methods and logistics for performing a successful visual stream assessment in a non-wadeable river, examples of potential data produced from the assessment, and methodology for compiling all of the data and summarizing the findings into a useable format for future improvements and corrective measures. With the increasing development of TMDLs throughout the state and requirements for performance of visual stream assessments on all TMDLs developed for pathogen and siltation and habitat alteration, this presentation will provide an overview and specific example of a successful visual assessment along with some lessons learned from our experiences

Arthur C. Newby

Senior Scientist
AECOM Water

While working for AECOM and legacy companies, Mr. Newby has completed twenty two years of project management experience in areas such as Water Quality Studies, Air Permitting, Underground Storage Tank Programs, Spill Prevention Plans, Odor and Corrosion, Construction Administration, and Superfund Site Cleanup.

He began work on the Nashville CSO program in the early 1990s when dissolve oxygen was the major concern with WWTP and CSO discharges. He has worked on projects which investigated dissolved oxygen, organic and inorganic toxic, and pathogen indicator concerns for sewer overflows in Nashville, Clarksville, Knoxville, and Kansas City.

Mr. Newby offers thirty years of RCRA/OSHA experience in developing and supervising confined space entry programs, work place and ambient air monitoring programs, hazardous waste permitting, delisting, exclusions, sampling and analysis, hazardous waste identification, operations of hazardous waste treatment and storage facilities, hazardous waste facility environmental audits, and transportation of hazardous waste.

He received a BA in Chemistry from David Lipscomb College in 1980. He is a Masters Level Certified Hazardous Materials Manager and a Certified Professional in Erosion and Sediment Control. He is also the chairman of the Water Quality Advisory Committee at the Cumberland River Compact.

Modeling the Cumberland River Using CE QUAL W2

Arthur C. Newby
AECOM Water
220 Athens Way, Suite 200
Nashville, TN 37228
(615) 244- 8864
art.newby@aecom.com

Greg Ballard[1]
Paul Stonecipher[2]

This presentation summarizes the recent calibration of the CE-QUAL-W2 model used on the Cumberland River for E. coli and its use to estimate water quality impacts from CSO discharges to the river. The portion of the Cumberland River that was modeled is located in north middle Tennessee in Davidson County. The upstream and downstream boundaries included Old Hickory Dam at river mile 216.3 and Cheatham Dam at river mile 148.7. This modeling was completed as a task under the Metro Nashville Davidson County (Metro Water Services/MWS) Long Term Control Plan/LTCP in an effort to determine baseline impacts to water quality from eight Combined Sewer Overflows in downtown Nashville. The modeling also estimated water quality impacts for proposed CSO alternatives. These estimates were used to determine cost versus benefit tables and curves in order to assist MWS in choosing the best CSO control option for the LTCP.

In March 2009 a Consent Decree between Metro Water Services (MWS) of Nashville and the United States Environmental Protection Agency (EPA) was entered by the United States District Court for the Middle District of Tennessee. The Consent Decree requires MWS to prepare and submit to EPA and the Tennessee Department of Environment and Conservation (TDEC) an updated Nine Minimum Controls Plan (NMCP) and a Long Term Control Plan (LTCP) evaluating and identifying corrective actions for achieving compliance as set forth in the *Combined Sewer Overflow Control Strategy* (54 *Federal Register* 37370).

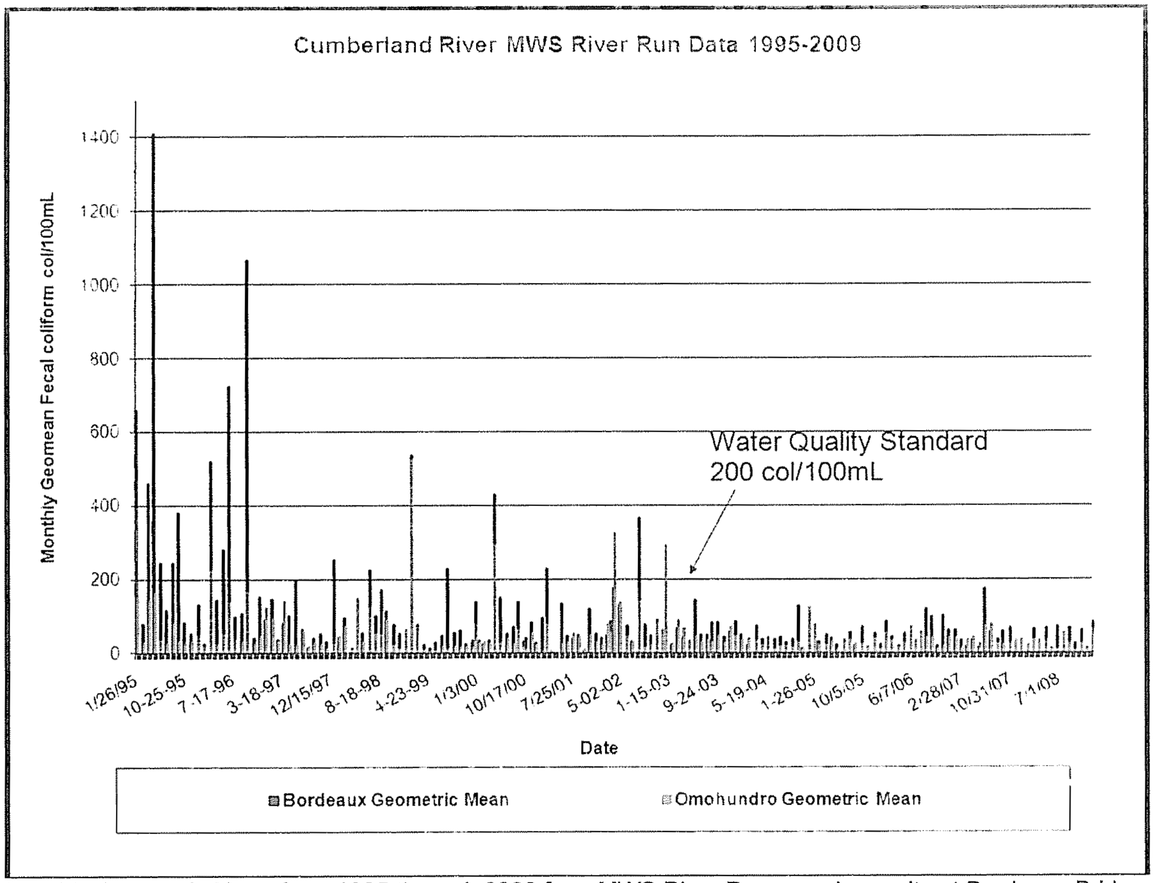
The City of Nashville has embarked upon developing a Long Term Control Plan with an end goal of improving the water quality of the Cumberland River within Davidson County.

The presentation will give an update on how water quality has changed over the past twenty years on the Cumberland River for pathogen indicators.

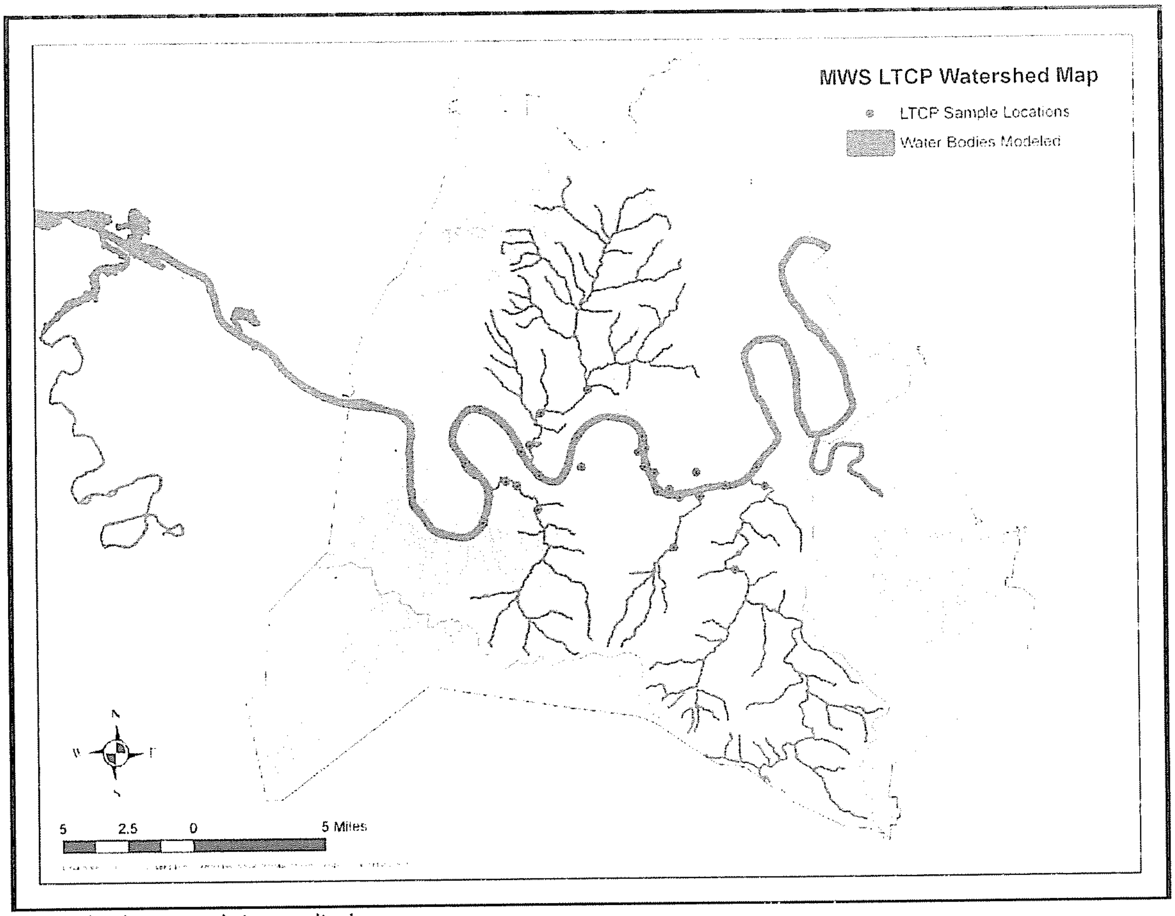
This presentation will also show how the model was updated from the modeling program in the nineties using newly acquired data from pollutant sources and a decay rate study which used in-river diffusion chambers. Faster computers and revised software currently make it possible to conduct model runs which use smaller time steps that increase model resolution and allow model runs to cover multiple years as compared to just a few days for model runs made back in the mid-1990s.

[1] Metro Water Services; 1600 Second Avenue North; Nashville, TN 37208; (615) 862-4525; greg.ballard@nashville.gov

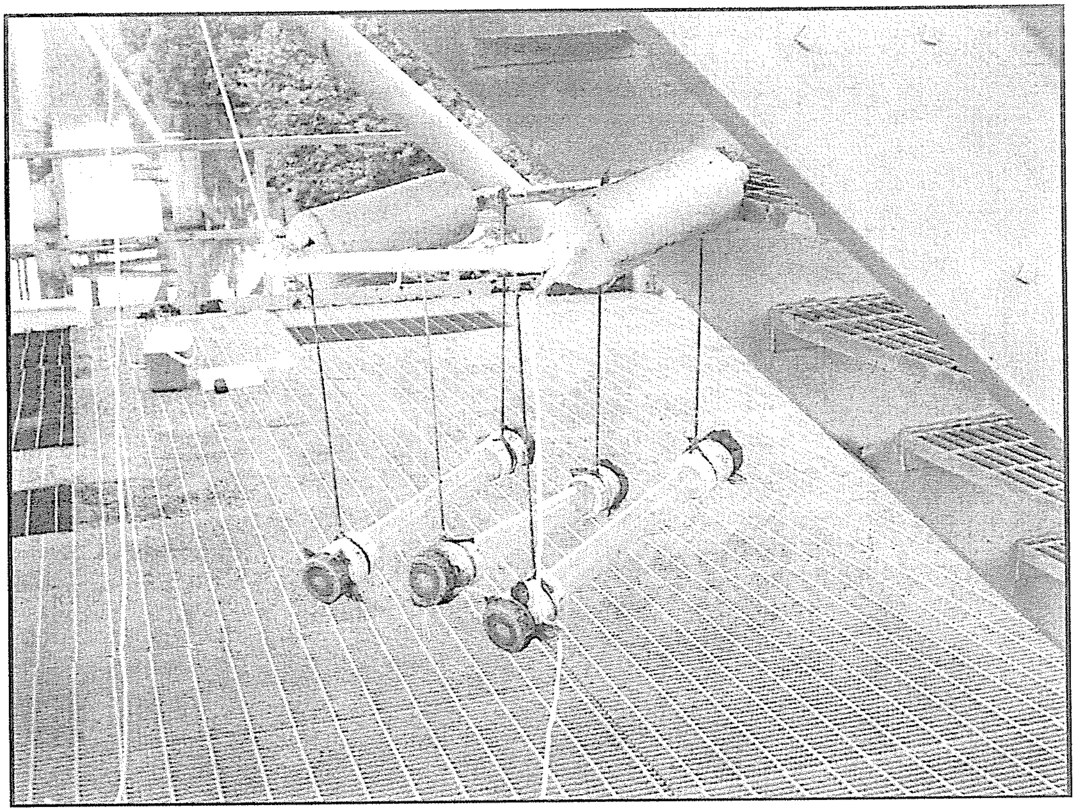
[2] AECOM; AECOM Water; 220 Athens Way, Suite 200; Nashville, TN 37228; (615) 244- 8864 paul.stonecipher@aecom.com



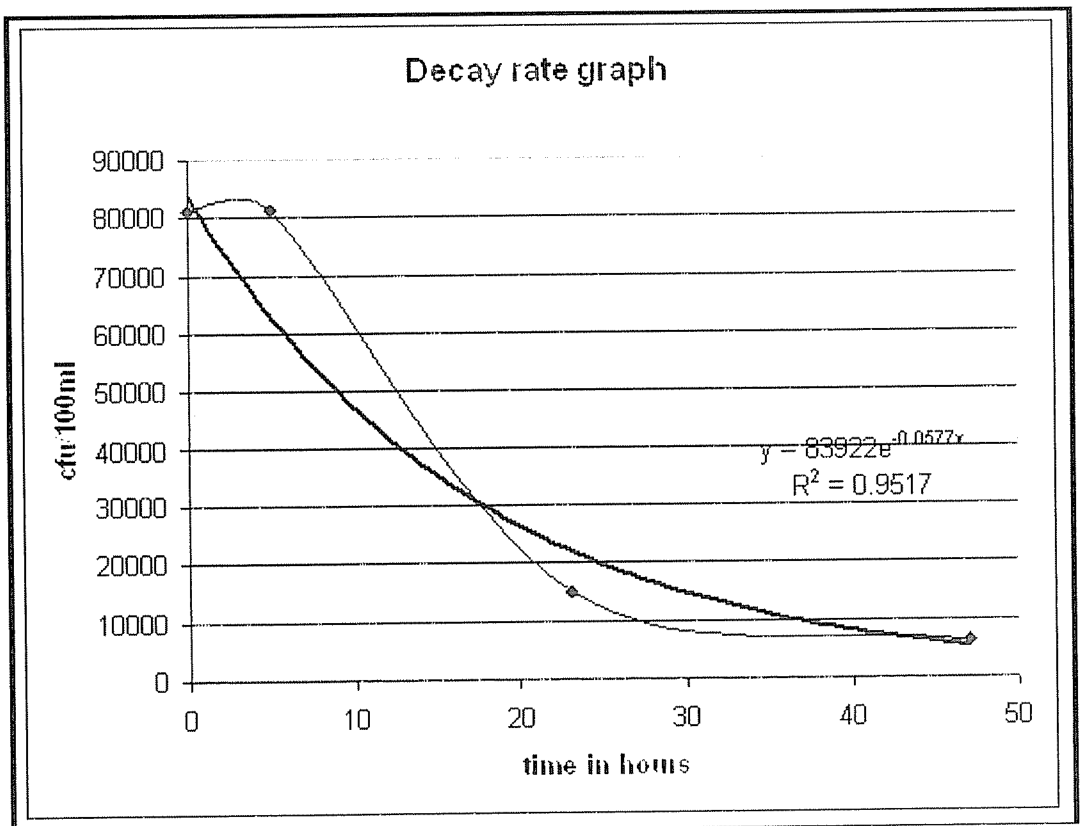
Monthly Geometric Mean from 1995 through 2009 from MWS River Run sample results at Bordeaux Bridge and Omohundro Bridge



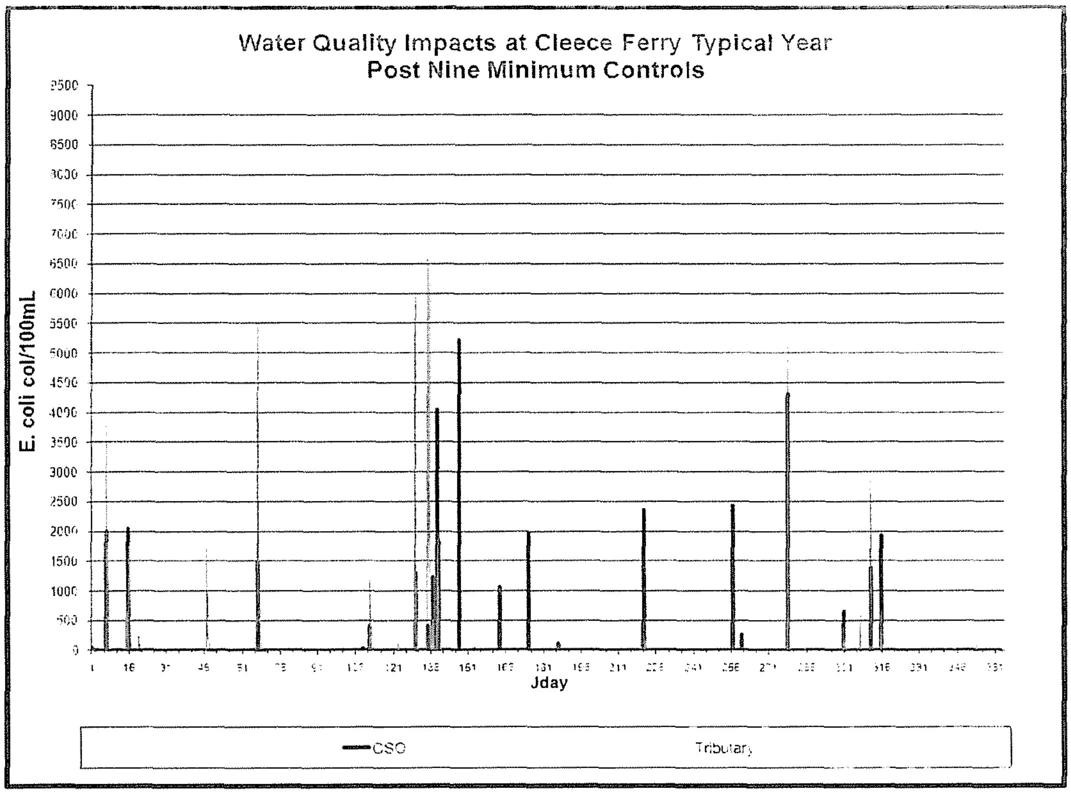
Watershed approach to monitoring



Diffusion Chambers



Decay Rate Study Results using an in-river diffusion chambers



Model Estimated E. coli concentrations downstream of CSOs

2011 Kentucky Tennessee Water Professionals Conference
Presenter Information

Randy Stambaugh, P.E., L.S.—GRW Engineers

Randy Stambaugh is a Project Manager with GRW's Louisville office. Mr. Stambaugh has a Bachelor of Science in Civil Engineering from the University of Arizona. He is a Professional Engineer in California and Kentucky and a Licensed Surveyor in Kentucky.

Mr. Stambaugh has a broad range of Civil Engineering experience. He has worked for engineering firms in California and Kentucky plus the Louisville Metropolitan Sewer District where he was the Louisville Floodplain Manager and the MS4 Coordinator.

Mr. Stambaugh is a member of several professional engineering organizations in Kentucky. He currently serves as the President of the Kentucky Stormwater Association.

Post Construction. Is your MS4 ready?

2011 Water Professional Conference

Surface Water Quality/Stormwater Management

The MS4 program applies to 45 communities in Kentucky and more will be added with the 2010 Census. The Phase II MS4 Permit went effective on April 1, 2009. It contains six Minimum Control Measures (MCM) that must be implemented. Post Construction, MCM #5, will have the biggest impact on the future of development in your community. Will you be ready?

Post Construction requires that you calculate the 80^{th} percentile storm and design facilities to manage it. Engineers love that! Wait, there's much more. A community must develop and implement Stormwater Runoff Quality Treatment Standards.

The Stormwater Runoff Quality Treatment Standards must address design, construction and maintenance of treatment facilities. The Phase II Permit allows for many options to manage the 80^{th} percentile storm. The goal is an 80% reduction in pollutants leaving the site. Design and construction we can deal with but what about maintenance? The Permit says "...permanent stormwater management over the life of the property's use." That means someone has to provide perpetual maintenance. Should the MS4 do it, or sign an agreement with the property owner allowing them to do it?

Perpetual maintenance by the owner leads to other problems. The MS4 must ensure that things are working and maintained properly. You must establish a process that begins with inspection and ends with enforcement. These are the things engineers don't love. Writing maintenance agreements, helping the lawyers write ordinances that give you the authority to inspect and enforce. Will you be ready?

Distribution

Session M7A

Bio

Vince Monks is the Distribution System (DS) Water Quality (WQ) Program Coordinator at Louisville Water Company. He leads and manages the major branches of the DS WQ Program including: Cross-connection Control, WQ Customer Complaint Surveillance and Resolution, Flushing, Tank Mgmt and Nitrification Prevention and Control, DS Monitoring and Treatment, and WQ Modeling. He is a graduate of the University of Louisville with a BS in Geography (urban and regional analysis focus). He holds a Class IV Water DS Operator license and is a certified Drinking Water Microbiology Analyst in the state of KY. He has technical experience in water distribution hydraulics and water quality, storm and sanitary sewer preliminary engineering design, GIS technologies and water distribution hydraulic/water quality modeling. He has contributed to ongoing Water Research Foundation (WRF) studies and currently is a member of the National AWWA Engineering Modeling and Applications Committee (EMAC), AWWA Cross-connection Control Committee, and the AWWA KY/TN Sectional Young Professionals, and Operations and Water Quality Committees. He has provided guidance and material to peer-reviewed AWWA Journal articles, presented material on distribution system water quality at AWWA Water Professionals Conferences and National Conferences. He is serving as a member of the KY sub-committee on the assessment of a state-wide cross –connection control program implementation. Vince is also involved with Edge Outreach. A not-for-profit ministry that provides clean water to underdeveloped and developing countries.

Maintaining Water Quality in Storage Tanks Through Optimized Management Strategies

Vince Monks, Eric Zhu, Ph. D., Rengao Song, Ph. D.
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Storage reservoirs in water distribution systems (DS) play a significant role in the contribution to the water quality (WQ). Historically, tank facilities have been designed to meet hydraulic requirements, where WQ was not an important consideration. This has typically led to tanks designed, constructed, operated and maintained in a manner that has a detrimental impact on the quality of water delivered to customers. Especially with water utilities that employ chloramines as a secondary disinfectant, such as Louisville Water Company (LWC); due in part to the high potential for persistent nitrification events.

LWC DS consists of over 4,100 miles of main and over 30 finished water storage facilities (ranging in size from 100,000 gallons to 30 MG). LWC has been faced with many distribution WQ challenges in recent times, primarily in finished water storage tanks. This can be contributed to the high ambient air temperatures, decrease in per capita water consumption and continued expansion of the DS, including construction of large bulk storage facilities, into more rural areas for future business development. Successfully managing consistent WQ throughout the DS required LWC to optimize tank management strategies.

Through a more holistic approach to tank management, LWC was able to develop and enhance WQ management. The key components of this strategy: improved seasonal dependent treatment schemes, improved DWQ modeling, innovative booster pumping, DS/tank specific operational modifications, seasonal storage reduction planning, advanced tank flushing techniques, enhanced nitrification prevention and control program, enhanced tank monitoring and maintenance program, reservoir mixing improvements, and an improved cleaning/inspection program. In addition, the low level feeding of chlorite, in area specific locations, is currently being implemented as a short-term residual management practice. In 2011, LWC will evaluate additional site specific DS treatment techniques for consideration as potential long-term strategies for managing WQ in finished water tanks.

This optimization maximized resources and technologies in both capital and O&M activities. LWC will continue to develop and integrate best industry practices into tank management and all other areas of DWQ management. LWC adapts to stay ahead of emerging regulations and to maximize the effectiveness of resources to meet current and future challenges. These practices can be implemented by other utilities looking to optimize tank management programs.

Jennifer Lind

CDM

(615) 320-3161

lindjm@cdm.com

Ms. Lind is an Engineer Intern experienced with developing and calibrating hydraulic models of pressure pipe systems. She has worked for CDM since 2005, originally in the Jacksonville, FL office and transferred to the Nashville, TN office in 2007. She received her B.S. in Civil Engineering from the University of Central Florida.

Credentials

Engineer Intern

Experience

2005 – Present Project Engineer

CDM

Education

Undergraduate

B.S. Civil Engineering

University of Central Florida

Planning for Disaster: How Knox County Utilities Utilized Hydraulic Modeling to Develop an Emergency Operations Supply Plan

Jennifer Lind, E.I. – CDM, 210 25th Avenue North, Suite 1102, Nashville, TN 37203

Model analysis can be a helpful tool when planning for growth or changes in a distribution system. However, the water utilities in Knox County, Tennessee have taken planning to the next level. These six utilities recognized the need for a county-wide emergency operations plan in case of water treatment plant outages, natural disasters causing limited service, critical main breaks, drought, or other emergency scenarios requiring the utilities within the County to deliver water across service area boundaries.

Due to several factors including plant locations, water main sizes, and especially the rolling topography that makes Knox County such a desirable place to live, calculations of the amount of water that could be transferred between utilities in the event of an emergency is not a simple tabletop exercise. To that end, the Knox County utilities, with the assistance of CDM, have combined their existing water distribution system hydraulic models to build a county-wide model, capable of analyzing the quantity of water available to each utility in the event of an emergency or planned outage.

The six utilities involved in the study included Knoxville Utilities Board (KUB), West Knox Utility District (WKUD), First Utility District (FUD), Northeast Knox Utility District (NEKUD), Halsdale-Powell Utility District (HPUD), and Knox-Chapman Utility District (KCUD). Together, their service areas span approximately 390,000 acres, utilizing 9 water treatment plants to produce a combined average daily flow of 63 million gallons per day (mgd), and 3,430 miles of piping, which convey the flow to approximately 184,000 customers.

Creating a hydraulic model of a single system always has a few twists and turns. Developing a model that encompasses six separate utility systems while accurately defining the operation and intricacies of each system brought a unique set of challenges. Because every system operates a little differently, understanding the variations in each system became a critical component to their integration. Further, the utilities used different software and modeling approaches. This paper will detail how CDM overcame those challenges to create the combined system model that accurately defined the operation and limitations of each system to develop a detailed emergency operations plan for the water utilities in Knox County.

Bio: Jan C. Routt

Jan C. Routt, President, Jan Routt & Associates, LLC, Lexington, KY. Routt is an experienced drinking water professional and researcher building upon over 27 years of diverse utility and consulting experience. She holds current Kentucky Water Treatment Plant Operator certification, and a BS in Microbiology from the University of Kentucky. Routt is co-leading the WRF 4324 "Impacts of Extreme Weather-Related Events on Water Quality" project and will coordinate and oversee all case study-related tasks/activities throughout the project.

ABSTRACT SUBMITTAL

Kentucky-Tennessee Water Professionals Conference
July 24-26, 2011
Covington, KY

Primary Author/Presenter: Jan C. Routt
Co-Authors: Melinda Friedman, Bill Lauer, Robert Cheng

Title: Using a Systematic, Measurable Criteria-based Approach to Optimize Drinking Water Distribution System Performance

Abstract

In January 2007, the Water Research Foundation (formerly AwwaRF) Board approved funding for the research project: Criteria for Optimized Distribution Systems (WRF Project 4109). The project was proposed and co-funded by the Partnership for Safe Water and supported by many utility members. The project consisted of developing criteria, assessments and tools for utility optimization of drinking water distribution systems. The project had three main objectives to: 1) develop distribution optimization criteria, 2) develop procedures for utility self-assessment using these criteria, and 3) prepare software tools for tracking distribution system performance based upon the agreed criteria. Project work was complete in early 2010 with development of consensus-based distribution system optimization criteria chlorine residuals, pressure, and main breaks. The project report is a guide (summary background, references, checklists) with Excel tools useful in optimizing distribution system performance overall.

In conjunction with, and subsequent to, the Water Research Foundation project, a new Partnership for Safe Water (PSW) program for optimization of drinking water distribution systems has been developed under the leadership of Partnership for Safe Water. Like PSW's successful surface water treatment plant optimization program, the PSW-Distribution System program will provide tools and guidance to allow and encourage utilities to improve distribution system performance overall, beyond regulatory requirements. This presentation will describe the WRF 4109 process and results, and the PSW distribution system optimization program which is currently being implemented.

Those attending this session will gain insights into both the WFP "Criteria for Optimized Distribution System" project and the Partnership Distribution System Optimization Program and will increase understanding of how basic measurable parameters and assessments of interrelated procedures and infrastructure status can be used for overall system performance optimization.

Collection Systems

Session M8A

Kimberly Martin
CDM
615-340-6529
MartinKM@cdm.com

Ms. Martin is environmental engineer experienced with sanitary sewer and combined sewer system hydraulic modeling. She has also considerable experience with sanitary sewer evaluations and rehabilitation design, bidding, and construction. She has been employed by CDM for the last nine years, beginning in Baton Rouge before transferring to Nashville in 2007. Ms. Martin is also a founding member, a former president, and the current project lead of the Nashville Professionals Chapter of Engineers Without Borders.

CREDENTIALS

Registered Professional Engineer in Louisiana and Tennessee

EXPERIENCE

June 2002 – Present	Project Engineer/Project Manager
	CDM – Baton Rouge, LA & Nashville, TN
May 1999 – August 2000	Staff Engineer
	O'Brien & Gere – St. Louis, MO

EDUCATION

B.S Civil Engineering – Washington University in St. Louis

M.S. Environmental Engineering – University of Texas at Austin

Beyond Unit Prices:
Using Site Investigations to Develop an SSO Corrective Action Plan that Will Work

Kimberly Martin, CDM, 210 25th Avenue North, Suite 1102, Nashville, TN 37203
Brent Freeman, Metro Water Services, Nashville, TN
Chris Hammer, CDM, 210 25th Avenue North, Suite 1102, Nashville, TN 37203

Purpose:

This presentation will discuss the value of including site investigations and considering non-cost factors when selecting improvement alternatives to address SSOs.

Benefits of Project:

The Metropolitan Government of Nashville and Davidson County (Tennessee), Metro Water Services (MWS) is committed to minimizing sanitary sewer overflows (SSOs) within its collection system. In support of this goal, MWS is developing a Corrective Action Plan / Engineering Report (CAP/ER) that will establish a plan for improvements to the sanitary sewer system over the next decade.

As part of the CAP/ER process, MWS developed and calibrated a hydraulic model of its sewer system, using radar rainfall data and both long-term and temporary flow monitoring data from more than 140 locations. Potential improvements, such as storage and pipe upsizing, were analyzed using the model to assess their effectiveness at minimizing SSOs and surcharging. Construction costs for viable alternatives were estimated using regionally appropriate unit prices, such as one dollar per gallon for off-line storage, to compare cost effectiveness of potential alternatives.

However, assessing costs by only considering unit prices has several potential disadvantages:

- Unit pricing neglects site constraints and constructability concerns;
- The benefits of renewing or improving existing infrastructure, particularly infrastructure that is nearing its useful life, are not assessed; and
- Non-cost benefits, such as operational flexibility, are omitted.

MWS conducted site investigations at each location identified for storage or conveyance improvements to identify cost-effective solutions to address SSOs. These investigations focused on identifying constraints due to terrain, proximity to existing structures, and other factors that may influence project costs. The information was then used to develop refined, conceptual-level construction cost estimates for alternatives under consideration.

MWS also convened meetings with staff from various divisions to discuss pros and cons of each potential improvement alternative. These discussions focused on the immediate need of addressing SSOs, as well as on long-term goals of reducing operation and maintenance costs, providing reliable customer service, and accounting for growth.

Conclusion:

Several case studies from the CAP/ER will be presented, illustrating how the additional steps of site investigations and discussion of non-cost factors have led to selection of improvement alternatives that might not have been chosen using a strict unit cost approach.

TETRA TECH

Lori L. H. McIlvaine, EIT

Project Engineer

Ms. McIlvaine joined Tetra Tech in August 2009. A mechanical engineer in training, she is interested in efficiency, energy, the environment, and humanitarian service, and has developed skills with Visual Basic, AutoCAD, and ArcGIS. At Tetra Tech, her responsibilities include client-interfacing in water, wastewater, and stormwater projects. Additionally, she represents the Engineering and Architecture Services group in Tetra Tech's Sustainability Council.

EXPERIENCE

Drinking Water / Wastewater

Blue Grass Army Depot, Madison County, Kentucky, 2009-Present – Manages the Depot's repair work order system, including tracking repairs, managing funds, and communicating with subcontractors. Also assists the project manager with management of the rest of the water and wastewater system at the Depot, including developing engineering solutions to environmental issues and preparing reports.

Industrial Pretreatment Program Management

Industrial Pretreatment Management Program, 15 Significant Industries, Winchester Municipal Utilities, Winchester, Kentucky, 2009-Present – Assists Winchester Municipal Utilities with management of their industrial pretreatment program, including producing monthly reports for the industries, maintaining the database of data, permit writing, and other support tasks.

Industrial Wastewater

CMOM Development and Implementation, Winchester, Kentucky, 2009-Present – Assists Winchester Municipal Utilities with development, tracking, and implementation of CMOM programs in response to EPA Consent Order.

Fats, Oils and Grease (FOG) Program, Winchester, Kentucky, 2009-Present – Assists Winchester Municipal Utilities with establishing and implementing a FOG Control program to address WMU's Consent Decree. The program addresses permitting, risk ranking, inspections, and best management practices.

Stormwater

On-Call Environmental Services Contract, Blue Grass Airport, Lexington, Kentucky, 2009-Present – Assists the project manager in the management of aircraft deicing fluids, stormwater monitoring and reporting, Integrated Spill Plans, and permit management.

On-Call Environmental Services Contract, Louisville Regional Airport Authority, Louisville, Kentucky, 2009-Present – Assists the project manager in the management of aircraft deicing fluids, stormwater monitoring and reporting, the Integrated Spill Plan, and permit management for both Louisville International Airport and Bowman Field.

Education:

Bachelor of Mechanical Engineering (BME), University of Dayton, 2008

Registrations/Certifications:

Fundamentals of Engineering (FE) Exam, NCEES

Permit Required Confined Space Entry

Professional Affiliations:

Pi Tau Sigma, International Mechanical Engineering Honor Society

Order of the Engineer

Water Environment Federation

Office:

Lexington, Kentucky

Years of Experience:

Since 2005

Years with Tetra Tech:

Since 2009

Other - Civil

Wadsworth City Engineering Department, Wadsworth, Ohio, 2005 – As an engineering intern. Ms. McIlvaine worked on organizational projects; planned road paving in AutoCAD; and assisted with surveying.

Other – Mechanical and Project Management

Salud del Sol, Inc., Nicaragua and the U.S., June 2008 to Present – As Founder and Executive Director of this nonprofit. Ms. McIlvaine is developing a solar autoclave to sterilize medical instruments using only energy from the sun. The solar autoclave is being developed through partnerships with the University of Dayton (UD), Massachusetts Institute of Technology (MIT), and Grupo Fenix, an international NGO located in Nicaragua. While the research and development is facilitated by members of Salud del Sol, the production of the solar autoclave will be housed by a group of entrepreneurial women, Las Mujeres Solares, living and working in the rural community of Sabana Grande de Totogalpa, Nicaragua. The Salud del Sol team has won first place in the UD Business Plan Competition, as well as second place in the Development Track of the MIT 100K Competition. At the cross-section of social entrepreneurship, renewable energy, and international healthcare, Salud del Sol is working to fulfill the mission of empowering communities in Nicaragua with the opportunity to improve their own healthcare systems while supporting sustainable development that creates jobs for members of these communities.

Ethicon Endo-Surgery, Inc., Cincinnati, Ohio, 2006–2007 – As an R&D co-op, Ms. McIlvaine developed and conducted mechanical tests; wrote engineering studies and protocols; and led a reliability study that increased product marketability in emerging markets of the developing world.

Grupo Fenix, NGO, Nicaragua, 2006 – As an engineering intern, Ms. McIlvaine improved and tested solar cookers; acquired experience in appropriate technology and renewable energy; and resided with a host family without running water or electricity.

Hidden Clauses and the Cost of Money

Lessons Learned in Negotiations and Implementation of Consent Decree Deliverables

Michael Flynn, Winchester Municipal Utilities; Felix Belanger, P.E., Tetra Tech; Lori McIlvaine, EIT, Tetra Tech

As a typical city established in the 18th-century Midwest, Winchester, Kentucky faces big challenges in dealing with its aging infrastructure. Its sanitary sewer system has earned the attention of the U.S. EPA, with the utility finalizing its Consent Decree in April of 2007. Still in the middle of implementation of the many required deliverables, Winchester Municipal Utilities (WMU) has learned some valuable lessons which are likely relevant to all cities facing similar EPA Consent Decrees, including lessons learned in original negotiations and in hydraulic modeling.

One of the most important phases of implementation of Consent Decree deliverables occurs before the decree is ever signed. One key negotiated factor was the definition of *peak flow*. The involved parties decided on a 2 year-24 hour storm event in the Consent Decree definition of *peak flow* and *surcharge condition*, which allows more development than a larger storm event definition would have. A second key negotiated factor was identifying locations of *recurring SSOs*. Because the utility would be required to identify remedial measures to eliminate every *recurring SSO* that they identified and to pay a negotiated fine, WMU attempted to minimize the number of locations on the original list of *recurring SSOs*. However, deep within the Consent Decree was a clause – three years after finalization of the decree, the EPA may assess a $500 penalty for every SSO that occurs in Winchester that was not on the original list of *recurring SSOs*. WMU SSOs are reported on a quarterly basis, leading to many potential costs which could have been avoided with the addition of more locations to the original list of *recurring SSOs* during negotiations. Though a longer original list may have resulted in a larger fine upfront and a higher capital project cost outlay, this experience highlights the importance for other cities to weigh the initial costs with the later penalties associated with "orphan" SSOs when negotiating their original list of *recurring SSOs*.

The other area to which Winchester's experiences can provide insight is in hydraulic modeling. WMU chose to model the worst sewer basins first (25% of the system), for design purposes, followed by the remainder of the sewer basins the following year. Due to budget constraints, Doppler rainfall data was only collected for three rain events during the first year, when it ideally would have been collected for all rain events, as it was in the second year. Due to similar budget constraints, only 54% of the first year's area was monitored, so flows from the remainder had to be estimated from lift station run time information. The second year, 100% of the system was covered by flow monitors. More upfront funding of the flow monitoring effort would have led to a more comprehensive flow monitoring program.

The experiences of WMU *can* and *should* be reviewed by any city facing Consent Decree negotiations with the EPA. The lessons are invaluable, for hindsight is 20/20.

Wesley Sydnor, PE – Louisville and Jefferson County Metropolitan Sewer District

Experience: 10 years – Water and wastewater engineering, 2 years with Louisville MSD, 5 years with O'Brien and Gere engineers as a consultant on the Nine Minimum Controls program and overflow response.

Education – BA from the University of Louisville, Masters of Engineering – University of Louisville

Job Responsibilities as it Relates to the Topic: Manages Nine Minimum Controls and CMOM programs, works on public education and outreach for Project WIN (the department managing programmatic activities for compliance with the Consent Decree).

Assessing Your Floatables – Utilizing Creative Methods to Determine the Impacts to Water Bodies

By Wesley Sydnor, PE – Louisville MSD

The Problem

In March 2003, EPA conducted a field inspection of Louisville and Jefferson County MSD's 110 CSO diversions. It was determined as part of this inspection that a disconnect of expectations existed between management, EPA, and CSO inspection and cleaning personnel. Prior to August 2006, twenty CSO diversions had installed solids and floatables control. Through the process of developing compliance documentation, EPA stipulated that solids and floatables (S&F) controls be installed at 78 additional diversions within the Louisville and Jefferson County MSD's (MSD) combined sewer system (CSS). This effort utilized in-house teams to plan, design, and build low cost controls using readily available materials. Installation of these new controls was completed on September 15, 2006, bringing the total number of S&F controls to 98. Assessment of these installed controls and their ability to capture floatable materials needed to occur to ensure that the proper placement of controls was achieved to allow for the maximization of resources for operation and maintenance (O&M) and capture of S&F materials.

Objectives of the Visual Assessment Project

The overall objective of the pilot project was to determine if installed S&F controls were making a positive impact on receiving water bodies. Additional goals were to determine if inspection and maintenance frequency was adequate to allow the installed controls to capture floatables effectively.

