SSR Smith Seckman Reid, Inc.

2995 Sidco Drive
Nashville, TN 37204
(615) 383-1113
FAX (615) 386-8469
www.ssr-inc.com

LETTER OF TRANSMITTAL

DATE: June 22, 2010 **JOB NO.:**

TO: Public Service Commission of KY
211 Sower Blvd.
Frankfort, KY 40601

RE: KY/TN Water Professional Conference

ATTN: Jeff Derouen, Executive Director

We are sending you: ☒ **Attached** ☐ **Under separate cover** Via Courier the following items:

☐ **Shop drawings** ☐ **Copy of letter** ☐ **Change order** ☐ **Samples**

☐ **Prints** ☐ **Plans** ☐ **Specifications** ☐ **Other:**

NO.	COPIES	LOG NO.	DESCRIPTION
1	1		Copies of Biographies
2	1		Copies of Abstracts

RECEIVED
JUN 23 2010
PUBLIC SERVICE COMMISSION

These are transmitted as checked:

☐ **For approval** ☐ **For your use** ☒ **As requested** ☐ **For review & comment**

☐ **No exceptions taken** ☐ **Make corrections noted** ☐ **Amend & resubmit** ☐ **Rejected**

☐ **Submit ____ copies for distribution** ☐ **Return ____ corrected prints**

☐ **Prints returned after loan to us** ☐ **Other:**

Remarks:

Copy to:

Signed: Donna Howell
Donna Howell, Admin. Asst.

c:\35th anniversary\nashville\transmittal.doc

Wednesday Session
Title: Energy Efficiency and Sustainability

John L. Willis, P.E., BCEE
Brown and Caldwell
770-673-3643
jwillis@brwncald.com

CREDENTIALS

Registered Professional Engineer

Chairman, new Water Environment Federation (WEF) Performance Digestion Team of the Bioenergy Subcommittee

Specializes in municipal and industrial water and wastewater studies and designs, including innovative biosolids systems, biological treatment and pumping facilities

Advanced biosolids experience includes designing the Country's first Class-A thermophilic anaerobic digestion facilities at the Mason Farm WWTP, preliminary design of the world's largest egg-shaped digesters at the Blue Plains AWWTP, and serving as the principal investigator for the development of the patented $CBFT^3$ Class A digestion process for Columbus Water Works

EXPERIENCE

1999-Present
Southeast Wastewater Practice Leader
Project Engineer, Project Manager
Brown and Caldwell

EDUCATION

Undergraduate
B.S.E., Electrical Engineering
Duke University, 1988

Graduate
M.S., Environmental Engineering
Duke University, 1990

Robert Bates is the Process Manager in charge of Biosolids at the Louisville Metropolitan Sewer District Morris Forman Water Quality Treatment Center (MFWQTC).

20 years experience in the wastewater industry ranging from process control at the 105 MGD MFWQTC, to project management, to chemical trials including polymers for sludge thickening and dewatering operations and odor control.

Led the operations and maintenance team that started the all new Digestion, Dewatering, Drying systems which now produces 75 tons/day of LouisvilleGreen, an EQ biosolids fertilizer.

Degree in Industrial/Electrical Technology
Kentucky Class IV Wastewater Operator
KY Chair of the KY/TN WEA Wastewater Treatment Technology Committee
WEF Residuals and Biosolids Committee Member
Carbon Task Force

Workshop – Energy Efficiency and Sustainability
Wednesday 8:30 to 12:00

Title: WWTP Plant Optimization to Maximize Rate of Return for Combined Heat and Power System

Scott A. Hardy, P.E.
5775 Peachtree Dunwoody Rd.
Suite D-520
Atlanta, GA 30342
PH: 404-459-6363
shardy@hazenandsawyer.com

Education
MS Environmental Engineering,
Georgia Institute of Technology, 1999

BS Environmental Engineering,
Rensselaer Polytechnic Institute, 1997

Registration
Professional Engineer - Georgia

Biography
Mr. Hardy has 12 years experience in water and wastewater treatment plant design and operations.

Mr. Hardy is currently project manager for Gwinnett County's F. Wayne Hill WRC Gas to Energy project and FOG Receiving Facility project, which includes installation of a 2.1 MW biogas engine generator with heat recovery and a FOG receiving facility. Mr. Hardy has also worked on the primary clarifier optimization project at the F. Wayne Hill WRC.

Mr. Hardy is also the lead design engineer of numerous anaerobic digestion facilities including City of Tallahassee's 26.5 mgd TP Smith WWTP expansion, City of Wilmington, NC's 16 mgd Southside WWTP expansion, and Fulton County's 38 mgd Big Creek WRF expansion. For the Big Creek WRF expansion, Mr. Hardy's responsibilities also included oversight of the overall process/mechanical design, which includes new headworks, primary clarifiers, a 14-mgd membrane bioreactor treatment train, odor control systems and upgrades to the existing conventional treatment train, as well as, the detail design of the plant's hydraulics.

Session M1A-1
Julie Roney

JULIE W. RONEY

100 Plantation Drive
Lawrenceburg, Kentucky 40342
Phone: 859/321-7562

SUMMARY OF EXPERIENCE:

During the past 30 years I have acquired considerable experience in the drinking water field, including technical, regulatory, managerial and financial.

PROFESSIONAL EXPERIENCE:

March 1, 2010 to Present — Environmental Scientist III

Position upgraded to Environmental Scientist III as the DOW Drinking Water Coordinator under the Director's Office

June 16, 2008 to February 28, 2010 — Environmental Scientist II
KY Division of Water

Reorganization of the Division of Water in June of 2008
Responsible for coordinating Division-wide drinking water program activities associated with the SDWA and KY regulations, including primacy issues, regulatory development, compliance, technical assistance, capacity development, DWSRF/PWSS grants, engineering plans review, training of internal and external staff
Liaison within the Division on drinking water-associated water supply, groundwater, drought, discharges
Liaison with outside agencies, including Public Service Commission, Department for Public Health, Division of Plumbing, Region 4 EPA, Federal EPA

June 1, 2003 to June 15, 2008 — Environmental Control Supervisor
KY Division of Water

Supervisor of the Drinking Water Branch's Technical Assistance and Outreach section; supervise 7 positions (include Web development)
Additional responsibilities in personnel and administrative areas
Coordinate drinking water technical assistance activities, including Area-Wide Optimization Program
Responsible for sanitary survey documentation and tracking
Oversee drinking water security issues and EPA Counter-terrorism Grant
Disinfection By-Product, Surface Water Treatment and Groundwater Rules "manager"
Plan and conduct training and workshops

January 15, 2002 to May 31, 2003 — Environmental Scientist II
KY Division of Water

Expanded duties of Environmental Technologist III include advisor to Drinking Water Branch on regulatory and scientific issues
Continue coordination of CTAP and AWOP
Coordinate Division of Water drinking water security issues

February 1, 1999 to January 15, 2002: Environmental Technologist III

Commonwealth of Kentucky
Department for Environmental Protection
Division of Water/Drinking Water Branch
14 Reilly Road
Frankfort, KY 40601

Responsible for coordinating the water treatment Comprehensive Technical Assistance Program (CTAP) and the Area-wide Optimization Program (AWOP) for the Drinking Water Branch;

Program Manager for new drinking water regulations related to specific contaminants

January 1, 1998 to January 31, 1999: Director of Water Quality

Kentucky-American Water Company
2300 Richmond Road
Lexington, KY 40502

Position of Water Quality Superintendent upgraded to Director
Expanded areas include involvement in company budgetary issues and projects, public relations and company acquisitions as well as indirect involvement in the supervision of 3 additional departments and oversight of a package wastewater plant

July 1, 1992 to December 31, 1997: Water Quality Superintendent

Kentucky-American Water Company

Position of Assistant Production Superintendent/Water Quality upgraded to Water Quality Superintendent
Additional responsibilities included: chairman of the Environmental Management Committee, KAWC representative to corporate Water Quality and KAWC liaison with the Kentucky Natural Resources and Environmental Protection Cabinet
Primary areas of additional responsibilities were compliance with all environmental regulations (air, wastewater, solid and hazardous wastes as well as water), permit processing, and formulation of company environmental policy

April 1, 1991 to June 30, 1992: Assistant Production Superintendent/Water Quality

Kentucky-American Water Company

Responsible for all aspects of water quality as produced by 2 water plants;
Duties included the direct supervision of 4 employees and indirect supervision of 18, assessment of treatment processes, coordination of projects involving water quality/treatment, review/implementation of Federal and State regulations, filing of compliance reports and interaction with appropriate State and company officials
Also responsible for the management of a departmental budget of $400,000 and a treatment chemical budget of up to $1 million, preparation of Request for Proposals and Budget Project Memorandums
Involved in employee relations: hiring of personnel, organization of departmental responsibilities and training

August 1, 1988 to March 31, 1991: Water Quality Supervisor

Kentucky-American Water Company

Responsible for the chemical/physical/microbiological quality of the water produced at large water treatment plant. Duties included overseeing the certified plant laboratories, assessing and optimizing treatment, ordering chemicals, collecting and analyzing samples,

Involved in special projects, budget preparation

September 24, 1987 to July 31, 1988: Chemist

Kentucky-American Water Company

Responsible for the atomic absorption spectroscopy lab and the drinking water certification program associated with the instrument. Also coordinated the certified bacteriological program in conjunction with the Water Quality Supervisor and co-supervised the plant chemical/physical laboratory

March 10, 1880 to September 23, 1987:

Lab Technician/Water-Microbiology Lab Supervisor
Commonwealth Technology Incorporated
2520 Regency Road, Suite 104
Lexington, KY 40503

Initial responsibilities included the chemical/physical/microbiological analysis of water, wastewater, industrial waters, mine drainage and soils.