Evaluation Details

Logistically, the process for determining the effectiveness of floatables included: research programs in other cities, outline team to perform inspections, determine where to inspect (upstream/downstream of the CSS, at a sampling of various control types), establish a rainfall tolerance to visually inspect (1/4"), build metrics to assess devices, build a visual rating system for floatables (scale of 1-5 at the shoreline, 10' off-shore, open water), develop a tracking system to determine the volume of floatables being retained in the CSS, establish documentation protocols (photos, video, time stamps), produce an event report outlining the pre-event/post event observations. A sample of the visual template is provided as **Figure 1**. Between July 1, 2009, and June 30, 2010, four qualifying inspection events occurred, where devices were assessed, and the water bodies were rated for impairment.

Volumes of floatables retained by street sweeping, trapped catch basins, and installed controls (by capturing the volumes of materials removed at the head works of the Morris Forman Water Quality Treatment Center) were compiled for the period between July 1, 2009, and June 30, 2010.

Results

Based upon inspection data, lessons learned for the project would include:

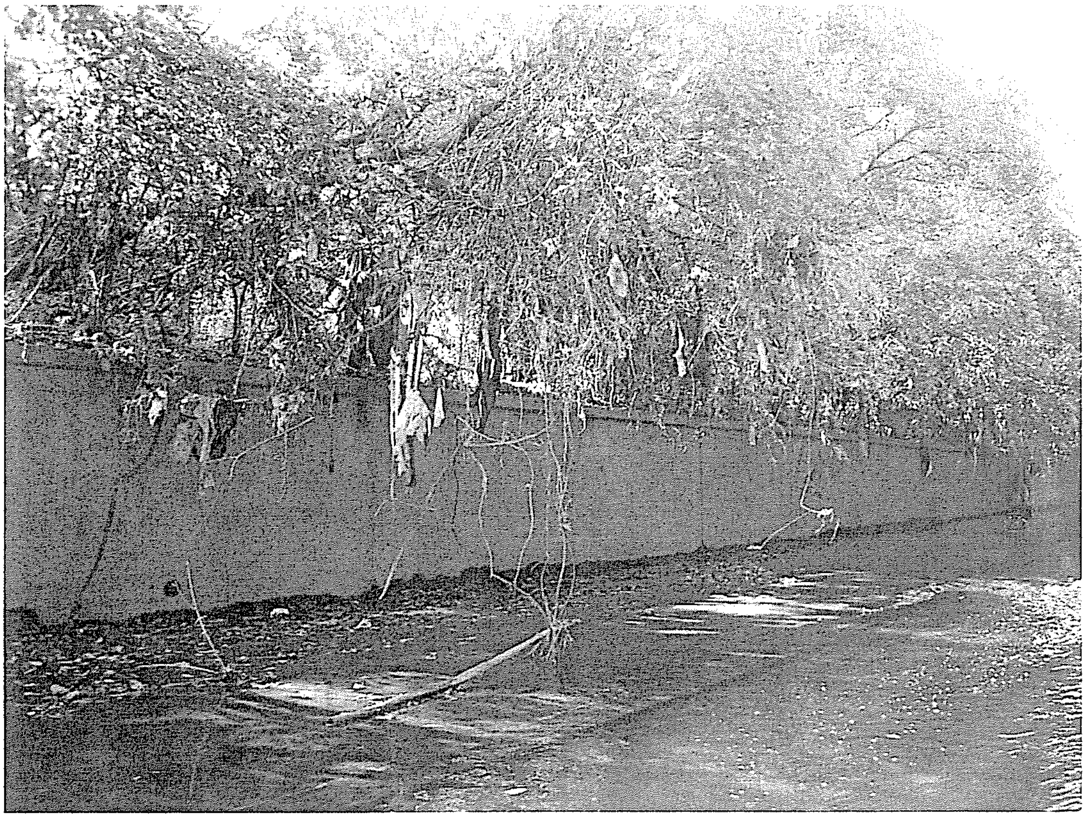
- Surface runoff – most impaired stream reaches were upstream of the CSS DURING the event
- Inspection cycles are critical to performance of devices
- Upstream controls in the system are effective – significantly more material being retained
- Baffles are doing the job of trapping floatables based on visual inspection

Data shows that volumes of materials captured at the head works of the MFWQTC have nearly doubled in the years since 2006. It is inferred by this data that the increase in materials captured at MFWQTC are related to the installation of solids and floatables controls at 78 diversions in 2006. **Table 1** includes the volumes of materials captured at the MFWQTC head works.

Recommendations moving forward, based upon inspection data and analysis would include:

- Set Common Expectations Through Training
- Develop Focus Areas for More Intense Cleaning
- Review Maintenance Cycles and define needed maintenance
- Evaluate the Need for Capital Projects

Figure 1 - Sample Aesthetic S&F Template:



Level 4 – Water body and/or banks have moderate levels of solids and floatables that are non-organic.

Table 1 – Materials Captured at the MFWQTC Head Works:

Year	Amount of Debris Removed
2004	4869 CY
2005	6299 CY
2006	6080 CY
2007	4358 CY
2008	6621 CY
2009	8760 CY
FY10	11,570 CY

TUESDAY SESSIONS

Collection Systems

Session T1A

Jason Hindenach, EIT -- GRW

Jason Hindenach is a sanitary engineer with GRW's Louisville office. Since earning his bachelor's degree in civil engineering at Michigan Technological University in 2003, Mr. Hindenach has experience in the fields of water and wastewater system engineering, as well as the geotechnical/geohydraulic industry.

He has worked on projects for clients such as the Louisville Water Company, the Northern Kentucky Water District, Kentucky American Water and the Louisville-Jefferson Metropolitan Sewer District, as well as numerous municipalities throughout Kentucky and Indiana. Currently an engineer in training, Mr. Hindenach is a member of the American Water Works Association, Kentucky Society of Professional Engineers and the Geo-Institute of American Society of Civil Engineers.

Joseph V. Pavoni, PE, LEED AP -- GRW

Joe Pavoni is a sanitary engineer with GRW's Louisville office. Mr. Pavoni earned both his bachelor's and master's degrees in civil engineering at the University of Kentucky. A LEED Accredited Professional for new construction, he also is a registered professional engineer in Kentucky and Indiana.

Mr. Pavoni's experience spans a broad spectrum of civil/public works activities. He has more than a decade of experience with project management/coordination and the planning, design, and construction administration of various wastewater collection and treatment facilities, water supply systems, and drainage systems for clients such as the Louisville-Jefferson County Metropolitan Sewer District, the Metropolitan Sewer District of Greater Cincinnati (MSDGC), Indiana American Water Company, and the Louisville Water Company, as well as numerous municipalities throughout Kentucky, Indiana and Ohio

Mr. Pavoni is a member of a several professional organizations and serves on the KY/TN WEA/AWWA Management Committee and the KY/TN WEA Watershed Management Committee. He is co-chair of the KY/TN WEA Louisville Chapter Partners Committee.

DEVISING A TRIPLE BOTTOM LINE SOLUTION FOR WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL AT A LAKE COMMUNITY

Joseph V. Pavoni, P.E., LEED AP and Jason Hindenach, E.I.T.
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In general, the typical engineering/construction project looks primarily at economics when evaluating alternatives to meet its goals. However, a truly sustainable solution also considers the Triple Bottom Line: environmental, social, and economic impacts. For the residential community at Lake Carnico in Nicholas County, KY, the Triple Bottom Line was integral in devising a long-term solution to the area's sewage collection, treatment, and disposal issues.

The Nicholas County Sanitation District #2 (NCSD2) was formed in 1978 to serve the wastewater needs for the surrounding lake development. As of 2010, there was still no sanitary sewage collection, treatment, or disposal facilities within the NCSD2 Lake Carnico area. Instead, the residents provide their own holding tanks, septic tank systems, aerated tanks, outhouses, etc. Wastewater retained in these on-site facilities is hauled away on a monthly basis to a state-approved disposal site at the residents' expense.

A Wastewater Facilities Plan Update was completed in 1998 to evaluate options for wastewater collection, treatment, and disposal within the planning area. At that time, the selected alternative was to construct low pressure sewers that would transport wastewater to a neighboring municipal system for treatment.

For political reasons, however, the receiving municipality later changed their decision and determined that they were no longer interested in accepting and treating NCSD2's wastewater. Up to that point, it had been the Kentucky Division of Water's (KDOW's) position that regionalization was preferred over having several different municipalities or sewer districts in a small geographic area. Recent developments had relaxed this stance, and KDOW suggested that NCSD2 go with a "lower-tech" on-site style solution that they could construct and maintain on their own. As a result of that decision, the review and approval of the plans and specifications would be performed by the State Health Department, instead.

The resulting design consisted of wastewater collection through a filtered low pressure Septic Tank Effluent Pumping (STEP) system for approximately 105 homes, recirculating gravel media filter and ultraviolet disinfection for treatment, and final disposal via subsurface drip irrigation. Existing septic and holding tanks will be replaced with new septic/pumping tanks, which will force liquid sewage to the treatment and disposal systems. This solution will eliminate over 100 failing septic and holding tanks, and help clean up a recreational lake area. The resolution – which came about as the result of a "social impact" – offered a more economic and simpler method of collecting, treating, and disposing of NCSD2's wastewater.

PUBLICITY FORM
(One form for each speaker)

Conference Speaker: Brandon C. Vatter. P.E.

Job Title: Director of Planning and Design

Employer: Sanitation District No. 1

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Alternate Email:

Provide a brief (75-word maximum) biography of the **speaker** for introduction at the conference; include information most relevant to the conference and session topic:
(Please Print or Type or attach bio)__________________________

Bio: Brandon is the Director of Planning and Design for SD1. Brandon is one of the main architect's of SD1's Watershed Plans - an innovative approach to addressing CSOs and SSOs in context with other pollutant sources for compliance with their Consent Decree. Brandon also lead the effort of developing and implementing SD1's continuous sewer assessment program which has been recognized nationally as a model for proactive asset management. SD1 will be implementing capital projects worth nearly $500 million over the next 5 years to improve water quality in Northern Kentucky. Brandon's design and construction experience includes wet weather planning and project implementation, asset management, hydraulic modeling, and all facets of treatment and collection system projects.

Education
B.S., Civil Engineering, University of Cincinnati, 1997.

Professional Registration:
Professional Engineer License: Ohio and Kentucky.

SD1's Innovative Continuous Sewer Assessment Program (CSAP) Streamlines Proactive Asset Management

Brandon C. Vatter, P.E., SD1, Barrett Groh, SD1, Rich McGillis, P.E., SD1, Reggie Rowe, P.E. CH2M HILL

SD1's Strategic Approach

The Northern Kentucky Sanitation District No. 1's (SD1) 2007 Consent Decree (CD) provided an opportunity for SD1 to formalize its Capacity, Management, Operations, and Maintenance (CMOM) program. SD1 determined that one CMOM Program in particular, the Continuous Sewer Assessment Program, was key to SD1's short and long-term goals of proactive and cost-effective asset management because it included core operation and maintenance activities that SD1 needed to improve system-wide. The CSAP program was subdivided into six subprogram activities shown in the table below to better organize and manage the highly active program activities:

District's CSAP Sub-Program Activities

Trouble Call	Preventative O&M	Sonar Inspections
Sanitary Sewer Evaluation Survey	Large Diameter Sewer Assessment	Manhole Inspections

Continuous Sewer Assessment Program Data Automation

With over 1,600 miles of sewers to inspect by 2018 SD1 would generate lots of data that would require timely and deliberate decisions. Therefore, SD1 developed a decision logic system to prioritize which sewers should be inspected, cleaned, and/or rehabbed and when leading to focusing expenditures only on pipes that needed attention. Correspondingly, SD1 converted to a new inspection coding and analysis system (SCREAM™) that would allow better data integration and automation with its gbaMS computerized maintenance management system, GIS, and other SD1 software and applications. Decision algorithms were also integrated with the work order system. This enabled uploaded field data to be automatically analyzed, next actions for each pipe automatically generated, and specific corrective actions reports and recommendations for repair, rehab or replacement automatically generated. Corrective action recommendations were based on the lowest lifecycle cost solution.

Benefits of CSAP Program Advancements

For over three years, SD1 has progressively benefitted from their process logic, integrated data and corrective action system. Management staff found they were better able to track and measure key performance measures that aligned with the organization's goals and objectives. They also found other operational benefits such as:

- Increased television footage with the same number of crews.
- Decreased costs to inspect and clean sewers.
- The automated decision logic increased productivity by efficiently handling and analyzing large amounts of data all the way from the field to the issuance of work orders.
- Standardized contractor inspection data with a template database and automated quality assurance/quality control increased data value by avoiding poor or incomplete data being uploaded into the gbaMS system.
- Asset information was more readily available across multiple staff levels through GIS and gbaMS.
- Report and data summary convenience facilitated better performance, cost monitoring, and compliance reporting and documentation across multiple staff levels.
- SD1's CSAP has been recognized as an industry leader by EPA in their guidance document "Innovative Internal Camera Inspection and Data Management for Effective Condition Assessment of Collection Systems".

Other utilities and consultants would benefit from learning more detail about SD1's CSAP and their lessons learned.

Ed Walker, PE,
Vice President,
Barge Waggoner, Sumner & Cannon

Ed has 38 years of experience as engineer on water and wastewater projects, including facility upgrades and expansions; water line, pumping and storage facilities; and wastewater collection and pumping facilities.

WATER QUALITY IMPROVEMENT ON THE CUMBERLAND RIVER USING IN-LINE TRASH-TRAP FLOATABLES CONTROL AT TWO CSOS

By: Greg A. Ballard, P.E.*, Ed Walker, P.E.**, Phil Regen, P.E.*, George E. Kurz, P.E., DEE**

* MWS (Metro Water Services).. Nashville

** Barge Waggoner Sumner & Cannon, Nashville

Abstract

Faced with requirements in its EPA Consent Order, Nashville MWS (Metro Water Services) will install in-line Trash-Trap™ units for floatables control in two CSO locations on the Cumberland River. These units are intended to satisfy the requirements of the "Nine Minimum CSO Controls Plan" established under EPA's National CSO Control Policy. Control number 6 specifically requires "control of solid and floatable materials in CSO discharges." EPA's strategy contemplated that implementation of the NMC would make relatively low-cost, short-term improvements that will be beneficial to the environment before implementation of a final solution under a long-term control plan. These units use replaceable net bags with half-inch mesh openings to catch floatables and large solids. The In-Line system is contained in a modular structure, configured for two nets at both sites and the chamber is installed to become part of the flow path of the original pipe. Each unit will have a hinged screen to allow for bypass over the top of the net if it is blinded during operation, without overflowing the chamber. Data from USA EPA sponsored projects documented trash and floatables capture above 99%. One unit will be installed in the 96-inch outfall from Schrader Lane, and the second will be installed in Davidson St. downstream of the 72-inch outfall from the Benedict & Crutcher CSO. Extensive geotechnical and environmental evaluations were required at each site since the weight of the Trash-Trap unit requires an independent and fully supported foundation. This paper will describe the development of the design criteria for the two locations, and the construction of the facilities. The Davidson Street location required additional underground exploration to precisely locate sensitive utilities with vacuum excavation. The Schrader Lane site is immediately adjacent to a protected wetlands. The process of planning and conducting the vacuum excavation and the wetlands study will be described and illustrated. The project is required to be completed in May 2011.

Collection Systems

Session T1B

Conference Speaker: Eric Onderak

Job Title: Project Engineer

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Biography

Mr. Onderak received his Bachelors in Civil Engineering from the University of Dayton and his Masters in Environmental Engineering from The Ohio State University. He has worked for AECOM in Columbus, OH for the past 6 years, primarily on collection system modeling for a number of different utilities. He has served as the model task manager on several large scale model calibration, system planning, and capacity analysis projects.

HOW DO WE MATCH THAT???
DEVELOPING A DETAILED MODEL OF THE NASHVILLE COMBINED SYSTEM

Eric Onderak, Paul Stonecipher - AECOM
Cyrus Toosi, Greg Ballard - Nashville MWS

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Abstract

In March 2009, a Consent Decree between Metro Water Services of Nashville, TN (MWS), and the U.S. Environmental Protection Agency (EPA) was entered. The Consent Decree requires MWS to prepare and submit a Long Term Control Plan (LTCP).

The dynamic model of the MWS combined sewer system (CSS) and combined sewer overflows (CSOs) was updated and calibrated to support the LTCP. The calibrated model is being used to assess existing performance, identify necessary improvements, and develop and evaluate alternative corrective actions. Issues that were critical to the model development include the use of groundwater infiltration, investigation of changing system conditions, and representation of complex hydraulics.

Groundwater Infiltration and Continuous Simulation

The model was calibrated using continuous simulation and data from October to December 2008.The use of the groundwater module in SWMM5 was incorporated to account for the infiltration volume observed during events in December. Including this component helps to ensure than any storage alternatives are not undersized during events that may occur during winter months when the ground in Nashville is typically saturated.

System Condition and Sediment

The flow meter data and overflow results indicated that the system operation was being impacted by changing sediment and debris conditions. For both the tunnels and the regulators, investigation into the performance was done to approximate the system conditions during each event. Understanding the system performance during the calibration period helps to establish future O&M needs, as well as illustrating the current impact on CSO volume.

Complex Hydraulic Structures

With multiple tunnels, a central pump station, and several large regulator chambers, representing the complex hydraulics of the combined system was important to match the existing performance. The details of the regulators and the First and Second Avenue Tunnels were incorporated into the model to match the observed data. Modeling of the Central Pump Station, the main outlet to the treatment facility, was critical; the pump station was modeled using the RTC module in SWMM5 to match the actual system operation.

Summary

The hydraulic model of the Nashville combined system was calibrated using the available tools in SWMM5 to provide a detailed representation of system performance. The model is currently being utilized to examine alternatives and analyze opportunities for CSO reduction in support of the 2011 LTCP submittal; enhancements described in this model have provided greater confidence that the proposed solutions will function as expected after implementation.

Biographies

Dr. Joshua Cantone, Water Resources Engineer, CH2M HILL

Originally from Adelaide, Australia, Dr. Cantone has been in the United States since August 2005 and recently graduated with his Masters and Ph.D. in Civil Engineering from the University of Illinois at Urbana Champaign in 2010. Both degrees had an environmental hydraulics and hydrology focus, with Dr. Cantone's research centering on improved understanding of the hydrologic and hydraulic response of collection systems in highly urbanized environments. Dr. Cantone has been working as a Water Resources Engineer in CH2M HILL's Chicago office since March 2010 and has significant expertise in real time control, hydrologic and hydraulic modeling, and green infrastructure.

John Loechle, Project WIN Senior Engineer, Louisville and Jefferson County Metropolitan Sewer District

Lessons learned and evaluation of alternative real time control strategies in Louisville, Kentucky

John Loechle, Project WIN Senior Engineer, Louisville and Jefferson County Metropolitan Sewer District

Dr. Joshua Cantone, Water Resources Engineer, CH2M HILL

Abstract

The Louisville and Jefferson County Metropolitan Sewer District (MSD) operates and maintains combined and sanitary sewer systems that serve over 700,000 people in Louisville and its surrounding areas. The sewer systems combine to contain in excess of 3200 miles of pipe, 75,000 manholes, 369 pumping stations and 27 treatment plants when all public and private facilities are considered. The MSD service area encompasses 11 watersheds in the Ohio River Watershed spanning approximately 385 square miles. Real Time Control (RTC) has been a critical part of MSD's control strategy for more than a decade and will continue to be going forward. RTC was first considered following the development of MSD's Draft Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) in 1996 and 1997. Since that time MSD has incorporated RTC into 9 sites, scattered throughout the combined sewer system. In September, 2009 MSD submitted their Integrated Overflow Abatement Plan (IOAP), as part of their Amended Consent Decree (ACD) requirements, to the US EPA and Kentucky Environmental and Public Protection Cabinet. The IOAP includes provision for the design and construction of a number of new facilities that will incorporate an RTC component. As MSD embarks on expansion of their RTC system, they engaged CH2M HILL to develop a holistic operating and control strategy for MSD's facilities. As part of this study, time was taken to reflect on the operation and control of MSD's current RTC system. A series of "lessons learned" interviews were conducted with staff from MSD and its sub-consultants. The interviews were aimed at

identifying impressions of the existing RTC system and ways that the system could be improved going forward. A plethora of "lessons learned" were identified and are outlined in this paper. Another significant portion of this study was committed to assessing the benefits and costs of alternative RTC strategies. In order to achieve this, a number of alternative RTC strategies were identified and a benefit-cost framework was developed to evaluate these strategies. These are presented in this paper.

Timothy W. Kraus

Education/Registrations/Awards

University of Louisville
Speed Scientific School
- AAS - 1982
- BS - 1985
- M Eng - 1987

PE - Kentucky & Indiana
UL Speed School Alumni Award – 1986
Young Engineer of the Year (Louisville Chapter KSPE) – 1997
KSPE Louisville Chapter Presidents Award - 2007
Samuel Williams Engineering Excellence Award - 2007

Professional/Technical

- WEF National and Regional Collections Committee
- APWA
- NSPE/KSPE
- ASCE Louisville Chapter President
- KSPE Louisville Chapter Secretary
- Past Kentucky State Plumbing Code Committee

Work History:

1986 – 1992 - Odgen Environmental
1992 – 1998 - Louisville Metropolitan Sewer Distrcit
1998 to Present – O'Brien & Gere

Personal:

Married, three kids (twin girls, son). Strives to remain active participating in triathlons.
Former Mayor – City of Norbourne Estates

Louisville & Jefferson County Metropolitan Sewer District
Downspout Disconnection Pilot Program

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Timothy Kraus, PE
O'Brien & Gere
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Louisville and Jefferson County Metropolitan Sewer District (MSD) is responsible for stormwater and sanitary sewer service in the Metropolitan Louisville, Kentucky area. In response to a Federal Consent Decree, MSD developed a comprehensive Overflow Abatement Plan to control sanitary sewer overflows (SSOs) and combined sewer overflows (CSOs). MSDs Overflow Abatement Program utilizes a unique approach, incorporating green infrastructure into its CSO abatement plans. A key component of MSDs Green Infrastructure program will be the removal and re-direction of downspouts directly connected to the combined sewer system.

This paper will summarize the history of MSDs private property initiatives to date, which along with their downspout disconnection program also includes a sizeable basement backup prevention program. Research performed to date of similar downspout disconnection programs in Chicago, Toronto and Portland will be presented as well, projects implemented to disconnect downspouts.

In 2003, MSD initiated a private property downspout disconnection project at CSO 209 – a CSO with an outfall in a highly utilized public park. The CSO 209 Project plan consisted of developing individual downspout removal plans for each home as well multiple meetings with each homeowner to receive approval for work to be accomplished. The construction was performed by a contractor via competitive bid. Although the program was successful and accomplished its purpose, the disconnection of downspouts was cost prohibitive at nearly $4000 per home in total.

During the summer of 2010, MSD began a pilot downspout disconnection program in the CSO 206 area. The purpose of the program was to disconnect customer's downspouts to allow for closure of a CSO which also discharged to the same public park as CSO 209. Similar to programs in Portland, Oregon, the program pays customers $100 for each downspout that is determined through dye testing to be connected to the combined sewer system. Downspouts that would cause drainage issues upon disconnection are excluded.

Many details about the pilot downspout disconnection program will be presented including:

- the hydraulic modeling that was completed to determine the target number of downspout to be disconnected;
- public outreach (public meetings, flyers, letters etc.) completed throughout the project;
- field inspection work completed;
- legal means for payment as well as legal documents created;
- results of inspections,
- costs of the program. and
- documented performance of flow reductions as a result of the downspout removals.

MSD anticipates expanding this program into the remainder of the combined sewer system in 2011.

Collection System

Session T1C

KY/TN WPC BIO

Curtis D. Courter, P.E.
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CREDENTIALS

Registered Professional Engineer (MI, OH, KY)

EXPERIENCE

Mr. Courter is Associate in Hazen and Sawyer's Cincinnati Office. He has extensive national experience on projects dealing with wet weather issues at all phases of development, including planning, study, design and construction.

07/06 – Present Associate
Cincinnati Office
Hazen and Sawyer, P.C.

05/97 – 06/06 Senior Principal Engineer
Detroit Office
Hazen and Sawyer, P.C.

EDUCATION

MBA
University of Michigan- Dearborn

MS Civil/Environmental Engineering
Wayne State University

BS Civil/Environmental Engineering
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Wet Weather Disinfection Alternatives

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Today utilities are under more pressure than ever to eliminate sanitary sewer overflows and bring CSOs into compliance with the Clean Water Act and the Federal CSO Policy. As the costs of compliance with the Clean Water Act continue to rise, even in the face of the current economic downturn, communities are struggling to find alternative methods to address wet weather issues.

Despite encouragement on the national level to incorporate green infrastructure into wet weather control plans, enforcement authorities continue to limit its application. Practical limitations exist as well, as the time frames required to fully implement and monitor such controls is well beyond the compliance time frames set by the regulators. Further, even aggressive implementation of green infrastructure cannot solve all of the wet weather issues within highly urbanized areas. It is also becoming more and more difficult to implement other traditional measures for wet weather control;

- Increasingly stringent stormwater permitting requirements, including recent updates to EPA guidance on establishing waste load allocations and numeric effluent limitations in NPDES permits, have further limited the viability of large scale sewer separation.
- Equalization at or near the WWTP often would require significant and costly conveyance improvements and site restrictions make it difficult and costly to develop distributed storage alternatives in the collection system at the locations where hydraulic limitations exist. Deep tunnel alternatives can address some of these issues, but these tunnels are expensive to construct and difficult to stage, thus making it difficult to fund, requiring large rate hikes or delays in implementation. Such large projects are also out of reach of small utilities.

Treatment alternatives vary widely in cost and complexity depending on the pollutants of concern that are being targeted. Beyond the nine minimum control requirements, water quality most often dictates bacteria reduction as the primary basis of design. Disinfection of CSOs has most often been achieved using sodium hypochlorite, a chlorine based compound. While relatively inexpensive, concerns over toxic residuals are driving evaluation of more expensive alternative disinfectants for wet weather flows, including ozone, UV and peracetic acid (PAA). Combined with pretreatment, UV has also been successfully utilized to treat wet weather flows generated in separate sanitary systems.

Despite its limitations, disinfection of wet weather overflows is often times more economical than other wet weather technologies. There are operational methods to reduce effluent toxicity concerns when using sodium hypochlorite. Alternatively, compounds such as PAA have shown great potential for wet weather application and where pretreatment is necessary to achieve other compatible pollutant reductions, UV is a viable alternative. This presentation will focus on the advantages and disadvantages of these and other disinfectants as well as design, operational, process control and cost considerations as applicable to wet weather control, whether at the WWTP or out in the collection system.

Joe Herman, PE

Mr. Herman is a Principal at Stantec with 15 years of experience in municipal infrastructure planning, evaluation, and design. Mr. Herman is a Professional Engineer and has both a Bachelors and Masters degree in Civil Engineering from the University of Kentucky. Over the past 2 years, Mr. Herman has been assisting the Lexington-Fayette Urban County Government in performing a Sanitary Sewer Assessment on their wastewater collection system to support their Consent Decree objectives.

Rod Chervus, PE – *Lexington Fayette Urban County Government (LFUCG)*
Joe Herman, PE – *Stantec*

<u>Addressing the "Elephant" in the Collection System: A Foolproof, Low Tech, Effective Method for Inspecting Large Diameter Trunk Sewers</u>

In today's regulatory climate, municipal owners are placing an increased focus on inspection and rehabilitation of their wastewater conveyance and collection systems. While large diameter trunk sewers form the backbone of the collection system, their maintenance and routine inspection is often overlooked or ignored. In many instances, municipal owners lack the in-house resources to inspect their large diameter trunk sewers. Cleaning and inspection of 36-inch and greater diameter trunk sewers often requires the use of an outside contractor. Regardless of who performs the work, inspection of large diameter trunk sewers require special consideration and planning as part of any Sanitary Sewer Evaluation Study (SSES) or Capacity, Management, Operation, and Maintenance (CMOM) program.

There are several methods available for inspection of large diameter trunk sewers. Traditional closed-circuit television (CCTV) inspection typically requires bypass pumping to reduce water levels in the pipe to allow an unobstructed view of the pipe. Bypass pumping is expensive, easily costing thousands of dollars a day.

Integrated sonar and CCTV systems and Focused Electrode Leak Location (FELL) technology permit inspection of large diameter sewers with partially empty or flooded pipe conditions, thus eliminating the need for bypass pumping. These methods have a higher unit cost than conventional CCTV inspection, but typically yield an overall savings where bypass pumping or dewatering would otherwise be required. Both "high tech" methods provide a limited amount of information when compared with conventional CCTV inspection and results may not be readily discernible, especially if performed under sub-optimal conditions.

One foolproof method for inspecting large trunk sewers that has been generally overlooked by municipal collection system owners allows for an "empty pipe" inspection without the need for costly bypass pumping and yields easily interpreted results. The method: conventional CCTV inspection using a traditional plug-and-release approach generally reserved for smaller sewers. This "low tech" method has been unjustly discarded as ineffective or risky for large diameter inspections. However, in many cases, this approach can be safely employed and provide considerable cost savings over other available inspection methods and uncompromising data quality.

This paper presents lessons learned, potential cost savings, and identifies risks with implementing a plug-and-release inspection approach on large diameter trunk sewers. Practical guidance and experiences (both positive and negative) are featured based on a recent inspection effort of approximately 23,000 linear feet of 36-inch to 54-inch trunk sewer in Lexington, Kentucky.

Jim Buckles, P.E., BCEE
Tetra Tech, Inc.
Lexington, Kentucky

Jim Buckles is has been employed by Tetra Tech since 1980 and currently serves as a senior project manager in their water and wastewater group. His educational background includes degrees in biology, microbiology, and civil engineering. He has specialized in water resources, stormwater, and wastewater projects throughout his career. He is a licensed engineer in Kentucky, Tennessee, and Arizona, past President of the Kentucky-Tennessee Water Environment Association, a Diplomate in the American Academy of Environmental Engineers, and a recipient of Water Environment Federation's Arthur Sidney Bedell Award.

Site-Specific Calibration of Parshall Flumes

by

Jim Buckles, P.E., BCEE, Tetra Tech, Inc.

Since the 1920s, the combination of a Parshall flume and a level sensor has been a popular choice for making open channel flow rate measurements in wastewater. Extensive tests in laboratories and under ideal field conditions have shown the Parshall flume tables to be within 90-95 percent of true value. However, laboratory conditions or ideal field conditions are difficult to find in an average wastewater collection system. Differences in field and laboratory conditions, improper selection of flume size, insufficient approach length, and difficult discharge conditions contribute to inaccuracies. Typically, a Parshall flume that measures within 15 percent of the actual flow rate is considered to be performing well.

Many utility managers find that a flow accuracy of 85 percent is not good enough. More accurate flow measurement data are required to properly compute wastewater loadings. In multi-jurisdictional wastewater systems and/or when discharges result from significant industrial users, a 15 percent uncertainty in the allocation of sewer fees can represent a significant sum of money, especially if Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and/or Ammonia (NH3N) surcharges are associated with the fee.

Parshall flumes are uniquely shaped devices that consist of a converging section, a throat section, and a diverging section. As wastewater passes through these flume sections, the result is that the water level in the converging section is higher than the water level in the diverging section. Typically, an ultrasonic level transducer is used to measure the depth of flow in a Parshall flume. Flow rates are calculated using standard Parshall flume rating tables that define the relationship between the depth of flow and the flow rate. These standard depth versus flow rate relationships are well documented (e.g., Water Measurement Manual, published by the U.S. Bureau of Reclamation). However, as previously mentioned, the dynamic environment of a wastewater collection system will produce non-ideal conditions, so that these standard relationships may have significant measurement errors associated with them.

Substantial improvement in flume metering accuracy can be obtained by developing a site-specific rating curve for each flume. Concurrent flow rate data collected with devises like a Doppler area velocity flow meter or tracer dilution study can be used to generate flume lookup tables. The lookup table defines the relationship between the reference flow rate (from Doppler or Tracer measurements) and depth of flow measurements made from the Parshall flume's ultrasonic level transducer. The result is a unique storage-discharge relationship that uses the stage (head) measured by the flume's ultrasonic level transducer and computes the discharge rates from the flow measurement in the look-up table.

The Doppler area velocity flow meter operates by emitting short acoustic pulses along multiple directions. This allows the meter to measure velocity at multiple points within the wastewater depth of flow. By measuring velocity at multiple points in the flow, the meter can infer the actual flow pattern and calculate flow rate based on this detailed information. As changes in hydraulic conditions will manifest themselves as changes in the distribution of velocities, direct measurement of the velocity distribution enables the meter to adapt to changing conditions. Accurate flow rate measurements within 2 percent are made even under challenging hydraulic conditions.

The tracer dilution technique uses the principal of mass balance to compute an unknown discharge rate. For these studies, fluorescent dyes that can be measured in very low concentration are injected at a known rate into a wastewater flow of an unknown rate. These dyes are not typically present in wastewater. At a downstream location where complete mix of the dye has occurred, a sample of the wastestream is collected and analyzed to determine its dye concentration. Once this value is known, a mass balance calculation is made to determine the unknown upstream flow rate. The tracer dilution technique is considered by experts to produce flow rate values within 2 percent (98 percent accurate).

One may ask why not use the Doppler or Tracer techniques as the primary flow measuring tool. The answer lies in reliability and cost. The Doppler area velocity flow meters are immersed in the wastestream and can go off-line for extended periods of time due to debris or sediment on the measurement sensor. The tracer studies are very costly and typically only continued for short periods of time. Conversely, the Parshall flumes are self cleaning and the ultrasonic sensor is mounted above the wastestream and not impacted by debris or sediment.

Currently, the Subregional Operating Group (SROG), which includes the cities of Glendale, Mesa, Phoenix, Scottsdale, and Tempe, uses look-up tables to compute discharges at their largest metering stations. Wastewater flow from the five SROG cities is measured at fourteen metering stations.

Their look-up tables were developed using ADFM Velocity Profilers for the reference flow rates along with depth of flow measurements from the ultrasonic level transducers at the Parshall flumes. Lithium tracer studies were used to verify look-up table rates. The goal for the SROG metering station flumes (with look-up tables) is for the flume to read within two percent of the ADFM on an average monthly basis for high, low, and median flow. SROG has achieved this goal at many of their metering stations.

Collection System

Session T1D

GEORGE E. KURZ, P.E., DEE

George Kurz is a Senior Technical Advisor for Barge Waggoner Sumner & Cannon in Nashville, TN. For the past 20 years he has focused on the development of a strategic approach for eliminating I/I in municipal sewer systems. He also developed standard methods for measuring effectiveness of rehabilitation using flow monitoring. George received a B.S. in Civil Engineering from Tennessee Tech University, and is a member of WEF and ASCE. He has published articles and given numerous presentations to national conferences since 1978. He has 34 years of experience in state and local government, sewer service contracting and consulting engineering.

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BRENTWOOD MORATORIUM RELIEF VALIDATED, I/I REDUCTION CONTINUES

By George E. Kurz, P.E., DEE & Kevin Colvett, P.E.

Abstract
Several problems confront municipal wastewater agencies operating under State or EPA Consent Orders. In additional to the fundamental problems of conducting the appropriate remedial work and obtaining funding to support that work, the communities they serve are still growing or changing in ways that often require new service connections. In some cases, those new service connections may represent significant new revenue. However, new connections may be prohibited or severely limited by moratorium provisions in the Orders. Recognizing that operators of collection systems under moratorium need sound approaches for requesting partial or total relief from these enforcement actions, this paper will discuss the successful approach used by the City of Brentwood, Tennessee to measure and document the level of I/I reduction resulting from sewer rehabilitation. All of the analyses are based on long-term sewer flow and rainfall monitoring. In April, 2009, the City was confident in reporting a reduction of 280 MG/year. Full documentation (including statistical levels of confidence) was provided to the State of Tennessee with a request for moratorium relief. The State staff responded and allowed the full amount documented. A previous, similar EPA Order required a level of three credits per one gallon of relief granted for rehabilitation work based on a table of standard flow credits per defect. By the end of November 2010, the system ADDWF (average daily dry weather flow) had decreased by 0.516 mgd to 2.768 mgd, and the annual (normalized) I/I portion of the total flow had reached 918 million gallons per year, representing a decrease of 590 MG/year. This reduction showed the additional benefit of continuing rehabilitation work in Brentwood.

TOPIC: Rehabilitation and Upgrade of the Lift Station 507 Storage Tank to a CSO RTB Facility

SPEAKER: David White, PE (dwhite@wadetrim.com, 317 829.5881)

Wade Trim, 1 North Pennsylvania St, 1005, Indianapolis, IN 46204

BIO: *Mr. White graduated from the University of Michigan with a Master's in Civil and Environmental Engineering. His coursework focused on hydraulics, hydrology. wastewater treatment, groundwater, and modeling of water resources processes. He is currently a Vice President with Wade Trim in their Water Resources Group where he has worked for the last 16 years leading planning, design and construction of CSO and wet weather facilities.*

TOPIC: Rehabilitation and Upgrade of the Lift Station 507 Storage Tank to a CSO RTB Facility

SPEAKER: David White, PE (dwhite@wadetrim.com, 317 829.5881)

Wade Trim, 1 North Pennsylvania St, 1005, Indianapolis, IN 46204

This presentation will focus on an overview of technologies that are typically applied to treat combined sewage flow. General background will be provided as well as issues and operational challenges. A case study on the City of Indianapolis Lift Station 507 will also be presented. Aspects of green solutions will also be discussed.

The existing City of Indianapolis DPW Lift Station 507 facility primarily operates as baffled storage for a part of the City's combined sewer system. Flow is currently directed by normally closed bypass gates in a non-linear pattern through four separate channels prior to pumping to the Broad Ripple-Riverside Interceptor or (during large storm events) overflowing into the White River during wet weather events. The existing Lift Station 507 is capable of storing approximately 1.2 million gallons of sewage. The existing washdown and grit handling system is non-operational. Cleaning of the facility is currently a manual operation that is planned once a year.

Based on Combined Sewer Overflow (CSO) control recommendations in the City's approved Raw Sewage Overflow Long-Term Control Plan (LTCP) and Water Quality Improvement Report (ICST, September 2006). Wet weather flows will be screened, treated and stored by the LS 507 facility during wet weather events. The specified performance criterion in the LTCP for Lift Station 507 is a maximum of four (4) untreated or partially treated overflow events in a typical year.

Meeting the performance criterion requires an upgrade to the existing LS 507 facility. This upgrade involves the addition of a self-cleaning, screening system at the entrance to the facility. A sodium hypochlorite disinfection system, dechlorination system with sodium bisulfite, and necessary chemical storage will also be added in a new room beneath the existing control building. The existing washdown and grit handling system will be replaced with a tipping bucket washdown system. The existing spray wash chamber will be converted to a new chemical unloading facility. When completed the facility will store up to 0.8 MG of CSO volume and treat a design flow of 53 MGD.

The upgrade also includes other various structural and equipment improvements such as replacement of all existing sluice gates and operators, replacement of dewatering pumps, addition of flow meters, level sensors, and sampling equipment, and replacing the emergency generator. The existing dewatering 6-inch force main will be replaced with a 10-inch force main. Level sensors will be installed at the CSO 205 diversion chamber (Structure B-3) and force main connection to the Broadripple interceptor. The operation of the facility will also be enhanced with the inclusion of a Supervisory Control and Data Acquisition (SCADA) operating system to allow control from the Belmont Advanced Water Treatment Plant. All existing mechanical and electrical components will be replaced except for several unit heaters.

A green roof, irrigation system and walkways will be added to a portion of the top of the existing storage tank. The existing control building interior walls and room setup will be modified and the roof replaced. A modified entrance and heavy duty access road to accommodate truck traffic will be constructed through the existing Riviera Club parking lot. A porous pavement system will be placed in combination with a concrete loading area adjacent to the chemical fill room area.

The project was bid at $4.6 million dollars. Construction began in early 2010 and is expected to be completed with the facility fully operational in July of 2011.

Chris Horvath

Chris Horvath has a Bachelor of Science in Mechanical Engineering from the University of Missouri – Rolla. He is a Private Inflow Reduction Report and Inflow/Infiltration (I/I) specialist. He has three years of civil engineering experience with the identification of sources of I/I and developing recommendations to remove sources of I/I. His experience has resulted in developing methods to relieve I/I and a quantitative way to accurately determine infiltration into private sanitary service laterals.

Lessons Learned – Private Source I & I Removal

Chris Horvath - RJN Group, Inc.
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The Problem:
Many cities across the United States are facing issues with eliminating Sanitary Sewer Overflows (SSO) and Combined Sewer Overflows (CSO). Sources of many of these issues are primarily due to Inflow and Infiltration (I & I). Some of the I & I is often from public sources such as sewer lines, inlets, manholes, and cross connections between the storm and sanitary sewers. Private sources such as laterals, downspouts, and area drains can contribute a significant amount of I/I to the system, many times exceeding public sources. Correcting public sources alone may not fully resolve the issues in eliminating SSO's and CSO's. Private sources need to be investigated in order to correctly deal with the elimination of I/I in the system.

Goals and Objectives:
Identification of the private sources can be found through a Sanitary Sewer Evaluation Survey (SSES). A plan must be developed to determine which sources will need to be removed from the sanitary or combined sewer system based on the amount of flow and budgetary concerns. The plan and goal should be the removal of enough I & I so that the SSO or CSO can be eliminated.

Plan
The most important part of any plan in removing private I & I sources is communication. In order to determine the best way to relocate the flow to keep in line with the local laws and to not exceed the capacity of the existing storm sewers and creeks, the engineering firm must work closely with the city departments when designing the removal of the private sources.

Since private sources are owned by the property owner, communication as well as a good relationship with the owner is imperative to achieving their consent to proceed with the proposed design. Communication with the property owner can be the biggest hurdle in the entire process. Therefore, a great deal of effort needs to be focused here to satisfy both the property owner and city departments.

Results
After approval from the property owners and the city, the city departments can move forward with the proposed repairs to the private sources and complete their plan to eliminate the SSO's or CSO's.

Presentation
The presentation will provide case studies of successful private source elimination projects along with methodologies that made the projects successful.

Public Informaton

Session T2A

Glen Thomas Bio
January 2011

Glen Thomas is the supervisor of communications and public relations for Memphis Light, Gas and Water (MLGW), the largest three-service public utility in the nation. He has been with MLGW since 1999 and has 19 years of experience in marketing communications and public relations for both private and public employers.

Thomas serves Vice Chair for the Public Information Committee of AWWA's Kentucky-Tennessee section. He also serves on the board of directors for both the National Association of Government Communicators (NAGC) and Utility Communicators International (UCI).

He and his wife, Shelley live in Memphis. They have two sons, Lyndon, 5; and Colin, 3; and an 11-year-old yellow lab, Lenny.

Title: Mobile Warming: Time to Embrace Mobile Technology

Main Author: Glen Thomas

Employer of Author: Memphis Light, Gas & Water

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Abstract Selection

As smart phones and mobile technology become the norm and not the exception, many organizations could see themselves fall behind in terms of customer communications. Memphis Light, Gas & Water is doing their part to keep pace with this rapidly changing medium, offering a number of mobile friendly programs and initiatives, such as a text messaging program, IPhone app, and use of mobile friendly social media to keep customers updated.

Social media is emphasized as a way of improving relationships with both the media and customers, and Thomas illustrates how by sharing how MLGW successfully managed to use social media through mobile devices after a devastating storm knocked out power to about 1/3 of MLGW's customers in June 2009.

Finally,

Objectives:

1. Provide background on the rapid growth of mobile technology.
2. Explore mobile technology possibilities for utilities looking to reach their customers.
3. Provide case study examples of MLGW's text messaging, social media and Iphone app projects.
4. Look at future implications of mobile technology on the utility industry.

Wesley Sydnor, PE – Louisville and Jefferson County Metropolitan Sewer District

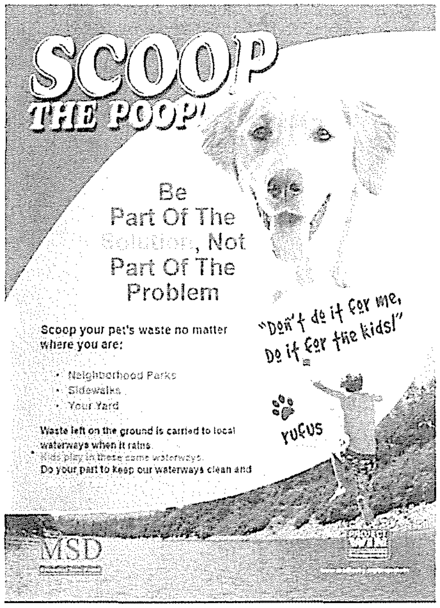
Experience: 10 years – Water and wastewater engineering, 2 years with Louisville MSD, 5 years with O'Brien and Gere engineers as a consultant on the Nine Minimum Controls program and overflow response.

Education – BA from the University of Louisville, Masters of Engineering – University of Louisville

Job Responsibilities as it Relates to the Topic: Manages Nine Minimum Controls and CMOM programs, works on public education and outreach for Project WIN (the department managing programmatic activities for compliance with the Consent Decree).

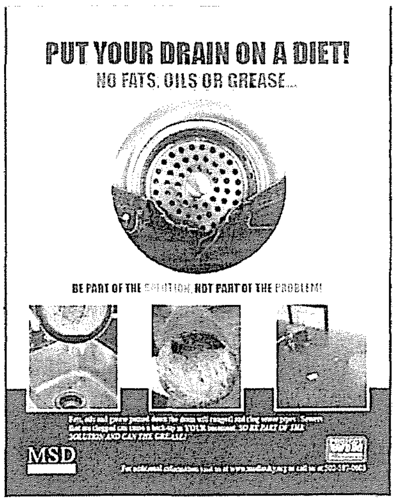
Making an Impact with Creative Public Outreach and Education Initiatives

Angela Akridge, PE – Louisville and Jefferson County MSD
Wesley Sydnor, PE – Louisville and Jefferson County MSD



As part of the Integrated Overflow Abatement Plan (IOAP) approved by the US EPA in September 2009, public information surveys are required to be performed on a bi-annual basis. These surveys included questions regarding the public's knowledge of personal behaviors that could impact the sewer system and water quality. The results of this survey revealed that there were gaps in understanding of causes of sewer overflows and connectivity of private property to receiving water bodies. To correct these gaps, Louisville MSD worked to develop creative methodologies to reach every person and address each behavior.

Early in 2010, Louisville MSD was approached with an opportunity to advertise with the local news paper: *The Courier Journal* and with Screenvision (movie theater advertising). This advertising opportunity developed into a partnership, in which *Courier Journal* staff was educated on how the sewer system works, and how overflows occur. Based on this dialogue, strategies were developed to outline key seasonal messages and stakeholder values were matched up with target audiences. Using data from the *Courier*, those audiences were delineated into demographic groupings and advertisements were created to deliver the messages.



Some of the gaps in public information and perception were related to the proper disposal of grease to prevent sewer overflows, cleaning catch basin grates, avoiding contact with water bodies after rain events, and collection and disposal of pet waste to prevent pollution.

During 2010 and 2011 messages were delivered via the newspaper, digital editions of the Courier Journal, Yahoo! Advertising, and on movie screens.

Feedback on number of "clicks" and views has been tabulated by the partner media agencies, and has been utilized to modify where messages are being presented. A discussion on Louisville MSD's planned use of social media will be presented.

Brief Highlight of:
"Aw CRAP! Now what? Communications in a Crisis"

We've all been there – whether it's a watermain break, a boil water advisory, or concern over 'wonky' test results. Bad things happen to the water utility sector each and every day.

How do you react when you have the Mayor on line one, and the TV station on line two? You have two choices – run and hide, or embrace this opportunity to build trust, display credibility, and restore confidence in not just the water system – but yourself as a manager.

There is a single emotional factor that will go further towards building trust than honesty, competence or dedication. Learn what that trait is – and how to incorporate it into your communications.

Speaker Bio:

Jeff Chatterton started in risk and crisis communications as a journalist, winning several awards for his coverage of a number of "crisis-oriented" events.

He worked for the Ontario government, handling a wide array of communications challenges. One day, Jeff was sitting at his desk at the Ministry of Environment when his supervisor stuck her head around the corner and said "Do you know how to get t0o Walkerton?"

It turns out some people were drinking the tap water and getting very ill as a result. Jeff stood up, picked up his suit jacket – and didn't return to his desk for three weeks. To this day, the sound of a helicopter makes him wince, since there were so many air ambulances ferrying sick and dying people away from one of Canada's largest environmental disasters. This very public and emotional event prompted Jeff to start Checkmate Public Affairs. He felt corporations needed better ways to speak the truth; especially when the truth was being stampeded by hysteria.

Today, Checkmate Public Affairs serves clients spread across three continents, and continues to service the needs of the water and infrastructure sectors today.

Reference:

"We had Jeff speak to the Ontario Water Works Association during a one day seminar, and he was excellent! He was entertaining, energetic and gave us some really valuable information about the role of risk and crisis communications. I'd happily recommend him for any industry association events." (Steve Gombos, Region of Waterloo: sgombos@regionofwaterloo.ca)

Customer Service

Session T2B

David Shehee
Kentucky American Water
Supervisor, Water Quality and Environmental Compliance

Mr. Shehee is married (Amy) and has one child (a son – Luke). He has a B.A. in chemistry from Berea College and a M.S. in analytical chemistry from Eastern Kentucky University. He is a certified Class IV Drinking Water Operator, a Class II Wastewater Operator, and a Class II Collection System Operator in Kentucky with 11 years of experience. He is responsible for drinking and wastewater compliance at Kentucky American Water, which serves approximately half a million people.

Improving Customer Satisfaction by Increasing Communications about the Quality of their Water

by

Susan Lancho and David Shehee
Kentucky American Water

Customer satisfaction in the drinking water industry can be very challenging for a variety of reasons. Often, customers form opinions about their water purveyor based upon factors that are difficult to control (e.g., increasing costs and increasing competition). Consequently, going the extra mile in those areas that can be controlled is critical for improving customer satisfaction and consumer confidence. Surveying your customer base is just the beginning of the process.

This presentation will evaluate tools used by a large system that serves almost half a million people in central Kentucky. The discussion will include the type of surveys used, some of the critical questions posed to customers, and areas of critical importance to customers. In addition, several tools used by the utility to educate consumers and improve satisfaction will be presented, including door hangers, out-calling system, water quality one-pagers, customer post cards, partnerships with other organizations for major events, and web content.

Customer Service
Round Table

Scott Clark
Hardin County Water District No. 2
270.737.1056
sclark@hardincountywater2.org

CREDENTIALS

Certified Class IV Distribution
Certified Class III Water Treatment
FEMA Certified in Incident Command and National Incident Management Systems.
Certified Large Meter Tester
AWWA-KY/TN Section- Chair of Customer Service Committee & Committee Member of the Water For People

EXPERIENCE

1996–Present Hardin Co. Water District #2 Elizabethtown, KY

Administrative Manager

- Oversee daily operation of the finance, human resource, customer service, information technology and meter testing departments for a utility with 17,000 connections.
- Work as a grant administrator on various state and federal grants.
- Responsible for yearly budgets and act as purchasing agent.

1994–1996 Hardin Co. Water District #2 Elizabethtown, KY

Information Systems Manager

- Responsible for the CIS, SCADA and other computer systems and hardware.
- Oversaw the collection and data entry for the CIS.
- Acted as purchasing agent for the District.

1990–1994 Hardin Co. Water District #2 Elizabethtown, KY

Water Treatment Plant Operator/Water Quality Control

- Implemented the District's Water Quality Control department.
- Collected and monitored water quality samples.
- Compiled and completed state and federal required reports.
- Operated a Class III Water Treatment plant.

EDUCATION

- Associates Degree in Business Management

KY/TN SECTION AWWA
2011 WATER PROFESSIONAL CONFERENCE
July 24 – 27

Abstract for Customer Service Tract
Scott Clark, CS Committee

Round Table Session: Customer Service Tips and Tricks

This session will allow attendees to share customer service information and experiences. Communicating effectively with customers doesn't just happen and it is never ending. Customer Service employees, which everyone one in an organization is, plays a vital role in the overall perception and effectiveness of the organization. By sharing what works and what doesn't work attendees will be able to enhance their organization customer service levels. Here are some examples of talking points examples:

1. Appearance counts. Perception is reality, and the reality is that people do judge a book by its cover. Be professional whether in person, by phone or email.
2. Don't take it personally! The customer is angry about the situation, not angry at you. Taking things personally just introduces anger into the situation and makes it harder.
3. Make certain that your tone of voice is in sync with your words. Remember, your tone of voice can completely contradict your message.
4. Seek always to do it right the first time; if this is not done, then do it very right the second time.
5. Make certain that your "solution" to the customer's problem is acceptable to them. Get their approval and agreement.
6. Always tell your customer what you CAN do for them. Don't begin your conversation by telling them what you CAN'T do.
7. Go the extra step by following up on your solution. Re-contact the customer to make certain that everything has been handled in a satisfactory manner, and they are pleased with the outcome.

These types of discussions are beneficial to attendees and provide the value of networking and benchmarking that is key to success of promoting the water industry as a whole.

Diversity

Session T2C

Mollie Bailey joined Northern Kentucky Water District in 2000 as a treatment plant operator, and was promoted to Plant Operations Forman in 2007. She received her Class III water treatment plant operator's license in 2003 and her Class IV in 2005.

Since 2000, Mollie has been a member of the Kentucky Water & Wastewater Association and the American Water Works Association. She is the Chair of the Membership Committee for the Kentucky/Tennessee section.

Mollie is working towards an Associates Degree in Environmental Engineering – Water and Wastewater from Cincinnati State Technical and Community College.

Using Diversity To Better Serve Your Community

The KY/TN AWWA Diversity Committee would like to challenge our attendee's to think about the world in which we work. We will present some actual data about the section from the membership database, and compare it to the participants' perceptions.

We will present a group exercise to show how our industry can recognize and value diverse backgrounds, diverse ideas and recruit a diverse employee base to better serve our communities.

This activity will challenge attendees to define and examine the world in which they live and work, and open up a conversation about how they feel about it, and in what ways we can change it.

Diversity Activity (Time: 10-15 minutes)

Objective
Measures your awareness of diversity and how you experience it in your daily life.

Instructions
The colored beads represent various ethnic groups. Please read the below list and place the most appropriate bead for each item in your cup. Choose only one bead for each item by using the most appropriate bead. If an item does not apply to you, feel free to change it or skip it.

Bead		**Group**
Black		African Americans
Blue/Other		Asian Americans or Pacific Islanders
Orange		Hispanic Americans or Latino/Latina Americans
Pink		Native Americans and Others
Red		Asian Americans
White		European Americans or White Americans
Yellow		Multi-Cultural Differences

Answer the following questions:

I am
My parents
My best friend
Most of my friends
My manager or boss
The CEO or owner of my company
Most of my co-workers
My hairdresser/barber
My doctor
My dentist
Most of my neighbors
The star of my favorite TV show
The star of my favorite movie
My favorite musician or singer
My hero or role model growing up
(other than someone from above)

Learning
How do you feel about the colors in your cup?

How can you change your cup?

What would your idea cup look like? Make a bracelet of your ideal cup with the string provided.

Message
The more colorful your ideal bracelet the more interesting! Your cup shows how you see the world every day. Don't feel guilty but be aware of your "diversity lens" and work towards making your world more diverse.

Wear your ideal Diversity Bracelet proudly!

Priya Dhingra Klocek Bio 2010

is the President of Consultant On The Go LLC, a consulting firm specializing in human resources, change management and global diversity consultancy. She is a business consultant, executive coach, mentor, and facilitator. Her mission is to help organizations manage and develop their most important assets, People. Her consulting practice focuses on diagnosing and improving the fundamental human interactions upon which all successful businesses are built.

Priya has more than 15 years of experience in the corporate sector. Her employers included Ashland Inc, Convergys, Great American Insurance, and Fifth Third Bank. More recently, she served as director of client services for Global Lead Management Consulting, which had clients in the entertainment, utility, healthcare, legal, and financial sectors.

Priya served in various roles and led several global projects during her corporate tenure. She conducted focus groups, 360° feedback sessions, and created and carried out a variety of leadership, cultural, and HR assessments. She was instrumental in the launch of Convergys call center in India. She was placed in charge of the language and cross-cultural training of employees in both India and the U.S.; the pattern she developed became the company's standard for all new employees. She also was instrumental in the launching of Convergys in the Philippines. Priya expanded her role at Convergys into that of a coach and mentor who helps to bridge the communication and cultural gaps all across the organization.

The success of Priya's work with Convergys helped to inspire her to launch her own consulting practice. She specializes in leadership development, change management, human resources, and diversity & inclusion. She leverages her diverse background and work experiences to help her clients navigate and manage complex business issues at home and abroad. She designs solutions that are strategic and forward thinking, yet practical. Besides consulting, Priya teaches a graduate course on managing diversity at Northern Kentucky University.

Priya holds a bachelors degree in business from the College of Mount St. Joseph and a master's degree in human resource development from Xavier University. She is a certified coach practitioner and is qualified in both the Prosci Change Management methodology and the Intercultural Development Inventory.

Abstract was requested by the KY/TN AWWA Diversity Committee to be scheduled on YP day (Martha Segal – Nashville Metro Water Services

Yes, I am diverse. So what, lets get some work done?
30-45 minute session

Over the years we have been taught to ignore our differences and focus on our similarities to get the job done. Research has shown that minimizing and ignoring our differences can impact the organization negatively while leveraging our differences can bring about positive results and increase employee engagement. Through this interactive session you will gain insights on how you can leverage the differences within your organization to increase employee satisfaction and better serve your customers.

Young Professionals

Session T2D

Engineer, Physicist, Lawyer…the life of Bill Samuels, Jr., President and CEO of Maker's Mark

Mr. Samuels will be speaking to the Young Professionals in the water and wastewater industry about his diverse background. Through his life's story, he will share some of the life lessons that he learned while climbing to the top. The young professionals will be learning about leadership qualities as well as how to diversify their lives and careers. This presentation will capture the interest of young professional's through bourbon making and arm them with skills to lead to career success.

Beginning the presentation with some family history, Mr. Samuel's great-great-great-great-great-grandfather, Robert Samuels, Sr. was a farmer and rye whisky distiller in Pennsylvania. Throughout the years his family relocated to Kentucky in 1784 and was one of the first families to make a corn whisky. Mr. Samuels great-great-grandfather, Taylor William, was the first in the family to incorporate family distilling into "a real business" around 1840 and branded his whisky T.W. Samuels. As time went on the bourbon whisky was passed down from generation to generation until it came to Mr. Samuel's father who sold T.W. Samuels Distillery in 1943 and bought Happy Hollow Distillery in 1953. The old recipe was burned and the distinctive taste of Maker's Mark was created.

Mr. Samuels graduated from Vanderbilt Law School in 1967, and began working at Maker's Mark. He became president and CEO in 1975. Prior to working at Maker's Mark, he was a design engineer with Aerojet General Corporation in Sacramento, California. Some of his accolades include: Kentucky Entrepreneur of the Year in 1995 and 2005; 2004 Louisville's citizen of the Year; and Kentucky Business Hall of Fame in 2006.

Bill Samuels, Jr.
President and CEO-Maker's Mark

Age: 70
Education: Engineer, Physicist, Lawyer
Born: Bardstown, Kentucky

Family Heritage:

- Great-Great-Great-Great-Great-Grandfather, Robert Samuels, Sr., farmer and rye whisky distiller in Pennsylvania.
- Great-Great-Great-Great-Grandfather, Robert, Jr., Captain in Pennsylvania Militia during American Revolution. Relocated to Kentucky in 1784 as farmer distiller—first in family to make corn whisky.
- Great-Great-Great-Grandfather, William, a farmer distiller and Nelson County Sheriff.
- Great-Great-Grandfather, Taylor William, first in family to incorporate family distillery into "a real business" circa 1840. Also the first to brand his whisky, calling it T.W. Samuels. As Nelson County High Sheriff, presided over final surrender of Civil War at family distillery in Samuels, Kentucky.
- Great-Grandfather, William I, carried on making bourbon whisky at family distillery.
- As did Grandfather, Leslie, who as Bardstown, Kentucky Mayor founded the local school system.
- Father T. William, sold T.W. Samuels Distillery in 1943 and in 1953 bought and restored Happy Hollow Distillery. He then burned the old family bourbon formula and created what is now known as the distinctive taste of Maker's Mark.
- I have been at Maker's since graduation from Vandy Law School in 1967 and have been President & CEO since 1975.

Previous Work:
Design Engineer, Aerojet General Corp., Sacramento, Cal. Fired in 1964 for incompetence.

Special Moments:

- Successful launch in '64 of my rocket nozzle (first ever non-graphite nozzle deployed)
- Being chosen Kentucky Entrepreneur of the Year (1995 and 2005).
- Presenting UCLA Legend John Wooden an honorary doctorate on his 90th birthday from the University of Louisville (as Board Chairman).
- One-on-one time spent as a youngster with bourbon industry legends: Hap Motlow (Jack Daniel), Pappy Van Winkle, Col. Jim Beam, Lyons Brown, Dr. Henry McKenna and I.W. Harper.
- Finally having my father say—and mean it—that I wasn't as dumb as I looked.
- Seeing my son, Rob, come into the business and do really well.
- The occasions when our distillery became the first beverage facility in all of America to be designated a National Historic Landmark and when the distillery was recently recognized by the Guiness Book of World Records as "America's Oldest."
- Being selected as Louisville's 2004 citizen of the Year
- Harvard Lampoon's Man of the Year 2005
- Being inducted into the Kentucky Business Hall of Fame (2006)

Awkward Moments

- Dad's burning of family bourbon formula flamed out of control catching my sister's hair on fire (1954).
- The only fight I can remember mom and dad ever having. It was when mom decided dad's new whisky (Maker's Mark) needed to have the neck of each bottle dipped in red sealing wax. Dad said it was too impractical. Mom won. Whew! (1958)
- A 2002 billboard design which flamed out of control and landed me on the hit list of every accountant in America. The ad read "Maker's Mark...disappears faster than a big 5 accounting firm" (think Enron).

Community Involvement

- Chair Board of Trustees, Bellarmine University
- President's Advisory Board, Clemson University.
- Immediate Past Chair (Louisville Chamber of Commerce)
- Board of Trustees; Jewish Health Care and St. Mary's Hospital
- Past Chair, University of Louisville Board of Trustees
- Past Chair, Kentucky Chamber of Commerce.
- Past Chair Louisville Area Workforce Development Board
- Past Chair Kentucky Distillers Association.
- Past Chair Kentucky Derby Museum.
- Past Chair Louisville Area Boy Scouts Council

Guest Lecturer; Graduate Business Schools

- Harvard
- Wharton, University Pennsylvania
- Stern, N.Y.U.
- Columbia
- McCombs, University of Texas
- Fuqua, Duke
- Haas, University of California at Berkeley
- Georgetown University
- Vanderbilt University
- Texas A & M

"Samuels literally, single-handedly created the fine bourbon category...he also made Maker's Mark an international symbol of excellence, which opened a door other distillers could walk thru."

--Perry Luntz, Beverage Alcohol Market Report, New York, NY.

DWWR

Session T3A

PAUL STONECIPHER, PE

Associate Vice President

Mr. Stonecipher is an AECOM national practice leader for sewer collection system rehabilitation and very versed in many forms of project and program management. He serves as a senior technical advisor to many AECOM projects. Mr. Stonecipher is also responsible for the design of water distribution systems, water storage, booster pumping stations, water system planning, wastewater collection and transmission facilities, sewer rehabilitation, and storm water conveyance systems. He has served as program manager for the Nashville overflow/bypass abatement program and was responsible for the management of municipal wastewater and water projects from inception to construction, overseeing the planning, design and construction of projects by engineering staff. Mr. Stonecipher has prepared and presented studies at national conferences and has published articles in national trade magazines.

He was a graduate of Tennessee Technological University in 1974 and has practiced pipeline design nationally from his Nashville office base. He is a member of the KY-TN WEF Collection Systems committee. An industry exception, he is a 37 year employee of the same firm, albeit corporate name changes. A licensed engineer since 1979 in several states, he started in construction oversight advancing to design and management of multimillion dollar complex projects concurrently. He still loves the “dirt” and construction aspects of a project to a successful culmination for a client with the challenges of doing it technically different and better while being cost conscious.

Abstract for 2011 KY-TN WPC

Rehabilitation of Franklin's Raw Water Reservoir

Corresponding Author and Presenter
Paul Stonecipher, P.E.
AECOM
220 Athens Way, Suite 200
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(615) 313-0365
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Co-Author
Mark Hilty, P.E., Director
City of Franklin, Tennessee
Water Management Department
Mark.Hilty@FranklinTN.gov

The City of Franklin (COF) owns and operates a 30 acre raw water storage reservoir at its existing 2.0 MGD water treatment plant (WTP) site off Lewisburg Pike in southern Franklin, Tennessee. The purpose of the reservoir is to store water harvested from the Harpeth River during periods of sufficient river flow and retain it for potable water treatment. The reservoir is the water plant's sole source water when river flows are too low to be utilized in accordance with Tennessee Department of Environment and Conservation (TDEC) withdrawal permit conditions. Therefore, it is important that the capacity and integrity of the reservoir be maintained so the water treatment plant can operate at or near design capacity. Water conservation of the watershed begins with the WTP source water and limitation of substantial losses though rehabilitation of this reservoir while serving the consumers of the treated potable water at acceptable service level. Due to the recent exceedingly dry summers, substantial known water reservoir losses and increased system demands, the reservoir's capacity and integrity had come into question. Therefore, the city decided that it was appropriate and timely to evaluate alternatives and implement the design of improvements to the raw water reservoir. Furthermore in 2010 this rehabilitation was constructed. The first task was to evaluate various Reservoir Sizing Alternatives for operations analysis, impacts, opinion of costs and the identification of recommended alternative from a capacity aspect.

The raw water reservoir had an existing volumetric capacity of 85 MG. The existing reservoir had several large leaks that were to be addressed in any successful construction or rehabilitation project. The Reservoir Liner Alternatives task was completed to investigate alternative reservoir lining systems in order to contain the water within the reservoir and prevent future leaks. Notwithstanding which capacity alternative was selected, it required a quality lining system for leakage control.

Since approximately 1993, the City of Franklin (COF) Water Treatment Plant discharged filter backwash water with its associated solids content to the raw water reservoir. This practice was discontinued in 2007 after installation of a connection to the COF sanitary sewer system for the discharge of filter backwash water. The river sediment and alum based solids contained in the filter backwash water contributed to a loss of capacity in the raw water reservoir. Under the operational conditions, the capacity of the reservoir was diminished to approximately 80 million gallons due to the accumulated volume of filter backwash materials within the reservoir.

Over the past years, the reservoir has developed excessive leakage through the bottom. In order to rehabilitate/abate these leaks with the installation of a liner, an adequate structural bearing foundation underneath the liner was required. Therefore, it was determined that the filter backwash solids material should be removed from the reservoir. The COF wished to determine the available and most cost effective disposal alternatives to address the filter backwash solids being stored in the raw water reservoir. A review of the alternatives was performed so that the COF could make an informed decision on how best to permanently dispose of the filter backwash solids to regain lost volume and provide adequate structural bearing for the improvements.

This **KY-TN WPC Presentation** will be to first inform attendees of the various alternatives and options Franklin considered for the volumetric sizing of the improvements to the WTP raw water reservoir. In addition the logical, step-by-step evaluation and selection of alternatives for reservoir liner material to rehabilitate the reservoir from a leakage perspective will be presented. Seven materials for the reservoir liner were considered. A concluding and major section of the **Presentation** will be a "**Lessons Learned**" from issues from the actual completed construction of the reservoir rehabilitation. The hauling over 1,900 dump truck loads for disposal of filter backwash solids and the sustainable reuse of the solids material will be highlighted. The reservoir bottom "soft spot/area" repair will be addressed as derived from the leakage repairs. The beneficial reuse of interior face rock rip-rap will be explained in a dirt liner foundation system. The detailed description of the installation of over 30 acres of a geo-membrane synthetic liner in 162 pieces is most interesting including in particular the expectations and process of testing the installation of the liner. Many seams were field installed to construct a single ply membrane for raw water containment. Provisions for sediment containment to facilitate maintenance and also water flow within the reservoir for water age management will be presented. A unique application of new erosion materials for protection of interior slopes and the liner will be provided. In short this is perhaps a rare and different rehabilitation project for source water conservation in several aspects, and has applications hereafter other parties could learn from.

Saving Ten Million Gallons of Water Loss Per Month:
A Case Study On How A Local Utility District Is Reducing Non-Revenue Water Loss
Through Acoustic Leak Detection
Blountville Utility District
Blountville, TN

Contributors: Harold Glover, Simon Wick, and Griff Machinski

Harold Glover, Operations Manager of Blountville Utility District, has been working for his utility for the last 30 years and has a vast amount of knowledge and experience in the utilities distribution system. Blountville Utility District has approximately 5250 metered connections in their system and has 184 miles of pipe. The pipe material in their system is a mixture of PVC (73%), AC (12%) & metallic pipework (15%). Over the years Blountville Utility has invested heavily in new technology to improve their day to day operations. Most recently they invested in new meters and an AMR system. Despite this investment they still experienced an unacceptable level of Non-Revenue Water (NRW). Last year Blountville Utility District contacted United Utilities (and their sister company, Matchpoint Inc.) to discuss how they could help. During 2010 Matchpoint Inc. carried out a leak detection survey in Blountville Utility District which was project managed by Simon Wick. Simon has over 18 years of experience in water distribution and in particular leak detection products and services. Using FCS's specialized equipment they have, to date, succeeded in saving over 9,500,000 gallons of water loss per month by working in partnership to reduce the utilities UFW. This case study will detail the decisions and actions taken to implement the program, the equipment and procedures used, and an account of the results achieved.

FCS Bio

Griff Machinski is the Eastern US Sales Manager for Fluid Conservation Systems. He has been working with FCS since May of 2006. Utilities both large and small utilize FCS's equipment daily to help reduce water loss and save substantial costs of maintenance and production. Griff travels throughout his territory, performing demonstrations of the equipment FCS provides for leak detection, data logging, flow measurement, and pressure control. He also spends a good amount of time giving presentations, teaching leak detection workshops, and speaking at water conferences. Griff feels that his primary function is to educate utilities about leak detection and the processes and steps that can be taken to help reduce water loss within each and every utility. Since Griff's start in 2006, he's been able to help utilities across the country begin successful leak detection programs. Griff is a graduate of Florida State University with a B.S. in Business Management. He lives in Jacksonville, FL with his wife and two children.

Title: Implementing a Comprehensive Regional Water Supply Plan in the Duck River

Thomas E. Dumm, PE
O'Brien & Gere
(301) 731-1160
Thomas.Dumm@obg.com

CREDENTIALS

Registered Professional Engineer
Chair AWWA national committee on Water Resources Planning and Management
Chair AWWA national subcommittee on Water Allocation and Regulation
Member Water Environment Federation

EXPERIENCE

1997 – Present	Sr. Technical Director O'Brien & Gere
1987 – 1997	Project Engineer Black & Veatch

EDUCATION

Undergraduate
BS, Civil Engineering, Penn State University

Graduate
MS, Water Resources Engineering, George Washington University

Implementing a Comprehensive Regional Water Supply Plan in the Duck River

Thomas Dumm, PE [1], George Rest, PE [1], Doug Murphy [2], Joe Bishop, PE [3], Brian McCrodden, PE [4]

ABSTRACT: Droughts and competing uses for existing water supplies in recent years have fostered creative approaches to water supply planning in the eastern United States. In central Tennessee, O'Brien & Gere and CTI Engineers have been working with the Tennessee Duck River Development Agency to address the potable water needs of a five-County region through 2060. Normandy Reservoir is located in the upper portion of the Duck River watershed and water is released to the Duck River to meet many needs including wasteload assimilation, environmental flow for threatened and endangered species, municipal and industrial water supply, irrigation, and recreation. The key study objectives included development of a plan for water supply that is environmentally sustainable (i.e., maintains or improves biodiversity) and socially beneficial by recognizing basic human needs and the benefits for the region. The regional water supply plan included the following recommendations:

- Non-Structural Components -
  - Develop and implement a regional drought management plan.
  - Develop and implement a water use efficiency program.
  - Optimize releases from Normandy Reservoir to preserve storage in the reservoir for periods when it is most needed.
- Structural Components –
  - Increase the elevation of Normandy Dam by five feet and increase the winter/spring pool elevation by five feet without increasing the summer pool elevation. This component increases water storage during droughts, enhances flood protection while minimizing environmental impacts, and enhances the reliable yield available for all Duck River uses.
  - Relocate Columbia's water withdrawal to a new intake approximately 25 miles downstream, near Williamsport, where there is adequate flow in the river during droughts to satisfy Columbia's projected needs. This component addresses the potential deficit in Maury County and southern Williamson County with a local, highly reliable supply and eliminates their sole reliance on Normandy Reservoir.

This presentation will address the process used to develop the recommendations for the comprehensive regional water supply plan and present the findings from the initial stages of implementiation for the recommendations including:

- Defining water demands and available water supplies based on reservoir/river constraints (i.e., instream flows for protection a multitude of uses) over a 50-year period.
- Evaluating over 40 water supply alternatives using pair-wise comparison techniques and other decision-making tools to address the following factors: reliable capacity, water quality, cost, potential delays due to permitting, flexibility, environmental benefits, and recreation.
- Defining non-structural and stuctural conponents of the recommended solution.
- Developing a regional drought management plan.
- Conducting initial investigations of the structural components.
- Addressing equity issues among several water utilites.
- Conducting highly-effective workshops and making critical decisions with the public and agencies personnel present.

[1] O'Brien & Gere, 8401 Corporate Drive, Landover, MD 21701
[2] Tennessee Duck River Development Agency, 210 E. Depot Street, Shelbyville, TN 37160
[3] CTI Engineers, 3354 Perimeter Hill Drive, Suite 140, Nashville, TN 37211
[4] HydroLogics, 811 Mordecia Drive, Raleigh, NC 27604

Biosolids

Session T3B

BIOGRAPHIC FORM

ɹeaker's Information:

Name: Daniel W. Miller Title: Principal Occupation: Director of Wastewater

Professional Organization/Company/Agency Represented Jones & Henry Engineers

Education & experience Background as applicable::
BSCE from the University of Toledo. Registered P.E. in Ohio and Michigan. Have worked on wastewater projects for 32 years at Jones & Henry Engineers and currently the Director of Wastewater at Jones and Henry. Have presented previously for WEF National and State WEF conferences.

Enhanced Solar Drying in the Mid-West – Carmel, Indiana
Daniel W. Miller – Jones & Henry Engineers

Abstract

The City of Carmel began operation of the Nation's first municipal BioPasteurization process in 2005 to achieve a Class A biosolid. After certifying their Class A process with the State, a local soil blender began to haul the product; however they had trouble handling the 24% biolsolids. The blenders wanted a dryer product.

Excess digester gas was available after the biopasteurization and digestion. Several processes were reviewed which would both utilize the excess gas and achieve a better product for the soil blenders.

Solar drying with supplemental heat (enhanced) was selected based on its simplicity, continual use of the digester gas, a $50,000 energy grant award, and the "green" component of the project. The process selected was Thermo-System by Parkson Corporation

Due to the timing of the energy grant, the solar drying building was built first without supplemental heat, and completed in January of 2008. The 200 feet by 40 feet greenhouse style building was designed to process 1,300 wet tons without supplemental heat, raising the solids from 24-65% to create a more desirable product.

Exhaust and circulation fans, temperature controls, and a weather station, utilize a PLC based control to maintain optimum drying conditions. Everything is automatic except filling and unloading. The PLC maintains optimum drying conditions, calculates drying conditions and estimates the sludge dryness from temperature and humidity. An electric "mole" moves randomly and has sensors to turn when walls are encountered to mix the biosolids for moisutre release.

Intial Results without Supplemental Heat

Batch 1, consisting of 200 cubic yards was loaded in on January 31, 2008 at 8-12 inches in depth. This batch was removed April 5th at 45% solids. The product consistency was great and the target dryness was reduced.

Batch 2, was loaded on May 19, 2008 and removed June 6th at 55%. Only 18 days to dry.
Batch 3, was laoded on June 6, 2008 and removed June 28th at 55% solids, 22 days to dry.
Batch 4, was loaded on June 28, 2008 and removed July 21, 2008 at 75% solids, 23 drying days.

Due to storage pile odors in batches 2 & 3, the target dryness was increased in batch 4. Odors were eliminated in the storage pile with the dryer material.

Supplemental Heat

Hot water unit heaters and a back-up boiler were added to utilize the excess digester gas and provide supplemental heat to the solar drying system. Work was completed in 2009. The additional heat can be utilized during all seasons and expected to increase the system output from 300 dry tons to 600-700 dry tons per year. Expectations were to batch product in and out of the system in approximately one half to two thirds of the time. Results have varied.

As supplemental heat was added, results were tracked and reported as to how the additional speeds the drying process in differing weather conditions, and increases production by the system.

The paper will review and summarize the various process conditions, such as % solids vs. relative humidity and percent sunshine, batch results, project difficulties, public acceptance, odors both during operation and storage, efforts to dispose of the products, the operation and maintenance costs of the enhance solar drying, and how solar drying could affect Class B disposal costs, or landfill disposal costs.

Professional Record

C. Michael Bullard, PE
Senior Associate

Mr. Bullard has 25-years of experience as an engineer in the design, operation, process optimization and maintenance of municipal and industrial water and wastewater treatment facilities. Mr. Bullard is Hazen and Sawyer's Corporate Residuals and Biosolids Practice Leader and has experience in full range of residuals and biosolids, thickening, stabilization, dewatering, biogas utilization, combined heat and power systems, and ultimate management processes.

Since rejoining Hazen and Sawyer in 2000, Mr. Bullard has served in role of either a senior technical advisor, project engineer and project manager on all of the significant biosolids projects Hazen and Sawyer has recently undertaken in the Mid-Atlantic region, including work at the following facilities.

- Burlington, NC – East and South Burlington WWTP
- Cary, NC - South Cary WRF
- Chapel Hill , NC – OWASA Mason Farm WWTP
- Charleston, SC – Plum Island WWTP
- Charleston, SC – Lower Berkeley WWTP
- Charlotte, NC – Irwin Creek WWTP
- Charlottesville, VA – Moores Creek WWTP
- Culpeper, VA – Culpeper WWTP
- Greenville, NC – Greenville Utilities WWTP
- Greenville, SC – Grove Creek WWTP
- Gwinnett County, GA – F. Wayne Hill WWTP
- Hillsborough, NC – Hillsborough WWTP
- Jacksonville, FL – Buckman Street WWTP
- Lee County, FL – Lee County Utilities
- Mebane, NC – Mebane WWTP
- Raleigh, NC – Neuse River WWTP
- Richmond, VA – Henrico County WWTP
- Roanoke, VA – WVWA Roanoke WWTP
- Rocky Mount, NC – Tar River WWTP
- Sunrise, FL – Sawgrass and Springtree WWTP
- Tallahassee, FL – T. P. Smith WWTP
- Waynesboro, VA – Waynesboro WWTP
- Wilmington, NC – James A. Loughlin WWTP
- Wilmington NC – M'Kean Moffit WWTP
- Wilson, NC – Hominy Creek WWTP

Mr. Bullard is active in the Water Environment Federation. He has served as both a chapter reviewer and chapter author for WEF's MOP-11. Additionally, Mr. Bullard has also published extensively in the area of wastewater treatment process control, process improvement and optimization, and solids dewatering.

Academic Credentials:

BSCE – North Carolina State University, 1984
MCE – North Carolina State University, 1986

Professional Engineer

North Carolina - #015761
Virginia - #036668
Tennessee - #023460
South Carolina - #021879
New York - #086081-1

Employment Record:

2000 – Present – Hazen and Sawyer, P.C.
1991 – 2000 – Eastman Chemical Company
1989 – 1991 – The Chester Engineers
1986 – 1989 – Hazen and Sawyer, P.C.

Principal Areas of Expertise:

- Residuals and biosolids management
- Digester gas utilization and energy production
- Biological nutrient removal
- Wastewater treatment facility design
- Operations process optimization
- Process improvement and process control

Professional Activities:

- Water Environment Federation
  - Residuals and Biosolids Committee
- Technical Practice Committee
  - MOP-11 – 4th Edition (Reviewer)
  - MOP-11 – 5th Edition (Chapter Author)
- WEFTEC Program Committee
  - Plant Operations 2002-08 (Past Chair)
  - Residuals and Biosolids – 2008 - Current

Awards and Honors:

- George B. Gascoigne Medal (1998), Water Environment Federation
- Willem Rudolfs Medal (2002) Water Environment Federation

C. Michael Bullard

Senior Associate

Publications and Presentations

1. Bullard, C. M., Fishman, M. A., Lisk, B. R., and Hardy, S. A., *Putting Digester Gas to Work: Economic and Environmental Sustainability Via on-Site Energy Production",* 2010 NC AWWA-WEA 90th Annual Conference, Winston-Salem, NC, November 2010.
2. Bullard, C. M., Fishman, M. A., Lisk, B. R., and Hardy, S. A., *Do Sweat the Small Stuff: Micro-constituent Impacts On Beneficial Digester Gas Utilization,* Proceedings 83nd Annual Conference of the Water Environment Federation (WEFTEC 2010), New Orleans, LA, October 2010.
3. Hardy, S. A., Jalla, S., and Bullard, C. M., *Solving the Many Variables in a Digester Gas Cogeneration System,* Chesapeake Water Environment Federation Annual Conference, Ocean City, MD, September 2010.
4. Rohrbacher, J. A., Bullard, C. M., and Wichser, R., *Energy Optimization Improvements at the Moores Creek WWTP Provide Substantial Energy Savings and Carbon Footprint Reduction*, Virginia Water Environment Association, VA JAM 2010, Hampton Roads, VA, September 2010.
5. Bullard, C. M., Fishman, M. A., Lisk, B. R., and Hardy, S. A., *Achieving Economic and Environmental Sustainability Objectives through On-Site Energy Production from Digester Gas,* Kentucky-Tennessee Water Professionals Conference, July 1010, Nashville, TN.
6. Bullard, C. M., Fishman, M. A., Lisk, B. R., and Rohrbacher, J. A., *Beneficial Utilization of Digester Gas – Making Sustainable Choices for On-Site Energy Production,* Proceedings WEF Residuals and Biosolids Specialty Conference, Savannah, GA, May 2010.
7. Abrams, J. S., Earle, J. K., and Bullard, C. M., *Pilot Scale Evaluation of Electro-Osmotic Enhanced Dewatering at the Plum Island Wastewater Treatment Plant*, Proceedings WEF Residuals and Biosolids Specialty Conference, Savannah, GA, May 2010.
8. Bullard, C. M., *Digester Gas Utilization: Sustainable Options for On-Site Energy Production,* Virginia Water Environment Association, 2010 Education Seminar, Richmond, VA, May 2010 (invited speaker).
9. Bullard, C. M., Fishman, M. A., Lisk, B. R., and Hardy, S. A.., *Sustainable Choices for On-Site Energy Production via Digester Gas Utilization*, South Carolina Environmental Conference, March 2010.
10. Abrams, J. S., Earle, J. K., and Bullard, C. M., *Pilot Scale Evaluation of Electro-Osmotic Enhanced Dewatering*, South Carolina Environmental Conference, March 2010..
11. Fishman, M. A., Bullard, C. M, Vogt, K. L., Lundin, C., *Seasonal and Lifecycle Cost Considerations in Evaluating Beneficial Utilization of Digester Gas*, Proceedings 89th Annual Conference of the North Carolina AWWA/WEA, Raleigh, NC, November 2009.
12. Bullard, C. M, Vogt, K. L., Lundin, C., *Seasonal and Lifecycle Cost Considerations in Evaluating Beneficial Utilization of Digester Gas*, Proceedings 82nd Annual Conference of the Water Environment Federation (WEFTEC 2009), Orlando, FL, October 2009.
13. Bullard, C. M, Lee, S. W., Cheatham, J. B., Dressell, D., Bond, R., and Shepherd, E., *Energy (and Cost) Implications Associated with Dewatering Technology Selection for Thermal Drying Applications*, Proceedings WEF Residuals and Biosolids Specialty Conference, Portland, OR, May 2009.
14. Bullard, C. M., *Sustainability in Wastewater Treatment Processes via Digester Gas Utilization*, NC WEA/AWWA Sustainability Seminar, Charlotte, NC, September 2008.