Set up the microbiology laboratory and obtained State certification for drinking water

Promoted to Water-Microbiology Supervisor with added responsibilities of overseeing all testing performed in the water and microbiology labs. Also coordinated sample collection and log-in, reviewed work performed by laboratory personnel, prepared all laboratory reports and summaries, trained new personnel

Acted as laboratory consultant to both water and wastewater laboratories

EDUCATIONAL BACKGROUND:

University of Kentucky, Lexington, KY

Obtained a Bachelor of General Studies in which I developed my own undergraduate program of study (concentrating in Environmental Sciences)

Graduated December 1979 with "High Distinction"

University of Kentucky, Lexington, KY

Post-graduate studies in Microbiology

1981-1982

University of Kentucky, Lexington, KY

Obtained Bachelor of Science in Biology (completed degree requirements from 1979)

Graduated December, 1990 with "High Distinction" and Departmental Honors

Eastern Kentucky University, Richmond, KY
Post-graduate work in Biology
1992-1994

PROFESSIONAL AFFILIATIONS/CERTIFICATIONS:

American Water Works Association –Kentucky-Tennessee Section
(Member of the section Board 2003-2006, section Chair 2005-2006)

Kentucky Water and Wastewater Operators Association (KWWOA)—North Central Chapter
(Secretary/Treasurer 1996 to 1999, State Board 1997 to 1999)

EEC Representative on the Kentucky Board of Certification of Water Treatment and Distribution System Operators (appointed October 2003)

Commonwealth of Kentucky Certified Class IVA Water Treatment Plant Operator and Class IVD Distribution System Operator

PAPERS/PRESENTATIONS/AWARDS:

"Evaluation of the Impact of the Disinfection/Disinfection By-Product Regulations on Kentucky-American Water Company", 1993 AWWA annual meeting, co-authored with Kevin Dixon (AWWSCo) and Dr. Philip Singer (UNC)

University of Kentucky and Lexington Herald-Leader 1993 "UK Stands Out" series on UK graduates

Numerous presentations at AWWA and KWWOA sectional meetings

Best Presentation Award, Bluegrass Cross-Connection Prevention Association, 1992

KY-TN AWWA "Distinguished Service" Award, 1999

KWWOA Eugene Nichols Award, March 2002

KY-TN AWWA "Best Paper" Award, September 2002

KY-TN AWWA "Fuller Award", July 2009

KY Department for Environmental Protection, Outstanding Performance Award, 2009

REFERENCES AVAILABLE

Session M1A-2
Julie Roney

JULIE W. RONEY

100 Plantation Drive
Lawrenceburg, Kentucky 40342
Phone: 859/321-7562

SUMMARY OF EXPERIENCE:

During the past 30 years I have acquired considerable experience in the drinking water field, including technical, regulatory, managerial and financial.

PROFESSIONAL EXPERIENCE:

March 1, 2010 to Present — Environmental Scientist III

Position upgraded to Environmental Scientist III as the DOW Drinking Water Coordinator under the Director's Office

June 16, 2008 to February 28, 2010 — Environmental Scientist II
KY Division of Water

Reorganization of the Division of Water in June of 2008
Responsible for coordinating Division-wide drinking water program activities associated with the SDWA and KY regulations, including primacy issues, regulatory development, compliance, technical assistance, capacity development, DWSRF/PWSS grants, engineering plans review, training of internal and external staff
Liaison within the Division on drinking water-associated water supply, groundwater, drought, discharges
Liaison with outside agencies, including Public Service Commission, Department for Public Health, Division of Plumbing, Region 4 EPA, Federal EPA

June 1, 2003 to June 15, 2008 — Environmental Control Supervisor
KY Division of Water

Supervisor of the Drinking Water Branch's Technical Assistance and Outreach section; supervise 7 positions (include Web development)
Additional responsibilities in personnel and administrative areas
Coordinate drinking water technical assistance activities, including Area-Wide Optimization Program
Responsible for sanitary survey documentation and tracking
Oversee drinking water security issues and EPA Counter-terrorism Grant
Disinfection By-Product, Surface Water Treatment and Groundwater Rules "manager"
Plan and conduct training and workshops

January 15, 2002 to May 31, 2003 — Environmental Scientist II
KY Division of Water

Expanded duties of Environmental Technologist III include advisor to Drinking Water Branch on regulatory and scientific issues
Continue coordination of CTAP and AWOP
Coordinate Division of Water drinking water security issues

February 1, 1999 to January 15, 2002: Environmental Technologist III
Commonwealth of Kentucky
Department for Environmental Protection
Division of Water/Drinking Water Branch
14 Reilly Road
Frankfort, KY 40601

Responsible for coordinating the water treatment Comprehensive Technical Assistance Program (CTAP) and the Area-wide Optimization Program (AWOP) for the Drinking Water Branch;

Program Manager for new drinking water regulations related to specific contaminants

January 1, 1998 to January 31, 1999: Director of Water Quality
Kentucky-American Water Company
2300 Richmond Road
Lexington, KY 40502

Position of Water Quality Superintendent upgraded to Director
Expanded areas include involvement in company budgetary issues and projects, public relations and company acquisitions as well as indirect involvement in the supervision of 3 additional departments and oversight of a package wastewater plant

July 1, 1992 to December 31, 1997: Water Quality Superintendent
Kentucky-American Water Company

Position of Assistant Production Superintendent/Water Quality upgraded to Water Quality Superintendent
Additional responsibilities included: chairman of the Environmental Management Committee, KAWC representative to corporate Water Quality and KAWC liaison with the Kentucky Natural Resources and Environmental Protection Cabinet
Primary areas of additional responsibilities were compliance with all environmental regulations (air, wastewater, solid and hazardous wastes as well as water), permit processing, and formulation of company environmental policy

April 1, 1991 to June 30, 1992: Assistant Production Superintendent/Water Quality
Kentucky-American Water Company

Responsible for all aspects of water quality as produced by 2 water plants;
Duties included the direct supervision of 4 employees and indirect supervision of 18, assessment of treatment processes, coordination of projects involving water quality/treatment, review/implementation of Federal and State regulations, filing of compliance reports and interaction with appropriate State and company officials
Also responsible for the management of a departmental budget of $400,000 and a treatment chemical budget of up to $1 million, preparation of Request for Proposals and Budget Project Memorandums
Involved in employee relations: hiring of personnel, organization of departmental responsibilities and training

August 1, 1988 to March 31, 1991: Water Quality Supervisor

Kentucky-American Water Company

Responsible for the chemical/physical/microbiological quality of the water produced at large water treatment plant. Duties included overseeing the certified plant laboratories, assessing and optimizing treatment, ordering chemicals, collecting and analyzing samples,

Involved in special projects, budget preparation

September 24, 1987 to July 31, 1988: Chemist

Kentucky-American Water Company

Responsible for the atomic absorption spectroscopy lab and the drinking water certification program associated with the instrument. Also coordinated the certified bacteriological program in conjunction with the Water Quality Supervisor and co-supervised the plant chemical/physical laboratory

March 10, 1880 to September 23, 1987:

Lab Technician/Water-Microbiology Lab Supervisor
Commonwealth Technology Incorporated
2520 Regency Road, Suite 104
Lexington, KY 40503

Initial responsibilities included the chemical/physical/microbiological analysis of water, wastewater, industrial waters, mine drainage and soils.

Set up the microbiology laboratory and obtained State certification for drinking water

Promoted to Water-Microbiology Supervisor with added responsibilities of overseeing all testing performed in the water and microbiology labs. Also coordinated sample collection and log-in, reviewed work performed by laboratory personnel, prepared all laboratory reports and summaries, trained new personnel

Acted as laboratory consultant to both water and wastewater laboratories

EDUCATIONAL BACKGROUND:

University of Kentucky, Lexington, KY

Obtained a Bachelor of General Studies in which I developed my own undergraduate program of study (concentrating in Environmental Sciences)

Graduated December 1979 with "High Distinction"

University of Kentucky, Lexington, KY

Post-graduate studies in Microbiology

1981-1982

University of Kentucky, Lexington, KY

Obtained Bachelor of Science in Biology (completed degree requirements from 1979)

Graduated December, 1990 with "High Distinction" and Departmental Honors

Eastern Kentucky University, Richmond, KY
Post-graduate work in Biology
1992-1994

PROFESSIONAL AFFILIATIONS/CERTIFICATIONS:

American Water Works Association –Kentucky-Tennessee Section
(Member of the section Board 2003-2006, section Chair 2005-2006)

Kentucky Water and Wastewater Operators Association (KWWOA)—North Central Chapter
(Secretary/Treasurer 1996 to 1999, State Board 1997 to 1999)

EEC Representative on the Kentucky Board of Certification of Water Treatment and Distribution System Operators (appointed October 2003)

Commonwealth of Kentucky Certified Class IVA Water Treatment Plant Operator and Class IVD Distribution System Operator

PAPERS/PRESENTATIONS/AWARDS:

"Evaluation of the Impact of the Disinfection/Disinfection By-Product Regulations on Kentucky-American Water Company", 1993 AWWA annual meeting, co-authored with Kevin Dixon (AWWSCo) and Dr. Philip Singer (UNC)

University of Kentucky and Lexington Herald-Leader 1993 "UK Stands Out" series on UK graduates

Numerous presentations at AWWA and KWWOA sectional meetings

Best Presentation Award, Bluegrass Cross-Connection Prevention Association, 1992

KY-TN AWWA "Distinguished Service" Award, 1999

KWWOA Eugene Nichols Award, March 2002

KY-TN AWWA "Best Paper" Award, September 2002

KY-TN AWWA "Fuller Award", July 2009

KY Department for Environmental Protection, Outstanding Performance Award, 2009

REFERENCES AVAILABLE

Session M1A-3
Brad Murphy

BRAD A. MURPHY
5444 Stone Hill Dr.
Taylor Mill, Ky. 41015
(859) 261-1933

Experience:

3/04 – Present **Northern Kentucky Water District, - Ft Thomas, KY** **Safety Coordinator**
- Manage the overall safety program
- Responsible for the training of over 150 people in confined space, HAZWOPER, Lockout/Tagout, Fire Safety, CPR/AED & First Aid etc.
- Wrote policies on HAZMAT, Safety, Security and Emergency Preparedness

8/98 – 3/04 **St Luke Hospitals, - Ft Thomas, KY,** **Safety Officer**
- Extensive knowledge in Emergency Preparedness, OSHA, EPA, HAZMAT.
- Monitor and investigate all employee accidents.
- Wrote Policies on HAZMAT, Life Safety, Emergency Management Etc.
- Responsible for the annual training of over 50 people in Hazardous Waste Operations and Emergency Response (HAZWOPER).
- Managed the installation of two HAZMAT decontamination rooms.
- Conduct new employee orientation on a bi-weekly basis and annual safety training for over 1,800 employees.
- Negotiated several contracts to save hospital $275,000.00 annually.

3/94 - 8/98 **Silco Fire Protection, - Cincinnati, OH.** **Fire Protection Inspector**
- Trained in overall loss prevention for a very diverse clientele.
- Maintained quality service to over 900 customers in various industries.
- Certified Kentucky Sprinkler Inspector.

3/92 - 3/94 **Sprinkler Inspection Services, - Alexandria, KY.** **Fire Protection Inspector**
- Responsible for the installation, inspection and testing of sprinkler systems, extinguishers, fire pumps, and 24-hour supervision.
- Certified Ohio Fire Extinguisher and Sprinkler System Inspector.

Certifications and Associations:
- Chairman KYWARN
- Department of Health & Human Services employee (DMAT)
- Certified Fire Protection Specialist
- National Fire Protection Association Member (NFPA)
- Hazardous Waste Incident Commander and Technician Trainer
- Northern Kentucky Emergency Planning Committee (NKEPC)
- Certified American Red Cross Instructor
- Competent Person for Confined Space & Trenching and Excavations

Education:
B.S. Eastern Kentucky University – 1992
Fire and Safety Engineering Technology, Industrial Risk Management

Session M1B-1
Mike Bernard

Session M1B
Title: The First Year of Operational Experience at Tennessee's Largest Membrane Filtration Plant

Mike Bernard, PE
Smith Seckman Reid, Inc.
615-460-0582
MBernard@ssr-inc.com

Mike Bernard is the Water Process Team Leader for the South Central Division of Smith Seckman Reid, Inc. in Nashville, Tennessee. He joined the firm while completing his Master's Degree in Environmental and Water Resources Engineering at Vanderbilt University. He is a native of Virginia, and has a Bachelor's of Civil and Environmental Engineering from the Virginia Military Institute. Mike has been involved with a myriad of design projects throughout Tennessee ranging from three large membrane filtration plants for the Cities of Murfreesboro, Alcoa and the Town of Smyrna to implementation of a nonpotable reuse distribution system for the City of Murfreesboro. He was published in the AWWA Journal in their December 2007 edition for his work at the Murfreesboro Water Treatment Plant, and has spoken at the last two AWWA/AMTA Membrane Technology Conferences regarding lime softening and microfiltration. Mike is a member of the American Water Works Association, the Water Environment Federation, the US Green Building Council and the National Society of Professional Engineers. He also currently serves as Vice Chair on the Board of the KYTN AWWA Section.

Session M1B

Title: Cost Effective Approaches to Unlocking Hidden Capacity and Efficiency in Your Water Treatment Plant

Kelly Comstock, P.E. BCEE
Brown and Caldwell
770-673-3669
kcomstock@brwncald.com

CREDENTIALS

Registered Professional Engineer
Board Certified Environmental Engineer

EXPERIENCE

6/06 – Present Senior Associate
Brown and Caldwell

2/97 – 6/06 Senior Project Manager
CDM

11/95 - 2/97 Environmental Engineer
Rosser Lowe

EDUCATION

Undergraduate
B.S. Environmental Engineering
The University of Central Florida, 1994

Graduate
M.S. Environmental Engineering
Georgia Institute of Technology, 1996

Alternative Solutions to Upgrade and Expand a Large Water Treatment Plant's Coagulation Feed and Storage System

Mr. Abraham is a Senior Project Manager with Camp Dresser & McKee, Inc. in Nashville, Tennessee. He has 25 years of experience as a project manager and design engineer that includes process selection, planning, design, and construction phase services for reclamation and water treatment facilities. He has bachelor of science and master of science degrees in civil engineering from South Dakota State University, and is a registered professional engineer in California, Tennessee, South Dakota and Iowa. He also holds a Grade 4 Water Treatment certification in California, and holds Board Certification with the American Academy of Environmental Engineers. He is an active member in several professional societies including ACEE, AWWA, WEF, ASCE, and AMTA, and is a past president of the Golden Empire Section of the California Water Environment Association.

As of July 1, 2009, Tom Moss is acting Director for the Division of Water Supply in the Department of Environment and Conservation. Tom had been the Deputy Director for the Division since February of 2007. Prior to that, Mr. Moss was the Manager for the Ground Water Management Section in the Division of Water Supply for over 15 years. Mr. Moss was principle author of Tennessee's Drinking Water Source Protection Program and Regulations and played an instrumental role in the changes regarding public water source and supply protection in the 2002 Tennessee Safe Drinking Water Act amendments. Prior to his position with the Division of Water Supply, Mr. Moss worked for 5 1/2 years in the Division of Superfund. Mr. Moss holds a graduate degree in geology from the University of Tennessee and is a registered professional geologist.

Bio of. Saya Qualls

Saya is the Chief Engineer for the Tennessee Division of Water Pollution Control. Previously, she managed the the division's Permit Section. She is responsible for coordinating the functions of the permitting, enforcement and municipal facilties 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 and is a registered professional engineer in the State of Tennessee.

Saya has been a member of the Water Environment Association for 18 years and served as association president in 2007-2008 .

Session M2A-3
Robert O'Dette

Session: M2A
Topic: Regulatory – TN Issues
Title: Biosolids in Tennessee: The Road Ahead

Robert G. O'Dette, M.S., P.E.
Tennessee Department of Environment and Conservation
Division of Water Pollution Control
615-253-5319
Robert.Odette@TN.GOV

- Over 40 years of experience in wastewater treatment and residuals management (more than 25 years as a regulator).
- Presented over 100 technical papers on 5 continents.
- B.S. and M.S. in Civil (Environmental) Engineering
- Registered Professional Engineer in 5 states.
- Past President and WEF Director for the KY-TN WEA.
- Won a Special National EPA Award for Biosolids in 1996 for Public Acceptance and Outreach Programs.
- Past Chair of WEF's Residuals and Biosolids Committee.
- Charter Member of the National Biosolids Partnership.
- Testified before the United States Congress relative to the benefits of biosolids recycling.

Session M2B

Title: Protecting Your Investment Through Operator Training

Kenneth P. Schnaars, P.E.
AECOM
615-313-0342
kenneth.schnaars@aecom.com

BIOGRAPHY

Mr. Schnaars specializes in environmental engineering and has specific expertise in wastewater treatment, water treatment, and industrial wastewater focusing on operations. In this position, Mr. Schnaars is responsible for project management, process design, process start-up and troubleshooting, equipment evaluation, operation and maintenance manuals, and operator training. Mr. Schnaars has performed the field investigation studies for the U.S. EPA Post Construction Evaluation research project on biological phosphorus removal systems, trickling filter/solids contact processes and lagoons receiving domestic and industrial wastewater. Mr. Schnaars also works on water plants and SCADA projects. His 34 years of experience is invaluable in the numerous plant start-ups and operator training sessions he has conducted. Ken is a hands-on individual passively helping operators in certification and plants to function effectively for the environment. He most recently lead the operations commissioning and reliability testing of the Nashville BioSolids facility. Mr. Schnaars is a member of the AWWA and WEF.