15. Willis, J., Bullard, C. M., Donovan, J., Schultz, S., and Shaw, T., *JEA's Path out of Biosolids Purgatory through Anaerobic Digestion and Drying Enhancements*, Proceedings WEF Residuals and Biosolids Specialty Conference, Philadelphia, PA, March 2008.
16. Schmidt, D. B., Bullard, C. M., Edeback, J., Wegis, H., *Handling Residuals Management in a Changing World: Lee County Utilities Regional Biosolids Management Plan*, Proceedings WEF Residuals and Biosolids Specialty Conference, Philadelphia, PA, March 2008.
17. Bullard, .C. M., Bonne, R. P., Martin, C., Russell, A., and Rorrer, T., *Lessons Learned (and Lessons Shared) from the Town of Cary's Dewatering and Thermal Drying Facility*, Proceedings WEF Residuals and Biosolids Specialty Conference, Philadelphia, PA, March 2008.
18. Willis, J., Bullard, C. M., Donovan, J., Schultz, S., and Shaw, T., *JEA's Path out of Biosolids Purgatory through Anaerobic Digestion and Drying Enhancements*, Proceedings 80^{th} Annual Conference of the Water Environment Federation (WEFTEC 2007), San Diego, CA, October 2007.
19. Bullard, .C. M., *Design, Permitting, and Start-up Considerations for a Residuals Dewatering and Thermal Drying Facility*, Virginia AWWA/WEA Joint Annual Meeting, Hampton Roads, VA, September 2007.
20. Barber, J. B, Musick, T. E., and Bullard, C.M., *Less Waste or More Treatment Capacity*, Industrial Wastewater, Water Environment Federation, December 2006/January/2007, Volume 5, Number 6, pp. 10-12.
21. Bullard, .C. M., Bonne, R. P., Martin, C., Russell, A., and Rorrer, T., *Design, Permitting, and Start-up Considerations for the Town of Cary Dewatering and Thermal Drying Facility*, North Carolina AWWA/WEA Annual Conference, Greensboro, NC, November 2006.
22. Bullard, C.M., Bonne, R. P., Brice, R., and Lasater, B., *A Tale of Three Cities: Different Approaches to Class A Biosolids Management*, Poster Presentation/Abstract in Proceedings 79th Annual Conference of the Water Environment Federation, (WEFTEC 06), Dallas, TX, October 2006.
23. Bullard, C.M. And Bonne', R.P. *Biosolids Dryings; Design, Technology, & Economic Considerations*, North Carolina AWWA/WEA Spring Conference, New Bern, NC, April 2006
24. Bullard, C.M., Blount, P.B., and Curtis, G.S., *Charting the Future for Biosolids Management using Lifecycle Costs*, Proceedings 78th Annual Conference of the Water Environment Federation, (WEFTEC 05), Washington, D.C., November 2005
25. Bullard, C. M. and Barber, J. B., *Reducing Dewatering Maintenance Costs using Reliability Centered Maintenance*, Proceedings Annual Conference of the North Carolina American Water Works Association and Water Environment Association (NC AWWW/WEA), Winston-Salem, North Carolina, November 2003.
26. Bullard, C. M., *Accommodating Process Variation in the Design and Sizing of Thermal Drying Facilities*, Proceedings 75th Annual Conference of the Water Environment Federation, Chicago, IL, October 2002.
27. Bullard, C. M., *Selection and Sizing of Thermal Drying Facilities Using Monté Carlo Simulation*, Proceedings VA AWWA/WEA Water Jam 2002, Virginia Beach, VA, September 2002.
28. Barber, J. B. and Bullard, C. M., *Drop that Load: Waste Minimization at a Large Chemical Manufacturer*, WEF Industrial Wastewater Newsletter, May/June 2002.
29. Bullard, C. M., Taylor, R. L., Monroe, A. M., Vogt, K. L., Caldwell, H., Blanchard, W., *Selection and Sizing of Thermal Drying Facilities for the City of Wilmington Northside Wastewater Treatment Plant*, Proceedings Annual South Carolina Environmental Conference, Myrtle Beach, SC, March 2002.
30. Bullard, C. M. and Barber, J. B., *Reliability Centered Maintenance*, Industrial Wastewater, Water Environment Federation, November/December 2001, pp. 31-35.

31. Bullard, C. M., Taylor, R. L., Monroe, A. M., Vogt, K. L., Caldwell, H., Blanchard, W., *Selection and Sizing of Thermal Drying Facilities for the City of Wilmington Northside Wastewater Treatment Plant*, Proceedings Annual Conference of the North Carolina American Water Works Association and Water Environment Association (NC AWWW/WEA), Pinehurst, North Carolina, November 2001.
32. Bullard, C. M., *Evaluating Clarifier Robustness Using Monte' Carlo Simulation*, Proceedings 74th Annual Conference of the Water Environment Federation, Atlanta, Georgia, October 2001.
33. Barber, J. B. and Bullard, C. M, *Minimizing Wastewater Load and Sludge Production at a Chemical Manufacturing Facility*, Proceedings: WEF Industrial Wastes Technical Conference, Water Environment Federation, Charleston, SC, August 2001
34. Bullard, C. M., *Improving Belt Filter Press Performance Using Reliability Centered Maintenance*, Proceedings 73rd Annual Conference of the Water Environment Federation, Anaheim, California, October 2000.
35. Bullard, C. M., and Barber, J. B, *Accounting for Environmental Variability with a Modified Activated Sludge Wasting Strategy*, Proceedings 72nd Annual Conference of the Water Environment Federation, New Orleans, Louisiana, October 1999.
36. Bullard, C. M., Barber, J. B., and Vannice, R. W., *Bench and Pilot Scale Anaerobic Liquid Treatment Evaluations for an OCPSF Wastewater*, Proceedings 72nd Annual Conference of the Water Environment Federation, New Orleans, Louisiana, October 1999.
37. Bullard, C. M., *Waste Minimization Success at a Large OCPSF Manufacturing Facility*, Proceedings: WEF/Indiana WPCF/Purdue University Industrial Wastes Technical Conference, Water Environment Federation, Indianapolis, Indiana, June 1999.
38. Bullard, C. M. and Barber, J. B., *Sludge Dewaterability Influences on the Full-Scale Evaluation and Selection of Sludge Conditioning Agents*, Proceedings 71st Annual Conference of the Water Environment Federation, Orlando, Florida, October 1998.
39. Barber, J. B., Bullard, C. M., "Thinking Outside the Box" to Improve Sludge Dewatering Performance, Proceedings Industrial Wastewater Conference, Water Environment Federation, Nashville, Tennessee, March 1998.
40. Barber, J. B., Bullard, C. M. and Meyers, A. J., *Nitrogen Supplementation Strategy for Variable-Strength Industrial Wastewater*, Proceedings 70th Annual Conference of the Water Environment Federation, Chicago, Illinois, October 1997.
41. Barber, J. B., Bullard, C. M., and Charles, M. A., *Centrifuge Test Predicts Solids Dewaterability*, Industrial Wastewater, Water Environment Federation, March/April 1997, pp. 31-36.
42. Operation of Municipal Wastewater Treatment Plants, 5th Edition, Chapter 16, Training, Water Environment Federation, Alexandria, VA, USA, 1996
43. Bullard, C. M., and Barber, J. B., *A Factor in Belt Filter Press Performance: Control of Sludge Dewatering Potential Can Reduce Costs*, Water Environment and Technology, Water Environment Federation, December 1996.
44. Bullard, C. M. and Barber, J. B., *Effect of Sludge Dewatering Potential on Belt Filter Press Capacity and Performance*, Proceedings 69th Annual Conference of the Water Environment Federation, Dallas, Texas, October 1996.
45. Barber, J. B., Bullard, C. M., and Charles, M. A., *Centrifuge Test Predicts Solids Dewaterability*, Biosolids Technical Bulletin, Water Environment Federation, Volume 2, Number 4, July/August 1996.
46. Barber, J. B.; Bullard, C. M.; and Charles, M. A., *Activated Sludge Process Control based on Sludge Dewatering Potential*, Proceedings 68th Annual Conference of the Water Environment Federation, Miami, Florida, October 1995.

Publications and Presentations

47. Barber, J. B., and Bullard, C. M., *Compensating for Limited Aeration Capacity with Anoxic Pretreatment*, Proceedings 67th Annual Conference of the Water Environment Federation, Chicago, Illinois, October 1994

48. Bullard, C. M., and Barber, J. B., *Improved Operational Performance Using an Extended Sludge Reaeration Process*, Proceedings 67th Annual Conference of the Water Environment Federation, Chicago, Illinois, October 1994

Evaluating Biosolids Management Alternatives in Northeast Tennessee: A Cooperative Masterplanning Effort

C. Michael Bullard[1], William Sorah[2], Johann Coetzee[3], Lee Brown[4] Gordon Cox[5] and Niki Ensor[6]

[1]Hazen and Sawyer, [2]City of Bristol, [3]Town of Elizabethton, [4]Erwin Utilities, [5]City of Johnson City, and [6]City of Kingsport

This presentation will share the results of a multiple agency regional biosolids management study jointly conducted for five entities located in Northeast Tennessee. The project participants in this work include the cities of Bristol, Elizabethton, Johnson City and Kingsport and Erwin Utilities. The scope of the study was to prepare a biosolids master plan with a focus on evaluating opportunities for a regional Class A, or other advanced treatment, residuals management option meet current and future residuals production rates for the participant agencies.

The study included site visits to each of the participant agency wastewater treatment plants and a review of plant operating data to determine current plant loading rates, current plant residuals production rates, current treatment plant solids handling infrastructure, and current residuals quality (e.g., criteria metals pollutant concentrations). Collectively the agencies currently generate approximately 4,900 dry tons per year of wastewater treatment residuals which are managed by land application and/or landfill disposal with operating costs ranging from approximately $80 to $260 per dry ton. Detailed results of the assessment of current residuals quality and quantity for each of the participant agencies and the aggregated residuals production rates will be included in this presentation.

Evaluations of selected Class A residuals treatment technologies and other advanced residuals treatment technologies were investigated and will be presented, these evaluations included:

- Aerated Static Pile Composting
- Alkaline Stabilization/Pasteurization
- Fluid Bed Thermal Oxidation
- Centralized Thermal Drying
- Decentralized Thermal Drying

Estimated capital and operating costs were developed for each of the alternatives. Operating costs were extended to a net present operating cost (NPOC) based on a 20-year operating horizon to develop a net present cost estimate for each of the alternatives. For each "class" of treatment options capital and operating costs tended to be grouped within a "range" for the specific treatment technology as shown in **Table 1** (see following page).

Table 1 Cost Summary – Biosolids Management Alternatives (Costs $MM)		
	Capital Cost Range	Total Net Present Cost Range
Status Quo – No Change	$0.00	$14.61
Composting Alternatives	$2.59-$7.95	$10.45-$15.81
Alkaline Stabilization Alternatives	$12.68-$13.31	$28.78-$38.00
Centralized Thermal Drying Alternatives	$21.90-$31.45	$42.22-$48.11
Decentralized Thermal Drying Alternative	$34.49	$62.69
Thermal Oxidation Alternatives	$43.58-$47.46	$70.48-$74.36

Based on the estimated capital and total net present costs, it appeared that composting may offer a Class A treatment alternative which could offer a slightly reduced to equal total net present cost to the current operating practices of the participant agencies. However, several of the participant agencies had operated composting facilities in the past and reported operational challenges with materials handling and final product distribution and marketing in addition to potential for on-site odor generation.

The remaining Class A treatment options (i.e., alkaline stabilization and thermal drying) require significant initial capital investment ranging from approximately $13MM for alkaline stabilization to $25MM for thermal drying. Furthermore, total net present costs associated with these alternatives range from approximately 2X to 3X the total net present cost associated with the current participant agency management practices. Migration to any of these technologies would require participant agencies to make an initial capital investment <u>and</u> incur an increased annual operating cost burden. In light of these economic considerations, the participants agreed that an external stimulus would be necessary to change the current operating practice.

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EDUCATION

August 2010-Present University of Louisville (U of L), Louisville, KY, USA
PhD in Chemical Engineering (Expected graduation date: August 2013)

2009-2010 University of Louisville (U of L), Louisville, KY, USA
MS in Civil and Environmental Engineering

- **GPA:** 3.93 out of 4.00

2004-2008 Abadan Institute of Technology (AIT) *, IR
BS in HSE (Health, Safety, and Environmental) & Technical Inspection Engineering field

- **GPA:** 3.16 out of 4.00

*AIT is one of the branches of Petroleum University of Technology

CERTIFICATES

- Engineering In Training Certificate, Kentucky State Board of Licensure for Professional Engineering, Louisville, KY, 2010
- Environmental Engineering Certificate, University of Louisville, Louisville, KY, 2010
- Welding Inspection, Presented by TUV Academy , Third Technical Inspection & First HSE Engineering National-Student Conference, 2006
- Guided Wave Ultrasonic, Presented by TUV Academy , Third Technical Inspection & First HSE Engineering National-Student Conference, 2006

WORK EXPERIENCE

University of Louisville , Louisville, KY 2009-2010
- Graduate Teaching Assistant

Abadan Oil Refinery, IR 2007-2009
- HSE and Technical Inspection Engineer

RESEARCH EXPERIENCE

- **M.S. Thesis:** Emission Difference between fuelling digester gas and natural gas in Morris Forman Wastewater Treatment Plant, Jefferson County, KY, USA, 2009-Present
  - In this study, we want to make sure that environmental compliance is met. Our study is to find out the difference of VOCs emission in two modes of fuelling either natural gas or digester gas. Our goal is to understand whether the VOC emission from these fuels is within the permission limit of EPA or not.
- **B.S. Thesis:** Water Disinfection with UV rays, IR, 2007-2008
  - In this study, we just wanted to make sure that UV rays have this ability to disinfect polluted water.
- Studying on LUST (Leaking Underground Storage Tanks) sites Pollution into Underground Water experimentally, under Professor J. Shayegan supervision, IR, 2006-

2007

- In this study we considered a gas station to understand the pollutant movement. This gas station has leakage of petroleum into the groundwater. The leakage was because of poor corrosion detection and technical inspection of that gas station. This leakage caused to change the colour and odor and lower the quality of water in that region.

PUBLICATIONS

1. "Possibility Evaluation in Application of Different Remediation Methods of Petroleum Pollutants in soil and its Algorithm in Industrial Case", presented at the Eurosoil Congress, 2008, Vienna, Austria.
2. "Occupational Stress Control", proceedings to the 2nd National Conference on Safety Engineering and HSE Management, 2008, IR. (In Persian)
3. "Safety Regulation in Well Drilling and Stimulation", proceedings to the 2nd National Congress of Petroleum Engineering, 2008, IR. (In Persian)

AWARDS AND HONORS

- Awarded **Graduate Teaching Assistant** at Civil & Environmental Engineering Dept, University of Louisville, 2009-2010
- Awarded the tuition scholarship for B.S in HSE & Technical Inspection Engineering from AIT, 2004-2008
- Ranked **2047** among more than 400,000 participants in National Entrance Exam of Universities in the country, July 2004

COMPUTER SKILLS

- Fluent, ICEM, AutoCAD, Visual MODFLOW Groundwater Modelling
- Matlab, Visual Basic, Adobe Photoshop, Adobe Acrobat Reader
- Microsoft windows 98/2000/ME/XP, Microsoft Office (Excel, Word, Power Point, FrontPage)

TECHNICAL TRAINING

- Iran Gas Company, IR, summer 2007.
  - Technical Inspection department.
- Iran Southern Zagros Oil & Gas Production Company, IR, summer 2006.
  - Aghar & Dalan gas field production unit.

PROFESSIONAL SOCIETIES

- American Society of Civil Engineers since 2009
- Society of Petroleum Engineers (SPE), 2004-2008
- Iranian Technical Inspection & Safety Association (ITISA) , 2004-2006

TEACHING EXPERIENCE

- Graduate Teaching Assistant, 40 students, U of L, 2009
- Private tutoring of Mathematics and Physics courses, IR, Since Fall 2005.

EMISSIONS COMPARISON OF NATURAL GAS USAGE AND DIGESTER GAS USAGE IN BIOSOLIDS DRYING

Mahyar Ghorbanian*, University of Louisville
Robert Bates, Louisville Metropolitan Sewer District

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A common practice in wastewater facilities is to use digester gas, a by-product of anaerobic digestion of wastewater solids, as a fuel for economical reasons instead of natural gas. At the Morris Forman Water Quality Treatment Center (MFWQTC), of Metropolitan Sewer District (MSD) in Louisville, Kentucky digester gas is used as a fuel in the biosolids drying process. The burning of the off-gasses from the drying system takes place in Regenerative Thermal Oxidizers (RTOs). It is important to note that MFWQTC has an industrial loading generated by an area called Rubbertown; an area focused on plastics and rubber production. This loading has the potential for increased Volatile Organic Compound loading on the RTO through the biosolids drying process.

The current research was conducted to identify if there exists any differences between using natural gas and digester gas as a fuel in biosolids drying in the RTO outlet quality. In this experiment, the RTO was run in two conditions: one with fueling of the drying system by digester gas and one fueling the drying system by natural gas; samples were obtained from a sampling port during each condition.

To capture a valid sample at the RTO, first it was determined which sampling ports could provide a representative sample of atmospheric emissions. For safety reasons, ports were installed to allow sampling to occur at ground-level, avoiding the need to use a ladder with the inherent safety risks. SilcoCan Canisters were used to store the samples to transport them easily to the laboratory and analyze them.

The captured samples were analyzed in the laboratory at the University of Louisville. Louisville, Kentucky. They were analyzed with a Gas Chromatography-Mass Spectrometry (GC-MS) instrument (GC System 6890 series). Gas chromatography separates the components of a mixture, and mass spectrometry characterizes each of the components individually.

In total. 24 chemical compounds have been found in the samples. Because some chemical compounds were only found during some but not all sampling events. and some others (with regard to their Reference Inhalation Concentration value) (RfC). have concentrations that are of no concern for health issues: these chemical compounds have been neglected. The chemical compounds of interest are:

1. 1, 3 – Butadiene;
2. Carbon Disulfide;
3. 1, 4 – Dichlorobenzene;
4. Methylene Chloride;
5. Methyl Ethyl Ketone.

The resultant data (as shown in the following table) from these two cases showed that there are negligible emission differences between these two fuels.

Table I - RfC, Average concentration and MQL for five chemical compounds

Chemical compound	RfC (Source: EPA) (μg/m³)	Avg concentration (μg/m³)		95 % Confidence Interval		Detection Limit (μg/m³)
		NG	DG	NG	DG	
1, 3 - Butadiene	2	60	62	19 - 101	32 - 92	0.23
Carbon Disulfide	700	16	14	13 - 19	10 - 18	0.33
1, 4 - Dichlorobenzene	800	32	42	21 - 43	37 - 47	0.63
Methylene Chloride	3000	9	9	5 - 13	7 - 11	0.36
Methyl Ethyl Ketone	1000	17	19	96 - 236	109 - 273	0.29

Therefore, based on the results, utilization of digester gas as a fuel in biosolids drying system is economical and poses no additional environmental risks due to chemical compounds present in gas produced by anaerobically digested biosolids.

Drinking Water/Water Quality

Session T3C

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EXPERIENCE

2008 – Present Scientist
Water Quality and Research
Louisville Water Company

- Conduct research in the areas of treatment/distribution optimization, advanced treatment technologies, new instrumentation/analytical methods, etc.
- Provide technical support for treatment and distribution-related water quality issues as needed

EDUCATION

M.S. Environmental Science
Indiana University, Bloomington

B.S. Biology
Indiana University, Bloomington

A Water Quality Perspective on Regional Partnerships: Evaluation of Disinfection Practices and DBP Control

Chris Bobay, Emily Bauer, Eric Zhu, Rengao Song, and Jim Smith
Louisville Water Company
Brett Pyles and Jim Bruce
Hardin County Water District #1
Shaun Youravich and James Jeffries
Hardin County Water District #2

In order to meet long-term growth needs in Hardin County, Kentucky, Hardin County Water District No. 1 (HCWD1) and Hardin County Water District No. 2 (HCWD2) are partnering with Louisville Water Company (LWC) to explore options for LWC to wholesale water to HCWD1 and HCWD2. One of the major challenges of this initiative is that both water districts use free chlorine disinfectant while LWC's residual disinfectant is chloramine. Simply blending the two waters could post significant technical and regulatory challenges, particularly with meeting the Stage 2 DBP Rule.

To verify the feasibility of mixing LWC water with Hardin County water, while exceeding regulatory and aesthetic requirements, a broad-based project team was assembled consisting of representatives from LWC, HCWD1, HCWD2, as well as engineering consulting firms. Three potential options are available:

1. Convert LWC's chloramine to free chlorine before blending;
2. Convert Hardin County's free chlorine system to combined chlorine system before blending;
3. Isolate Hardin County distribution systems and separate different waters.

A comprehensive evaluation is underway to investigate the disinfection byproducts formation potential (DBPFP) under different water conditions. Major tests in this study include: 1) Modified simulated distribution system (SDS) testing to understand DBPFP and reaction kinetics under "real-world" conditions; 2) Full-scale DBP monitoring throughout each utility's distribution system to validate SDS results; 3) Conversion study to understand and simulate DBP formation after breakpoint conversion for LWC water and after chloramine conversion for HC waters; 4) Modified uniform formation condition (UFC) test to characterize DBPFP and precursors under uniform conditions.

Following the DBP formation study, a water blending study will be carried out primarily to evaluate potential taste and odor and stability issues arising from blending and disinfectant conversion.

This work provides an excellent case study for dealing with water quality challenges associated with blending different waters. The methodology and findings may provide valuable guidance for utilities facing similar challenges.

William B. Dowbiggin, P.E., BCEE
CDM

Mr. Dowbiggin is a water treatment specialist with CDM and has designed over 40 water treatment plant and distribution facilities ranging from 1 mgd to 225 mgd in capacity. He has also completed many water treatment bench/pilot plant projects and prepared over 40 presentations and publishings including 10 at national American Water Works Association (AWWA) conferences. He is a peer reviewer of articles for the Journal AWWA, has assisted in start-up and provided training for many water treatment projects.

<u>Activated Carbon Use and the Latest on AWWA Standards for GAC and PAC</u>

William B. Dowbiggin, CDM, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, 919-787-5620, dowbigginwb@cdm.com, Member of the AWWA Activated Carbon Standards Committee

Granular Activated Carbon (GAC) and Powdered Activated Carbon (PAC) are used in water treatment throughout the United States primarily for Taste and Odor (T&O) control, but more recently utilities are turning to GAC for additional protection from synthetic organic chemicals (SOCs), Disinfection Byproduct (DBPs), endocrine disruptors and Pharmaceutical and Personal Care Products (PPCPs). The various applications of activated carbon are not well understood throughout the water treatment industry, with the possible exception of PAC use for T&O control, which is well documented in many of the major utilities over the years. Ongoing research by the AWWA Research Foundation is starting to better define the process of biofiltration with GAC as Wilmington, NC has practiced for over 10 years to cost-effectively lower DBP levels. Research is still under way to define appropriate design and operating conditions with biofiltration.

This presentation will summarize current usage of activated carbon to answer questions of interest to AWWA members, such as why have these recent new water plants included GAC? Why is it used in post-filter contactors at some of these new plants instead of just putting it in the filters? What does it cost and is it cost-effective? When is PAC alone adequate? What is re-activation and why consider that instead of buying new carbon?

The presentation will also inform the audience of recent developments on the AWWA standards for GAC and PAC. This will inform the audience of important points such as the choices that the AWWA standards committee and hence the AWWA standard leave to the customer. It is not enough to simply specify carbon meeting the AWWA standards. The AWWA standards allow a wide variety of carbon to be flexible for a variety of applications. The purchaser needs to know what areas must be defined for activated carbon purchase.

David Shehee
Kentucky American Water
Supervisor, Water Quality and Environmental Compliance

Mr. Shehee is married (Amy) and has one child (a son – Luke). He has a B.A. in chemistry from Berea College and a M.S. in analytical chemistry from Eastern Kentucky University. He is a certified Class IV Drinking Water Operator, a Class II Wastewater Operator, and a Class II Collection System Operator in Kentucky with 11 years of experience. He is responsible for drinking and wastewater compliance at Kentucky American Water, which serves approximately half a million people.

Optimizing Corrosion Control – It's more than Lead and Copper Results

By David Shehee
Supervisor of Water Quality and Environmental Compliance
Kentucky American Water

Ensuring optimal water quality involves a thorough evaluation of many parameters. This is easily controlled in the water treatment plant, but becomes more difficult in the distribution system where cross connections, main breaks, pressure gradients, main types and ages, etc., can impact water quality. While some of these issues cannot be controlled, the impacts from many can be reduced through effective corrosion control.

Optimizing corrosion control in a distribution system is critical for reducing the potential for customers having to deal with nuisance issues (e.g., discolored water) or, more importantly, potential health issues (e.g., bacteriological issues and elevated lead or copper levels). In addition, the type of corrosion control chosen can have adverse impacts on wastewater treatment plants.

This presentation will evaluate tools used to optimize corrosion control using zinc orthophosphate in a large system that serves over 250,000 customers in nine counties. Data from routine sampling (including Larson Index calculations), corrator probes, and coupon testing will be evaluated during the presentation. In addition, issues associated with overfeeding corrosion inhibitors will be explored with examples. The presentation will also look forward to potential changes in corrosion chemistry based upon new research on the role of zinc in corrosion chemistry.

Drinking Water/Water Quality

Session T3D

Bio: Jan C. Routt –Distribution System Optimization

Jan C. Routt, President, Jan Routt & Associates, LLC, Lexington, KY. Routt is an experienced drinking water professional and researcher building upon over 27 years of diverse utility and consulting experience. She holds current Kentucky Water Treatment Plant Operator Certification and a BS in Microbiology from the University of Kentucky. Routt served as Co-Principle Investigator for Water Research Foundation Project 4109 "Criteria for Optimized Distribution Systems. Routt has previously served as a Partnership for Safe Water utility reviewer and has recently provided input on the new Partnership Distribution Optimization Program and Guide.

ABSTRACT SUBMITTAL

Kentucky-Tennessee Water Professionals Conference
July 24-27, 2011, Covington, KY

Primary Author/Presenter: Jan C. Routt
Co-Authors: Benjamin D. Stanford, Stuart J. Khan, Jean F. Debroux, Ben Wright

Title: COLLABORATIVE RESEARCH TO BETTER UNDERSTAND IMPACTS OF EXTREME WEATHER ON WATER QUALITY—APPROACH AND PRELIMINARY RESULTS

Extreme weather-related events include altered precipitation patterns (e.g., floods, heavy snowfall, droughts); major storm-related events affecting power and infrastructure integrity (e.g., wind, lightning, heating/freezing, atypical water runoff/erosion) and changes to source water flow volumes, temperatures and contaminant loading into surface and groundwater supplies. Extreme weather-related events are of primary concern to drinking water utilities, since they could affect both the supply and quality of drinking water, service reliability, regulatory compliance, consumer perception, and costs.

In the last few decades there has been anecdotal evidence that low-probability weather events (floods, droughts, heat waves, etc.) are recurring more frequently, and are affecting different regions than in the past. Water utility infrastructure and operations procedures are generally designed to enable utilities to reduce the risks from typical, region-specific extreme weather events to an acceptable level, but a thorough understanding of the potential risks is necessary for proper planning in the future. This presentation will describe progress on a highly collaborative international drinking water research effort (Water Research Foundation RFP 4324 "Water Quality Impacts of Extreme Weather-Related Events") which is seeking to better characterize and quantify effects of extreme weather-related events on water quality. Project work is in progress from early 2011, continuing through 2012, and is involving over 50 US and Australian utility, agency and academic partners and advisors

Preliminary results from Australia-workshop (planned for March 2011), literature search, participant questionnaires/interviews, and relevant data-gathering will be summarized in this presentation. Case study examples and emerging data patterns will be highlighted for discussion. Session attendees will be afforded the opportunity to respond to a questionnaire intended to help illustrate how extreme weather-related events may affect operational complexity which may, in turn, present water quality challenges. Insights shared will be useful to drinking water professionals in their real-time understanding of, and response to, extreme weather-related events, and in planning for future such events.

Timothy E. Soward

IntelliTech Sytems

513-910-0317

tim.soward@itsyteminc.com

Credentials: Senior Chemist

Experience: Mr. Soward has over 29 years of professional work experience. He has worked as a research assistant, chemist, group leader, project manager, president/co-owner of a drinking water testing lab and program manager. His experience ranges from medical research, industrial quality assurance, clinical medicine, environmental analytical chemistry and US EPA regulatory development. Mr. Soward is currently working full time as a consultant to the US EPA Office of Ground Water and Drinking Water, Washington D.C. The scope of work primarily involves drinking water regulatory development support with an emphasis on economic analysis. As a member of the Federal Advisory Committee Technical Work Group, Mr. Soward recently completed the management and co-authorship of the *Technologies and Cost Document for the Revision to the Total Coliform Rule* and is currently managing and co-authoring *The Revised Total Coliform Rule Assessments and Corrective Actions Guidance Manual*. He performs literature reviews specific to drinking water treatment technologies as well as health effects research of emerging drinking water contaminants. This work is typically part of EPA's 6 year review process and the Candidate Contaminant List (CCL). He also assists EPA with the development of guidance documents to assist public water systems nationwide for compliance with new or revised drinking water regulations.

Education: Bachelor of Science, Pre Medicine - Northern Kentucky University, 1984
Master of Science - Environmental Health/Industrial Hygiene, University of Cincinnati College of Medicine, (17 credit hours completed), 1995-1998
Master of Public Health, Boonshoft School of Medicine, Wright State University – 2009 – 2010 (16 credit hours completed – 8 credit hours in progress - **anticipated graduation - 2011**)

Abstract

Data have been collected on waterborne disease outbreaks (WBDOs) in the United States since 1920. Since 1971, state and local health departments have reported WBDOs via the Waterborne Disease and Outbreak Surveillance System (WBDOS). This paper describes some of the general trends in WBDOs associated with drinking and recreational water in the United States. During the period 1920 – 2006, a total of 2122 WBDOs associated with recreational and drinking water were reported in the U.S. Illness occurred in 896,630 persons, resulting in 1181 deaths. A crude mortality rate of 1 in 100,000 was calculated and an incidence rate of 473 per 100,000 person. During the period 2005–2006, a total of 78 WBDOs associated with recreational water were reported. Illness occurred in 4,412 persons, resulting in five deaths. The etiologic agent was confirmed in 62 (79.5%) of the 78 WBDOs. *Cryptosporidium* was associated with 53% of the treated recreational water WBDOs and 93% of the cases. Norovirus, *Shigella* and *E. coli* 0157 were equally associated (15%) with untreated recreational water. During the same period 2005–2006, a total 20 WBDOs associated with drinking water caused illness in 612 persons and resulted in four deaths. The etiologic agent was confirmed in 18 of 20 of the WBDOs. *Legionella* was associated with 50% of the WBDOs associated with drinking water. The number of WBDOs recorded during 2005—2006 were at the highest level since data have been recorded however it is unclear if this is a result of an actual increase in WBDOs or better surveillance and reporting through the WBODSS.

This review focuses on the Cyano Hazardous Algal Blooms (cyanoHABs) at Grand Lake Saint Marys Ohio. Cyanotoxins are natural contaminants in water that are produced by cyanobacteria also called bluegreen algae which can occur worldwide. This paper focuses on four cyanotoxins that have been detected in Grand Lake Saint Marys: microcystin. saxitoxin. anatoxin-a and cylindrospermopsin. The goal of this review is to inform the reader of the presence of cyanotoxins as a public health threat, describe a case study where cyanotoxins caused illness and to present potential solutions for minimizing risk from the proliferation of cyanobacteria in recreational waters and removal of cyanotoxins from potable water.

Mr. Garden is a Senior Project Engineer with the Water Services Unit of Barge Waggoner Sumner and Cannon in Nashville, Tennessee. He is a Vice President with 17 years experience in water and wastewater engineering in the southeastern United States. His professional emphasis has been on membrane water treatment, utility response to disinfection by-products, and technology implementation in smaller utilities. He obtained his Chemical Engineering BE from Vanderbilt University in 1972, a Master of Science from the Naval Postgraduate School in 1983, and a Masters in Environmental and Water Resource Engineering from Vanderbilt in 1993.

Mr. Hart is a Vice President with Carollo Engineers and has 17 years of experience in the water industry. He has significant experience with UV, membranes, design-build and chemical feed systems and recently co-authored the chemical feed chapter of the AWWA/ASCE Water Treatment Plant Design Handbook. He has an undergraduate Environmental Engineering Degree from Syracuse University and a Masters in Environmental Engineering from Virginia Tech.

2011 KY/TN Water Professionals Conference: AWWA
July 24-27, 2011
Covington, KY

Title: "Black Box" or Conventional Filter Replacement – Does Membrane Pretreatment Pay ?

Presenters: George Garden, P.E. BCEE, Barge Waggoner Sumner & Cannon
Vincent Hart, P.E., Carollo Engineers

Abstract:

The introduction of microfiltration/ultrafiltration membranes (MF/UF) into the water market over 20 years ago originally produced a "black box" concept which implied that raw water could be applied to membranes and finished water would be produced (with some additional chemical disinfection). Since the introduction of MF/UF membranes, pretreatment of raw water prior to membrane filtration has shown value in many applications. Pretreatment can include the following:

- Oxidant addition (potassium permanganate, chlorine, chlorine dioxide)
- Powdered activated carbon
- Ion exchange resin
- Direct coagulant addition
- Conventional treatment using flocculation/sedimentation
- Softening

This presentation will review a number of different case studies which examine the impact of pretreatment on allowing higher membrane flux, extended times between backwashes, reduction or elimination of enhanced flux maintenance, increased intervals between chemical cleans as well as increased DBP precursor removal. Case studies including the recently constructed and operational MF pressure membrane plant in Sewanee which utilizes, so called "micro-flocculation" pretreatment as well as one plant which examined the net present value comparison of the direct application of raw water to the membranes versus flocculation/sedimentation pretreatment prior to the membranes. Both methods of operation were examined and the plant was constructed to operate utilizing either method. The presentation will also discuss a Water Research Foundation project which examined the potential for using pretreated water to provide a low fouling water that would result in the incorporation of membranes within an existing plant hydraulic profile (gravity flow).

Flood

Session T4A

H. J. "BUD" SCHARDEIN, JR.
EXECUTIVE DIRECTOR
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schardei@msdlouky.org

PROFESSIONAL RESPONSIBILITIES

Current **Executive Director**
Louisville and Jefferson County Metropolitan Sewer District
Louisville, Kentucky

- Responsible for operations, maintenance and capital projects and budget ($170 million annual budget, 600 employees.)
- Emergency Response - Responsible for coordinating all MSD response efforts to natural, accidental, mechanical systems and intentional events that affect MSD operations and systems.
- Community Relations - Responsible for presenting MSD projects, programs and initiatives to government, civic groups, neighborhood associations and media.

EDUCATION

Morehead State University (1966 – 1969)
Bachelor of Arts in Communications – Spalding University (1994) *(Summa Cum Laude)*
Urban Terrorism Training, Texas A & M University (2001)

PROFESSIONAL/CIVIC ORGANIZATIONS

University of Louisville, Board of Overseers
National Association of Clean Water Agencies (NACWA)
American Public Works Association (APWA) – (Past Chair-Central KY)
Kentucky State Boxing Commission (Former Commissioner)
Louisville Fund for the Arts (Former Board Member)
Greater Louisville, Inc., Executive Board
The Public Relations Society of America (PRSA)
Victory Athletic Club (Past President)
St. John's Day Center for the Homeless (Former Board Member)
Metropolitan Housing Coalition (Past Vice President)
City of Louisville Plumbing Control Board
Brightside (Former Board Member)

ACHIEVEMENTS/ACTIVITIES:

Boxing (currently active as a trainer) and Former State Commission Member
Who's Who in American Colleges and Universities (1990)
Past Parish Council President, St. Michael Orthodox Church
PRSA Gold Screen Award for Video Production

PERSONAL

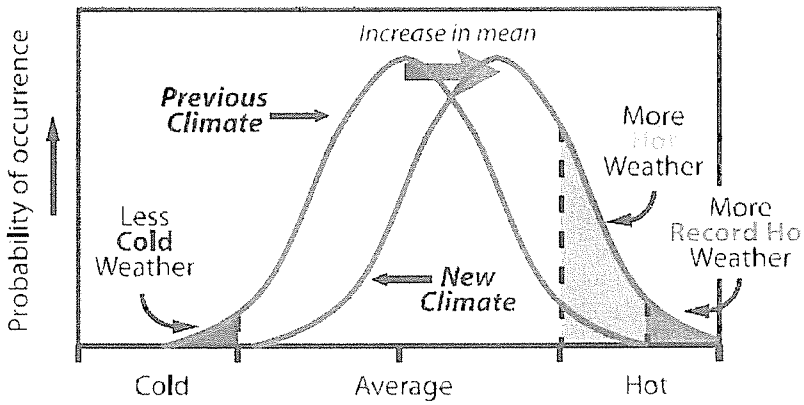
Born September 8, 1948, married with two children
Military Service: US Army (1969-71) Honorably Discharged

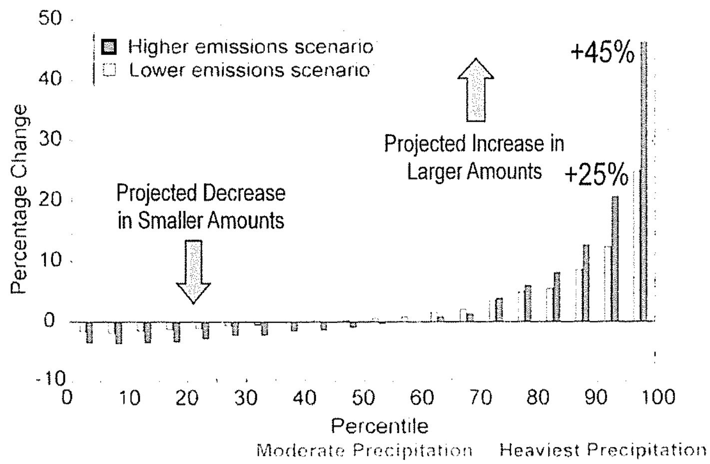
Climate Change and Flood Protection
Bud Schardein, Executive Director – Louisville MSD

This presentation will explore the historical trends in rainfall and flooding events in the United States, specifically the Louisville area, and will address the challenges faced by cities to protect their assets and human safety by building and maintaining a flood protection system that will respond to the changing environment.