CREDENTIALS

Certified Wastewater Plant Operator, Grade 4, IL
Certified Wastewater Plant Operator, Grade 3, WI
Certified Environmental Trainer, US
Risk Assessment Methodology for the Water Infrastructure (RAM-W)
Registered PE - Wisconsin

EXPERIENCE

1976 – Present	Associate Vice President AECOM USA, Inc. (previously Metcalf & Eddy/Consoer Townsend)
1974-1976	Engineer with small Wisconsin firm

EDUCATION

BET, Civil Engineering,
University of Central Florida, 1974
AS, Sanitary Engineering and Highway Design,
University of New York, 1972

Session M2B-2
Thomas Schaffer

Session M2B
Title: Making Regional Wastewater Treatment a Reality

Tom Schaffer, P.E.
HDR Engineering, Inc.
859-223-3755
Tom.Schaffer@hdrinc.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

August 1998-Present March 1992-June 1996	16 years with HDR Engineering (formerly Quest Engineers) Vice-President, Section Manager for Water Business Group Focused on wastewater projects
June 1996-August 1998 July 1985-March 1992	9 years with Brown and Caldwell, Atlanta, Georgia Project Engineer and Project Manager for wastewater planning and design projects
January 1984-June 1985	Graduate Research Assistant for Environmental Engineering Dept at Georgia Institute of Technology
June 1979-December 1983	5 years as Plant Engineer for Cargill, Inc. Domestic Soybean Crushing Division

EDUCATION

Undergraduate	B.S. Agricultural Engineering University of Minnesota
Graduate	MS Environmental Engineering Georgia Institute of Technology

Session M2B-3
Carrol Proffitt

Session M2B

Title: Reduce Operating Costs by Eliminating Aeration in an Aerobic Digester

Carrol L. Proffitt, Wastewater Manager

Newport Utilities

(423) 625-2847

cproffitt@newoprtutilities.com

CREDENTIALS

- Certified Class IV Wastewater Plant Operator
- Certified Class II Collections System Operator

EXPERIENCE

- 12/96-Present Manager Newport Utilities Wastewater Department
- 3/92-12/96 Superintendent James S. Franks WWTP
- 4/88-3/92 Assistant Superintendent James S. Franks WWTP
- 9/79-4/88 Laboratory Technician James S. Franks WWTP
- 3/73-9/79 Operator Newport Utilities WWTP

EDUCATION

Associate of Science

Environmental Health Technology –Walters State Community College

Associate of Science

Architectural Technology- Walters State Community College

Associate of Science

Business Management Technology- Walters State Community

Session M2B-3
Ted Mullennix

Session M2B

Title: Reduce Operating Costs by Eliminating Aeration in an Aerobic Digester
Newport Utilities James B. Franks WWRP Case Study

Ted Mullennix
Ennix Incorporated
805-610-4189
tm@ennix.com

President
Ennix Incorporated
Digestion Service Provider to Wastewater Treatment Plants
1995 to present

Education
B.A. Economics
University of Colorado

MBA
Thunderbird Graduate School for Global Management

Bruce Tobey is Vice President Business Development for Home Service USA Corp. Bruce joined the Home Service Corporate Development team in 2008 after spending six years as the Director of Business Development for Homeowner Safety Valve Company, where he worked to develop and grow its program of partnerships with public sector utilities offering water and sewer line and in-house plumbing protection plans to residential customers.

As a result of Bruce's strategic analysis and business planning efforts, the company realized strong growth, reflected in the explosive expansion of its sewer lateral protection plan business and the successful launch of collaborations with eight public sector water and wastewater utilities. Additionally, he provided legal, claims review, and customer service support to the program as this growth occurred to ensure that quality standards were preserved.

Bruce's brings to this work his extensive background in public sector water and wastewater utility operations and management, including nine years of service as the Mayor of Gloucester, Massachusetts, where he focused on the management of the City's public works, water and wastewater utility, its environmental protection responsibilities, and a renewed emphasis on providing and measuring customer satisfaction with municipal services; and as an attorney with the Massachusetts Water Resources Authority, where he headed the General Law Department and concentrated on wastewater and drinking water system operations.

Bruce remains active in local government, serving on the City Council in Gloucester, MA. He is a Past President of the Massachusetts Municipal Association, chaired the Advisory Council of the National League of Cities in 2008, and is completing a term as a member of USEPA's Local Government Advisory Committee.

Bruce graduated from Wesleyan University, majoring in Russian, is a cum laude graduate of Suffolk University Law School, where he was a member of Law Review and received an MBA degree from the Sawyer School of Management of Suffolk University. He is licensed to practice law in New York and Massachusetts and he is a veteran of the United States Coast Guard.

Session M3A
Why Care About Customer Satisfaction?

Cristina Marciani
American Water
859-268-6703
cristina.marciani@amwater.com

Experience

7/09 – Present
Manager, Billing, Payments, & Collections
Interim Manager, Field Resource Coordination Center
Eastern Division Customer Relations
American Water

10/96 – 11/08
Area Manager
Enterprise Rent-A-Car

Education

BA, Transylvania University
Lexington, KY

Session M3A
Title: "Why Care About Customer Satisfaction?"

Stacy R. Owens
American Water
Eastern Division Manager, Operations Support
2300 Richmond Road
Lexington, KY 40502
stacy.owens@amwater.com

Experience

2009 – Present	Manager, Operations Support Eastern Division American Water
2003 – 2009	Customer Service Advocate Field Operations Kentucky American Water
2002 – 2003	Customer Service Representatives Field Operations Kentucky American Water
1995 – 2002	General Accounting Representative Accounting Kentucky American Water

Education

Associate in Applied Sciences – Computer Information Systems
Lexington Community College

Bachelor of Business Administration – Management
University of Kentucky

Master of Business Administration
Sullivan University

Session M3A
Title: Water Leak Adjustments

Christopher R. Goodloe
Louisville Water Company
502-569-3652
CGOODLOE@LWCKY.COM

EXPERIENCE
9/2006 - Present CALL CENTER MANAGER
Customer Service Division
Louisville Water Co.

PROFESSIONAL AFFILIATIONS
Greater Louisville, INC. Customer Contact Center Network
Planning Committee Member

AWWA KY/TN Section
Customer Service Committee Member

EDUCATION
B. A. Economics
University of Louisville

Christal Wade Bioshort

Christal Wade, WTI Program Coordinator

Christal Wade is the Program Coordinator for the Water Training Institute at Commonwealth School of University College at Western Kentucky University (WKU) and as such acts as the liaison between the Center for Water Resource Studies, the Community College, partnering organizations/utilities, and students of the program. Ms. Wade has been working in with the Center for Water Resource Studies at WKU since 2004, when she started in the WATERS Laboratory as an analyst. Ms. Wade is an EPA approved Cryptosporidium Analyst, a KMLCP Microbiological Analyst, and a KEPSC Qualified Inspector. She has been working with the Water Training Institute since 2008. Ms. Wade has achieved both a Bachelor and Master of Science degree in Biology from WKU and is currently working on a Master of Art in Adult Education with an emphasis on Instructional Design. In addition, Ms. Wade currently is the instructor of record for the WTTI200C: Water Supply & Wastewater Control, the WTTI212C: Water Distribution & Wastewater Collections, and WTTI222C: Water & Wastewater Instrumentation & Control courses of the Water Resource Management Associate degree program WKU.

Session M3B-2
Carrie Turner

Using Government Affairs to Solve Water
M8B (Special Topics)

Carrie Turner
LimnoTech
(734) 332-1200
cturner@limno.com

Carrie Turner is a senior project engineer with LimnoTech who specializes in developing affordable and sustainable solutions for wet weather pollution-related issues. She has over 10 years of experience evaluating impacts of pollutant sources on watersheds and in waterways using innovative data and modeling analyses that build on her 12+ years of work in environmental chemistry prior to joining LimnoTech. Ms. Turner's expertise includes strategic planning, technical support and guidance, project management, and presentation of findings. She has:

- Assisted a utility in implementing the country's first wet weather Consent Decree based on the principles of watershed management;
- Contributed technical analyses and documentation to support the development of combined sewer overflow Long Term Control Plans for ten communities and utilities; and,
- Conducted assessments of wet weather pollution impacts at regional, watershed and local waterway scales.

Education:
MS, Environmental Engineering, Wayne State University, 1998
BS, Chemistry, Miami University, 1986

Professional Certifications:
Professional Engineer, Michigan, 2002 (#49256)

Session M3B
Title: Plant Maintenance Optimization

Bob Carmon, CMRP
Brown and Caldwell
423-331-4048
RECarmon@brwncald.com

CREDENTIALS

Certified Maintenance and Reliability Professional

EXPERIENCE

2009 – Present	Maintenance and Reliability Specialist Brown and Caldwell, Nashville, Tennessee
2008 – 2009	Maintenance Management Consultant AssetPoint Reliability Solutions, Greenville, SC
2003 – 2008	Plant Engineer Johns Manville, Etowah, Tennessee
2002 - 2003	Reliability Engineering Manager Bowater Newsprint, Calhoun, Tennessee
2000 - 2002	Site Manager for CMMS Installation
1995 - 2000	Plant Engineer
1990 - 1995	Site Coordinator for Corporate Maintenance Improvement
1988 - 1990	Plant Engineer
1984 - 1988	Manager of Maintenance
1983 - 1984	Mechanical Department Assistant Superintendent
1981 - 1983	Project Manager
1974 - 1981	Mechanical Project Engineer
1968 - 1971	Co-op Student

EDUCATION

Undergraduate

B.S., Mechanical Engineering
University of Tennessee at Knoxville

Session M4A-1
Tim Ball

Tim began his water works career in 1977 at Louisville Water Company as a Drafting Technician. He worked his way through the ranks to become the Program Manager for LWC's water main rehabilitation program. In 2003 Tim joined forces with the engineering firm of Jordan, Jones, and Goulding in an effort to broaden the trenchless rehab market. He has also been involved in a number of AwwaRF research projects related to waterline rehab. After over 30-years in the industry Tim has worked with many utilities across the Country as well as utilities in Western Europe promoting trenchless renewal of existing pipeline networks.

Jeff Cruickshank

Session M4A (11:00)

Title: Planning Distributions Systems for New Supply Sources

Jeff Cruickshank (Crook-shank), P.E.
Hazen and Sawyer
336-292-7490 x 81720
jcruickshank@hazenandsawyer.com

CREDENTIALS

Registered Professional Engineer
AWWA Life Member
Contributing Author for M32, AWWA's Manual of Practice of Network Modeling

EXPERIENCE

2003-Present: Hazen and Sawyer
Manager of Greensboro Office which specializes in hydraulic modeling

1976-2003 Pitometer Associates
District Manager, Field Testing and Modeling in more than 50 Water Systems

Session M4A
Title: Replacement of Water Lines on Lookout Mountain Bluff

Jerry D. Hightower, P.E.
CTI Engineers, Inc.
423-267-7613
jhightower@ctiengr.com

CREDENTIALS

Registered Professional Engineer
KY-TN/AWWA George Warren Fuller Award Winner

EXPERIENCE

1991 - Present	Senior Project Manager CTI Engineers, Inc.
1971 - 1991	Project Manager/Design Section Manager Hensley-Schmidt, Inc.

EDUCATION

Undergraduate
B. S. Civil Engineering
Georgia Institute of Technology
Graduate
Environmental Engineering
University of Tennessee at Knoxville

Session M4B

Calibrating a Large Water Distribution System Model

Jennifer Lind, E.I.

CDM

615-320-3161

LindJM@CDM.com

Credentials

Engineer Intern , 2008

Experience

6/2007 – Present Project Engineer, CDM

9/2005 – 6/2007 Student Intern, CDM

Education

B.S. Civil Engineering, University of Central Florida

Session M4B

Title: A Study on the Impact of Water Chemistry in the Water Treatment Plant to Lead and Copper Corrosion in the Distribution System

Z. Michael Wang, PhD, PE, BCEE
Hazen and Sawyer
919-833-7152
mwang@hazenandsawyer.com

CRIDENTIALS

Registered Professional Engineer
Board Certified Environmental Engineer (BCEE) Diplomate – American Academy of Environmental Engineers

EXPERIENCE

8/83 – 7/85	Research Assistant Civil and Environmental Engineering Department University of North Carolina at Charlotte
8/85- 8/86	Research Assistant Water Resource Engineering University of North Carolina at Chapel Hill
08/86 – Present	Assistant Engineer - Vice President (since 2001) Director of Hydraulic Modeling Director of Chemical Systems in Water and Wastewater Treatment Hazen and Sawyer, P.C.
3/08 – Present	Stollery Executive-in-Residence and Industry Advisor Department of Civil and Environmental Engineering University of Alberta, AB, Canada

EDUCATION

Undergraduate

B.S.	Environmental Sciences Rutgers-The State University of New Jersey

Graduate

MSE	Civil and Environmental Engineering University of North Carolina at Charlotte
PhD	Civil, Construction and Environmental Engineering North Carolina State University

Session M4B-3
Kevin Laptos

Session M4B
Title: Evaluating and Improving Storage Facility Impacts on Water Age in Distribution Systems

Kevin T. Laptos, P.E.
Black & Veatch
704-510-8439
LaptosKT@bv.com

CREDENTIALS

Registered Professional Engineer
Member – American Water Works Association (AWWA)
  Member, Engineering Modeling Applications Committee
Member – Water Environment Federation (WEF)
Fellow Member – American Society of Civil Engineers (ASCE)

EXPERIENCE

2007 – Present (3 years)	Infrastructure Planning Practice Leader Black & Veatch
1990 – 2007 (17 years)	Senior Project Manager & Principal Hydraulic Engineer Gannett Fleming

EDUCATION

Undergraduate
  B.S. Civil Engineering
  Virginia Tech
Graduate
  M.S. Civil Engineering
  Virginia Tech

NARRATIVE SUMMARY

Mr. Laptos serves as Infrastructure Planning Practice Leader for Black & Veatch Water Americas. He specializes in modeling and planning of water distribution and wastewater collection systems and hydraulic transient analysis. He has 20 years of professional experience in engineering practice and management involving the planning, design, construction, operation, and rehabilitation of water and wastewater systems. He has served as a project advisory committee member for an AWWARF-sponsored research project related to distribution system intrusion due to the occurrence of low pressure transients. Mr. Laptos also currently serves on the AWWA Engineering Modeling Applications Committee and is a Fellow Member of ASCE. He has also authored and presented numerous technical papers related to system modeling, information management and GIS integration, and hydraulic transient analysis for AWWA and ASCE conferences and publications.

Session M5A

Title: *Inflatable Dam Technology Provides Solution to Community Water Needs*

Kristen Braden, Construction Project Manager
H.R. Gray, Inc.
614.487.1335
kbraden@hrgray.com

CREDENTIALS

Attorney - Licensed to Practice in Ohio
Engineer-in-Training

EXPERIENCE

- Over 7 years of experience in the construction industry including the management of projects ranging from $1 - $20 million.
- Experience includes public and private sector projects such as water/wastewater, roadways, airports, and offshore oil and gas production facilities.
- Facilities Engineer for the ExxonMobil Production Company in New Orleans, Louisiana.
- At ExxonMobil, project management responsibilities in project planning and conceptual development; budget development and estimating; project set-up and start-up; and project closeout.
- At H.R. Gray, project management responsibilities on several water and wastewater construction projects. Responsibilities have included managing contractor's payments, negotiating contract modifications, and resolving construction related questions and conflicts on-site.
- Responsible for the contract administration, coordination between contractors and resolution of design and layout issues on a project with multiple contracts to construct an inflatable dam pump station and reservoir.
- Assisted with the preparation, analysis and resolution of disputes and claims on various construction projects.

EDUCATION

- Bachelor of Engineering, Civil Engineering, Vanderbilt University
- Master of Science, Engineering, University of Texas
- Juris Doctor, University of Cincinnati.

SPEAKING EXPERIENCE

- 2010 Ohio Parks and Recreation Association Annual Conference
- 2009 Lower Colorado River Authority Conference
- 2008 Kentucky/Tennessee Water Professional Conference
- 2008 Ohio Parks and Recreation Association Annual Conference
- 2007 Primavera Annual Conference

Session M5A

Topic: Engineering and Construction Issues
BIM and IPD – Are Ready? Should you be?

John Watkins, P.E.
JJG, a Jacobs Company
678.333.0258
John.Watkins@JJG.com

CREDENTIALS

Registered Professional Engineer – MO, NY, PR

EXPERIENCE

Jordan, Jones and Goulding, Inc.

6/05 – Present	Sr. VP, Project Delivery
5/02 – 6/05	Manager, W/WW
4/99 – 5/02	Project Director, F. Wayne Hill WRC, Ph 2
1/96 – 4/99	Project Director, F. Wayne Hill WRC, Ph 1
6/91 – 1/96	Manager, W/WW
6/87 – 6/91	Manager, Mechanical and Electrical Division

Lockwood Greene Engineers Inc.

1978 – 1987	Project Engineer / Manager

EDUCATION

Bachelor of Chemical Engineering
Georgia Institute of Technology

Session M4A
Presentation Title: Design/Build in the Water Industry – How to Make is a Success

Session M5A-3
Thomas Dittmaier

Presenters:
Thomas A. Dittmaier, P.E.
Burns & McDonnell Engineering
9040 Executive Park Drive, Suite 226
Knoxville, TN 37923
865-692-1508
tdittmaier@burnmscd.com

Credentials

Registered Professional Engineer in Missouri, Tennessee, Kentucky, Georgia, South Carolina and North Carolina

Education

Undergraduate – B.S. Civil Engineering, Missouri University of Science & Technology, 1980
Graduate – M,S. Civil Engineering, University of Missouri-Columbia, 1982

Experience

6/2006 to Present:	SE Region Manager, Infrastructure Group Burns & McDonnell Engineering Knoxville, Tennessee
3/1994 to 5/2006:	Various positions, including Director of Operations and Vice President of Engineering Knoxville Utilities Board Knoxville, Tennessee
6/1980 to 2/1994	Project Engineer and Project Manager Burns & McDonnell Engineering Kansas City, Missouri

Co-Presenter:
Scott Terry, Vice President
Garney Construction
6401 Centennial Blvd.
Nashville, TN 37201
(615) 350-7975
sterry@garney.com

Credentials

Active member of Design Build Institute of America and ACI 373 Committee Member for the "Design and Construction of Circular Prestressed Concrete Structures with Circumferential Tendons”

Education

Four-year carpentry apprenticeship program, 1981
Various construction related college courses

Experience

4/2009 to Present	Vice President, Water Facilities Southeast Region Garney Construction Atlanta, GA
3/2001 to 4/2009	Sr Vice President, Water Facilities Western Region Garney Construction Denver, Colorado
11/1994 to 4/2001	Project Manager and General Manager Grimm Construction (acquired by Garney in April 2001) Denver, Colorado
4/1985 to 11/1994	Co-founder and Vice President Paramount Construction Denver, Colorado
5/1982 to 4/1985	Project Engineer Western Summit Constructors Denver, Colorado

Bio

As a Vice President with Garney, Scott monitors each water/wastewater project that is under construction in his southeast region. With more than 30 years of construction-related experience, Scott has been directly involved with nearly every type of construction project, including commercial buildings, roads and bridges, water and wastewater treatment facilities, heavy civil, concrete storage reservoirs, and pipelines. His responsibilities also include marketing and negotiating design/build and construction manager at risk contracts. Scott has been with Garney since 1994 and enjoys the many challenges of developing a top-notch construction company while expanding the company’s markets.