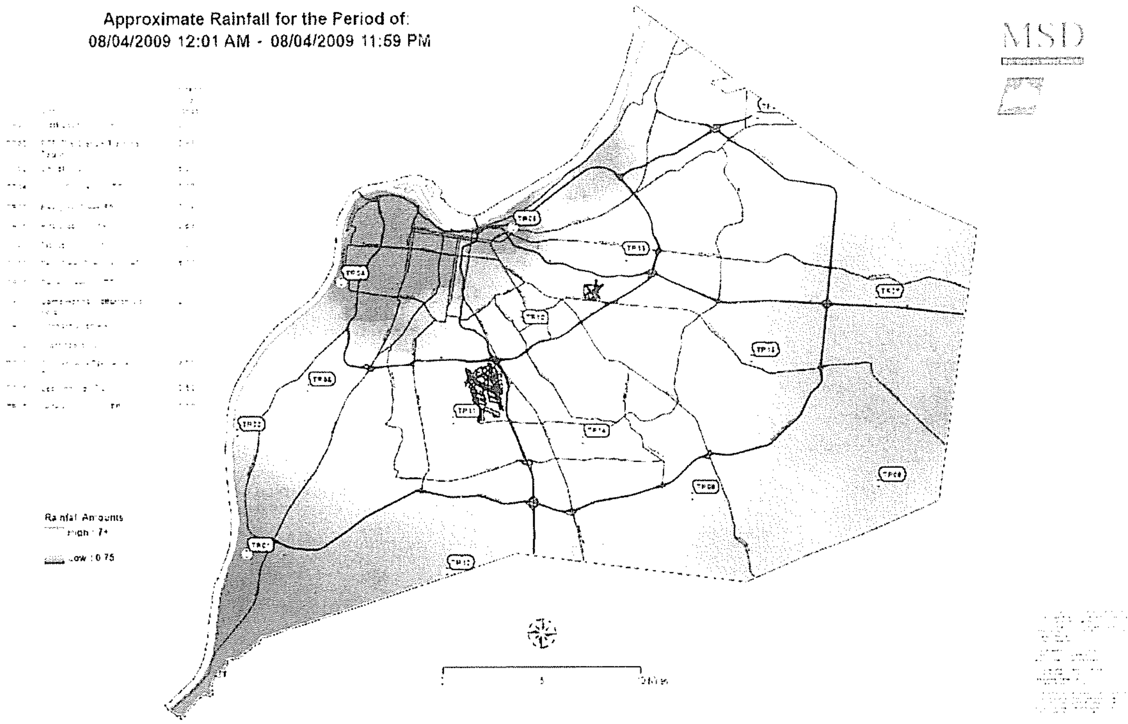
The session with include a dialogue on the following topics:

- Global Climate Change Impacts in the U.S.
- Weather and Climate Extremes in a Changing Climate
- Impacts on Water Resources, Agriculture, Land Resources and Biodiversity in the U.S.
- Schematic showing the effect on extreme temperatures when the mean temperature increases, for a normal temperature distribution
- Similar shift in distribution for non-normal precipitation distribution
- Discussion of the August 4, 2009 rainfall event in which 7 inches of rain fell over a 90-minute period.
- Update on the Hazard Mitigation Grant Program that has prompted:
    - Flood Zone Delineation within the CSS
    - Property data collection information
    - Identification of homes within the 10-year floodplain
    - Preliminary benefit/cost runs
    - Detailed benefit/cost analyses using field data for those identifed as eligible
    - Presentation of recommendations to MSD Executive Team
    - Grant development and submittal





The discussion will conclude with strategies for educating the public on flood protection issues, how to prioritize projects for health and safety funding, how to balance the needs of aging infrastructure with a challenging economy, and methods to reduce flood damage risks in this changing environment.



Sonia Harvat is the Public Information Officer for Metro Water Services and a member of the Emergency Management Support staff for the Mayor's Office of Emergency Management in Nashville , TN. She has a degree in Biology from the University of Tennessee and worked as an Environmental Compliance Officer for many years. Her science background and field experience help her to effectively communicate with and educate the community.

ABSTRACT

Metro Water Services Response to the May Flood in Nashville

Are You Prepared for Your Own Emergency?

How the historic flood in Nashville affected Metro Water Services and our facilities

- 13.53" of rain fell in two days
- One of two water treatment plants was flooded and out of service; the other treatment plant came within .14" of flooding
- Two of three wastewater treatment plants were flooded - one substantially
- The biosolids facility was flooded and inoperable
- Eleven sewer and water pumping stations were flooded; two inaccessible
- Infrastructure at multiple reservoirs was compromised
- 21% of our workforce was personally affected by the flood
- Assistant Director of operations was stranded at home without power and limited cell signal

Response to the crisis – Planned and unexpected

- We maintained water pressure and avoided a Boil Water Notice
- Security had to be maintained at the flooded facilities
- Employees had to be assigned and communicated with
- The community had to be communicated with
- Volunteer assistance was utilized
- Agreements and connections to neighboring water utilities were utilized
- In addition to response to the emergency, regular business had to continue

Lessons Learned

- NIMS training but widespread throughout the utility be ongoing and
- Communication is KEY
- Training does not prepare you for everything
- Be prepared for inconsistent information from various agencies (National Weather Service, Corps of Engineers, USGS, etc.)
- After the "Emergency', issues continue to linger
- Documentation prior to, during, and after the crisis is critical
- Train the accountants
- Have clauses in existing contracts for emergency services
- Be aware of ALL of your resources prior to needing them

Post Flood

- Be prepared for a long recovery period
- Refine utility preparedness
- Use disaster stories to reiterate policies and procedures
- Focus on future community preparedness

Martha Segal is an Assistant Director with Metro Water Services in Nashville TN. Her area of responsibility is Customer Services. The Customer Service Center serves over 185,000 water, wastewater and stormwater accounts in Metro Nashville/Davidson County, TN. Customer Service consists of six sections, including Cash/Payment Processing, Billing & Collections, Phone Center/Dispatch, Meter Reading/Field Activities, Permits and Information Services.

Martha has been with Metro since October 2000. Prior to that, Martha was with the Department of Utilities in Norfolk, VA for over 14 years. She completed her Bachelor of Science degree in Business Administration and Master of Business Administration degree at Old Dominion University. Martha has successfully implemented CIS, IVR, EBPP, Mobile Dispatching and AMR/AMI systems in public utilities.

Martha is a member of the American Water Works Association and a Past Chair of the KY/TN AWWA Section. She is currently serving as Chair of the KY/TN AWWA Diversity Committee.

Flooded with Questions: How Metro Water Services Customer Services Responded to the May 2010 Flooding

In May 2010, Nashville, TN experienced a 500 year flood event. Like every other large public utility that is impacted by a catastrophic event of this type, we have been working on creating a Lessons Learned document for our Department.

I would like to focus specifically on how our Customer Services Division responded to customer needs. While we have an emergency plan, an event of this magnitude presented opportunities for consideration that we had not thought of before.

When one of your water treatment plants is down, how do you get customers to conserve water? Residential customer compliance is one thing, but how do you get non-essential businesses to either decrease usage or shutdown their business entirely during the initial response? How do you identify specific types of businesses and get information to them?

How do you handle customer accounts when customer homes are damaged and they are no longer living there? Are fees for transferring service, late fees, and emergency cutoffs waived?

Internal department needs had to be addressed as well. One section was flooded and all their computers had to be replaced. Our only support staff person for computer hardware had been deployed to OEM so how did we mobilize other staff members to assist with getting them back in service.

Our Accounting division was in the middle of renovations and had no computers connected over the weekend. When the flooding started, they immediately knew they would need access to computers for purchasing/requisition emergencies and FEMA records. Details as to how we mobilized staff to get them back in service will be discussed.

Many of our employees are generally reassigned during bad weather events to OEM to answer emergency phone calls. What happens when they request our services for this but our department has been severely impacted by the emergency as well?

This presentation will present challenges as they arose and opportunities for thinking outside the box in order to address these challenges. I will also discuss how this impacts our planning for future emergencies and lessons learned.

Flood

Session T4B

KEN BAKER
BIO

Ken has a diverse background in both the public and private sectors of the water industry. He holds a Bachelor of Science degree from Western Kentucky University and a Master of Science degree in Environmental Engineering from the University of Tennessee at Knoxville. He possesses more than 30 years of water and wastewater treatment and system operation, maintenance, and management; regulatory management; and engineering consulting experience. His experience includes specialized knowledge to perform detailed facility and system evaluations; budget analysis and development; profit and loss evaluations; process optimization; troubleshooting; technical writing; manpower assessments; state/federal grant and loan programs; NPDES and regulatory compliance; and business development activities. Ken is a grandfather of three and is currently employed as a Principal for Gresham, Smith and Partners in Nashville, TN.

Other authors or presenters include:

- Dale Mosley – Gresham, Smith and Partners
- Jay Tant, P.E. – Metro Water Services
- David Tucker – Metro Water Services
- Gilbert Nave – Metro Water Services
- Glen Doss – Metro Water Services

TOO MUCH WATER LEADS TO WATER CONSERVATION IN NASHVILLE

On May 1-2, 2010, historic flooding occurred in Nashville and Middle Tennessee. The two days of rainfall totaled 13.57 inches, according to the Nashville International Airport; this amount shattered the May monthly rainfall record of 11.04 inches. The Cumberland River reached nearly 12 feet above flood stage and crested at 51.9 feet before the waters began to finally recede. The relative calmness of the Cumberland River, Nashville's water supply source, now unleashed by the storm of the century, rapidly surrounded and submerged Nashville's K.R. Harrington Water Treatment Plant (KRH-WTP).

On Sunday, May 2nd plant personnel implemented the emergency shutdown procedure for the K.R. Harrington Water Treatment Plant (KRH-WTP), a procedure that was developed in the event of a catastrophic failure of the Wolf Creek Dam in Kentucky. Electrical power to the plant was shut down, valves closed, personnel evacuated, and the system was somewhat secured. The last to leave the plant were carried off in a boat as the KRH-WTP was completely out-of-service because the Cumberland River reached levels most thought they would never see in their lifetime. On May 4, 2010 the Tennessee Department of Environment and Conservation (TDEC) issued an emergency order to conserve water in Metropolitan Nashville because the City was now dependent on the aging 90 MGD Omohundro WTP to maintain water supply to the City. At that time, the capacity of the available distribution storage system was approximately 60 MGD.

The KRH-WTP is located on the Cumberland River near the confluence of the Stones River. The plant was constructed in 1974 with a capacity of 60 million gallons per day (MGD) and was upgraded to a capacity of 90 MGD in 1992. Water from the Cumberland River is withdrawn by four 30 MGD raw water pumps. There are two parallel treatment trains composed of six flocculation/clarifiers and eighteen filters with mixed media. From the filters, the water flows by gravity into four clearwells, comprising a total of 9 million gallons (MG) of storage capacity. Four constant speed high service pumps, each 2500 horsepower (HP), 4160 volt (V), pump the water from the clearwells out to the distribution system. KRH-WTP also has two backwash pumps, each 450 HP, 480V, for cleaning the filters.

It's May and the unofficial start of summer vacation is less than 30 days away. The people of Nashville will want a reliable source of water as the conservation measures began to affect small businesses and homeowners who rely on clean water to fulfill their socioeconomic needs. Water restrictions were officially lifted by Mayor Karl Dean on June 1, 2010 – 30 days after the flood. What did Nashville do to get a 90 MGD WTP back in operation after it had sustained significant water damage to major equipment such as the electrical components, high service pumps, raw water pumps, numerous valves, instrumentation and controls, and the clearwell.

The lessons learned from this experience are infinite but need to be shared with other utilities so disaster recovery planning can be responsive and effective. This would include: developing critical path schedules; developing check out and startup procedures; performing immediate condition assessments; prioritizing the elements of the critical path; scheduling and managing. Operational protocol and design criteria can also be assessed and improved.

Max 3,000 characters with spaces

Name: Brent Fulghum, P.E.
Abstract: A Blessing in Disguise? Clarksville's Dewatering Operations after the Flood

Brent Fulghum joined the Nashville office of Hazen and Sawyer in 2010. Mr. Fulghum is a licensed P.E. with 6 years of experience in water and wastewater process design. He has a B.S. in Biology from The University of Tennessee at Chattanooga and a B.S. in Civil and Environmental Engineering from Georgia Tech. He has recently completed the design of a 28-MGD membrane filtration system for the City of Clarksville and is currently working on flood recovery efforts and long-term design improvements at the Clarksville WWTP.

A Blessing in Disguise?
Clarksville's Dewatering Operations after the Flood

The City of Clarksville historically processed sewage sludge using plate and frame presses followed by a RDP lime stabilization process which produced Class A biosolids. The process was operationally intensive and costly. Since solids handling operations were severely impacted by the May flood event, alternative dewatering and disposal methods were an immediate need. For these reasons, the City is currently conducting a full-scale pilot study using a decanter centrifuge by Flottweg, Inc. and a belt filter press by BDP Industries in preparation for the design of dewatering improvements. The purpose of this study is to demonstrate successful performance, provide hands-on experience, and to evaluate life cycle costs. Testing is being conducted on two sewage sludges: (1) combined primary and waste activated sludge and, (2) combined primary and waste activated sludge with intermediate thickening. The results of the study will provide a comparison of cost and performance-based differences between the technologies tested that will be used to determine long-term design improvements.

PRESENTER
Valorie C Gilley
Metro Water Services

PAPER TITLE
May 2010 Flood Recovery - Navigating FEMA Guidelines for Federal Assistance

CREDENTIALS
- Professional Interior Designer in Tennessee

EXPERIENCE
2000 - Present
Senior Project Manager
Metro Water Services

EDUCATION
- Undergraduate
  B.S., Interior Design
  Western Kentucky University
- Real Estate
  Affiliate Broker

EXPERIENCE SUMMARY
Valorie Gilley is a senior project manager with 26 years of professional experience. Her strengths include facility planning and design, construction management, and project management. Valorie has worked in government at both the local and state level, as well as private industry, for 26 years in the Nashville, Tennessee, area.

PRESENTER
Tazio R. Qubeck PE
Brown and Caldwell

PAPER TITLE
May 2010 Flood Recovery - Navigating FEMA Guidelines for Federal Assistance

CREDENTIALS

- Professional Engineer in Tennessee

EXPERIENCE
2010 - Present
Senior Engineer
Brown and Caldwell

EDUCATION

- Undergraduate
  B.S., Civil Engineering
  Tennessee Technological University, 1999
- Graduate
  M.S., Civil Engineering
  Tennessee Technological University, 2002

EXPERIENCE SUMMARY
Tazio Qubeck is a senior engineer with 8 years of professional experience. His strengths include project design, project management, construction management, field inspection services, and operations assistance. Focus areas include WWTPs and biosolids. Tazio has worked in the Nashville, Tennessee, area for the past 8 years as an engineering consultant for Metro Water Services and surrounding utilities.

AREA OF CONSIDERATION | TOPIC

Wastewater and Water Environment | Management

PAPER TITLE

May 2010 Flood Recovery - Navigating FEMA Guidelines for Federal Assistance

PRESENTERS

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COORDINATION CONTACT

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ABSTRACT

This presentation will provide an in-depth look at management approaches to maximize federal reimbursement for flood related damages.

Due to the May 2010 flooding in Nashville, many Metro Water Services (MWS) facilities sustained damage, including the K.R. Harrington WTP, Dry Creek WWTP, and the Biosolids Facility. As part of the recovery effort, the Federal Emergency Management Agency (FEMA) provides assistance to repair damaged facilities. Successful reimbursement for repairs requires an understanding of the federal guidelines, categorization of direct flood related, indirect flood related and non-flood related damages, and detailed documentation of all costs associated with the repair efforts.

Engaging the FEMA staff who provide interpretation of the Federal Guidelines and prepare the necessary paperwork is key to reimbursement for eligible damages. As a manager, it is critical to foster a healthy team with clear lines of communication. Specific management challenges include disagreements on eligibility for reimbursement of repairs and clear separation of improvement projects from flood related damages.

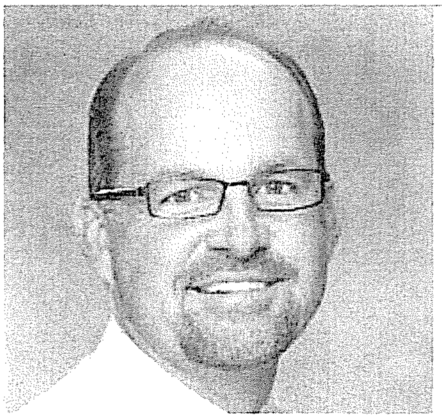
Another critical aspect of the FEMA process includes adequate documentation of the damages and repair efforts. FEMA typically separates the damaged facility into components, such as a process or building. A project worksheet (PW) is then prepared for each component. All costs for emergency measures, construction contracts, and engineering fees must be allocated to each PW and must break out any non-flood related tasks. This level of detail increases the management oversight to maintain adequate documentation.

(1,635)

Flood

Session T4C

M. Shannon Lambert, PE



EDUCATION

Master of Science, Civil Engineering
University of Missouri-Rolla, 1995

Bachelor of Science, Civil Engineering
University of Missouri-Rolla, 1990

PROFESSIONAL REGISTRATIONS

PE: TN, KY, AL, MO

AFFILIATIONS

Water Environment Federation

American Water Works Association

YEARS OF EXPERIENCE

19 years

Mr. Lambert has served as design engineer, lead design engineer, project engineer, and project manager on water and wastewater treatment plant expansions and upgrades, sewer collection systems, and water distribution systems. His experience includes evaluations, designs, and construction administration.

PREVIOUS EXPERIENCE

Central WWTP and Biosolids Facility Flood Recovery, Metro Water Services, *Nashville, TN* Project Manager: The Biosolids Facility and portions of the Central WWTP were flooded on May 2, 2010. The Biosolids Facility received significant damage and was removed from service due to said damage. Mr. Lambert led a multi-disciplined team to perform a damage assessment of the facilities, develop a recovery plan, develop a schedule for the execution of the recovery plan, and direct the team during the execution of the recovery plan. He also led the preparation of scope of work for the facility repairs and oversight of the repairs and assisted MWS in communications with FEMA in the development of Project Worksheets.

Raw Water Pumping Station Floodwall, *City of Hannibal, MO* Project Engineer: Prepared plans and specifications for a reinforced concrete floodwall around the perimeter of Hannibal's existing raw water pumping station at the Mississippi River. Design included a reinforced concrete floodwall with sheet pile cutoff to control seepage, an interior drainage system, and a prefabricated aluminum-hinged gate for access to the raw water pumping station.

Biosolids Management Project, Metro Water Services, *Nashville, TN* Project Manager: Led the project team in implementation of the Long-Range Biosolids Management Plan. Project included development of conceptual design for the Central WWTP Biosolids Facility consisting of DAF thickening, anaerobic digestion, centrifuge dewatering and heat drying; assistance in the selection of a design-build contractor for the Central WWTP Biosolids Facility project; preparation of plans and specifications for the Dry Creek solids handling upgrade consisting of thickening and dewatering improvements and new anaerobic digestion facility; and construction phase services for both projects. The Biosolids Management Project has a program budget of $155 million.

Long-Range Biosolids Management Plan, Metro Water Services, *Nashville, TN* Project Manager: Led the preparation of the Long-Range Biosolids Management Plan. Evaluated the existing facilities, assisted in preparation of opinions of probable construction costs, and evaluated delivery options for project implementation. The study included evaluation of the existing solids handling facilities at the Central WWTP, Dry Creek WWTP, and White's Creek WWTP; development of alternatives for biosolids treatment and disposal at the plants; economic and noneconomic evaluation of the selected alternatives; and recommendation for the long range plan. Delivery options were evaluated and an implementation plan was recommended for the long-range plan.

Barker Road/Omohundro Equalization Basin, Metro Water Services, *Nashville, TN* Project Manager: Led the design team in preparation of plans and specifications for a new 15-MG equalization basin and pumping station designed to reduce overflows in the collection system. The basin is a prestressed concrete construction on a deep foundation. The pumping station includes a diversion structure and wetwell to allow excess wet weather flow to be diverted to the equalization basin while allowing some flow to continue downstream.

Smith Springs Equalization Basin, Metro Water Services, *Nashville, TN* – Project Manager: Led the design team in preparation of plans and specifications for construction of a new one-million gallon circular, cast-in-place concrete flow equalization basin at the Smith Springs Pump Station site. The basin includes submersible mixers, an aluminum dome cover, and a modulating drain valve.

Deep Sewer Tunnel and Influent Pumping Station, *Reading, PA* – Project Manager: Led a team in the design of a new tunnel and influent pumping station. The tunnel includes the investigation and design of the major components of the tunnel, including site surveying; geotechnical investigation program; geotechnical design for pipe line, access shafts, drop/vortex shafts; carrier pipe design; design of local sewer connections; and coordination with the installation of a deep influent pump station at the WWTP. The tunnel includes five shafts between [illegible] feet and [illegible] feet in depth and a 5,586-foot long, [illegible]-foot diameter tunnel located entirely in rock. Inside the mined tunnel, a carrier pipe will be installed.

The influent pumping station has a firm capacity of [illegible] mgd. The pumps will be installed in an [illegible]-foot diameter circular shaft and will have immersible motors and adjustable frequency drives. The dry well will be approximately [illegible] feet deep. The pumps will discharge to two 42-inch force mains to the Headworks Facility. The estimated construction cost for the tunnel and pump station is approximately $[illegible] million.

K.R. Harrington Water Treatment Plant Evaluation, Metro Water Services, *Nashville, TN* – Assisted in the preparation of the evaluation of a needs assessment and prioritization at the K.R. Harrington WTP. The needs assessment included a review of the existing treatment facilities and a preliminary evaluation of its capabilities to meet the present and future capacity, reliability, and water quality needs. The report provided a summary of the evaluation and prioritized recommendations for improvements.

Filter Valve and Actuator Replacement Project, Knoxville Utilities Board, *Knoxville, TN* – Led the assessment of alternatives for upgrading the valves, actuators, and control system for the ten filters at the Mark B. Whitaker Water Treatment Plant. The evaluation considered reliability, maintainability, implementability, optimization of filter performance, and capital costs. Led the design of the replacement of the valves, actuators, and control system for the ten filters at the Mark B. Whitaker Water Treatment Plant.

North County Plant Facilities Improvement Plan, *St. Louis County Water Company, MO* – Participated in the evaluation of alternative improvements for various systems and facilities at the 96-mgd North County Plant. Systems that were evaluated included most of the chemical feed systems (chlorine, ammonia, ferric sulfate, activated carbon, and lime), electric power distribution, and control and security systems. Improvements for the plant's control building were also evaluated, including improvements to the HVAC and drainage systems and improvements to mitigate damage resulting from a major seismic event.

2011 KY/TN Water Professionals Conference
July 24 - 27, 2011
Covington, Kentucky

Title: **A Phased Approach to Flood Recovery at the Central WWTP Biosolids Facility**

Presenters: **Ron Taylor, P.E., Chief Engineer of Operations, Nashville Metro Water Services**
M. Shannon Lambert, P.E., BWSC

ABSTRACT

Rainfall records were shattered on May 1 and 2 in Nashville. A new two day rainfall record was established when 13.57 inches fell on these two days, which shattered the previous record of 6.68 inches. The excessive rainfall amount caused the rivers in Middle Tennessee to rise to record levels. The crest of the Cumberland River at Nashville was 51.86 feet which is the highest level recorded since the Cumberland River dam system was built in the 1960s. The previous record was 47.6 feet. Flood stage in Nashville is 40 feet. The swollen Cumberland River caused extensive flooding throughout Nashville. Nashville was declared a Federal Disaster Area on May 4.

The site elevation of the Central WWTP Biosolids Facility ranges from 415-420. The buildings on the site have a Finished Floor Elevation (FFE) of 417. The elevation of the Cumberland River at the Biosolids Facility reached an elevation of approximately EL. 419.2. Therefore, all the buildings on the site were flooded.

The Biosolids Facility treats all the solids generated at the Central and Whites Creek WWTPs. The facility has a capacity to treat 138 dry tons per day. The Biosolids Facility was placed into continuous operation in 2009. The primary processes of the facility are Dissolved Air Flotation Thickening (DAFT), Anaerobic Digestion, Centrifuge Dewatering and Rotary Drum Drying.

The Biosolids Facility was removed from service during the flooding on May 3. Once the Biosolids Facility was removed from service, there were no solids processing capabilities for either the Central WWTP or the Whites Creek WWTP.

The presentation will include a description of the phased approach to flood recovery of the facility including:

- Initial Damage Assessment
- Development of a Recovery Plan and Critical Path Schedule
- Implementation of Temporary Solids Handling and Treatment Facilities
- Maintenance of Plant Operations with Coordination of Recovery Activities
- Re-commissioning of Unit Processes
- Disaster Recovery Lessons Learned

Title: Clarksville Flood Recovery – Steps Toward Recovery, Upgrades, and Dealing with FEMA

Stephen H. King, P.E., BCEE
CDM
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CREDENTIALS

Registered Professional Engineer - TN and KY
Board Certified Environmental Engineer (BCEE)

EXPERIENCE - 27 Years

9/03 – Present	Principal/Senior Project Manager CDM- Nashville
3/02 – 9/03	Director of Nashville Operations/Senior Engineer DBS & Associates Engineering, Inc.
4/01 – 2/02	Environmental Services Manager HNTB Corporation - Nashville
9/97 – 4/01	Senior Environmental Engineer - Associate Gresham, Smith & Partners - Nashville
10/96 – 8/97	Environmental Services Manager HNTB Corporation - Nashville
8/95 – 10/96	Chief Engineer Griggs & Maloney, Inc. - Murfreesboro
2/94 – 8/95	City Engineer City of Brentwood
1/92 – 2/94	Office Manager/Senior Engineer Elrod-Dunson, Inc. Lexington, KY
4/85 – 1/92	Project Engineer Elrod-Dunson, Inc., Nashville
8/84 – 4/85	Environmental Engineer Tennessee Department of Environment and Conservation

EDUCATION

University of Tennessee - Knoxville
Bachelor of Science in Civil Engineering

ABSTRACT_CLARKSVILLE FLOOD RECOVERY- STEPS TOWARD RECOVERY, UPGRADES, AND DEALING WITH FEMA_MICHAEL CRAWFORD_STEPHEN H. KING.

Title: Clarksville Flood Recovery- Steps toward recovery, upgrades, and dealing with FEMA

Main Author: Stephen H. King

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Abstract Selection: Wastewater & Water Environment; Collection Systems

Clarksville Flood Recovery – Steps Toward Recovery, Upgrades, and Dealing with FEMA

This presentation will review the steps taken immediately after the May 2010 flood, temporary measures implemented, planned upgrades, and dealing with FEMA for reimbursement. Topics that will be discussed include:

- **Temporary Emergency Pumps:** Explanation of the decision process related to type of emergency pumps and when electrical motors were used instead of diesel pumps.

- **Cleaning and Temporary Measures:** Explanation of the process to clean and disinfect the pump stations, cleaning sanitary sewer lines that were surcharged, and temporary fencing around most temporary pumps.

- **Dealing with FEMA:** Explanation of the process that FEMA uses for reimbursement and how the Clarksville team handled funding issues. A discussion of how FEMA handles Mitigation and what impacts that has on project funding. Brief explanation of the FEMA categories of work and project documentation.

- **Dealing with TEMA**: A discussion of TEMA's role and the part they play in the recovery process. At six months into the flood, why is TEMA not involved?

- **Electrical Testing:** Discussion on what FEMA expects and how electrical testing was completed.

- **Project Upgrades:** The City used the flood as an opportunity to upgrade all of the flooded pump stations to improve performance and reliability. The improvements also will include mitigation.

- **Returning Pump Stations to Service:** A discussion of problems that were encountered with pump stations that were repaired and returned to service without upgrades.

- **FEMA Eligible Items for Reimbursement:** A discussion of what FEMA will typically reimburse and what items of work are typically "out of bounds".

Title: Niagara Falls in Nashville: Catastrophic Failure of a Levee and Trunk Sewer

Kenneth R. Stewart III, P.E.
Gresham, Smith and Partners
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ken_stewart@gspnet.com

BIOGRAPHY

Mr. Stewart is a Senior Engineer with over 13 years of experience in the planning, design, and construction of water distribution, wastewater collection, and treatment systems. A graduate of Tennessee Technological University, he has been involved in the development, design, and construction oversight of numerous projects including water treatment facilities, water and wastewater pumping stations, sanitary sewer and water systems, potable water storage, and sewer system rehabilitation.

CREDENTIALS

Registered Professional Engineer in Tennessee and Kentucky

EXPERIENCE

8/2006 – Present	Gresham, Smith and Partners
2/2006 – 8/2006	Metro Water Services, Nashville, TN
2/2000 – 2/2002	Barge, Waggoner, Sumner, and Cannon, Inc.
8/1997 – 2/2000, 02/2002 – 02/2006	GRW Engineers, Inc.

EDUCATION

Master of Science in Civil Engineering, Tennessee Technological University, May 97

Bachelor of Science in Civil Engineering, Tennessee Technological University, May '95

Niagara Falls in Nashville: Catastrophic Failure of a Levee and Trunk Sewer

On May 2, 2010, a levee adjacent to Richland Creek failed resulting in flooding of the 400+ feet deep REOStone Rock Quarry in Nashville, TN. The section of streambed in the general area was destroyed and the quarry was filled with approximately 7 billion gallons of water. The streambed was positioned over a natural fault line that contributed to the collapse of the levee and destruction of the section of Richland Creek.

During the time frame of the flooding, two sections of 42-inch trunk sewer serving the Cockrill Bend area were "blown-out". One section of line was located within the levee. The other was an aerial crossing of Richland Creek that connected to the trunk sewer just downstream of the blown-out section of sewer within the levee. This failure allowed a significant volume of raw sewage to flow into the natural drainage of the creek; thereby creating adverse environmental health and water quality issues in Richland Creek and the quarry. Once the flood waters receded and the levee site was deemed safe, Metro Water Services' Field Service crews immediately implemented emergency response protocol to divert raw sewage from flowing into the creek by installing temporary by-pass pumping at the site until a permanent solution could be implemented.

The magnitude of the flood damage and various other constraints such as schedule, topography, volume of sewage flow, poor hydraulic gradient for the trunk sewers, and consideration of trunk sewer alignment in conjunction with the levee repairs presented several engineering and construction challenges for MWS, Rogers Group, Gresham, Smith and Partners and the general contractor. The solution required the need to define specific criteria for a permanent repair that would reduce the risk of a catastrophic failure of the levee and trunk sewers in the future. This was accomplished through a collaborative effort between the Owner, Engineer, Contractor, and the regulatory authorities.

Flood

Session T4D

Dan Miklos is a Senior Associate with Hazen and Sawyer serving as the Project Manager and Technical Advisor for many wastewater and innovative biosolids projects. Dan holds Class III and Class IV wastewater operator licenses in Ohio, Indiana, Kentucky and New Jersey and is a registered Sanitarian. He holds patents in solids minimization technology and has designed polymer equipment for market entry. He has provided management and technical expertise for new facilities including numerous dewatering project startups and troubleshooting.

When Disaster Strikes – The Clarksville WWTP Story

Dan Miklos and Scott Woodard, PE, Hazen and Sawyer, PC

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dmiklos@hazenandsawyer.com

The City of Clarksville, TN Wastewater Treatment Plant is rated at 25 MGD with peak flows of up to 70 MGD. The plant consists of fine rotary drum screens, vortex grit removal, primary settling, aeration, secondary settling with UV disinfection. The effluent is discharged through a 5,000 ft gravity effluent line to the Cumberland River and is pumped when the river is at elevated stage.

On May 3, 2010 an estimated 1,000 year storm event raised the nearby river to unprecedented levels. The plant levee was breached and the wastewater treatment plant was completely flooded. In many places, unit processes were submerged under 20 ft of water for more than six (6) days. Hazen and Sawyer was contracted by the City of Clarksville to assist in restoring wastewater treatment at the facility as quickly as possible.

The most significant problem was acquiring resources for flood recovery, including temporary power, pumps, sludge dewatering, dehumidification, and property restoration services. The "critical path" of the recovery was to pump down the site, clean out debris and provide a minimum of primary settling and disinfection while full secondary treatment was restored. Hazen and Sawyer staff immediately began acquiring resources and mobilizing assistance for the flood recovery. Allied Technical Services (ATS) was immediately hired by Hazen and Sawyer as a subcontractor and was on site within 24 hours. ATS worked with the Hazen and Sawyer and the City to develop a recovery plan to employ once floodwaters subsided enough to begin pumping floodwaters out of the site. Hazen and Sawyer has been on site since the initial flooding and continues to assist the City in the recovery efforts.

This presentation will focus on the effort of restoring functional treatment at the plant and will cover the following unique issues / tasks associated with the flood recovery:

- Organizing and developing a critical path schedule for recovery, including repair and supply of necessary long lead time items.
- Developing alternative process options to provide treatment for unit processes requiring more time for repair.
- Utilizing the "new old stock" market for long lead items to restore critical process components as quickly as possible.
- Protecting public health as soon as possible through partial treatment with primary settling and temporary disinfection.
- Developing and maintaining the logistics of providing a safe work environment for 100+ flood recovery workers.
- Defining emergency purchasing procedures while satisfying City and FEMA procurement procedures.
- Expediting documentation to categorize flood recovery efforts for Insurance and FEMA funding.

- Assisting City staff at various levels with administration, bid document development, contract award, tracking, resource development and site management.

PRESENTER
Douglas P. Yarosz, Jr. PE
Brown and Caldwell

PAPER TITLE
Nashville's (Not So) Dry Creek WWTP – Flood Recovery in the Wake of a 1000-Year Rain Event

CREDENTIALS

- Professional Engineer in Tennessee
- KY/TN WEA Wastewater Treatment Technologies Committee - Tennessee Committee Chair

EXPERIENCE
2002 - Present
Senior Engineer
Brown and Caldwell

EDUCATION

- Undergraduate
  B.S., Civil Engineering
  Bucknell University, 2000
- Graduate
  M.S., Civil Engineering
  Bucknell University, 2009

EXPERIENCE SUMMARY
Doug Yarosz is a licensed engineer, with over 8 years experience in Brown and Caldwell's Nashville, TN office. Since Nashville's historic floods in May, Doug has been assisting Metro Water Services with the recovery of the Dry Creek Wastewater Treatment Plant. He is currently serving as the Tennessee Co-Chair of the KY/TN WEA Wastewater Treatment Technologies Committee. His career is his passion—he visits treatment plants in his free time.

PRESENTER
Heather Crabtree, PE
Metro Water Services

PAPER TITLE
Nashville's (Not So) Dry Creek WWTP – Flood Recovery in the Wake of a 1000-Year Rain Event

CREDENTIALS

- Professional Engineer in Tennessee

EXPERIENCE

2009 - Present
Project Manager
Metro Water Services

2008 – 2009
Project Manager
CCR Environmental Solutions, LLC

2005 – 2007
Environmental Engineer
Center for Toxicology and Environmental Health

2001 – 2005
Engineer in Training; Project Engineer
Barge, Waggoner, Sumner and Cannon, Inc.

1999-2001
Engineer in Training
The Advent Group, Inc.

EDUCATION

- Undergraduate
  B.S., Civil Engineering
  Tennessee Technological University, 1999

EXPERIENCE SUMMARY
Heather Crabtree is a project manager for the Metro Water Services Engineering Division in Nashville, TN. She is responsible for the flood recovery efforts at the Dry Creek Wastewater Treatment Plant and additional non-flood related water and wastewater improvement projects. She has ten years of previous experience as a consulting engineer managing various water, wastewater and compliance projects.

AREA OF CONSIDERATION | TOPIC

Wastewater and Water Environment | Young Professional

PAPER TITLE

Nashville's (Not So) Dry Creek WWTP – Flood Recovery in the Wake of a 1000-Year Rain Event

PRESENTERS

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COORDINATION CONTACT

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ABSTRACT

This presentation will provide an insider prospective of the historic flood of May 2010 and subsequent recovery at Metro Water Services' (MWS) Dry Creek WWTP in Nashville.

Middle Tennessee was drenched with a total of 13.57 inches on May 1-2, 2010, shattering the previous two-day record of 6.68 inches. In their After Action Report, the USACE states the two-day storm was "far greater than a 1000-year rainfall event." This event caused the rivers in Middle Tennessee to rise to record levels. The crest of the Cumberland River at Nashville was 51.86 feet, the highest level recorded since the Cumberland River dam system was built in the 1960s.

The Dry Creek WWTP is the smallest of three WWTPs owned and operated by MWS (rated capacity of 24 MGD ADF). Located at the confluence of Dry Creek and the Cumberland River, the facility is just over 2 miles downstream of Old Hickory Dam. On May 2, power was turned off to all Dry Creek WWTP processes when the flood waters eclipsed the crest of its protective berm and flooded the site. At the facility site, the Cumberland River would crest at approximately 3.5 feet above the 100-year flood elevation. A majority of the buildings were flooded, one by up to 10.5 feet. All five electrical substations were submerged, rendering a majority of the plant's electrical distribution system inoperable. The entire 44,000 square foot tunnel system was also filled with flood water, in one area to nearly 35 feet deep. It was several days before the flood waters receded.

During and for several days after the flood waters receded, onsite influent pumping systems were without power, with incoming flows bypassed directly to Dry Creek. However, the plant did continue to receive and provide extended primary treatment to flow from offsite pump stations. Once the flood waters receded, the tunnel system was drained and disinfected, generators were brought in, and recovery of the plant's process and equipment began.

Presentation of plant recovery will include the following topics:

- Process Recovery
  - Temporary disinfection using sodium hypochlorite
  - Primary treatment, including removal of 2-3 foot thick floating sludge layer resulting from lack of sludge withdrawal
  - Recovery of the biological system, CBOD removal (7-10 days), ammonia removal (30-35 days)
  - Temporary dewatering was limited by volume until thickening system recovered
  - Extended operation in manual mode without many instruments
- Electrical Recovery
  - Several levels of electrical equipment requiring cleaning
  - refurbishment/replacement, testing prior to equipment recovery (substation, MCC, local electrical equipment including motors)
  - Flood water inside the insulation of 5KV and 480V conductors
  - 150+ flooded instruments requiring replacement
- Mechanical Recovery
  - Water entered submersible influent pump motors via cables
  - 90+ pumps located in flooded tunnels
  - 60+ electric actuators flooded and inoperable
  - 230+ geared manual operators requiring inspection/cleaning/regreasing

(2,997)

Mike Callahan is the Senior Service Hydrologist at the National Weather Service (NWS) in Louisville, Kentucky. He has held this position for over 26 years. Before this he was a Hydrologist at the Mid-Atlantic River Forecast Center in Harrisburg, Pennsylvania; and before that, a Meteorologist in Charleston, West Virginia. His total career in the NWS spans 33 years. Mike also taught Meteorology at the University of Louisville for over 10 years. Mike is a Hoosier, a graduate of Indiana University. He lives in Jeffersonville, Indiana with his wife of 32 years and one married daughter, 25.

As Service Hydrologist, Mike is the hydrologic expert for the NWS for Central Kentucky and South Central Indiana. In addition to monitoring stream levels and issuing flood warnings, he works with communities to help them mitigate losses from flooding. Mike has been in a number of NWS storm surveys and FEMA disaster mitigation studies. He also is an active member of the local weather preparedness groups, and water availability groups.

Possible Ramifications of Climate Change on Water Resource Management

Presenter: Mike Callahan

This presentation will begin with a brief overview of the science behind mechanisms of climate change. Next, the current status of the indicators of climate change such as sea ice, land ice, global average temperature, carbon dioxide levels, methane levels, and others will be examined. This will be followed by a short history of computer-based climate models and how they have evolved. Finally, the latest thoughts of how climate change based on the model predictions will modify the hydrologic cycle and the possible effects this will have on future water resource management strategies will be discussed.

Private Property

Session T5A

Kristen M. Benick, PE

Ms. Benick received her Bachelor of Science degree in Civil Engineering from the University of Dayton. She has experience designing wastewater treatment plants, collection systems and pump stations including the development of construction drawings and specifications. She is experienced in evaluation sanitary sewer overflows and combined sewer overflows in capacity-deficient collection systems and developing solutions. She has performed sanitary sewer modeling and has developed Wastewater Master Plans, Long Term Control Plans and Infiltration and Inflow studies for multiple municipalities. Since joining AECOM in 2009, Kristen has performed numerous tasks during development of the Northern Kentucky Sanitation District No. 1 Watershed Plans, and she currently is a task leader for SD1's Vernon Lane Infiltration and Inflow Reduction project .

PEEKING INTO THE WORLD OF PRIVATE SOURCE I/I CONTROL
A CASE STUDY OF AN INTEGRATED APPROACH TO SSO CONTROL

Kristen M. Benick, Eric D. Onderak, Geoffrey M. Grant - AECOM
Barrett M. Groh, Brandon C. Vatter – Sanitation District No. 1 of Northern Kentucky

Corresponding Author:
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4219 Malsbary Road
Cincinnati, OH 45242
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ABSTRACT

The Vernon Lane Infiltration and Inflow (I/I) Removal Project is one of the first projects the Northern Kentucky Sanitation District No. 1 (SD1) is implementing as part of their Watershed based approach to wet weather control. This project is an example of the innovative strategy that has been adopted to control sanitary sewer overflows (SSOs) and how Watershed Plan projects are helping redefine standard policies for I/I removal and storm water management.

The Vernon Lane project area has two recurring SSOs that pose health risks to the community. The prime objectives are to eliminate the local SSOs in a typical year and reduce downstream SSOs by controlling public and private source I/I that has previously been identified as the major sources of extraneous flow in the separate system. The integrated approach also evaluates the impact of the redirected inflow on the stormwater system, balancing needed capacity upgrades and hydromodification concerns.

Model predictions indicate that reducing public source I/I and eliminating at least 50% of the private source I/I will result in typical year control of the two SSOs. Of the nearly 300 homes tested, approximately 110 homes had at least one direct (private) source of storm water to the sanitary system. These illegal connections include downspouts, driveway drains, and area drains which have become a target of the fix. In an effort to gain successful participation, homeowner education has been a priority throughout the project. Early on, homeowners were provided a copy of dye testing data and a description of the project and SD1's cost sharing program for completion of designed improvements. As part of the design, homeowners will be provided an opportunity to suggest alternate pipe arrangements that accomplish the I/I reduction goals but provides them with additional benefits. Public source fixes include pipe replacement, pipe lining, and pipe bursting. Some alignments in the study area follow narrow creekbeds that make full replacement nearly impossible.

One of the most challenging components is storm water management. The impact of the additional clear water flow removed from the separate system was evaluated using a hydraulic model to identify if pipe size adjustments to the storm system may be required. However, a balance between increased storm water conveyance and hydromodification was explored during the study phase of the project. Defining Qcritical (maximum allowable flowrate without causing hydromodification) was an important step early in the process to identify places where new stormwater flows could be problematic. In these problem areas green stormwater controls were considered as they could provide both detention and treatment of the storm water flows.