Session M5B

Startup of a 200 MGD Influent Pump Station:

Jonathan S. Lapsley, P.E.
CDM
704-342-4546
lapsleyJS@cdm.com

CREDENTIALS

Registered Professional Engineer, NC & SC

EXPERIENCE

07/03 - Present Environmental Engineer and Project Manager for a variety of Water and Wastewater Projects for Camp Dresser & McKee (CDM) in the Carolina's based out of CDM's Charlotte, North Carolina Office

EDUCATION

Undergraduate

B. S. Civil Engineering
Clemson University

Graduate

Masters of Engineering – Environmental Fluid Mechanics
Cornell University

Session M5B
Engineering and Construction Issues

Condition Assessment of Pre-Stressed Concrete Main

Keith D Coombs, PE
Louisville Water Company
(502) 569-3682
kcoombs@lwcky.com

Registration: Registered Professional Engineer, Kentucky

Experience:

October 2007 to Present
Process Owner – Capital Planning and Hydraulics
Louisville Water Company

February 2004 to October 2007
Process Owner – MRRP, Transmission and Relocation
Louisville Water Company

October 1996 to February 2004
Process Owner – Main Replacement and Rehabilitation
Louisville Water Company

August 1993 to October 1996
Project Engineer – Main Replacement and Rehabilitation
Louisville Water Company

October 1992 to April 1993
Geotechnical Engineer
US Ecology, Louisville, Kentucky

October 1983 to October 1992
Geotechnical Engineer
FMSM Civil Engineers, Lexington and Louisville, Kentucky

September 1982 to October 1983
Staff Engineer
US Army Corps of Engineers, Louisville District

Education:

Bachelor of Science - Civil Engineering, 1981
Master of Engineering – Civil Engineering, 1982
Speed Scientific School, University of Louisville

Nicholas E. Winnike, P.E.

CH2M HILL

513-337-9351

Nicholas.winnike@ch2m.com

PROJECT ROLE

Project Manager – design team

EXPERIENCE

5/79 - Present Engineer/Project Manager/Vice President
CH2M HILL

Have managed 5 plant and pump station design projects for NKWD

PROFESSIONAL REGISTRATIONS

Professional Engineer Kentucky, Ohio, Indiana, Wisconsin, Missouri

EDUCATION

B.S. Civil Engineering
University of Notre Dame

M.S. Environmental Engineering
University of California, Davis

Richard Harrison, PE

Vice President of Engineering
Northern Kentucky Water District

Richard Harrison is Vice President of Engineering at the Northern Kentucky Water District. He has a Bachelor's of Science Degree in Civil Engineering from the University of Kentucky and is a Licensed Professional Engineer in the State of Kentucky. The group he manages is responsible for the procurement of professional services, asset management planning and design and construction management for new projects for the District.

Richard is a member of the American Water Works Association (AWWA) serving as the Vice-Chair of the KY/TN Section of AWWA's Water Utility Council and the Chair of the executive committee of the Section's Kentucky Water Utility Council. He is also a past President and current member of the Covington Rotary Club and a member of the Northern Kentucky Society of Professional Engineers currently serving on the Chapter's Board of Directors.

Richard has been with the Northern Kentucky Water District since 1988.

Session M6a
Title: Don't Let Water Hammer Ruin Your Day…
the Importance of Transient Analysis in the Design Process

Scott A. Hall, P.E.
Brown and Caldwell
770-673-3611
shall@brwncald.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

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

2009 – Present – Atlanta Office
2005 – 2009 – Nashville Office
1998 – 2005 – Charlotte Office
1996 – 1998 -- Atlanta Office

EDUCATION

Undergraduate
B.S. Civil Engineering
Georgia Institute of Technology

EXPERIENCE SUMMARY

Scott has 14 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.

Session M6A-2

Glenn Weist

From: Weist, Glenn E.. [Glenn.Weist@aecom.com]
Sent: Tuesday, April 20, 2010 2:48 PM
To: Mike Bernard
Subject: Glenn Weist Bio

Mike:

BIO
Mr. Weist is a senior project engineer/manager with nearly 25 years of experience in planning, designing and constructing water and wastewater projects for industrial and municipal clients. His experience includes water pumping, storage and distribution systems, wastewater pumping and collection systems improvements, and process support services in various water and wastewater treatment plant projects. Mr. Weist is a graduate of the University of Cincinnati and is a Registered Professional Engineer in Ohio and Kentucky.

Glenn Weist, P.E.
AECOM Water

New Address and Direct Office Phone
4219 Malsbary Rd, Cincinnati, OH 45242
P.513.878.6865 C.513.509.2444

Session M6A

Title: Getting the Most Out of Your Existing Infrastructure Case Study for Wet Weather Storage for a Wastewater Pumping Station

Jay Fulmer, P.E.
Brown and Caldwell
704-358-7204
jfulmer@brwncald.com

CREDENTIALS

Registered Professional Engineer

10 years of experience in hydrologic and hydraulic modeling, wastewater system planning, pumping station design, construction management, water resources planning, storm water design and business consulting

EXPERIENCE

1999-Present
Project Engineer / Project Manager
Brown and Caldwell

EDUCATION

Undergraduate
B.S., Civil Engineering
Clemson University, 1996

Graduate
M.S., Civil Engineering
Clemson University, 1998

Session M6B
Collection System Issues

Staging Inline Storage and Green Infrastructure for CSO Control

Gunilla Goulding, PE
Malcolm Pirnie, Inc
847-517-4116
ggoulding@pirnie.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

7/01 – Present	Project Engineer Malcolm Pirnie, Inc. Cincinnati, OH/ Schaumburg, IL
7/98 – 7/01	Engineer Malcolm Pirnie, Inc. Cincinnati, OH

EDUCATION

Undergraduate

B.S. in Mathematics and Spanish
Centre College, Danville, KY

Graduate

M.S. in Mathematics
University of Illinois at Urbana-Champaign

M.S. in Civil Engineering
University of Texas at Austin

SOCIETIES

Illinois Water Environment Association, Watershed Committee

Water Environment Federation, Collection Systems Committee

Water Environment Federation, Government Affairs Committee

BIOGRAPHY

Gunilla Goulding, a Project Engineer with Malcolm Pirnie, Inc. in Schaumburg, Illinois, has more than 11 years of experience in combined sewer overflow (CSO) and sanitary sewer overflow (SSO) planning and analysis, hydrologic and hydraulic modeling, and sewer monitoring data assessment. Her expertise in collection system modeling has supported sewer utilities in developing master plans, evaluating infiltration/inflow impacts and solutions, assessing CSO and SSO control options, and answering regulatory actions

Session M6B-2
Mike Burgett

Session M6B
Title: Developing Nashville's Nine Minimum Controls Plan

Michael A. Burgett, P.E.
Gresham, Smith and Partners
615-770-8531
mike_burgett@gspnet.com

BIOGRAPHY

Mr. Burgett is a Senior Engineer with over 25 years of experience in the planning, design and construction of water distribution, wastewater collection and treatment systems. A graduate of Vanderbilt University, he has been involved in the development, design, and construction oversight of numerous projects including wastewater treatment facilities, wastewater pumping stations, sanitary sewer systems, sewer system rehabilitation, and combined and separate sewer overflow abatement. He has written, co-authored and presented papers on the subjects of sewer system rehabilitation, the quantification and reduction of I/I, combined sewer separation and alternative project administration.

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

4/05 – Present	Senior Associate, Gresham, Smith and Partners
1/95 – 3/05	Project Manager, Gresham, Smith and Partners
5/92 – 12/94	Project Manager, Professional Services, Inc
10/89 – 4/92	Associate Engineer, Robert Johnson and Associates
8/83 – 9/89	Project Manager, John Coleman Hayes and Associates

EDUCATION

B.E. Civil Engineering
Vanderbilt University

Session M6B
Title: Developing Nashville's Nine Minimum Controls Plan

Vernon (Wes) Frye, P.E.
Metro Water Services
615-862-4525
wes.frye@nashville.gov

BIOGRAPHY

Mr. Frye is presently a Special Projects Manager currently coordinating the Department's response to a Consent Decree with regards to the 9 Minimum Control Plan and the Long Term Control Plan. He has served as the Assistant Director for operation and maintenance of the collection system for a number of years, as the Superintendent of System Maintenance which maintained the water and sewer pumping stations, and served in other positions involving operation and maintenance of both the water and wastewater systems over the past 38 years. He is a member of the WEF, the WEF Collection System Committee, and the AWWA.

CREDENTIALS

Registered Professional Engineer in Tennessee
Grade II Collection System Operator License in Tennessee
Grade II Water Distribution System Operator License in Tennessee

EXPERIENCE

11/1972 – Present	Various Positions Metro Water Services Nashville, Tennessee Special Projects Manager Assistant Director – System Services Superintendent of Operations Superintendent of System Maintenance Senior Civil Engineer Superintendent of Pumping Stations and Reservoirs Civil Engineer

EDUCATION

BS in Civil Engineering, Tennessee Technological University
MS in Engineering Administration, University of Tennessee
Nashville School of Law (Completed 1 year)

Session M6B-3
Paul Cate

Session M6B
Title: Warner Park Combined Sewer Overflow (CSO) Control Facility

Paul C. Cate, P.E.
CTI Engineers, Inc.
423-267-7613
pcate@ctiengr.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

1991 - Present	Executive Vice President Senior Project Manager CTI Engineers, Inc.
1988 - 1991	Project Manager Hensley-Schmidt, Inc.
1985 - 1988	Manager of Special Projects Thomas J. Davis, Inc., Seoul, Korea
1984 - 1985	Project Engineer/Manager Watt and Estes, Inc.
1982 - 1984	Staff Engineer E.G.&G. InterTech, Inc., Arlington, Virginia
1973 - 1982	Project Engineer/Manager Hensley-Schmidt, Inc.

EDUCATION

Undergraduate
B. S. Civil Engineering
University of Tennessee at Knoxville
Graduate
Business Administration
University of Tennessee at Chattanooga

Dustin Bambic is a Senior Hydrologist with AMEC Earth & Environmental in Nashville, TN. Most of his work involves assisting public agencies with NPDES permit compliance, watershed monitoring, and development and implementation of TMDLs. His educational background includes mathematics and physics (Western Kentucky University) and hydrology and environmental engineering (University of California-Davis).

Session M7A
Title: Funding a Large Stormwater System: The First Four Years

Scott Morgan, P.E.
Environmental Engineer
City of Memphis
901-576-7125

Credentials

Registered Professional Engineer

Experience

3/2006 – Present	Environmental Engineer Public Works City of Memphis
3/2006 – 9/2009	Manager, Environmental Engineer Storm Water Program City of Memphis
5/2002 – 3/2006	Project Manager Pangean-CMD Associates, Inc.

Education

B.S. Geological Engineering
University of Mississippi

Zack Daniel, P.E.
Client Service Manager
CDM
Nashville, TN
615-320-3161

Credentials

Registered Professional Engineer – TN, KY
2010 WPC Chairman
2008-10 AWWA Training Committee Chair
WEA Utility Management Committee

Experience

2/2005 – Present	Project Manager/Client Service Manager CDM Nashville, TN
5/2002 – 2/2005	Project Engineer/Manager Willis Engineers Charlotte, NC
1/2001 – 5/2002	Graduate Research Assistant/Teacher The University of Memphis Memphis, TN

Education

B.S. Civil Engineering - 2000
The University of Memphis

M.S. Environmental Engineering – 2002
The University of Memphis

Session M7A
Title: No More "Rain Tax" Talk: Turning the Public into Stormwater Stewards

Terry Cole
Jordan, Jones & Goulding
678-333-0203
terry.cole@jjg.com

EXPERIENCE

7/05 – Present	Communications Practice Director Jordan, Jones and Goulding
2/98 – 7/05	Regional Communications Manager Brown and Caldwell
10/88 - 2/98	Communications Coordinator Douglasville-Douglas County Water and Sewer Authority
6/87 - 10/88	General Assignment Reporter Neighbor Newspaper Corporation

EDUCATION

Undergraduate
- B. A. Journalism
- University of Georgia

Graduate
- Master of Communications
- Georgia State University

Session M7B

An Integrated Solution for Biosolids Data Management Utilized by the Moccasin Bend WWTP, Chattanooga, TN

Aaron Stephens
Material Mattes, Inc.
717-367-9697
AStephens@MaterialMatters.com

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

Session M7B-2
Kevin Rhodes

Session M7B
Title: Exploring the Feasibility of Biosolids to Energy

Kevin H. Rhodes, P.E.
Woolpert, Inc.
513-527-2528
kevin.rhodes@woolpert.com

CREDENTIALS

Licensed Professional Engineer

EXPERIENCE

5/04-Present	Project Director Energy Utilities Group Woolpert, Inc., Cincinnati, OH
9/97-5/04	Vice President/Chief Mechanical Engineer ZBA, Inc., Cincinnati, OH
3/94-9/97	President Rhodes Engineering Corporation, Florence, KY
6/91-3/94	Project Engineer Burgess & Niple, Ltd., Cincinnati, OH
5/87-6/91	Project Engineer Civil Consultants, South Berwick, ME
7/83-5/87	Nuclear Engineer Portsmouth Naval Shipyard, Portsmouth, NH

EDUCATION

B.S. Mechanical Engineering
The Pennsylvania State University

Session M7B-3
Michele Kline

Session
Title:

Michele Kline
I. Kruger Inc.
919-677-8310
michele.kline@veoliawater.com

Experience

4/10 – Present	Sr. Product Manager Biosolids I. Kruger Inc.
4/07 – 4/10	Product Manager Biological Treatment Systems I. Kruger Inc.
10/04 – 4/07	Regional Product Manager Biological Treatment Systems I. Kruger Inc.
7/03 – 10/04	Application Engineer Biological Treatment Systems I. Kruger Inc.
6/00 – 10/02	Application Engineer Filtration Products RPA Process Technologies (Ronningen-Petter)

Education

Undergraduate
B.S. Chemical Engineering
Michigan State University

Graduate
MBA
North Carolina State University

Session M8A

Title: Beneficial use of Dairy and Carbonated Soft Drink Wastes in POTWs

T. Houston Flippin, P.E., DEE
Brown and Caldwell
615-255-2288
hflippin@brwncald.com

CREDENTIALS

Registered Professional Engineer in 10 states

Board Certified Environmental Engineer, American Academy of Environmental Engineers

Works with food and beverage industry clients and helped many municipalities optimize their wastewater treatment facilities to accommodate industrial wastewater

EXPERIENCE

1984 - Present
Wastewater Process Leader with Brown and Caldwell
Brown and Caldwell (formerly Eckenfelder, Inc.)

EDUCATION

Undergraduate
B.E., Civil and Environmental Engineering
Vanderbilt University, 1982

Graduate
Environmental and Water Resource Engineering
Speciality in Water and Wastewater Treatment
Vanderbilt University, 1984

Session M8A
Title: Local Limits Re-Evaluation for Louisville MSD – 5 WQTCs, 80 SIUs 4 Receiving Streams, 1 Class A Biosolids Product

Bradford E. Derrick, P.E.
Strand Associates, Inc.
Brad.Derrick@strand.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

2005- Present	Project Engineer Strand Associates (Louisville, KY)
2003	Engineering Intern Donahue Associates (Indianapolis, IN)

Specific experience in:

- Wastewater treatment design and operations
- Industrial pretreatment
- Regulatory compliance, including CSO issues

EDUCATION

B.S. Civil Engineering - Purdue University
M.S. Civil Engineering – Purdue University

Session M8A-3
Curt Courter

Session M8a
Title: What if Industrial Flows Don't Make it to the Plant? SD1's Determination of Potential Water Quality Impacts from Non-Domestic Dischargers in their CSS

Curtis D. Courter, P.E.
Hazen and Sawyer, P.C.
513-469-2750
ccourter@hazenandsawyer.com

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
Wayne State University

Session M8B-1
Rengao Song

A Comprehensive Approach to Address Black Water Complaints

Rengao Song, Chris Bobay, Eric Zhu, and Emily Fritz
Louisville Water Company
550 South 3rd Street
Louisville, KY 40202

Dr. Rengao Song is the Manager of Water Quality and Research at the Louisville Water Company. He has been with LWC for the past 11 years.

Dr. Song is on AWWA's Academic Achievements Committee and serves as technical expert for several projects and is a reviewer of a few professional journals. He has produced more than 30 papers, 4 book chapters, and 60 presentations at national and/or international levels. Over the past few years, Dr. Song has directed and graduated 2 Ph.D students and 3 MS students.

Dr. Song graduated from the Department of Civil and Environmental Engineering at the University of Illinois at Champaign-Urbana.