The integrated approach to SSO and stormwater control will help SD1 meet their SSO control requirements while helping enhance the built environment at an overall lower cost than a single grey infrastructure solution.

PRESENTER
Andrew B. Lukas PE
Brown and Caldwell

PAPER TITLE
Taking Private Property I/I Reduction from Pilot to Full Scale

CREDENTIALS

- Professional Engineering in WA, MN, and WI

EXPERIENCE
1990 - Present
Vice President
Brown and Caldwell

EDUCATION

- Undergraduate
  B.S., Civil Engineering
  University of Wisconsin at Platteville, 191990
- Graduate
  M.S., Civil Engineering
  University of Washington, 1995

EXPERIENCE SUMMARY
Mr. Lukas is Brown and Caldwell's Wet Weather Solutions Leader and a Vice President with the firm. He is very experienced in wastewater and storm water facility planning with particular expertise on capacity studies of systems that experience significant wet weather flows. His recent leadership roles on large CMOM and asset management projects build on that planning experience. Mr. Lukas is also one of the company's leaders for Infiltration and Inflow-related projects.

AREA OF CONSIDERATION | TOPIC

Wastewater and Water Environment | Collection System

PAPER TITLE

Taking Private Property I/I Reduction from Pilot to Full Scale

PRESENTER

Andy Lukas PE

Brown and Caldwell

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COORDINATION CONTACT

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ABSTRACT

The Milwaukee Metropolitan Sewerage District (MMSD) has a long history of evaluating I/I, even performing demonstration I/I reduction projects, but none of these efforts led to significant program implementation. A recent facility plan, completed in 2007, even showed that I/I reduction was not cost effective when compared to other ways of getting to a once in five-year SSO objective. Then major rainstorms hit the MMSD service area in the span of two weeks in July 2010, causing thousands of sewer backups in a large number of municipalities. Public outcry was profound and persistent. Action was called for by impacted residents, news media, and politicians. The result was MMSD commitment to expanding a fledgling private property I/I (PPII) reduction program into a major initiative to prevent unwanted surface water and groundwater from entering the system and causing these problems.

Now MMSD is working to establish this program, in partnership with its 28 satellite municipalities. The program elements address a wide range of topics, including legal authority for MMSD to fund the program, mechanisms for prioritizing specific activities, determining eligible expenditures, how to maintain control at the municipal level, and effectiveness evaluation of the program.

Brown and Caldwell, with subconsultants, was hired by MMSD to support the overall program, including developing municipal-specific PPII programs, inspecting and designing solutions to common PPII situations, and overseeing the contracting of repairs. BC had previously performed a number of important I/I reduction pilot projects for MMSD, which included repair technologies as diverse as open cut excavation, cured-in-place-pipe lining, system flood grouting, and storm system rehabilitation. The results were analyzed consistently to determine cost-effectiveness of the work and amount of I/I reduction achieved by each. The report disclosed important conclusions about what would be required to achieve success on a larger scale.

The presentation will cover the topics of successful pilot PPII work and how it can factor into establishing a systemwide program. It will also explain the considerations and decisions MMSD made in setting up the program and addressing concerns in a variety of areas. Example projects complete to date will be described in detail. Attendees will come away with a clear understanding of how pilot programs can be valuable to a mission aimed at significant I/I reduction goals. They will also hear about the latest national trends in sewer system wet weather flow management regulation by state and federal agencies.

(2,630)

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Amanda Waters was appointed as SD1's General Counsel in November 2006. She is part of the Executive Management Team and is responsible for managing SD1's legal matters and providing guidance to the Board of Directors and staff on laws, regulations, litigation and other developments affecting SD1.

Before joining SD1, Ms. Waters served as Deputy Director for the Office of Legal Services of the Kentucky Environmental and Public Protection Cabinet and as Policy Advisory to the Cabinet Secretary. She worked as a staff attorney for the West Virginia Department of Environmental Protection prior to her employment with Kentucky state government.

Ms. Waters received her law degree and Environmental Law Certificate in May of 2000 from Pace Law School in White Plains, New York. She is licensed to practice law in Kentucky, West Virginia, New York and Connecticut. She received a BS in Biology from Eastern Kentucky University in 1997.

Legal and Funding Issues Associated with Private Source Inflow and Infiltration Removal

Amanda Waters, Deputy Executive Director/General Counsel
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Utilities across the nation must address sanitary sewer overflows (SSO) resulting from infiltration and inflow (I/I) of wet weather flows into sewer systems. I/I also leads to increased costs for wastewater conveyance and treatment and claims for damage to private property due to basement backups.

On average, approximately half of a utility's sewers are located on private property; estimates of I/I contributions from private property range from 20-80 percent. Despite the need to address private source I/I, most SSO reduction and elimination projects are focused on the public sewer system. This is in large part due to the legal obstacles associated with private source removal which include the following:

- Private property access/Right of Entry
- Liability for work performed on private property
- Limitations on the use of public funds on private property

Options available to address these legal challenges will depend on the organization of the utility and the laws, ordinances and regulations governing and authorizing the utility such as those dealing with right of entry and public funding on private property. The presentation will examine case studies, options and tips on how to effectively manage and overcome legal hurdles in order to implement a comprehensive I/I elimination program.

Management

Session T5B

Title: *"Water, Water, Everywhere, Nor Any Drop To Drink" - The Creation of Tennessee's Newest Utility District*

Jason Griffin, P.E.
Gresham, Smith and Partners
615-770-8466
jason_griffin@gspnet.com

Credentials

Registered Professional Engineer: TN, KY, AL, GA

Experience

June 1991 - July 1996	Cooperative Education Program (3 terms) Metro Nashville Overflow Abatement Program Consoer Townsend & Associates
January 1997 - Present	Project Engineer / Project Manager / Principal in Charge / Department Manager Gresham, Smith and Partners

Education

Bachelor of Science in Civil Engineering
Tennessee Technological University / December 1996

"Water, Water, Everywhere, Nor Any Drop To Drink" - The Creation of Tennessee's Newest Utility District

Jason Griffin, PE
Gresham, Smith and Partners

So close, but yet so far away; this has long been the sentiment of residents in rural Henry County, Tennessee. The Springville / Britton Ford community, which lies wedged between the Kentucky Lake backwater tributaries of the Big Sandy River and West Sandy Creek, has struggled for many years with drinking water contamination issues. While a few small non-community water systems exist for campground areas, the majority of residents have settled for iron, coliform, and Ecoli contaminated well sources. The closest public water supply is five miles away. However, these main extensions would not have sufficient capacity to support the over 1,300 residents. An ambitious task lay at hand; to determine the most feasible option for safe and reliable drinking water, and with no money, how to create a feasible way to pay for it. In October 2008, the challenge was accepted by several dedicated local residents and politicians; and with Gresham, Smith and Partners willing to see the process through no matter the outcome, the fruits of everyone's labor are near.

The plan would be simple; its execution pain stakingly long. The steps: 1) evaluate the options of water supply, 2) determine under traditional funding scenarios whether affordable water rates could be established, 3) determine if adjacent utilities desired to expand their system to serve the area; if not, formally create a new utility district, 4) apply for any and all funding assistance, and 5) upon securing funding, have enough paying customers to sign up.

An initial study phase was enacted by the Henry County commission to establish the validity of moving ahead with the creation of a new utility district and subsequent funding applications. After the evaluation proved worthy to proceed, in April 2009 the Utility Management Review Board granted approval for the formation of the Springville Utility District; and in May 2009 the district was formally chartered.

Over the following 12 months loan and grant assistance was sought out for the $4.3M initiative. Positive response came in the form of grant offers from all agencies that were contacted. In all, over 80% of the project budget was secured in the form of grants which totaled $3.5M.

With the funding pledged and depending upon the number of monthly paying water customers willing to sign up, minimum water rates looked to be in the range of $26 to $35. The goal of achieving affordability had been met. Over 400 residents signed up during a four month period and paid a discounted tap fee of $500.

With funding secured, paying customers signed up, and design underway the Springville Utility District has become Tennessee's newest public water utility provider. Having an advantage to start from nothing, the design of the district will utilize the latest materials and technology to create operational efficiency.

PRESENTER
Lawrence P. Jaworski PE
Brown and Caldwell

PAPER TITLE
Looking into the Regulator's Crystal Ball: The Future of Wet Weather Treatment

CREDENTIALS
- Professional Engineer in DE, DC, IL, MD, MI, NY, VA, WI, IA

EXPERIENCE
2010 - Present
National Wet Weather Regulatory Compliance Leader
Brown and Caldwell

EDUCATION
- Undergraduate
  B.S., Environmental Engineering
  University of Illinois, 1972
- Graduate
  M.S., Civil/Environmental Engineering
  University of Illinois, 1973

EXPERIENCE SUMMARY
Mr. Jaworski has more than 35 years of experience in environmental engineering with specialized emphasis in the areas of wet weather solutions, regulatory assistance, consent decree negotiations and compliance, and wastewater collection treatment and disposal systems. He has been involved in the study, design, construction, and operation of a variety of systems including municipal and industrial wastewater treatment facilities. Mr. Jaworski was President of the Water Environment Federation in 2003 - 2004

AREA OF CONSIDERATION | TOPIC

Wastewater and Water Environment | Management

PAPER TITLE

Looking into the Regulator's Crystal Ball: The Future of Wet Weather Treatment

PRESENTER

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COORDINATION CONTACT

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ABSTRACT

USEPA is currently developing draft regulations to address how municipalities handle wet weather flows at POTW's in the future. This presentation will provide an update of EPA's current rule-making process for handling of wet weather flows at POTW's and a discussion of various options to handle these increased flows.

The issue is whether any diversion of peak wet weather flow around the biological secondary portion of a plant constitutes a 'bypass.' This 'bypass' is either prohibited or warrants a "no feasible alternative" analysis in every five-year permit cycle. As a result of CMOM programs, sanitary sewer overflow control programs, and combined sewer overflow control programs, municipalities have been tightening collection systems, resulting in increased wet weather flows to the treatment plant.

The Infiltration/Inflow (I/) control programs for sanitary sewer systems require a cost-effective analysis of the cost of I/I removal versus the cost of transport and treatment of I/I. Therefore, when the cost-effective I/I removal point is reached, the remaining I/I is transported to the treatment facility.

Similarly in combined sewer systems, the national CSO Control Policy includes the Nine Minimum Controls that all CSO communities must implement. One of the Nine Minimum Controls includes the requirement to "maximize flow to the plant.

These requirements, coupled with increased levels of treatment efficiency for nutrient removal, result in increased wet weather flows to the facility. Once at the facility, high levels of treatment result in sensitive biological treatment systems that are less tolerant to swings in hydraulic or pollutant loadings.

(1,669)

Ronald C. McMaine, P.E.

Mr. McMaine began working with Bell Engineering in 1978. He has worked with more than 50 water systems. These systems have ranged in size from a few gallons per minute up to 24 million gallons per day. Project scopes have included operations assistance, planning, plant and distribution system design, hydraulic analysis, and system evaluation. Prior to coming to Bell Engineering he had six years of experience in two water systems, including three water treatment plants. His specialties include bringing water treatment plants into conformance with Safe Drinking Water Act requirements, especially disinfection by-products. He is currently chair of the Water For People committee.

EDUCATION

B.S. Mathematics, Michigan State University minor: chemistry, physics, geology
M.S. Civil Engineering, University of Kentucky

Registrations

Professional Civil Engineer, Kentucky
Professional Sanitary Engineer, Kentucky
Professional Engineer, West Virginia,
Class IV Water Plant and Water Distribution System Operator, Kentucky

Societies

American Water Works Association, KY-TN Section
(Life Member)

Kentucky Water and Wastewater Operators Association

Abstract: 2011 WPC Northern Kentucky

Title: Sustainability and Transparency—the Water For People Approach

Authors: Candace Vannasdale, Chair Elect—Water For People Committee
Ron McMaine, Chair—Water For People Committee

Sustainability and transparency have become more than slogans for the water/wastewater industry. Sustainability is promoted, mandated, and to a certain extent, funded by government agencies, and is an important consideration for any responsible organization. Transparency is more and more important as organizations seek to gain and maintain credibility in their dealings.

For the developing countries served by Water For People (WFP), the problems of non-sustainability and lack of transparency are often magnified. Realizing that no one benefits if these problems remain unaddressed and hidden, WFP has developed approaches for both issues that are successful and can be applied to systems in Kentucky and Tennessee.

This presentation describes those approaches. WFP believes enduring water and sanitation solutions can be achieved when key local role players--private sector, civil society, and government—are supported in a way that enables them to understand and act responsively and support community water supply and sanitation development. WFP works with local organizations to train communities and schools on the water cycle, water pollution, water source protection, reforestation and composting.

Sustainability issues also include cost effectiveness and ease of operation and maintenance. This presentation discusses the procedures for engineering and operational decisions, and engineering details of selected processes for both water and wastewater. Financial, managerial, and technical decisions are made by all the role players to assure the system is operated effectively, maintained regularly, repaired as needed, and eventually replaced. Success is not based upon who is helped today, but who is still being helped at checkpoints over the next ten years.

For transparency, WFP developed FLOW (Field Level Operations Watch), an Android mobile phone application that captures data on water points and sanitation programs in eleven different countries. The data is automatically compiled and uploaded to Google Earth, so it is free and available for anyone to see and use. Data may include photos or video, with information on water quantity and quality. This presentation will describe the technology used and the short term and long term value of the information.

In summary, this presentation describes the sustainability and transparency procedures for the WFP, and in so doing, gives water and wastewater utilities in Kentucky and Tennessee a different perspective that helps them achieve the capacity development goals of a sustainable, transparent utility.

Management

Session T5C

Edward D. Wetzel, Ph.D., P.E.
Senior Vice President
SAIC Energy, Environment & Infrastructure LLC (formerly R.W. Beck)
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Education: B.S. Civil Engineering, Lafayette College, Easton, PA
M.S./Ph.D. Civil Engineering, Lehigh University, Bethlehem, PA

Registrations: Professional Engineer in four states plus NCEES certification

Dr. Wetzel is responsible for the Water and Waste Resources Division of SAIC (formerly R.W. Beck). SAIC is an $11 billion per year, 45,000 employee organization that provides technical and business consulting services to federal, state and municipal governments and industrial clients worldwide. Dr. Wetzel's group provides water, wastewater and solid waste consulting services to primarily municipal and state clients throughout the U.S.

Dr. Wetzel has managed a variety of projects for municipal clients. Projects include water treatment process studies, water quality investigations, privatization studies, utility acquisitions, rate and connection fee studies, bond reports, resource recovery facility feasibility study, manhole rehabilitation, sewer system modeling, wastewater reuse and wastewater treatment plant design and performance evaluation. He is contributing author to the Water Environment Federation's Manual of Practice No. 8, *Design of Municipal Wastewater Treatment Plants*.

Dr. Wetzel has represented various governments in valuation, due diligence investigations and negotiations for the purchase of private utilities. Acquisitions have been both by negotiated agreement and condemnation, with settlements ranging from $3 million to $2 billion in transaction value.

KY/TN Water Professionals Conference

Abstract Submittal

Utility Managers Workshop

"Surviving the Recession- An Owner's Perspective"

The Management Committee of the KY/TN Water Environment Association would like to sponsor a mini-workshop at the upcoming Water Professionals Conference (WPC) to be held in Covington, KY on July 24-27, 2011. It is anticipated that this workshop would be scheduled during one of the regular 90-minute "Management" sessions normally included as part of the WPC agenda. The workshop would be facilitated by a member of the KY/TN Management Committee, and would deal with a timely topic of interest to utility managers in the region. We currently anticipate inviting four utility managers or Board members from water and wastewater utility systems, representing a cross-section of systems in terms of size, geography, complexity and ownership structure.

The topic chosen for the 2011 conference is "Surviving the Recession- An Owner's Perspective". We anticipate having each of the utility managers provide a 10-15 minute presentation about how their particular system is dealing with issues of reduced revenues and budgets during the current recession. Following the four presentations, we would facilitate a discussion between the attendees and the speakers. Topics of discussion might include:

- Revenue enhancements to offset reduced consumption;
- Cost saving measures, including outsourcing of services;
- Staffing adjustments and reorganization;
- Technology improvements to increase operational efficiency; and
- Prioritization of capital improvement needs.

Safety

Session T5D

Douglas E. Kimbler
Bio

Doug's career spans over 20 years in the water and wastewater industries. He began with a B.S. in Chemistry from Western Kentucky University in 1985. He went on to earn an M.S. in Organic Chemistry from Western Kentucky University in 1989.

In Doug's first years out of college he worked in various industries gaining experience in industrial wastewater. In his career at Bowling Green Municipal Utilities Doug worked with the Water Treatment Plant, Wastewater Treatment Plant, and distribution and collection systems.

Doug's current position at BGMU is Superintendent of Treatment Plants. In this position, he is responsible for managing the Water and Wastewater Treatment plants as well as distribution and collection systems maintenance for the City of Bowling Green, KY. These systems include a 30 MGD water treatment plant and distribution system, a 10.6 MGD wastewater treatment plant and collection system and 29 water and wastewater system personnel. He oversees all aspects of water and wastewater system operations, assisting the Systems Manager with planning and budgeting for the division.

Doug is married to Cindy; they have two sons. The oldest, Lucas, is a Freshman in High School and Joshua is in seventh grade. His nights are occupied with assisting with homework, shuttling his sons to various sports and band events, and keeping up with the WKU Hilltoppers. Doug is an active member of AWWA and WEA.

Do You Need A Haz-Mat Team?

Doug Kimbler – Bowling Green Municipal Utilities

Contact information: Doug Kimbler, Treatment Plants Superintendent
Bowling Green Municipal Utilities
P.O. Box 10300
Bowling Green, KY 42102-7300

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270-792-9941 (m)
dkimbler@bgmu.com

For systems using gaseous chlorine and other potentially dangerous chemicals, a well-trained on-site Haz-Mat team can provide an extra level of safety over relying solely on local emergency agencies in case of an accident. This Additional layer of safety comes at a cost in money and manpower. After due consideration, Bowling Green Municipal Utilities decided to establish its own Haz-Mat team. This paper will discuss:

- The decision process in deciding to establish a Haz-Mat team;
- The development process of establishing our Haz-Mat team, including cost-benefit evaluation;
- Establishing the team, including personnel selection and training;
- The role of the team in emergencies as well as day to day operations

Todd Adams. Safety Director
Murfreesboro Water & Sewer Department
P.O. Box 1477
Murfreesboro, TN 37130-1477
Phone: 615-893-1223
Cell: 615-642-3263
Fax: 615-893-2153

Bio Information

- Murfreesboro Water & Sewer Department – 10 years as safety director
- TNOSHA – 3 years as a general industry compliance officer
- Worked as a environmental chemist for 3 years
- Graduated from Middle Tennessee University with a B.S. in Biology and Environmental Science
- Served as the chair for the KY/TN AWWA Safety & Security Committee
- Winner of AWWA Category II Excellence in Safety Award 2010

WATER PROFESSIONALS CONFERENCE
JOINT TECHNICAL PROGRAM ABSTRACT SUBMITTAL GUIDELINES AND FORM

I want to present: Paper

Areas of Consideration: General Issues

Topic Category:

Drinking Water:
Plant Operations
Distribution
Water Resources & Conservation
Drinking Water Quality

Wastewater & Water Environment:
Water Reuse
Collection Systems
Biosolids
Industrial Wastewater/Pretreatment
Watershed Management
Surface Water Quality
Stormwater Management
Plant Operations (ww)

General:
Safety & Security

Presenter Info:
Name: Todd Adams
Company: Murfreesboro Water & Sewer Department
Address: PO Box 1477
City, State, Zip: Murfreesboro, TN 37130
Phone: (615) 890-0862
Email Address: tadams@murfreesborotn.gov

Paper Info:

Title of Paper: Accident Investigation for the Water/Waste Water Professional

Date Project Detailed in the Presentation Will Be Complete:
On-going

If Similar Work Has Been Presented Previously, When and Where?
Unknown for AWWA

Abstract Specifics:

Many accidents occur in the United States workforce on a daily basis. Water and waste water workers are part of these unfortunate occurrences, but by implementing a consistent accident investigation program, employers can greatly reduce the frequency of accidents.

Accidents are part of a broad group of events that adversely affect the completion of a task. Accident investigations determine how and why these failures occur. By investigating an accident the information can be used to prevent: similar accidents, promote a healthy workforce, prevent equipment damage, and save money. The intent of this paper is to introduce basic accident investigation procedures and describes accident analysis techniques.

<u>Objectives</u>

After attending this workshop you should be able to:

1. Describe the primary reasons for conducting an accident investigation.
2. Discuss employer responsibilities related to workplace accident investigations.
3. Conduct accident investigation procedures

Basics of Accident:

- What is an accident?
- What is an incident?
- What causes accidents?
    - Unpreventable acts
    - System failure
    - No-fault accidents

Steps for performing an adequate accident investigation

- **Secure the accident scene**
- **Collect facts about what happened**
- **Develop the sequence of events**
- **Determine the causes**
- **Recommend improvements**
- **Write the report**
- **Analyze the facts**
- **Implement Solutions**

Detailed description of the presentation:
Power Point presentation, dry erase board, and various handouts.

Henry Arellano is a Territory Manager for Care Safety LLC in Nashville, Tennessee. He has over ten years experience in safety distribution and is steeped in product knowledge and training. He has a Bachelors of Business from Belmont University and has served on the Safety and Security Committee for Kentucky/Tennessee AWWA for four years. Henry is also a certified OSHA Outreach Training Instructor for both 10 and 30 hour OSHA courses. He is a certified competent fall protection trainer and inspector as well as instrument technician for an array of gas detection manufacturers. He appreciates the fulfillment that what he does on a daily basis will help many people to get home safe.

Every day in the United States thousands of permit required confined space entries take place. Though typically a routine task, there are real hidden hazards that exist. As members of the Safety and Security Committee of the AWWA, we intend to explore many of the hidden dangers that exist during confined space entries. In a one hour session, attendees will be exposed to the importance of hazard specific gas detection, proper rescue and emergency action plans, and the role of each person involved in a quality confined space entry.

At the forefront is the quality of air within a confined space. Most entrants, attendants and supervisors understand the importance of capturing the data in regards to oxygen and other gas levels. Our intent is to unveil the mystery behind gas detection and demonstrate how gases inherently function and affect one another within a confined space. Furthermore we will explore the importance of periodic calibration and bump tests of gas detection instrumentation.

Also in a confined space entry, workers often rely on Fire and EMS agencies for rescue. We will cover the reality that comes with these types of assumptions and the huge risks involved. We will also speak to the proper equipment needed to safely deploy and retrieve personnel form a confined space.

Confined space entry is a group activity and no one person should ever take on an entry on their own. We will discuss the role of each person to be involved in a permit required confined space including their rights and obligations. Attendees will receive all the information needed to ensure that everyone does their part.

As members of the AWWA Safety and Security committee we would be honored if allowed to speak at the 2011 conference. Thank you in advance for your consideration. Should you have any questions, please feel free to contact me at the information below.

Henry Arellano
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Watershed Issues

Session T6A

Jason Heath Biography

Manager – Monitoring, Assessment, and Standards Programs
Ohio River Valley Water Sanitation Commission (ORSANCO)
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Jason Heath is the Manager of Monitoring, Assessment and Standards Programs with the Ohio River Valley Water Sanitation Commission (otherwise known as ORSANCO). Mr. Heath has been with ORSANCO since 1989. He has a BS. Engineering from West Virginia University and an M.S. Environmental Engineering from the University of Cincinnati. He has his E.I.T. in Kentucky and is a board certified Environmental Engineering Member with the American Academy of Environmental Engineers. Mr. Heath currently serves on the WEFTEC Program Committee and is the Vice-Chair of WEFTEC's Surface Water Quality and Ecology Symposia.

POSTER
Submitted by Jason Heath

Ohio River Valley Water Sanitation Commission's Program:

Registry of Distinguished Water and Wastewater Operators

The purpose of this poster is to advertise ORSANCO's Registry of Distinguished Water and Wastewater Operators program to conference attendees. This program was established to give professional recognition to outstanding water and wastewater operators throughout the Ohio River Basin.

I. Purpose of Program

To recognize those water and wastewater operators in the Ohio River Basin (Compact District) who have demonstrated exceptional expertise in the operation of their respective utilities, thereby exemplifying a commitment to quality drinking water and clean streams for its citizens.

II. Eligibility for Consideration

Operators of public, private and industrial water and wastewater treatment facilities in the Compact District who possess the highest certification required by the facility being operated.

III. Process of Election to Registry

1. Nominations of distinguished operators to be considered for recognition and entry in the Registry may be submitted to the Ohio River Valley Water Sanitation Commission offices in Cincinnati, Ohio through state agencies regulating the water and wastewater treatment industry, state level water treatment or pollution control associations or the Commission's Water Users or Publicly Owned Treatment Works (POTW) Advisory Committees.

2. The nominee will be contacted and briefed on the program and evaluation process. The nominee will confirm a willingness to undergo evaluation.

3. For water operator nominees - A member of the Commission's Water Users Committee from the nominee's state will arrange for an on-site evaluation visit by a team of qualified personnel to review the nominee's qualifications. For wastewater nominees - A member of the Commission's POTW Advisory Committee from the nominee's state will arrange for an on-site evaluation.

4. The recommendation of the evaluation team will be forwarded to the Commission office through the Water Users/POTW Committees.

5. In the event a favorable recommendation is forwarded, the nominee's name will be considered by the Commission for election to the Registry.

6. Upon election to the Registry by the Commission, the registrant will be issued a certificate recognizing the date of his election.

IV. On-site Evaluation

Each nominee for the Registry will be evaluated by an on-site visit from a team of qualified personnel representing the following areas of expertise:

1. A minimum of one licensed operator certified by examination in the highest classification in the state and actively engaged in the operation of a treatment facility.

2. An environmental engineer experienced in operations or licensed professional engineer practicing in environmental engineering.

3. A water/wastewater utility administrator.

The inspection team will be assembled by a Water Users or POTW Advisory Committee member or a member of the Registry from the nominee's state. The evaluation should be conducted over the period of one-half to one day and the results thereof transmitted to the Water Users/POTW Committee Chairman along with particular observations and/or recommendations.

To assist the inspection team in its evaluation, an evaluation package, including a "worksheet" will be made available to the inspection team. The worksheet provides a basis for rating a candidate on 13 specific areas of inquiry. As a guideline, candidates should be eligible for evaluation in at least 10 of the areas and should score at least 80 percent of the total possible points for these areas.

Upon completion of the on-site evaluation, the evaluation team will conference to discuss its findings. In order for a favorable recommendation to be forwarded to the Commission through the Water Users/POTW Committee, there must be unanimous opinion of the evaluation team members.

The evaluation team will indicate its findings by forwarding a statement as to whether or not all members agree or do not agree that the applicant should be considered by the Commission for election to the Registry. The evaluation team, in submitting its statement to the Commission through the Water Users/POTW Committee should also submit any and all notes, including worksheets. The Water Users/POTW Committee Chairman will destroy all documents with the exception of the team's finding (agreement or non-agreement) regarding consideration for election to the Registry, which will be forwarded to the Commission office.

V. Certificate of Election

Certificates of recognition may be presented to recipients as guests of the Commission at dinners held in conjunction with the triennial Commission meetings or at functions of state/local operator association meetings. The certificates will be mounted on handsome wood plaques indicating the date of election to the Registry and signed by the Chairman of the Commission and Executive Director.

Moderators Biographical Information

Moderator:	Mark A. Sneve, P.E.
Employer:	Strand Associates, Inc.
Address:	325 West Main Street, Suite 710 Louisville, KY 40202
Phone:	(502) 583-7020
Position:	Senior Associate, Wastewater Discipline Coordinator for KY Offices, Project Manager
Years of Experience:	21
Present responsibilities:	Project Manager of wastewater treatment projects, responsible for all wastewater projects in Kentucky offices of Strand. Worked with CSO communities on compliance and long-term control planning. Worked in regulatory arena throughout career.
Organizational Affiliations:	WEF KY-TN WEA (Watershed Committee) IN WEA KWWOA NSPE, KSPE ASCE ACEC (Environmental Committee, Water Subcommittee)
Education:	BS Civil Engineering, University of Iowa, 1987 MS Civil and Environmental Engineering, University of Iowa, 1989
Licensure:	Professional Engineer in KY, IN, MS, AL, WI and OH
Past Papers:	KY-TN WPC (9 papers) IN WEA (2 papers) WEFTEC (2 papers) KY WWOA (5 papers) Other (4 papers)

Existing Water Quality Standards and Wet Weather Compliance are Mutually Exclusive. Why Does This Have to be the Case?

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ABSTRACT

It is the national goal of the Clean Water Act (CWA) that, whenever attainable, water quality that provides for the protection and propagation of fish, shellfish, and wildlife and further provides for recreation in and on the water be achieved. This is commonly referred to as the "fishable/swimmable" notion of the Act. To help accomplish this goal, water quality standards (WQS) were created.

A WQS defines the water quality goals for a water body, or portion thereof, by designating the use or uses to be made of the water and by establishing criteria necessary to protect those uses. Anti-degradation policies maintain and protect existing uses and high-quality or National/State Resource Waters.

USEPA first promulgated WQS regulations in 1983 and the most recent Amendment to the USEPA procedures for approving state WQS was published in 2008. WQS were initially developed to address wastewater treatment plant discharge impacts to receiving waters during low flow stream conditions. More recently, nonpoint source pollution abatement was introduced to improve water quality via the Total Maximum Daily Load (TMDL) Program. In-stream wet weather flow regimes and non-point source pollutant contributions during wet weather events have historically been ignored in WQS.

States may remove a designated use, as long as it is not an existing use, or establish sub-categories of a use if it can be demonstrated that attaining the designated use is not feasible due to one or more of the six criteria described at Section 131.10(g) of the Act. Most often the criterion of choice is based upon controls more stringent than those required by Sections 301(b)(Secondary Treatment) or 306 (New Source Performance Standards) that result in substantial and widespread economic and social hardship to a community. This demonstration consists of performing a Use Attainability Analysis (UAA) which is a robust scientific assessment of the physical, biological, chemical and economic factors affecting attainment of the pertinent WQS.

Recreation in and on the waters of the United States is a fundamental principle of the CWA. Because pathogenic bacteria are ubiquitous and bacteria concentrations in current water quality criteria are utilized to measure water quality attainment, WQS must be adopted in the context of wet weather. While ambient in-stream water quality is degraded during and immediately after wet weather events, there comes a point at which no further investment should be made to

David S. Pyzoha, PE, BCEE

Dave is a 1972 graduate of Cleveland State University with a Bachelors of Civil Engineering degree. He is a registered professional engineer in both Kentucky and Ohio. Dave joined Gresham Smith and Partners in 2007 as a Principal in the Water Services Group serving offices in Cincinnati, Columbus, and Louisville. He currently manages the Cincinnati Office.

His 37 year career has allowed him to develop a diverse technical background in storm water management, storm water utility development, watershed management, wet weather consent decree programs, and most recently environmental sustainability.

Dave has written and presented several technical papers on stormwater management, stormwater utility development, and the integration of GIS and computer modeling to analyze and solve water related problems. He is also a published author. The book was written for municipal agencies to help guide them through changing stormwater management regulations and is titled Implementing a Storm Water Management Program, through CRC Press.

Holistic Watershed Management
Turkey Run Stormwater Management Basin

David S. Pyzoha, PE, BCEE
Gresham, Smith and Partners

Columbus Regional Airport Authority (CRAA) is implementing a major program to reshape airfield and customer service facilities at Port Columbus International Airport (CMH), Columbus, OH. The program involves multiple phases, involvement with many regulatory agencies and environmental compliance issues. Gresham, Smith and Partners (GS&P) prepared a stormwater management plan (SWMP) to aid CRAA plan for the integration of current and future elements of the Program Management Airport Development Plan (PMADP). The goal of the SWMP was to cost-effectively implement build-out capacity of the stormwater system through the development phases. GS&P recognized the need for a holistic approach to stormwater management since there were three major watersheds within the airport operations area affected by the proposed improvements. Holistic Watershed Management is based upon "***emphasizing the importance of the whole and the interdependence of its parts***".

The Turkey Run Stormwater Management Basin was the key facility in the PMADP. The design of the basin required leadership and facilitation from GS&P and CRAA when it became apparent strict compliance to all engineering, environmental, and permitting aspects of the project would require compromise. This paper will overview the process and results of how key issues, conflicting design criteria, alternatives considered, and negotiated solutions were accomplished leading to approval of construction permits with multiple agencies.

The SWMM model was used as the major analytical tool to simulate conditions through each development phase. The SWMP provides direction for the implementation of runoff controls based upon the anticipated progression of airport projects included in the PMADP. Turkey Run Stormwater Management Basin provided approximately 23 acres of open space just south of the airport operations area (AOA). Turkey Run, a highly impacted stream due to industrial activities, generally bisects the proposed basin area. The proposed area is strategically located to minimize the need for stormwater control facilities within the AOA. The presence of the stream, endangered species habitat, small wetland areas, and funding/permitting requirements complicated the process. The Turkey Run Stormwater Management Basin design offered many lessons learned regarding the benefits of early and continuous activism with federal, state, and local officials. Opening lines of communication expedited several interdependent solutions that in a holistic perspective allowed for the resolution of policy and criteria conflicts associated with engineering design and environmental permitting requirements.

The presentation will discuss the process, goals and objectives, performance criteria, and construction status. A brief list of issue resolution to be discussed includes:

- Meeting Stage-Storage-Discharge criteria for City of Columbus and FAA
- Meeting runoff water quality standards for City of Columbus and Ohio EPA
- Design for phased development conditions
- Groundwater and slope stability
- Creating an environment to distract large waterfowl
- Mitigating Turkey Run using a self-forming stream design
- Wetlands mitigation
- Basin enhancements to downstream flooding conditions
- Construction Sequencing with the proposed runway improvements
- 5-Year Maintenance Plan

Watershed Issues

Session T6B

Name: Alanna Malone

Title: Assistant Director, Center for Water Resource Studies, Western Kentucky University.

Education: B.S. Geography/Chemistry, 2005, Western Kentucky University

Licensing & Certifications: Licensed Wastewater Treatment Plant Operator Class I, State of Kentucky – Certification No. 15591. Geographic Information Systems (GIS) Certification – WKU. Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP) user and trainer through National Association of Sewer Services Companies (NASSCO) – Certification No. T-706-3608. Certificate of Training on Fundamentals of Construction Site Erosion and Sediment Control.

Experience: Alanna Malone is currently employed by the Center for Water Resource Studies at Western Kentucky University (CWRS-WKU) as the Assistant Director. Her primary responsibilities include but are not limited to: creating educational materials for wastewater treatment systems; using Geographic Information Systems (GIS) technology to assist public wastewater utilities in system characterization; providing wastewater operators with training and education regarding water sampling, analysis and certification preparation; and assisting small communities with aging onsite wastewater management systems. She has assisted municipalities with combined sewer systems by means of mapping, manhole inspections, smoke testing and generation of a plan to address major storm and sewer line issues. Aside from aiding combined sewer systems, Mrs. Malone has also worked with Kentucky Rural Water Association (KRWA) in the areas of mapping, smoke testing, and camera work for small utilities throughout the state. Work was recently completed on a major subcontract that involved the review of GPS data collected for water features, in which Alanna was responsible for field operations and quality control management, data verification and quality assurance/quality control. A bonus was awarded by the customer for accuracy and timeliness on this project. Other project experience includes sampling at Bacon Creek in Hart County in conjunction with KDOW, sampling in the Long Falls and Panther Creek area for a TMDL project in conjunction with KDOW, and mapping of storm water outfalls using GPS/GIS. Prior to the Field Operations Manager position with the CWRS, Mrs. Malone was employed at the WATERS Laboratory (September 2004 through December 2005) as a Lab Analyst. She was responsible for various analyses of water samples according to Standard Methods for the Examination of Water and Wastewater.

Comparison of a Stochastic and Mechanistic Approach for Total Maximum Daily Load Development

Alanna Malone, Dr. Andrew N. Ernest, Ph.D, P.E., BCEE, D.WRE

Center for Water Resource Studies, Western Kentucky University

The Clean Water Act requires states to develop lists of impaired waters, which are *waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards* (1). Water bodies are evaluated to determine if they support their designated uses (ex: domestic water supply source, aquatic habitat, primary contact recreation, fish consumption, etc). The level at which the designated use is supported is based on water quality criteria developed to protect this use. The impaired waters list, also known as the 303(d) list, is a list of water body/pollutant combinations for which a Total Maximum Daily Load (TMDL) must be developed. A TMDL is a calculation of how much pollutant may be allowed into a water body while meeting all of its designated uses. This study will compare the calculation of a TMDL for one pathogen impaired segment using two different approaches; a predominantly stochastic Load Duration Curve (LDC) method and the more mechanistic/deterministic approach employing a hydrologic and water quality model.

The LDC process is a stochastic-dominant approach as it relies on historical hydrologic data to assess the exceedance probability for stipulated in-stream water quality carrying capacity. EPA considers this method applicable because it allows for characterizing water quality concentrations at different flow regimes, and stream flow is an important factor in the determination of loading capacities (2). A key requirement of the LDC approach is development of a statistically representative Flow Duration Curve (FDC) for a specific assessment point in the impaired segment. Historical stream gauge data is the most representative resource for this. For this study, in the absence of historical stream gauge data in the vicinity of the impaired segment, the Water Availability Tool for Environmental Resources (WATER) application (USGS) was used to estimate flow statistics.

Mechanistic approaches rely on mathematical models that explicitly define the physical, chemical, and biological processes affecting the fate and transport of contaminants through the watershed. Appropriately calibrated, deterministic models are used to iteratively determine the maximum load that the impaired segment can receive before exceeding the water quality standard. A variety of mathematical models exist for simulating (i.e., deterministic modeling) the fate and transport of various constituents in the environment. For this study, the Hydrological Simulation Program – FORTRAN (HSPF) model was selected based on its incorporation of contaminant fate and transformation with mechanistically-based hydrologic transport processes, and its integration within EPAs BASINS 4.0 assessment toolbox.

The LDC and mechanistic modeling approaches determine a TMDL in significantly different ways. The LDC approach is end-point driven, relying on representative in-stream flow statistics to derive the maximum load, while the mechanistic modeling approach is process-driven, relying on adequate representation of pollutant fate and transport theory. While each approach has its own merits, no metrics currently exist to support the validity of one approach over another in any given situation. The goal of this study is to identify key application parameters that may subsequently be investigated in greater detail. For the purpose of this study, the TMDL for a single pollutant/water body combination will be developed using both approaches. Qualitative insight as to the potential application parameters are expected to be elucidated during the process.

References:

1. http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/glossary.cfm#303dthreatenedimpairedwaters

2. An Approach for Using Load Duration Curves in the Development of TMDLs – August 2007 – EPA 841-B-07-006

David S. Pyzoha, PE, BCEE

Dave is a 1972 graduate of Cleveland State University with a Bachelors of Civil Engineering degree. He is a registered professional engineer in both Kentucky and Ohio. Dave joined Gresham Smith and Partners in 2007 as a Principal in the Water Services Group serving offices in Cincinnati, Columbus, and Louisville. He currently manages the Cincinnati Office.

His 37 year career has allowed him to develop a diverse technical background in storm water management, storm water utility development, watershed management, wet weather consent decree programs, and most recently environmental sustainability.

Dave has written and presented several technical papers on stormwater management, stormwater utility development, and the integration of GIS and computer modeling to analyze and solve water related problems. He is also a published author. The book was written for municipal agencies to help guide them through changing stormwater management regulations and is titled Implementing a Storm Water Management Program, through CRC Press.

<u>Timing and Education is Everything in Adopting a Stormwater Management Utility</u>

David S. Pyzoha, PE, BCEE

Gresham, Smith and Associates

Compliance with EPA stormwater regulations has placed a huge financial burden on community budgets. Stormwater utilities have been a successful recourse over the last 25 years. Historically, educating the electorate and strategic timing has played a huge role in the successful programs.

GS&P has been working in southern Alabama as a facilitator with the Baldwin County Watershed Coalition (BCWC) through the <u>Mobile Bay National Estuary Program</u> to develop a stormwater management program and utility to meet unfunded federal water quantity and quality regulations. The BCWC is an extraordinary volunteer organization that was started nearly five years ago. The organization is represented by more than a dozen local cities, Baldwin County, and elected representatives of the State Senate and House of Representatives, and local environmental and watershed protection interest groups. This broad-based group recognized the importance to protect the environmental and ecological richness of the area in order to grow the local economy, protect property values, and attract a high level of tourism and commercial activities adjoining the Gulf of Mexico and Mobile Bay. The benefits of the stormwater program will allow the BCWC to foster projects on a watershed basis across political boundaries versus fragmenting or phasing through each governmental entity.

The paper will review the goals, vision, needs analysis, and legal issues to develop a coalition based stormwater utility not under the authority of a single governmental entity. When the public is asked to contribute more of their discretionary income to a program that often is misconstrued as a tax, timing and the awareness of value has to be right for the electorate to agree. The old adage, "timing is everything" applied itself. The Gulf oil spill, the economic recession, and the political climate associated with fiscal responsibility all happened leading up to a resounding "NO" vote on November 2nd. The issues of 2010 created monumental pressure for continued political endorsements. Without doubt the high unemployment rate and loss of business revenue due to the Gulf oil spill were contributing factors.

The importance and benefits for the program to continue are still there. The paper will outline the next steps to re-educate the electorate through an outreach campaign to reassess the organizational structure, reinforce local needs, promote the benefits the BCWC can facilitate, and justification of the user fee structure to fund the program to meet the vision of comprehensive watershed management and long term sustainability of the built environment using "green" and "gray infrastructure" best management practices.

Scott Hall is the Manager of ENVIRON's Ecotoxicology Group in Brentwood, Tennessee. He oversees the aquatic toxicology laboratory, and various projects related to industrial effluent discharge compliance. Specific expertise relates to conducting toxicity identification evaluations, biological and water quality assessments, and deriving site-specific discharge limits for toxics. Mr. Hall has a Masters Degree in Aquatic Toxicology and over 20 years experience consulting to various industries in areas related to NPDES permit compliance.

Review of USEPA's Draft Ammonia Water Quality Criteria–Role of Freshwater Mussels & the Unique Implementation Issues Related to the Proposed Criteria.

Scott Hall, ENVIRON International Corporation.

USEPA's proposed freshwater ammonia water quality criteria (WQC) have not been finalized pending public comment. However, some form of the draft criteria will be adopted by USEPA, and subsequently by state regulatory agencies who will implement these criteria into NPDES discharge permits. Like past (1999) ammonia WQC, the proposed criteria are pH- and temperature-dependant. The re-derived criteria make use of a much larger database than the 1999 criteria derivation, and include data on freshwater mussels. Addition of the mussel toxicity test data results in much lower ammonia criteria for the "mussels present" condition. While the data on ammonia toxicity to mussels consistently indicates such species are highly sensitive to ammonia, there are some test protocols and other concerns related to the data used in criteria re-derivation. Additionally, there are issues related to the environmental relevance of the mussel toxicity test data with respect to the way WQC are applied in discharge permits, and there are key concerns related to the way WQC are applied in the NPDES discharge program. This presentation will update the status of the proposed ammonia WQC, present the strengths and concerns related to the proposed criteria, and highlight potential issues related to the implementation of the criteria in the NPDES discharge program.

Wastewater Process Operations

Session T6C

Education
Bachelor of Science in Civil Engineering, 1992
Auburn University, Alabama

Professional Registrations
Professional Engineer
AL, TN, KY, GA, NCEES

Membership/Affiliations

AWWA, WEF, SAME

Kevin W. Kennoy, P.E.
Senior Project Manager

Kevin Kennoy is the East Water Services Leader and a Vice President of Garver with nearly 20 years of water and wastewater experience. He has provided project management and engineering design expertise for municipal, federal and private clients ranging from small scale to complex treatment plant and collection/distribution project assignments in Alabama, Georgia, Kentucky, Indiana, Florida and Tennessee. Over the past 5 years, Mr. Kennoy has led several wastewater treatment projects which involved energy reduction and management utilizing various GREEN technologies and operational adjustments. Some example technologies and operational adjustments include fine bubble/adjustable blower vane system, increased biogas production/alternative fuel use and recycle/reuse water applications.

Past experience includes operations engineer and management duties for a subsidiary of the largest private, investor-owned water utility in the United States. His preliminary design experience includes hydraulic studies, I/I reduction, and wastewater facility master planning. He also has extensive experience in planning, management, and development of plans and specifications for rural development, State Revolving Fund, Community Block Grant, and Environmental Protection Agency projects in Alabama and Kentucky.

PAPER ABSTRACT

2011 KY- TN Water Professional Conference

July, 2011 - Covington, KY

Title: _"Achieving Green Energy Management Solutions at WastewaterTreatment Facilities "_

Presenter(s): _Kevin Kennoy, PE,_

Company/Organization: _Garver,LLC_

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Energy represents the largest controllable cost for water and wastewater utilities. Large pumps, blowers, drives, motors, and other equipment often operating 24 hours a day, consume precious water and wastewater utility dollars which if saved could help finance needed manpower or infrastructure. With Tennessee and Kentucky utilities experiencing increased costs to operate and stagnant or dwindling income, it is imperative for water and wastewater utilities to become more efficient in the management of their resources. This presentation will provide listeners with the basis for and the tools to implement a systematic program to minimize energy usage and cost, without sacrificing treatment objectives and performance. An example case study will be presented that shows steps that one municipality took to achieve a GREEN solution. In fact, thus type of project qualifies for SRF Principal Forgive Program using GREEN technology solutions. Below is a description of the example project.

Back in **1955,** *in the US, 7 out of 10 families owned a motor car, new laws were put in place requiring* **seat belts** *to be installed on all new cars, the* **average wages** *were $3,851 per year, the minimum wage was raised to $1.00 per hour, the* **first McDonalds** *was erected in 1955,* **TV dinners** *appeared, the* **first cans of Coca-Cola** *were sold,* **rock and roll music** *saw the likes of more idols including Elvis Presley , Bill Haley and the Comets, Chuck Berry and The Platters. Oh and by the way, the Rocket City's first major central wastewater treatment facility was constructed to treat 10 mgd of wastewater prior to reaching the meandering Spring Branch creek as it flows to the Tennessee River. Fast forward 55 years to 2010 and the City still has to not only operate and maintain the original plant and subsequent expansions (41 mgd total capacity today) over the years, but has to face increasing regulatory treatment demands, reduced city tax revenue and escalating fuel/energy costs. Garver was hired by the City to assist plant operations personnel in increasing the life of the existing sludge handling/biogas facilities while identifying ways to reduce operational/energy costs. Garver was successful in this endeavor and was able to make relatively minor modifications to the existing sludge thickening/digestion facilities in order*

to reduce the dependence on the oldest footprint of the treatment plant thus reducing overall plant labor, maintenance and energy costs by almost 25%. In addition, a new FOG treatment facility is designed to directly impart FOG into the digestion process to increase biogas production. With increased biogas production, modifications were made to the existing multi-energy boiler to add biogas as a energy to further reduce natural gas and maximize the use of biogas generation.

DAN GUMMERSHEIMER, P.E.

Division Manager

Profile

A highly educated professional engineer, Mr. Gummersheimer has a strong background in project and construction management. He joined Alliance Water Resources in 2005 as project manager and was promoted to division manager in 2007.

Current Responsibilities

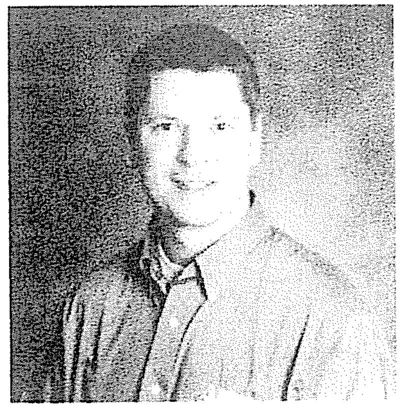
Mr. Gummersheimer oversees Alliance divisions in the Missouri cities of Bowling Green, Elsberry and Troy, as well as Public Water Supply District #1 of Ralls County, Mo. Those systems include two contracts for full public works services, a rural water distribution system with administration and utility billing, and a state-of-the-art membrane bioreactor wastewater treatment utility. For each division client, he supervises client service, contract obligations, and regulatory compliance.

Prior Experience

As Project Manager for Alliance Water Resources, Mr. Gummersheimer was responsible for overseeing client projects from conception to completion. He acted as client (owner) representative for all aspects of project planning and budgeting while overseeing design and construction. His activities as owner's representative assured client's projects progressed on schedule, within a prescribed budget and in conformance with scope and quality requirements.

Mr. Gummersheimer worked for more than five years as senior project manager for the Bi-State Development Agency Cross County MetroLink extension in St. Louis where he ensured that utilities were protected during construction of the light rail system. In addition to coordinating utility interests with outside agencies (including private companies and state governments) he administered agreements, easements, cost estimates and project documentation.

As civil engineer for the City of Webster Groves, Mo., Mr. Gummersheimer oversaw major capital improvement projects for the City. He has also served more than five years as system engineer for a private water company in St. Louis County.



Areas of Special Expertise

- Construction and Project Planning and Management
- Contract Administration
- Plan Reviews

Education

- Graduate Certificate in Project Management -- DeVry University Keller Graduate School of Management
- Master of Business Administration -- DeVry University Keller Graduate School of Management
- Bachelor of Science in Civil Engineering -- University of Illinois

Certifications/ Registrations/ Memberships

- Registered Professional Engineer - Missouri, Illinois
- American Society of Civil Engineers
- American Water Works Association
- American Public Works Association

WWTP Energy Efficiency Improvements
Daniel A. Gummersheimer, P.E. - Alliance Water Resources

Summary: In March 2010, Alliance Water Resources (AWR) worked with vendors to provide and install equipment which improved the aeration process at the municipal wastewater treatment plant (WWTP) in Bowling Green, Missouri. The aeration process improvements included replacement of coarse bubble diffusers with fine bubble diffusers as well as the addition of variable frequency drive units which were connected to the existing blower assemblies which in turn provide air supply to the two aerations basins. As a result of the completed aeration process improvements, the WWTP realized a reduction in electrical power demand (in monthly kilowatt-hours used) averaging 40% or greater. The municipality attained immediate benefits through reduced electrical energy consumption, lower monthly electricity bills, reduced quantities of produced sludge, and a one-time incentive of $55,220 from the local electricity provider, Ameren UE, for implementation of the energy efficiency improvements. The rebate incentive lowered the actual project cost from $120,227.63 to $65,007.63 or a project cost savings of 46%.

Project: AWR formed a partnership with Environmental Dynamics, Incorporated and Vandevanter Engineering to explore and estimate project feasibility pertaining to the installation of two variable frequency drive units, the replacement of coarse bubble diffusers with fine bubble diffusers within the two aeration basins and two digester basins, and the reprogramming of the SCADA controls which integrate equipment operations with the attributes of the influent wastewater. AWR agreed to fund the estimated $120,000 in capital improvements for the city through an enhanced operations contract. The city achieved electrical savings through the use of the aeration process improvements which can be summarized below:

- VFD units controlled the rotational speed of the electric motors connected to the three, positive displacement blowers which provide air flow to the two aeration basins.
- Modern, fine bubble diffusers required less air volume than coarse bubble diffusers and provided air flow over a larger surface area of the basin.
- Lower air volume requirements in each aeration basin reduced the air supply demands required from each blower which in turn reduced the electric demands from approximately 75 hp per basin to 20 hp per basin.

Furthermore, the city saved additional money since the local electrical utility provider implemented an electric rate increase of 10% and the city's aeration process improvements demanded less electric power for operations as well as savings through fewer trips related to land application of sludge since the sludge volume decreased as a result of the operations modifications.

Mr. Ron Latimer is a Senior Associate with Hazen and Sawyer. He has a Bachelor's in Civil Engineering and Master of Science in Environmental Engineering from Georgia Tech. He has over 15 years of experience in wastewater treatment plant design including study, optimization, and design of numerous wastewater treatment plants with specialization in BNR/ENR process design and modeling.

He is currently leads the BioWin process modeling group for Hazen and Sawyer and provides company-wide process support and review. Mr. Latimer has performed or provided oversight of BioWin process modeling including field testing, calibration and application of the model for process design and optimization at over 30 BNR/ENR facilities.

Potential Pitfalls in Process Model Calibration and Application

Ron J. Latimer, P.E., Paul A. Pitt, Ph.D., P.E,
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Over the past few years, utilization of advanced activated sludge process simulation models such as BioWin and GPS-X has increased significantly. These process simulation models, when properly calibrated and applied, are powerful tools for evaluation, optimization, and design of BNR/ENR plants. When considering stringent effluent nutrient permit limits, particularly ENR limits, utilization of a properly developed and calibrated model using site specific wastewater characterization is highly recommended. Site specific wastewater characterization and calibration of the model is critical to achieving accurate simulation results for ENR plants. We have conducted detailed wastewater characterization and model calibration for more than 30 wastewater facilities, many of which are BNR/ENR plants, over the last five years. From this experience, many potential pitfalls have been identified related to model calibration and application.

Use of uncalibrated models has risks associated with it; however, use of an incorrectly calibrated model that was calibrated to bad data or incorrect assumptions can be even worse. Issues that can have major impacts on model calibration include sampling and analysis problems, non-ideal flow splitting, backmixing within reactors, flow meter calibration, and non-ideal DO control. Case studies will be used to demonstrate the issues found and the potential major impacts to model calibration. This paper will summarize the results of these efforts, illustrate the impacts and key issues to BNR/ENR modeling and design, summarize issues and potential pitfalls identified when carrying out the sampling plans and plant calibration, summarize lessons learned, and provide recommendations for improving these efforts.

Emergency

Session T6D

EMERGING CONTAMINANTS –
RISK, REGULATIONS AND TREATMENT TECHNOLOGIES

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CREDENTIALS
Registered Professional Engineer in Tennessee, Kentucky and Ohio

EXPERIENCE
Dr. Bell is an environmental engineer with CDM with over 14 years of experience in research, selection, design and optimization of water/wastewater processes. Kati is CDM's national technical resource group leader for wastewater disinfection and much of her research is focused on implementing new technologies and improving conventional processes to meet increasingly stringent regulatory limits on disinfection across the country.

EDUCATION
B. S. Biochemistry, University of Dallas
M.S. Biology, Tennessee Technological University
M.S. Civil Engineering, Tennessee Technological University
Ph.D. Environmental Engineering, Vanderbilt University

EMERGING CONTAMINANTS –
RISK, REGULATIONS AND TREATMENT TECHNOLOGIES

Katherine Bell[1], Ph.D., P.E., BCEE

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Abstract

Described as microconstituents, emerging contaminants of concern. endocrine-disrupting compounds. and pharmaceuticals and personal care products, these compounds are ubiquitous in the surface water environment and studies conducted to date suggest that municipal wastewater is likely the primary source. Recently. the USEPA Office of Research and Development (ORD) developed a prioritization of compounds for research based on ranking by predicted risk to human health or aquatic life. Additionally. ORD has initiated a national survey of major municipal effluents which would identify a worst case scenario for concentrations likely to be encountered in surface water, ground water. or drinking water. Results for individual plants will be reported to the corresponding plant operator and EPA Region and will be published in a peer-reviewed scientific manuscript, describing the WWTPs and emerging contaminant results. but will not reveal which measurements come from which plant.

While results of this survey will not directly result in regulations. many expect that when regulations do begin to be implemented, they will be done so on a state-by-state basis. One potential regulatory course is to limit microconstituents in wastewater discharged to the environment through the authority in the Clean Water Act under provisions of maintaining suitable ecological conditions in receiving waterbodies. Additional regulations may develop through the annual review of effluent guidelines and pretreatment standards.

Looking forward, WWTP owners and operators do have some insight into treatment opportunities. The vast majority of microconstituents are organic compounds, making them potentially treatable by conventional processes. Research has shown that many compounds are incidentally or partially removed by sorption, biological decomposition (partial), and chemical oxidation. One of the most promising processes for enhancing the removal of microconstituents is disinfection. With increasing concerns of risk management for gas chlorine systems, there are opportunities to plan for future regulations during facility upgrades. For example, treating compounds through an enhancement of disinfection, such as an advanced oxidation process (AOP) can be an effective removal mechanism. UV disinfection, if modified to operate as an AOP, can be effective at altering and/or removing many compounds. A newcomer to the wastewater disinfection market is ferrate, which at some pH conditions has a higher redox potential than ozone and can address microconstituents.

The objective of this paper is to provide an overview of disinfection processes and enhancements and summarize the most recent information on fate of microconstituents through these processes. Chlorine, ozone. UV-AOP and ferrate will be included. Additional discussion will be provided on the use of these disinfection processes to target specific groups of contaminants. in anticipation of potential future regulations.

Jennifer Baldwin Bio

Dr. Jennifer Baldwin has more than nine years of experience in the engineering profession. She has been active in AWWA since becoming a member in 2002, serving as the current chair of the Inorganics Committee as well as vice chair of the committee for the past two years and participating on several local AWWA committees. Dr. Baldwin holds a B.S. degree in Chemical Engineering and a Ph.D. in Civil (Environmental) Engineering from Purdue University. After completing her Ph.D., she worked for HNTB as a project engineer, focusing mainly on drinking water treatment plant design. In 2006, she joined CH2M HILL's Knoxville office where she provides process mechanical expertise on a variety of infrastructure development projects. Dr. Baldwin currently serves as Chief Engineer and QA Manager for the Baton Rouge SSO Program, which includes more than 84 projects to be constructed in five years. Dr. Baldwin has her professional engineer's license in Indiana and Tennessee, where she currently resides.

Emerging Issues in Drinking Water Treatment: The ABCs

Jennifer D. Baldwin, Ph.D., P.E., CH2M HILL

Over the last several years, many drinking water contaminants of concern have come under public scrutiny. As the public becomes more well informed, drinking water contamination becomes a bigger issue. Drinking water treatment professionals must become more aware of the contaminants and how to interact with the public.

Emerging contaminants are assigned to a broad spectrum of categories, including inorganics, organics, microbial, and disinfection byproducts. Inorganics of recent concern include arsenic, perchlorate, lead and copper, and nitrogen compounds (ammonia, nitrate, and nitrite) as well as lesser known contaminants, such as antimony and anionic disinfection byproducts. Organic contaminants include pesticide and pesticide byproducts, disinfection byproducts, endocrine disruptors (such as DDT and PCBs), and personal care products (such as triclosan, the active ingredient in most antibacterial soaps).

The Stage 2 Disinfection Byproducts Rule and Long Term 2 Surface Water Treatment Rule were enacted to protect public health from both microbial contaminants and disinfection byproducts. These contaminants have been regulated together, since the disinfectants used to inactivate microbial contaminants can create harmful byproducts when reacting with inorganic or organic matter in the water. Microbial contaminants listed on the Contaminant Candidate List (CCL) 3 include Adenovirus, Hepatitis A virus, and *E. Coli 0157*. Regulated disinfection byproducts include trihalomethanes (THMs), haloacetic acids (HAA5s), chlorite/chlorate, and bromate. Nitrosoamines, including N-nitrosodimethylamine (NDMA), are listed on CCL3 as possible disinfection byproducts from utilizing chloramines for disinfection.

This presentation will focus on a literature review of the state of emerging contaminants in drinking water. Specifically, the focus will be on treatment methods to remove multiple contaminants, such as these emerging contaminants of concern. This presentation will also discuss the difficult balance between budgets, meeting regulations, and protecting public health.

Nora Kim is a process engineer with Jacobs Engineering Group. She received her B.S. in Civil Engineering from Rutgers University and her M.S. in Environmental Engineering from the University of North Carolina - Chapel Hill where her research was focused on disinfection by-products.

Wastewater Disinfection: New and Emerging Technologies

By: Nora Kim
Submitted for 2011 KY-TN WPC

The disinfection of wastewater effluent for reuse is becoming more common as water suppliers are impacted by increasing water demands and drought. A growing body of knowledge on disinfection by-products and the increasing importance of emerging contaminants, such as endocrine disrupting chemicals and pharmaceuticals and personal care products, have resulted in more restrictive limits for water reuse. Also, they have provided drivers for innovative research for new alternatives for disinfection and exploration of their ability to remove emerging contaminants. Some states have already begun to propose limits for DBPs and many have decreased coliform limits for reuse applications. Research on the impact on existing methods of disinfection such as chlorine has shown that the degradation products of some pharmaceutical compounds in combination with chlorine has been found to be more toxic than the parent compound.

Some of the new and emerging technologies include peracetic acid, pasteurization, advanced oxidation processes, and ultrasonic cavitation. Several pilot and bench scale studies have been published on the use of these new methods. Their varying potential for use in full-scale applications for both disinfection and reduction of emerging contaminants are discussed.

The use of combined disinfection to provide multi barrier disinfection has been studied at the pilot scale. This approach includes combining existing technologies such as chlorine and UV disinfection and new and emerging technologies with existing technologies, such as peracetic acid and UV disinfection. Several pilot studies have been published on the use of combined disinfection.

The purpose of this presentation will be to present an overview on the pros and cons of new and emerging wastewater disinfection technologies. Case studies of the disinfection efficacy and simultaneous removal of emerging contaminants from available literature will be presented.

Industrial Pretreatment

Session T7A

Jeff Pintenich, Brown and Caldwell

- Jeff has 36 years of environmental and civil engineering experience with solid and hazardous waste, wastewater treatment, and air pollution control projects for industry. He has designed and/or prpeared closure plans for thousands of acres of waste impoundments during his career.

- He is Vice President and Technology Director, Private Sector, for Brown and Caldwell; he functions as Chief Engineer for their practice of over 400 Private Sector professionals providing a wide array of environmental engineering and scientific services

- He earned his B.E.in Civil Engineering from Vanderbilt University in 1973 and M.S.in Environmental Health Engineering from The University of Texas at Austin in 1976.

- In October 2009 he received the Hazardous Waste Management Award for Design and Operational Excellence from the Water Environment Federation.

- In April the Board of Directors of the American Academy of Environmental Engineers Certified him by Eminence in the profession as a Board Certiied Environmental Engineer.

NPDES Impoundment Risk Assessments Spawned by the Kingston, Tennessee December 2008 Ash Release

Jeffrey L Pintenich, PE, BCEE, CHMM
Brown and Caldwell, Nashville, Tennessee

The very unfortunate failure of the Tennessee Valley Authority (TVA) coal ash impoundment in Kingston, Tennessee in December 2008 initiated a series of debates about the relative hazards posed by similar waste impoundments, as well as discussions about the nature of coal combustion residue or CCR. Although some of the numbers are still being debated, approximately one billion gallons of coal ash was released form the 84-acre Kingston site, impacting two rivers, and destroying about 50 properties were destroyed. Clean-up costs are estimated at $1 billion over a four-year period. EPA has proposed a set of regulations to further regulate CCR storage/disposal sites. In addition, state environmental agencies have been questioning the adequacy of their approaches to verifying the integrity of wastewater and waste sludge surface impoundments. This paper summarizes the approach chosen by the State of Tennessee, and describes the risk assessment conceived and applied by Brown and Caldwell to address the State's requirements for clients. This approach will have application to facilities in other states as well.

The principal substance of the new Tennessee requirement is as follows. "Within six months from the permit's effective date, the permittee shall submit ...... a report which addresses the process and structural integrity of its wastewater treatment facilities (including ponds/berms). The integrity of the permittee's waterborne wastes and sludge storage/disposal units shall also be evaluated. This report shall also address measures implemented and planned by the permittee to reduce the chances that a wastewater treatment facilities/unit failure would result in an uncontrolled discharge to the local receiving streams. The integrity failure evaluations and upgrade options, considerations, recommendations shall be completed by independent professional engineers, environmental management professionals, or other experts deemed qualified by the Division. The report shall document that the permittee has evaluated the integrity results/recommendations, and include the permittee's planned integrity upgrades, as warranted. The permittee's risk assessment results and determinations shall dictate the scope of the integrity evaluation and report."

Our approach, which will be described in greater detail in the paper and presentation, involves identifying potential process, structural, and geotechnical risks and assigning them one of four consequences relating to severity (e.g., negligible or catastrophic), in addition to one of five probability of occurrence categories , such as frequent or improbable. In combination, these types of attributes are employed to assemble an Integrity Risk Assessment Matrix, which ranks potential consequences and probabilities of occurrence into those which exhibit low, medium, serious, and high risks to safety and the environment. These risks are then addressed as appropriate by corrective actions, enhanced inspection and monitoring, further evaluations, etc. Three example sites are assessed and the outcomes summarized to demonstrate the utility of this approach.

Dennis E. Purschwitz, P.E.

Mr. Purschwitz has over 20 years leachate treatment experience. He has participated on the leachate management committees for several major commercial landfill companies. He was the author and instructor of the SWANA leachate management training course. Mr. Purschwitz is a Principal with Civil Environmental Consultants, Inc. in their Franklin, Tennessee office. He has 25 yrs wastewater treatment plant design experience overall.

Pete A. Shack, P.E.

Mr. Shack is a registered professional engineer in over 15 states and a licensed wastewater treatment operator. He has over 35 years experience as a process engineer treating all types of industrial wastes. He has studied, designed, permitted, constructed, started-up, or operated over 100 treatment plants. Mr. Shack received his Master of Science degree from Texas A&M University in Civil Engineering. He has been a member of the KY-YN WEA for 32 yrs. He is the president of Phoenix Environmental Engineers, Inc. in Nashville.

MEMBRANE BIOREACTORS APPLIED TO TREATMENT OF LANDFILL LEACHATE

Dennis E. Purschwitz, P.E. and Pete A. Shack, P.E.

Many landfills are treating the leachate on-site as the cost of transportation and regulatory requirements drive off-site disposal costs higher. The use of on-site biological treatment to pretreat MSW landfill leachate containing high levels of ammonia (NH_3-N) and COD has been in practice for some time. Conventional complete-mix activated sludge, sequencing batch reactors (SBR), treatment lagoons, artificial wetlands, and other configurations have been employed. The application of membrane bioreactor (MBR) technology to enhance biological treatment performance is new and provides significant advantages for difficult to treat leachates. This paper describes the first application of a new MBR technology to treat leachate in the southeastern US.

Treatment investigations were conducted that demonstrated NH_3-N levels of 2500 mg/L in leachate from landfills where aluminum dross was disposed could be converted to nitrate (NO_3-N) using biological nitrification in the presence of inhibitory substances as consistent removal of NH_3-N to less than 10 mg/L was achieved in a year long study. High solids carryover in the effluent due to inhibition and long sludge ages led to consideration of alternatives to reduce the loss of biomass in the effluent. Membrane filtration technology provided the unique opportunity to control solids inventory and at the same time reduce the size of treatment units. A review of the treatment investigation results and resulting process design is presented and compared to conventional technology in terms of the advantages, disadvantages, and costs.

Start-up and full scale operating experience with the submerged membrane system is also described and discussed. Full scale performance data is provided for nitrification of over 2,000 mg/L ammonia to less than 1 mg/L. Particularly, the lessons learned and controls needed to successfully implement this technology are reviewed and explained.

BIO

Reinaldo González, Ph.D.

Dr. González is an Associate Environmental Engineer and Project Manager with Burns & McDonnell located in Kansas City, Missouri. He has a B.S. in Chemical Engineer from the Universidad del Zulia, Venezuela, MS and Ph.D. Degrees in Environmental Engineering from Oklahoma State University. He has experience in design and operations of industrial and municipal wastewater treatment systems. Industrial clients include food processing, refining, petrochemical, pharmaceutical, automotive, and metal finishing.

ABSTRACT 1

Pretreatment Feasibility Analysis at a Food Processing Facility

An evaluation of alternatives for additional on-site pretreatment versus discharge to a POTW will be presented. The existing on-site pretreatment facility was evaluated and recommendations for improvements and/or replacement will be included in the presentation. The existing on-site pretreatment included only pH adjustment and an aerated lagoon. Six pretreatment alternatives were evaluated for additional pretreatment including: advantages and disadvantages, capital cost, operation and maintenance cost, and life cycle analysis. Annual rates/surcharges and life cycle cost for discharging to a POTW facility was also included in the evaluation.

ABSTRACT 2

Conductivity Reduction Feasibility Analysis at a Meat Processing Facility

Client retained Burns & McDonnell to perform a feasibility assessment for the reduction of specific conductivity (SC) in the wastewater from their meat packing facility. The SC in the final effluent from the on-site wastewater pretreatment plant has been less than 3,700 μS/cm which is the permit limit; however, a new SC limit of 2,200 μS/cm was impossed. The goal of the feasibility assessment was to identify and evaluate feasible alternatives to comply with the new SC permit limit of 2,200 μS/cm. The main wastewater streams generated at the facility included ham processing wastewater, hot dog processing wastewater, and sanitary wastewater for a total flow of approximately 200,000 gallons per day. Most of the wastewater is discharged to their wastewater pretreatment facility; however, approximately 20,000 to 30,000 gallons per day of high SC wastewater are segregated and hauled out for final disposal.

Industrial Pretreatment

Session T7B

Jim Buckles, P.E., BCEE
Tetra Tech, Inc.
Lexington, Kentucky

Jim Buckles is has been employed by Tetra Tech since 1980 and currently serves as a senior project manager in their water and wastewater group. His educational background includes degrees in biology, microbiology, and civil engineering. He has specialized in water resources, stormwater, and wastewater projects throughout his career. He is a licensed engineer in Kentucky, Tennessee, and Arizona, past President of the Kentucky-Tennessee Water Environment Association, a Diplomate in the American Academy of Environmental Engineers, and a recipient of Water Environment Federation's Arthur Sidney Bedell Award.

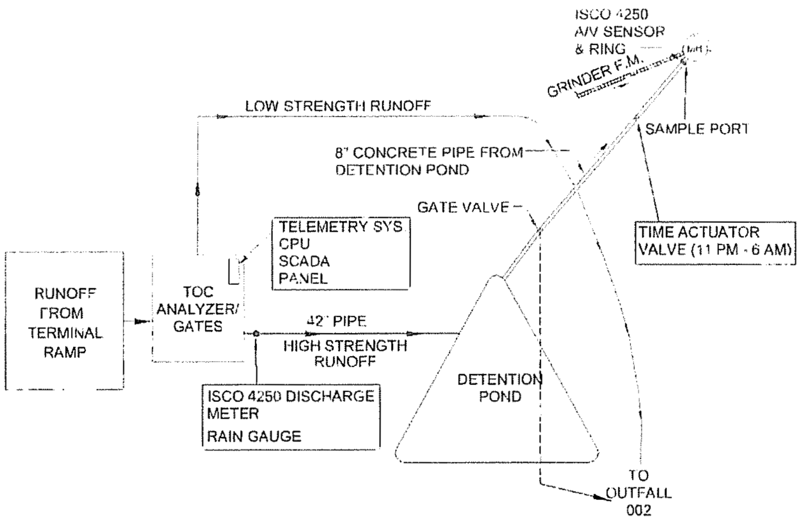
Management of Deicing Stormwater

by
Jim Buckles, P.E., BCEE
Tetra Tech, Inc.

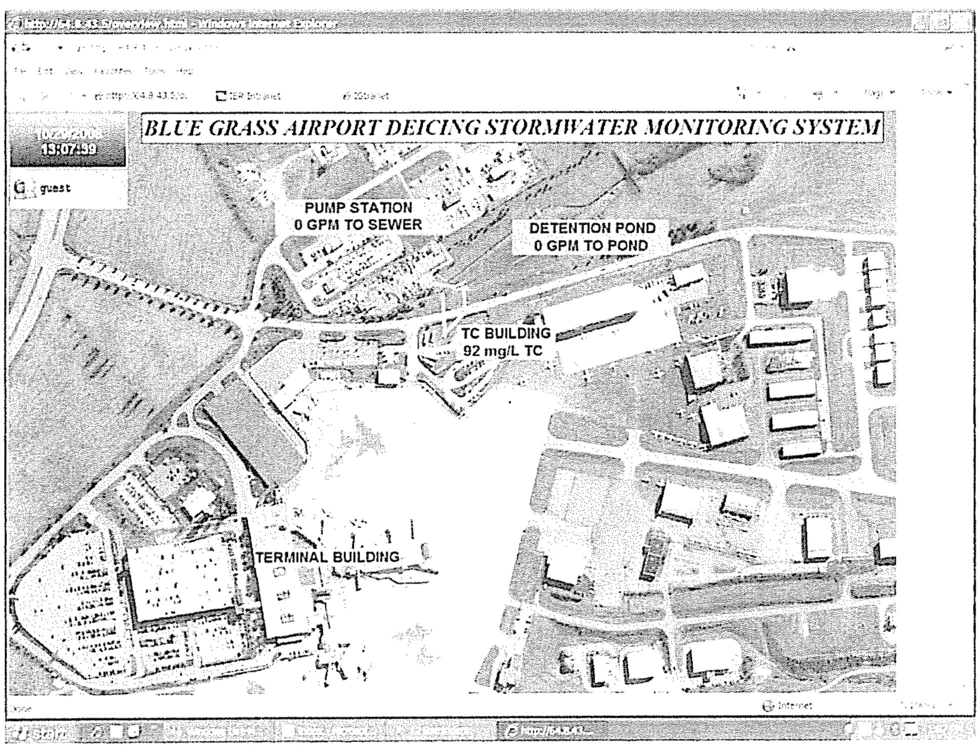
Blue Grass Airport (BGA) is a public airport located in Lexington, Kentucky, four miles west of Lexington's downtown district. BGA serves over one million passengers each year and occupies approximately 1,000 acres. During inclement weather, the Federal Aviation Regulations prohibit takeoff when snow, ice, or frost is adhering to critical surfaces of the aircraft. The introduction of glycol-contaminated runoff from deicing operations can impose a significant impact on adjacent water systems. Glycol-contaminated stormwater runoff and wastewaters can deplete oxygen levels and threaten aquatic life.

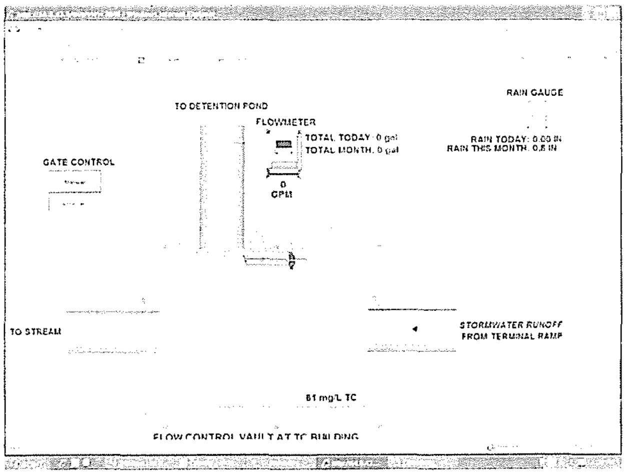
BGA was issued a Kentucky Pollutant Discharge Elimination System (KPDES) permit by the Kentucky Division of Water that authorizes discharge at eight outfalls surrounding the airport property. One outfall is associated with the terminal ramp where at-gate aircraft deicing occurs. The monitoring frequency is storm-event driven, based on precipitation amounts and time between precipitation events. One grab sample is to be collected during a period of discharge resulting from a precipitation event of 0.1 inches or greater. A 24-hour no precipitation period must precede each event, and BGA is not required to take more than one sample per week.

Blue Grass Airport uses a Total Organic Carbon (TOC) as the organic strength monitoring parameter, rather than the more commonly used biochemical oxygen demand (BOD). This allows BGA to use an online TOC analyzer that continuously measures the organic strength of deicing stormwater from the terminal ramp where the application of ADF occurs and automatically controls diversion gates that prevent the discharge of high organic strength deicing stormwater. All stormwater runoff from the terminal ramp is conveyed to the online TOC analyzer. High organic strength runoff is directed to the detention pond for controlled discharge to the Lexington-Fayette Urban County Government (LFUCG) sewer system; lower strength runoff is directed toward KPDES outfall 002. A sketch of the deicing stormwater system is shown below.



The key components of the stormwater monitoring equipment include a TOC analyzer, hydraulic gates, discharge metering equipment, and a website-based control and communication system. When significant concentrations of ADF are detected, a signal from the analyzer operates a pair of gates that convey ADF runoff to a detention basin. The detection and conveyance of deicing stormwater is automatically monitored and managed by an online web-based monitoring system, shown below. Information gathered by the equipment is evaluated, diversion gates are manipulated, and text messages and email alerts are sent to assigned staff for action.





This system has saved BGA thousands of dollars in LFUCG surcharge fees, while maintaining 100% compliance with BGA's KPDES discharge permit. Additionally, the automatic components of the system allow labor to be focused elsewhere, especially valuable during deicing season when much time and energy is required to ensure flight safety.

The system also helps BGA to accomplish the goals of their EPA-mandated Spill Prevention, Control, and Countermeasure plan. A Lower Explosive Limit (LEL) sensor has been added to the stormwater monitoring equipment system. In the event of a petroleum release on the terminal ramp, discharge from the ramp passes through a monitoring station with an LEL meter. If petroleum is detected, alarms are sent via text message and email to a Rapid Response Team and the discharge is automatically directed to a detention structure for proper disposal.

PCB Sleuthing: The science of being a wastewater collection system detective

Aaron Stephens
Material Mattes, Inc.
717-367-9697
AStephens@MaterialMatters.com

Aaron is vice president of information systems and technology at Material Matters, Inc., an environmental consulting firm. He specializes in data analysis and management, database development, and numerical modeling. Aaron has a master's degree in Agricultural and Biological Engineering from Penn State. He enjoys solving problems and playing detective.

EXPERIENCE

1/09 - Present	Vice President of IST Material Matters, Inc.
1/07 - 12/09	Information Systems Manager Material Matters, Inc.
6/02 - 12/06	Independent Consultant for Material Matters, Inc. Stephens Consulting
10/01 - 12/06	Independent Computer/Technology Contracts Stephens Consulting
8/01 - 10/01	Instructor Pennsylvania State University
6/96 - 8/96	Research Intern NASA Goddard Space Flight Center

EDUCATION

Undergraduate

B. S. Agricultural and Biological Engineering
Pennsylvania State University

Graduate

M.S. Agricultural and Biological Engineering
Pennsylvania State University

PCB Sleuthing: The science of being a wastewater collection system detective

Aaron Stephens, Trudy Johnston, and Kelly Brenner of Material Matters, Inc: Ray Martrano of Microbac Laboratories, Inc

The Problem

In early 2009, Material Matters was asked to assist and advise a municipal wastewater authority (Authority) on concerns related to biosolids poly-chlorinated biphenyl (PCB) concentrations reported by several commercial laboratories. Biosolids PCB concentrations were reported to be above regulatory ceiling limits concentrations in 3 samples in late 2008 and early 2009. Two anaerobic digesters, totaling about one million gallons, had PCB levels measured as high as 20 ppm, dry weight basis.

Goals and Objectives

At the start of this process, there were a handful of overarching goals:

- Verify that PCBs were not applied to the farmland through the biosolids land-application program.
- Evaluate the scope and nature of the PCB contamination within the treatment plant.
- Determine the source of the PCBs, if possible.
- Establish a monitoring plan to verify the PCBs are no longer in the system.

Identifying the Problem

Typical outside lab historic results consistently did not detect PCBs in the biosolids, usually reported as <0.91 ppm PCB or less. When a PCB spike appeared, a split sample was submitted for analysis in November 2008 to the same laboratory normally used and a second commercial laboratory to determine if PCBs were really present. The labs disagreed: one reported <0.6 ppm PCBs and the other reported 20.0 ppm PCBs. Additional split sampling was performed, now in conjunction with the state; again, contamination was confirmed.

When the problem was identified and verified, the two digesters were nearly full, and it was the fall of the year when biosolids are typically applied to farm fields. The secondary digester is used primarily to store solids prior to being utilized for land application. Time was critical, and there weren't many options available.

Results

This paper and presentation will present the details of the completed investigation, including:

- Selecting and utilizing unique sampling techniques for detecting PCBs in small samples
- Identifying and testing appropriate collection system manholes and interceptors
- Identifying, surveying, inspecting, and testing industrial sites on which PCBs could be present
- Attempting to prove origin of the contamination by establishing a PCB isomer "fingerprint" at the WWTP, which could then be matched at the source. Commercial PCBs are a blend of a variety of different PCB isomers. In this case, Aroclor 1254 and Aroclor 1260 were identified.
- Consulting a US EPA specialist on PCBs

Over the span of half a year of sleuthing, some "hot" sites were located and identified in the Authority's service area, with PCB levels over 100 ppm, and as high as 318 ppm.

CHRISTINA BOLEY BROWN, P.E.

EDUCATION:
B.S., Chemical Engineering, University of Colorado, Boulder, 1996

PROFESSIONAL LICENSES:
Professional Engineer, Tennessee

PROFESSIONAL MEMBERHIPS AND AFFILIATIONS:
American Institute of Chemical Engineers (AIChE)
National Society of Professional Engineers (NSPE)

CURRENT PROFESSIONAL INVOLVEMENT: 2003 - present, **AquAeTer**, Project Engineer

Ms. Brown has eleven years of diverse experience in chemical and environmental engineering. Her current projects include air emissions, groundwater remediation, environmental litigation support, wastewater system optimization and upgrades, regulatory compliance, and environmental site assessments. She has been involved in environmental sampling, geomorphologic analysis, technical document preparation, bench and pilot-scale system testing, process modeling and optimization, process design and budget preparation. She also has five years of experience in radiological waste treatment and processing, including development of technical baseline documents for radiochemical processes. Her computer skills include programming in Visual Basic.

PRIOR PROFESSIONAL INVOLVEMENT:
2001-2002 Lucent Technologies, Atlanta, GA, Member of Technical Staff
1996-2001 Westinghouse Savannah River Company, Savannah River Site, Aiken, SC, Engineer

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AREAS OF EXPERTISE:

Air
Emission Calculations
Air Emissions Modeling – WATER9

Environmental Investigation/Remediation
Groundwater Investigations
Soil Investigations and Sediment Surveys
Aquatic Toxicity Testing & Analysis
Bench & Pilot-Scale Studies
Chemical Kinetics Studies
Fate and Transport Analysis/Site Conceptual Models
Groundwater Remediation
Bioremediation
Design of Experiments
Geomorphologic Analysis

Quantitative and Statistical Analysis
Analytical Method Selection
Data Analysis and Validation
Statistical Analysis
Database Design & Management
Results Applicability

Industrial
Chemical Processing
Wood Treatment
Nuclear Waste Remediation
Chemical Hazard Analysis
Solid and Liquid Waste Characterization
Site Assessments
Sara Form R Reporting
Toxic Equivalency of Dioxins and Furans

Abstract: Quantifying Surfactant Levels in Wastewater

Surfactants can have significant detrimental effects on wastewater treatment processes such as dissolved air flotation due to foaming issues, and, aerated biological systems due to oxygen transfer issues. We are working with an industry that is having trouble with their wastewater treatment system due to a suspected surfactant present in the incoming raw material stream. The surfactant is used in the raw material production process and is proprietary. The objective was to identify the presence and, if possible, identity of the surfactant to help them deal with the wastewater treatment issue in the best way. We could not find a commercial lab that would perform a sublation (as described in ASTM 5540B) so we set up our own column and are performing sublation in our lab. Sublation involves bubbling nitrogen through a column of the wastewater and into an overlying layer of ethyl acetate. The ethyl acetate retains the surfactant, regardless of type. The ethyl acetate is then evaporated off and a surfactant film remains on the glassware.

We developed a strategy for producing and quantifying this film for use in determining breakpoints for adverse operating conditions, and are currently investigating methods for identifying the type of surfactant material present. Methylene blue and cobalt thiocyanate tests for anioinic and nonionic surfactants (5540 C & D) are available, but these tests are tied to standards and provide limited insight.

Industrial Pretreatment

Session T7C

Chuck Durham bio:

Chuck Durham is an Associate Director and Project Manager for Tetra Tech, Inc., with over 21 years of regulatory experience in the water pollution control field with emphasis on the federal pretreatment program. He has experience in all facets of pretreatment program development, implementation and oversight. Prior to joining Tetra Tech in 2001, Mr. Durham served as a Program Manager for the Tennessee Division of Water Pollution Control. Mr. Durham is the Project manager for the pretreatment oversight effort in support of EPA Region 9 and the California State Water Board. This effort includes the performance of audits, PCIs, review of various program modification documents including local limit assessments. Mr. Durham also serves as Project Manager providing support to the EPA Office of Water Management and has provided pretreatment technical support to 6 EPA Regions and 18 States. He has conducted more than 400 pretreatment audits and inspections, and has served as an instructor for numerous EPA-sponsored training courses. Mr. Durham has been a member of the WEF since 1994; he has been honored with the Bedell Award, and currently serves as the Chair for the Ky-Tn WEA Pretreatment Certification Committee, and has a B.S. in Mechanical Engineering from Tennessee Technological University.

Byron Ross, Monitoring & Management Services, LLC.

Mr. Ross has over 22 years of experience in industrial pretreatment, wastewater treatment, receiving stream assessment, and environmental sampling and monitoring. In 2003, Mr. Ross started Monitoring and Management Services, LLC, a small business that provides technical assistance to federal, state and local government agencies in the areas of industrial pretreatment and Capacity, Management, Operations, and Maintenance (CMOM). Since 2004, Mr. Ross has been a contractor for Tetra Tech, Inc. for U.S. EPA tasks related to industrial pretreatment and wastewater. Prior to the formation of Monitoring & Management Services, Mr. Ross worked as a Chemical Manager for Henkel/GM for 2 years, an environmental monitoring supervisor for a private laboratory for 7 years, and as a Biologist for a municipality for 8 years. Mr. Ross has performed the following duties for U.S. EPA, as a contractor with Tetra Tech, Inc.:

- Conducted numerous Industrial Pretreatment Inspections and Audits in EPA Regions 5 and 9.
- Speaker/Presenter at Wastewater and Industrial Pretreatment Training Courses and Seminars in EPA Regions 4, 5, and 9.
- Industrial Pretreatment Local Limits Calculations and Verification Reports for EPA Regions 4 and 9.
- Technical Review of Permits and Sewer Use Ordinances in Regions 4 and 9.
- Technical Assistance to California Regional Water Quality Board Personnel in EPA Region 9.

Ms. Jennifer Dodd received her Bachelors degree in Chemistry from Warren Wilson College, Asheville, North Carolina, in 1994. She then participated in an internship with the Chemical Oceanography Department of Brookhaven National Laboratory. In 1997 she received her Masters degree in Environmental Science and Engineering from the Civil/Environmental Engineering department at Virginia Tech. Ms. Dodd worked for over 2 years as an environmental consultant for Eastern Research Group in the Washington D.C. area. During that time she worked on projects for the Navy, developing Uniform National Discharge Standards, and EPA, working on categorical effluent limitation guidelines and pretreatment standards (specifically the Iron and Steel rule and the Metal Products and Machinery Rule). Since September 1999, Ms. Dodd has worked for the Tennessee Division of Water Pollution Control, Pretreatment Program. She has been the Pretreatment Coordinator for the State of Tennessee since October 2003. Ms. Dodd has served on multiple national pretreatment workgroups and has presented at several EPA conferences and workshops.

Abstracts for Pretreatment Sessions

(Pretreatment – the protection of the WWTP and collection system from industrial wastewater discharges).

David Philips <u>EPA Update</u>

David Phillips is the pretreatment coordinator for EPA Region 4. He will talk about current federal and regional mandates and other topics of concern relating to pretreatment.

Byron Ross <u>Mercury 101 and Dental Amalgam</u>

EPA is in the process of developing federal pretreatment standards to control discharges containing dental amalgam from dentist offices. Mr. Ross will review issues with sampling for mercury, other sources of mercury, amalgam separator technology, and data from states with current amalgam separator programs.

Byron Ross <u>Identifying Pollutant Sources in Wastewater</u>

Mr. Ross will review pollutant sources within industrial, commercial, and domestic applications. He will review a number of case studies tracing sources of pollutants being discharged to a WWTP. The session will also cover seasonal variations for certain pollutants.

Chuck Durham <u>Pretreatment Enforcement Case Studies</u>

Mr. Durham will review a couple of pretreatment enforcement case studies, where municipalities were required to take enforcement against industrial users for causing interference or pass through problems at the WWTP. He will detail what worked and didn't work in each case.

Jennifer Dodd <u>Pretreatment Standards Review</u>

This session will be a review of common pretreatment categorical standards that apply to industries discharging to sewer systems. The session will also cover common mistakes made by WWTP when applying pretreatment standards to industrial discharges.

Pretreatment Certification Committee <u>Pretreatment Roundtable</u>

The committee members will discuss topics of concern for pretreatment coordinators, including pharmaceutical take-back programs, industrial inspections, sampling, and new state and federal issues. The session will also give audience members an opportunity to ask a panel of experts site-specific pretreatment questions.

Industrial Pretreatment

Session T7D

David Phillips
Pretreatment Program Coordinator
U.S. Environmental Protection Agency, Region 4
Clean Water Enforcement Branch
Atlanta Federal Center
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Atlanta, GA 30303
Phone: 404.562.9773
Fax: 404.562.9729
E-Mail: phillips.david @epa.gov

David Phillips has been working with the Pretreatment Program for much of his tenure at the U.S. Environmental Protection Agency (EPA), and has served as coordinator of the EPA Region 4 program since 2001. He also serves as a senior enforcement officer for EPA Region 4 in the National Pollutant Discharge Elimination System (NPDES) program, is a member of the Region 4 emergency response team, and has worked with the Region management, operations, and maintenance program to abate sewer overflows since its inception. Mr. Phillips earned his BS/BS in Biological Sciences and Environmental Science from Emory University, and his ME in Environmental Engincering from the University of Florida.

Chuck Durham is an Associate Director and Project Manager for Tetra Tech, Inc., with over 21 years of regulatory experience in the water pollution control field with emphasis on the federal pretreatment program. He has experience in all facets of pretreatment program development, implementation and oversight. Prior to joining Tetra Tech in 2001, Mr. Durham served as a Program Manager for the Tennessee Division of Water Pollution Control. Mr. Durham is the Project manager for the pretreatment oversight effort in support of EPA Region 9 and the California State Water Board. This effort includes the performance of audits, PCIs, review of various program modification documents including local limit assessments. Mr. Durham also serves as Project Manager providing support to the EPA Office of Water Management and has provided pretreatment technical support to 6 EPA Regions and 18 States. He has conducted more than 400 pretreatment audits and inspections, and has served as an instructor for numerous EPA-sponsored training courses. Mr. Durham has been a member of the WEF since 1994; he has been honored with the Bedell Award, and currently serves as the Chair for the Ky-Tn WEA Pretreatment Certification Committee, and has a B.S. in Mechanical Engineering from Tennessee Technological University.

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Sustainability

Session T8C

KAMM
Kentucky Association of Mitigation Managers

KSA

2010 KAMM / KSA Conference

Building Mitigation Partnerships for a Better Kentucky

April 19 - 22

Presentation Bio and Abstract

Name and Title of Presenter(s): Justin Gray, P.E. – Sr. Technical Services Engineer

Organization/Affiliation: Louisville & Jefferson County MSD

E-mail: gray@msdlouky.org

Agency/organization Website: www.msdlouky.org

Phone: 502-540-6398

Brief bio (one paragraph):

Originally from Owensboro, KY

Graduate of Univ. Louisville w. Masters in Civil/Environmental Engineering in 2001

10 years with FMSM Engineers primarily working on stormwater and flood mitigation planning, floodplain modeling/mapping, & GIS development

With Louisville MSD for the past three years, managing planning, Consent Decree related programs, sewer and water quality modeling and monitoring, proactive asset management, and capacity assurance in the Regulatory Services Division

MSD
Metropolitan Sewer District

From Fish to Fecal & Green to Gray

Environmental Monitoring Challenges & Returns for Consent Decree & MS4 Programs

Justin Gray – Louisville & Jefferson County Metropolitan Sewer District

The Louisville & Jefferson County Metropolitan Sewer District (MSD) signed a Consent Decree in August 2005, which was amended in April 2009, with the United States Environmental Protection Agency (EPA) and the Kentucky Department of Environmental Protection (KDEP). MSD is also nearing the completion of negotiations with KDEP for its 3rd permit in the Municipal Separate Storm Sewer System program. The Consent Decree required that MSD develop on overflow control plan for mitigating public health and water quality impacts from both combined and sanitary sewer overflows (CSOs and SSOs) throughout its 3,200 mile sewer system while the MS4 program is focused on stream and storm water quality improvements through additional structural and non-structural management practices. MSD has developed an Integrated Overflow Abatement Plan (IOAP), which has received technical approval from EPA Region IV and KDEP, and a proposed Stormwater Quality Management Plan (SQWMP), which is currently under review by KDEP.

In order to successfully implement these plans and report quarterly and annually on progress and resultant water quality improvements, MSD is continues to monitor a wide assortment of environmental parameters throughout its service area, improving data centralization and quality control measures, and is developing a central interface for customer access to this information. MSD monitors the following environmental data at numerous locations throughout its service area:

- Precipitation (gauge, radar rainfall),
- Sewer level, flow and grab sampling,
- Stream flow and ambient water quality (pH, DO, conductivity, etc.),
- Stream recreational season and dry/weather grab sampling,
- Infrastructure performance monitoring (pump station, treatment plant),

- In-depth and recurring biological indicator species and habitat analyses.

Customer request, asset work order activity, and sewer overflow tracking protocols have also been developed and implemented to identify problem areas and track system performance on an event-specific and long term basis.

This information will increasingly be used to support the following activities as these regulatory plans and capital projects are implemented:

- Municipal Separate Storm Sewer System (MS4) permit activities and reporting.
- IOAP capital project performance analysis.
- Green infrastructure stormwater reductions to reduce CSO gray infrastructure sizing.
- Operations & maintenance dry and wet weather event analyses.
- Validation and recalibration of hydrologic, hydraulic, and water quality models,
- Real Time Control (RTC) global and local operations,
- Systematic and site-specific cause and effect evaluations,
- Tracking and reporting programmatic progress both quarterly & annually, and
- Plan adaptation to measured environmental impacts.

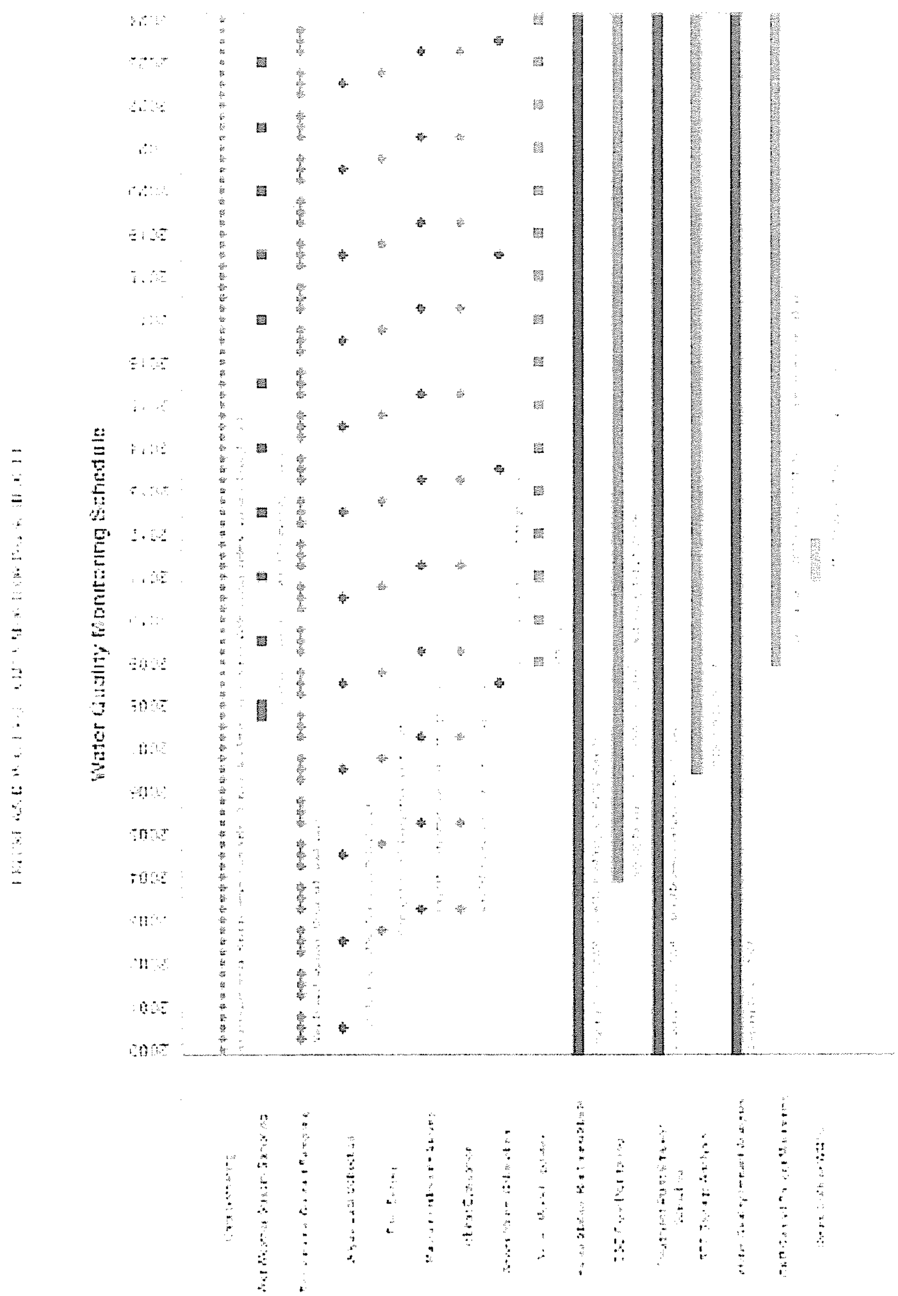
As it has for more than 20 years, MSD currently monitors a wide array of assets for performance including sewer lines, actuated gates, pump stations, and treatment plant components. A large amount of ambient, environmental data is also routinely collected including stream flow, water quality, rainfall, biological, and habitat information at more than 28 long term monitoring sites throughout the County. A summary schedule of MSD's ongoing monitoring and modeling activities is displayed in Attachment A.

Under the IOAP, the primary compliance assessment objectives will be to certify project and activity performance to the selected overflow control level, both for CSOs and SSOs, as well as determine if predicted water quality benefits are realized and adjust programs and project accordingly. As such, compliance monitoring for new infrastructure components (e.g. conveyance lines and storage basins) will support impact analysis and the validation of various objectives of IOAP projects initiatives, and the overall abatement plan. Under the MS4 program, the primary compliance assessment objectives will be to estimate improvements in stream water quality from the various management practices and programmatic efforts.

A group of 20 green demonstration projects have been defined in the IOAP that will serve as case studies for establishing the stormwater reduction efficacy of various green practices (e.g. downspout disconnections, pervious pavement, rain gardens, dry wells, etc.) in keeping water from entering the combined sewer system. The approved IOAP allows MSD to use this information, coupled with broader sewershed monitoring and modeling, to downsize gray infrastructure storage projects as the effects of the green infrastructure program are realized. .

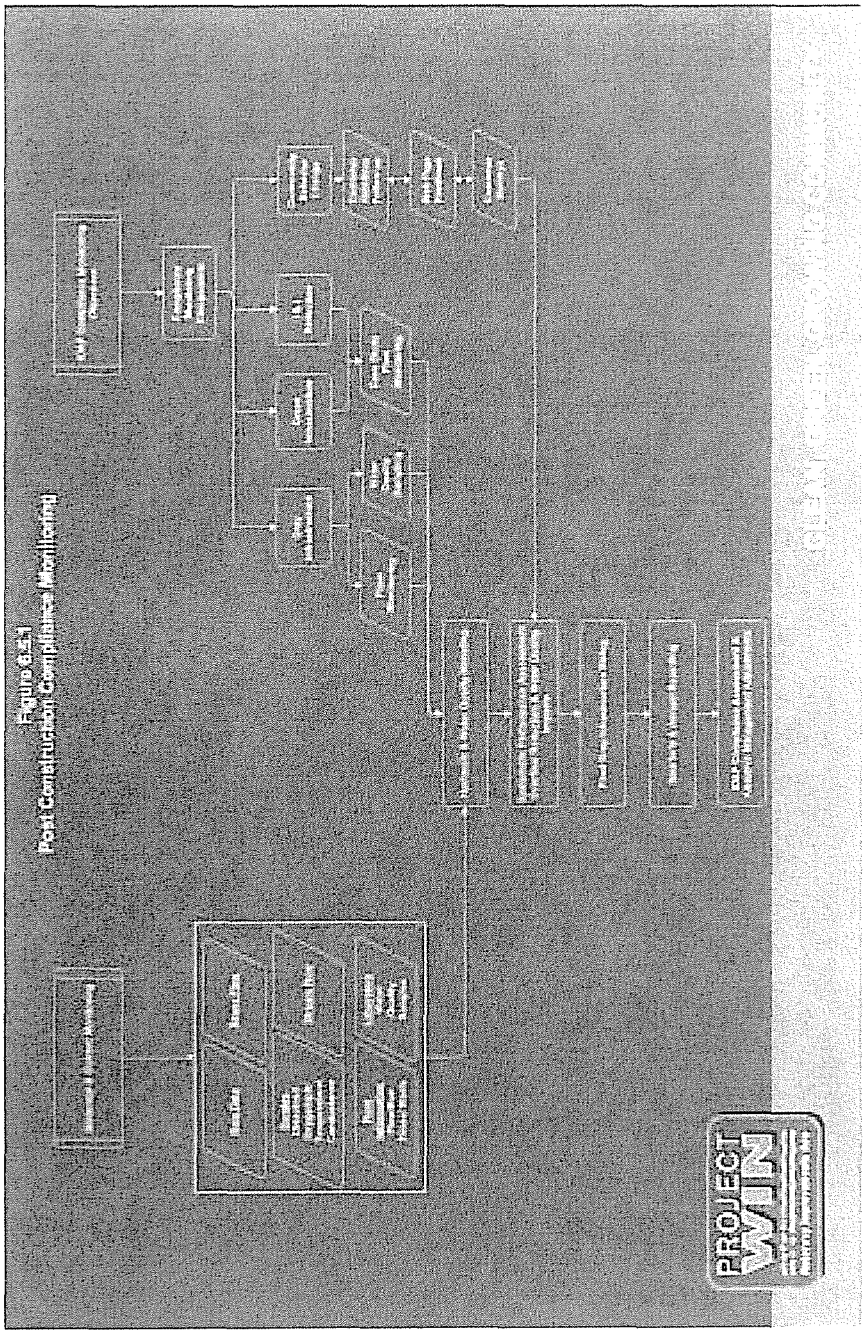
This paper will focus on a brief description of the environmental data sets that are collected, their collection frequency, future anticipated monitoring, and quality control measures and data integration efforts currently being implemented to ensure data usefulness for reporting and impact analysis as various projects, programs, and plans are implemented. The use of the data for regulatory reporting as well as supporting past and future sewer and water quality modeling will be discussed. The analytical process of 'right-sizing' process of CSO gray infrastructure storage project sizes using monitored and modeled green infrastructure stormwater and overflow reductions will be showcased (see Attachment B).

Attachment A



MSD
Metropolitan Sewer District

Attachment B



Wesley Sydnor, PE – Louisville and Jefferson County Metropolitan Sewer District

Experience: 10 years – Water and wastewater engineering, 2 years with Louisville MSD, 5 years with O'Brien and Gere engineers as a consultant on the Nine Minimum Controls program and overflow response.

Education – BA from the University of Louisville, Masters of Engineering – University of Louisville

Job Responsibilities as it Relates to the Topic: Manages Nine Minimum Controls and CMOM programs, works on public education and outreach for Project WIN (the department managing programmatic activities for compliance with the Consent Decree).

Fulfilling Louisville's Consent Decree Requirements for Overflow Reduction by "Right-sizing" Gray Controls with Green Infrastructure

NOTE: This session is designed to work with proposed related 30-minute sessions by Mr. Justin Gray and Mr. Chad McCormack. The sessions relate, but avoid overlap and repetition.

Wesley Sydnor, PE – Louisville and Jefferson County MSD

As part of the Integrated Overflow Abatement Plan (IOAP) approved by the US EPA in September 2009, overflows were reduced by the planned capital investment of $850 Million over 15 years. This capital investment included the design and construction of nearly 20 CSO storage basins, Real Time Control (RTC) facilities, high rate treatment, and increased conveyance. The first two years of capital projects include 19 demonstration projects that will be monitored and modeled to determine the efficacy of green management practices. In the first 5 years of the IOAP, green infrastructure was incorporated into the planning effort in order to front load that investment and reduce gray projects on the back end of the program. This adaptive management approach was approved and encouraged by the EPA.

There will be three techniques to incorporate green in Louisville Metro: 1) Approval and deployment of a downspout disconnect program that will allow for reimbursement of $100/downspout to homeowners, 2) Implementation of a private incentives program that will promote the use of green practices in development and retrofits, and 3) Partnerships with local agencies to perform green implementation on public lands and rights-of-way.

IOAP projects will be "right-sized" based upon voluntary participation in these programs, and with the more assertive and proactive approach to target high impact CSO basins for green, to seek out opportunities, and to aggressively market the value of green to those partners.

The proactive adaptive management approach for the IOAP, or "right-sizing" of gray projects is being approached with the following tasks for targeted CSO basins:

- Impervious Area Disconnection Needs Estimate Using Hydraulic Model
- Establish & Implement Flow Monitoring Plan
- Identify Candidate Sites w/ Rough Cost, Property Owner Info, and Acreage Controlled
- Model Candidate Sites and Expected AAOV & Sizing Impact
- Conceptual Design and Property Owner Meetings
- Design & Construction
- Post Construction Monitoring & Data Analysis
- Model Recalibration using appropriate Storage Parameters & Flow Data
- Typical Year Modeling Analysis & IOAP Storage Basin Size Assessment
- Case Study Development & Regulatory Coordination

Every year the annual overflow volume will be re-calculated by incorporating these green controls in the service area. Once IOAP projects are in the planning stage, project sizes will be re-calibrated using these new overflow volumes and frequencies to determine what the new cost of gray controls will total. The plan is to reduce the overall program cost by incorporation of green controls to infiltrate water before it enters the combined sewer system.

Charles D. "Chad" McCormick, P.E.

URS Corporation, Inc.

Mr. McCormick is a licensed Professional Engineer in Kentucky, Tennessee and Indiana. Mr. McCormick has a broad base of stormwater quality and quantity management experience with numerous municipal and state agencies clients in Kentucky, Indiana, Tennessee and Ohio since 1992. His stormwater management responsibilities have focused on:

- Louisville and Jefferson County MSD's MS4 Stormwater Quality and Green Infrastructure Program
- Stormwater quality programs development for municipal and state agencies.
- Stormwater quantity and quality ordinance and regulation development
- Community and inter-community stakeholder process facilitation
- Stormwater and Watershed quantity and quality master planning
- Stormwater design guidance manuals
- Sampling and monitoring programs
- Stormwater utility/program development, audit and revitalization
- Stormwater infrastructure design

Mr. McCormick is a frequent presenter at the Kentucky-Tennessee Water Environment Association (WEA) and Tennessee American Water Resources Association (AWRA) meetings. He has also presented for Water Environment Federation (WEF), American Society of Civil Engineers (ASCE) and numerous related local training, elected official and public stakeholder workshops.

Education

BS and M.ENG-Civil Engineering,
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ABSTRACT

NOTE: This presentation is designed to work with proposed related 30-minute presentations by Mr. Justin Gray and Mr. Wes Sydnor. The sessions are related, but avoid overlap and repetition

Bridging the Green Infrastructure Gaps
Between Combined (CSS) and Separate (MS4) Systems

Charles D. "Chad" McCormick, PE

Combined Sewer System (CSS) and separate sewer systems are increasingly focused on green infrastructure source controls that limit the stormwater volume entering sewers, streams and waterways. The Louisville and Jefferson County Metropolitan Sewer District (MSD) is aggressively focusing on green infrastructure to achieve the CSS and Municipal Separate Storm Sewer System (MS4) program goals, while remaining fiscally responsible. There are several regulatory, design guidance and financial incentive strategies for green infrastructure currently in place and under development.

The Louisville MSD is under consent decree to implement an aggressive green infrastructure program in the CSS. MSD is also negotiating its MS4 permit program which places a strong emphasis on green infrastructure. Louisville MSD with its MS4 Co-permittees is using the overlapping goals and objectives of the two programs to provide system-wide financial incentives, a regulatory framework and design guidance.

A Green Management Practice (GMP) guidance manual for design professionals is central to MSD's approach. The manual is addresses technical issues inherent to stormwater management practice design while considering the programmatic differences between the needs of the CSS and MS4 programs. The GMP manual provides "Design Strategies" addressing a wide range of needs including:

- Green Streets Intersection and Alleys
- Downspout Disconnection
- Green and Blue Roofs
- Rainwater Harvesting
- Urban Forestry
- No Mow and Stream Buffers
- Parks and Multi-Function Areas
- Residential Neighborhoods
- Green Alleys
- Pond Retrofits

The financial incentive program serves as an integrating element between the current CSS regulations and anticipated strengthened MS4 "post-construction" requirements. The incentive program provides for a short-term stipend that provides value to MSD while meeting a viable economic price-point for retrofits, redevelopment and new development. A long-term financial incentive is also provided to encourage proper operation and maintenance of the green infrastructure enable by the short-term stipends.

This presentation will identify key green infrastructure technical and programmatic issues related to green infrastructure regulations and financial incentive programs that will be of interest to local government staff, elected officials, consultants and design professionals.

Proposed Microconstituents/Emerging Contaminants Workshop

Wednesday Workshop

Proposed Microconstituents /Emerging Contaminants Workshop Agenda

	Moderators: Kati Bell, Ph. D., P.E., BCEE & Peter Goodman
8:30 - 8:35 AM	**Greetings/Introductions and Overview of the Session**
8:35 - 9:15 AM	**Overview of Microconstituents and Emerging Regulations** Robert Bastian, Senior Environmental Scientist, Office of Wastewater Management, US EPA
9:15 – 9:45 AM	**Microconstituent Physicochemistry and Analytical Methods** Martha J. M. Wells, Ph.D., Chair of Department of Basic Sciences & Assistant Dean for Research, Midway College School of Pharmacy
	BREAK 9:45 – 10:00AM
10:00 – 10:30 AM	**Occurrence Survey Case Study** Sam Dinkins, Ohio River Valley Water Sanitation Commission (ORSANCO)
10:30 – 11:00 AM	**Emerging Contaminants and Their Implications for Water Resources** Kati Bell, Ph. D., P.E., BCEE - CDM
11:00 – 11:30 AM	**Treatment Technologies – Costs & Considerations** Terry Keep – Trojan Technologies
11:30 AM - 12:00 PM	**Roundtable Discussions** All Speakers

2011 KY-TN Water Professionals Conference
Microconstituents/Emerging Contaminants

Workshop Abstract

As the ability to detect environmental contaminants at ever decreasing concentrations has grown along with the ability to quantify potential adverse health impacts for such contaminants, new water quality concerns have developed. The primary contaminants of concern for potable water and wastewater utilities are often referenced as "microconstituents". These microconstituents include more than 100,000 naturally occurring and manmade compounds such as pharmaceuticals (pain relievers, antibiotics and heart medications), personal care products (soap, shampoo and face wash), flame retardants (used in polyurethane foam furniture, electronics and textiles), and perfluoro chemicals (non-stick coatings). These contaminants are often present in the sub-nanogram per liter concentration, necessitating challenging and costly analytical techniques. Present in domestic wastewater, the contaminants are usually only partially removed during wastewater treatment and can be discharged into the environment.

Microconstituents have become the focus of increasing environmental and public interest due to mainstream media attention. While not currently regulated by national drinking water or other standards, the USEPA has published a draft recommended water quality criterion for one microconstituent (nonylphenol) and facilitated a voluntary phase-out for additional compounds. It is widely expected that initial regulations regarding these microconstituents will be handled on a state-by-state basis.

Many treatment technologies are currently available to reduce, if not essentially remove, these compounds in water, wastewater and residuals. These technologies include membrane systems, granular activated carbon, advanced oxidation processes among others. However, certain compounds are difficult to remove from a treatment technology and/or cost basis. Therefore, a multi-faceted treatment program should be considered. It is important to keep in mind however, that there are currently limited national regulations in place for microconstituents and it is uncertain what removals of microconstituents will be required at either water or wastewater treatment facilities. This special workshop provides an overview of the chemistry, occurrence and regulation of microconstituents.

Also during this session, the practical application of treatment technologies will be discussed as it is related to the management of microconstituents in water, wastewater and biosolids. Workshop participants should gain an understanding of microconstituents with respect to their physicochemical properties, their occurrence and distribution, and potential future regulatory implications. Participants will also learn how various treatment technologies fit into an overall programmatic approach to addressing these emerging pollutants. This workshop will provide supporting information to participants on the challenging issue of addressing microconstituents and an introduction of how to investigate the latest information and technology solutions to this emerging issue.

ROBERT K. BASTIAN

Bob Bastian is a Senior Environmental Scientist with the Office of Wastewater Management (OWM) at the U.S. Environmental Protection Agency in Washington, D.C. - where he has worked for the past 35 years. His responsibilities include dealing with numerous wastewater and biosolids management issues associated with POTWs, such as wastewater and biosolids reuse, innovative treatment processes, wastewater and biosolids disinfection practices, natural biological waste treatment technologies (land treatment, constructed wetlands, ponds, etc.), advanced wastewater treatment, decentralized wastewater treatment, and water quality benefits of wastewater treatment. Bob is also actively involved in OWM's efforts to address energy conservation, on-site power generation and energy recovery, toxics control and hazardous waste/CERCLA related issues associated with POTWs.

In dealing with this broad range of issues, Bob has participated on numerous interagency workgroups and committees, and has served as an EPA liaison with numerous external groups such as the Water Science and Technology Board (WSTB) of the National Research Council/National Academy of Sciences, the Water Environment Federation, National Water Research Institute, WateReuse Assoc., and NSF Int'l.

He has coordinated the development of numerous EPA technology assessments, technical reports and guidance documents, including EPA's Guidelines for Water Reuse issued in Sept'92 and the revised version issued in Aug'2004 and the report on Progress in Water Quality: An Evaluation of the National Investment in Municipal Wastewater Treatment (EPA-832-R-00-008; June'00) and a review of the Agency's policy on disinfection of municipal effluents in the late1980's.

He has worked closely with the WSTB on the development of a series of reports, including Managing Wastewater in Coastal Urban Areas (1993), Use of Reclaimed Water and Sludge in Food Crop Production (1996), and Issues in Potable Reuse; The Viability of Augmenting Drinking Water Supplies with Reclaimed Water (1998), and a new ongoing study focused on an Assessment of Water Reuse as an Approach for Meeting Future Water Supply Needs following up on their Desal study report, Advancing Desalination Technology issued in 2008.

He co-chaired the Interagency Steering Committee on Radiation Standard's Sewage Sludge Subcommittee that addressed the question of radiation in sewage sludge and ash, producing a series of documents, including the ISCORS Assessment of Radioactivity in Sewage Sludge: Radiological Survey Results and Analysis (ISCORS Technical Report 2003-02; NUREG-1783; EPA 832-R-03-002; DOE/EH-0669; Nov'2003), ISCORS Assessment of Radioactivity in Sewage Sludge: Modeling to Assess Radiation Doses (ISCORS Technical Report 2004-03; NUREG-1775; EPA 832-R-03-002A; DOE/EH-0670; Feb'2005), and ISCORS Assessment of Radioactivity in Sewage Sludge: Recommendations on Management of Radioactive Materials in Sewage Sludge and Ash at Publicly Owned Treatment Works (ISCORS Technical Report 2004-04; EPA 832-R-03-002B; DOE/EH-0668; Feb'2005).

He has also managed a series of National Demonstration Projects, including among others the Massachusetts Foundation for Excellence in Marine and Polymer Sciences, Inc. Advanced Ecologically Engineered Systems (Solar Aquatics or "Living Machines") in Frederick, MD, and

South Burlington. VT; King County (Seattle). WA's 1MW Molten Carbonate Fuel Cell Demonstration Project: the West Palm Beach. FL. Wetlands-Based Potable Water Reuse Demonstration Project: the Columbus Water Works (GA) CBFT3 Thermophylic Digestion/Class A Demonstration Project; and the Florida Keys Decentralized Treatment Demonstration Project.

OTHER FACTS

- grew up on a family dairy farm in NW Ohio
- earned B.S. and M.S. degrees in biology, earth science, and mathematics at Bowling Green State University in Ohio
- was made an officer, a gentleman and an engineer by Act of Congress
- participated in a ten year long program monitoring the effects of radiation on the environment at the atomic test site on Enewetak Atoll in the Northern Marshall Islands
- served three years on active duty with the U.S. Army Corps of Engineers on the Chief of Engineers staff
- have been working with the U.S. EPA since late 1975

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RECENT RELATED PRESENTATIONS

- Wastewater and Biosolids Management Issues: Where have we made substantial progress, and what are the frontiers? 17Feb2011. Department of Civil & Environmental Engineering, University of Wisconsin-Madison

- Dioxin and Radiation in Biosolids. 18 & 19Jan2011. CWEA – Whittier & Dublin, CA

- Biosolids Update Current Regulatory Priorities and Issues. 18 & 19Jan2011. CWEA - Whittier & Dublin, CA

- Water Reuse and Reclamation. Nov2001. Region 3 DW Directors. Ft. Meade. MD

- Sustainability and Biosolids: US Perspective.WEF Residuals and Biosolids 2010; Leveraging Biosolids in the Energy-Climate Era. 24May2010. Savannah. GA

- Digester Gas CHP Funding and Wrap-up Workshop A: DIGESTER GAS-FUELED COMBINED HEAT AND POWER, WEF Residuals and Biosolids 2010: Leveraging Biosolids in the Energy-Climate Era. 23May2010. Savannah, GA

- Green Regulations Update – What to Watch Out For.NBP Webcast, 27Jan2010

- Green Regulations Update – What to Watch Out For.WEF Residuals & Biosolids 2009 Conference; Reality of all Gas? Renewable Energy, Energy Efficiency and Sustainable Solutions for Biosolids. 3May2009. Portland, OR

- Energy Efficiency and Recovery in Wastewater Facilities. EPA ORD/NRMRL & OWM Joint Meeting. 26June2009. Edison, NJ

- Complying with ARRA Buy American Provisions for SRF-Funded Projects. EPA Webcasts. 11 & 22June2009

- Regulations and Emerging Requirements. 15Mar2009. AWWA Membrane Technology Conference & Exposition. Memphis, TN.

Dr. Martha J.M. Wells, BS, MS, PhD Chemistry

Wells has 30 years' professional experience in federal, industrial and academic positions. Currently, Wells is the Assistant Dean for Research and Chair of Pharmaceutical Sciences at Midway College School of Pharmacy in Paintsville, Kentucky and Professor of Chemistry, Emerita, at Tennessee Technological University, Cookeville, Tennessee. As a separations scientist, Wells has conducted extensive research in analytical sample preparation, and chromatographic and spectroscopic techniques for water quality studies. Wells currently serves as Councilor (2004 – present) of the American Chemical Society (ACS) representing the Division of Environmental Chemistry, Inc.; she is also past chair of that Division. Her writing experience includes 42 peer-reviewed original research articles, 9 book chapters, 4 review articles, and 24 technical reports and non-refereed publications. Wells' current research interests include metabolomic (lipidomic) and proteomic investigation; characterization of fatty acid and eicosanoid (prostaglandins and leukotrienes) profiles; bioindicators of the intersex condition; emerging contaminants including pharmaceutical and personal care products (PPCPs) and endocrine disrupting chemicals (EDCs); the role of dissolved organic matter (DOM, such as proteins and humic/fulvic acids) in drinking water disinfection by product (DBP) formation; analytical method development, the application of chemometrics to chromatographic and spectroscopic data; and quantitative structure-activity relationships.

Sam Dinkins is an Environmental Specialist with the Ohio River Valley Water Sanitation Commission (ORSANCO) in Cincinnati, Ohio. ORSANCO was established in 1948 to control and abate pollution in the Ohio River Basin. ORSANCO is an interstate commission representing eight states and the federal government. Member states include: Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, and West Virginia. ORSANCO operates programs to improve water quality in the Ohio River and its tributaries, including: setting waste water discharge standards; performing biological assessments; monitoring for the chemical and physical properties of the waterways; and conducting special surveys and studies. Mr. Dinkins' areas of involvement include the Watershed Pollution Reduction Program (Dioxin, PCB's, and Bacteria Studies), TMDL's, and Water Quality Modeling.

EMERGING CONTAMINANTS –
RISK, REGULATIONS AND TREATMENT TECHNOLOGIES

Katherine (Kati) Y. Bell, Ph.D., P.E., BCEE
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CREDENTIALS
Registered Professional Engineer in Tennessee, Kentucky and Ohio

EXPERIENCE
Dr. Bell is an environmental engineer with CDM with over 14 years of experience in research, selection, design and optimization of water/wastewater processes. Kati is CDM's national technical resource group leader for wastewater disinfection and much of her research is focused on implementing new technologies and improving conventional processes to meet increasingly stringent regulatory limits on disinfection across the country.

EDUCATION
B. S. Biochemistry, University of Dallas
M.S. Biology, Tennessee Technological University
M.S. Civil Engineering, Tennessee Technological University
Ph.D. Environmental Engineering, Vanderbilt University

Presentation Title:

Treatment of Emerging Environmental Contaminants in Water

Presenter:
Terry Keep, HBSc
Trojan Technologies Inc.

Presenter Bio: Terry has an Honors Bachelor of Science degree in Environmental Biology from the University of Western Ontario, is a Canadian Certified Environmental Practitioner and has been an AWWA member since 2005. Terry has been with TrojanUV for the past 5 years where he was in Business Development for 3 years in Municipal Drinking Water and the past 2 years as a Sales Manager for the Environmental Contaminant Treatment group (ECT)

Presentation Summary:

There is a growing awareness of chemicals in the world's water supply. Recent research has shown that a wide variety of environmental contaminants exist at trace concentrations in streams, lakes, rivers, and groundwater throughout the world. These contaminants include industrial byproducts, fuel additives, pesticides, and **pharmaceuticals**. Many of these chemicals have both carcinogenic and **endocrine-disrupting effects** at extremely low concentrations

In broad terms, the term "environmental contaminants" refers to harmful chemicals present in soil, in air, and in water. These compounds may come directly from human sources such as industrial manufacturing, agricultural run-off, and wastewater discharge; or they may originate from natural sources, such as the taste and odor-causing chemicals in water generated by algae and bacteria blooms. Some are highly mobile in water, resistant to biodegradation, and are difficult to treat by conventional technologies such as carbon adsorption or air stripping. Examples such compounds include **N-nitrosodimethylamine (NDMA), 1,4-dioxane, methyl tertiary-butyl ether (MTBE),** pesticides, pharmaceuticals, volatile organic compounds (VOCs) such as trichloroethylene (TCE), and taste and odor-causing compounds such as MIB and geosmin.

UV, alone and in conjunction with hydrogen peroxide, is effective for the treatment of many environmental contaminants. UV oxidation is a destructive treatment technology that breaks up environmental contaminants. Other technologies merely transfer the contaminant from one medium to another (air stripping for example, transfers contaminants to the vapor phase).

UV oxidation also has the added benefit of disinfection, including inactivation of *Cryptosporidium* and *Giardia*. Current applications of UV for environmental contaminant treatment include treatment of drinking water, **treatment of wastewater for discharge and reuse, groundwater remediation,** and treatment of contaminated industrial discharge water**.**

This presentation will review some of the installations in the United States that presently make use of this technology to treat contaminants in water. Specifically, the focus will be on groundwater replenishment treatment strategy from an UV oxidation point of view in California. Orange County Water District and Orange County Sanitation District will utilize UV Oxidation as part of a multi-barrier system to purify wastewater to levels that far exceed drinking water standards for groundwater replenishment.

UV oxidation can be used to treat environmental contaminants on a large scale (hundreds of millions of gallons per day). The world's water supply is interconnected: one city's wastewater frequently becomes another city's drinking water. For the protection of water users, UV oxidation is a multifunctional part of a multi-barrier treatment system.