Session M8B --

Title: Setting up a Certified Bacteriological Lab
It is more than just buying lab equipment

Dorothy J. Johnson
Kentucky American Water
859-335-3670
Dorothy.johnson@amwater.com

CRENDENTIALS

Certified Class IV Water Plant Operator

EXPERIENCE

12/02 – Present	Water Quality Specialist Kentucky American Water
4/96 – 12/02	Lab Analyst Kentucky American Water
2/94 – 4/96	Principal Lab Technician University of Kentucky Livestock Disease Diagnostic Center
1/93 – 2/94	Project Leader PTRL East, Inc
2/91 –1/93	Staff Scientist PTRL East, Inc

COMMITTEES

Chair – KY/TN AWWA Operations & Water Quality

EDUCATION

B.A. Biology
Berea College

Session M8B-3
Scott Alpert

Session M8B
Title: Key Design Parameters of Advanced Oxidation Processes for Emerging Contaminant Destruction

Scott M. Alpert, PhD, PE
Hazen and Sawyer, P.C.
704-357-3150
salpert@hazenandsawyer.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

2009 – Present	Senior Principal Engineer Hazen and Sawyer, P.C. (Charlotte, NC)
1997 – 2008	Project Manager HDR Engineering, Inc. (Charlotte, NC)
1995 – 1997	Project Engineer Welker and Associates, Inc. (Atlanta, GA)

EDUCATION

Undergraduate
Bachelor of Mechanical Engineering
Georgia Institute of Technology

Graduate – Masters
Master of Science (Environmental Engineering)
Georgia Institute of Technology

Graduate – Doctoral
PhD (Environmental Engineering)
North Carolina State University

Session T1A-1
Frank Rombardo

Frank Rombardo, M.S., P.E. Mr. Rombardo is a process engineer with 10 years of experience in the water treatment field. His graduate work was on the disinfection byproduct formation during water treatment practices. He is a technical advisor on the water treatment practice team for Jordan, Jones & Goulding a Jacobs Engineering Group Inc. company. His responsibilities include managing water treatment design projects and overseeing water treatment evaluations and studies. Mr. Rombardo has served as the lead process engineer on several treatability studies, plant evaluations, plant design projects, as well as water treatment plant upgrade/improvement projects. He also has experience with bench-scale, pilot-scale and full-scale testing at water treatment plants. In addition, he has worked on process evaluations, planning studies, master plans, permitting, regulatory reviews and coordinating with regulatory agencies. Mr. Rombardo has presented papers on water treatment practices at numerous local, state and national conferences. Mr. Rombardo is a member of American Water Works Association (AWWA), Water Environment Federation (WEF), American Membrane Technology Association (AMTA), Georgia Association of Water Professionals (GAWP), American Society of Civil Engineers (ASCE), National Civil & Environmental Engineering Honor Society (Chi Epsilon).

Session T1A
Title: Evolution of a SCADA System

Doug Kimbler
Terry Hendrick
Jordan Blacklock
Bowling Green Municipal Utilities
270-782-1200

Doug Kimbler:

Credentials:

Class II Wastewater Plant Operator

Experience:

11/08 – present	Treatment Plants Superintendent, BGMU
11/03 – 10/08	Research Analyst, Western Kentucky University
3/00 – 11/03	Purchasing Agent, BGMU
10/93 – 3/00	Special Projects Coordinator, BGMU
9/91 – 10/93	Plant Chemist, BGMU

Education:

Undergraduate: BS Chemistry, Western Kentucky University
Graduate: MS Chemistry, Western Kentucky University

Personal: Doug has been married to Cindy Kimbler for 17 years; they have 2 children, Lucas and Joshua, and are trying to build a house while maintaining their sanity.

Terry Hendrick

Credentials:

Class IV Water Treatment plant Operator
Class II Wastewater Treatment Plant Operator

Experience:

5/98 – present	Chief Operator WTP, BGMU
3/97 – 5/98	Assistant Chief Operator WTP, BGMU
10/95 – 3-97	Plant operator, BGMU

Education:
BS in General Studies, Western Kentucky University

Personal:
Terry has been married to his wife Kathy for 24 years. They have 2 children, Cory and Kristen. They appreciate any help you may be willing to offer with college tuition.

Jordan Blacklock

Credentials:

Licensed Electrician

Experience:

6/09 – present Instrumentation and Control Specialist, BGMU

Education:
BS in Applied Technology, Western Kentucky University

Personal:
Jordan has been married to his wife Tasha for 1 year.

Session T1A-3
Paul Hargette

SPEAKER DATA FORM

2010 KY/TN WATER PROFESSIONALS CONFERENCE
NASHVILLE, TENNESSEE
TUESDAY, JULY 20, 2010
SESSION T1A

NAME: Paul Hargette

TITLE: Process Engineer

COMPANY: Black & Veatch

CONTACT INFORMATION: 864-254-0625 (phone), hargetteph@bv.com (e-mail)

TITLE OF PRESENTATION: Capital Planning in an Uncertain Economy – SJWD's Water Plant Capacity Expansion

SHORT PERSONAL RESUME: Paul is a Process Engineer with Black & Veatch in Greenville, South Carolina, specializing in water treatment and distribution projects. Paul has nineteen years experience with a Bachelor's Degree in Civil Engineering and a Master's Degree in Environmental Engineering from Virginia Tech and is a member of the American Water Works Association.

Session T1B

Title: Lessons Learned from Start-up of New Membrane Filtration Water Treatment Plant in Upper East Tennessee

David L. Jones, P.E.
CTI Engineers, Inc.
865-246-2750
djones@ctiengr.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

2002 – Present	Assistant Vice-President / Branch Manager Knoxville, TN CTI Engineers, Inc.
1988 – 2002	Principal Engineer Oak Ridge, TN Foster Wheeler Environmental Corporation
1984 – 1988	Senior Engineer Westinghouse Corporation Cincinnati, OH
1982 – 1984	Environmental Engineer Ohio Environmental Protection Agency Columbus, OH
1979 – 1982	Engineering Intern Burgess & Niple, Ltd. Cincinnati, OH

EDUCATION

B.S. Civil Engineering
University of Cincinnati

Session T1B

Title: On-Site Hypochlorite Generation: A Look at the Numbers

Kate Keenan, P.E.
Hazen and Sawyer
919-833-7152
ckeenan@hazenandsawyer.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

1999-Present Senior Principal Engineer
Hazen and Sawyer

EDUCATION

Undergraduate
B.S. Civil Engineering
State University of New York at Buffalo

Graduate
M.S. Environmental Engineering
University of North Carolina at Chapel Hill

Amelia L. Ravin, AICP, LEED AP

Energy Strategy Leader

Education

MCP - City Planning, Environmental Policy, Massachusetts Institute of Technology, 2004

B.S. – Biology, Emory University, 1999

Ms. Ravin is an environmental planner and senior project manager at CDM with unique experience assisting local governments, utilities and industry in energy and greenhouse gas management, sustainable development and stakeholder engagement. Her experience with public agencies and private institutions includes greenhouse gas inventories and strategic planning, energy master planning, renewable energy project development, air quality analysis, land use planning, public involvement and grant management. As Energy Strategy Leader for CDM, Ms. Ravin plays a key role in developing the firm's strategy for providing energy services, creating internal and external training curriculum, and leading CDM's Integrated Energy Management practice. She is a professional planner (AICP) and a Leadership in Energy and Environmental Design Accredited Professional (LEED AP).

Session T1C-2
Michael Bullard

Session:	**T1C**
Date/Time:	**20 July 2010 / 2:00PM to 2:30PM**
Topic:	**Sustainability**
Title:	**Achieving Economic and Environmental Sustainability Objectives Through On-Site Energy Production from Digester Gas**

C. Michael Bullard, PE
Hazen and Sawyer, PC
4011 Westchase Blvd., Suite 500
Raleigh, NC 27607
919-833-7152
mbullard@hazenandsawyer.com

CREDENTIALS

Professional Engineer (TN, NC, VA, SC, NY)

EXPERIENCE

05/2000 – Present	Hazen and Sawyer, PC Raleigh, NC Senior Associate - National Biosolids Practice Leader
05/1991-04/2000	Eastman Chemical Company Kingsport, TN Senior Civil Engineer
03/1989-04/1991	The CHESTER Engineers Pittsburgh, PA Civil Engineer/Project Manager
05/1986-02/1986	Hazen and Sawyer, PC Raleigh, NC Assistant Engineer

EDUCATION

Undergraduate:	North Carolina State University BSCE – Cum Laude May 1984
Graduate:	North Carolina State University Master of Civil Engineering May 1986

Session
T1C-3
Alan Stone

From: Cubbage, Laurissa [lcubbage@hazenandsawyer.com]
Sent: Thursday, April 22, 2010 10:28 AM
To: Mike Bernard
Subject: RE: Biographical Information for WPC10

Mike,
Here is Alan Stone's bio for the conference:

Alan Stone is currently a Vice President with Hazen and Sawyer and has been with the company for 21 years. He has is masters and undergraduate degrees in Civil Engineering from North Carolina State University. His focus is wastewater engineering and plant design, project management, and hydraulic modeling.

Let me know if you need anything else.
Thanks,
Laurissa

Laurissa Cubbage
Hazen and Sawyer

From: Mike Bernard [mailto:mbernard@ssr-inc.com]
Sent: Thursday, April 22, 2010 9:44 AM
To: Scott, Leanne (WS); glenn.weist@aecom.com; kevin.rhodes@woolpert.com; Cubbage, Laurissa; pcate@ctiengr.com; Keenan, Catherine H.; syonker@burnsmcd.com; abby@hallstrategies.com; Harvat, Sonia (WS); john.watkins@jjg.com; marialundin1@gmail.com; dowbigginwb@cdm.com; brent.tippey@hdrinc.com; joslyn@nkywater.org; tim.ball@jjg.com; pwood@qk4.com; saya.qualls@tn.gov; dbillings@fewpb.com; jana.fattic@wku.edu; john.watkins@jjg.com; tom.schaffer@hdrinc.com
Subject: RE: Biographical Information for WPC10

Everyone,

Sorry for the confusion. I had not sent my latest spreadsheet to Leanne because I was waiting on the last few of you to email me bios. She did not realize that many of you emailed your bio directly to me because the website has been so problematic. Below is the list of remaining bios that I have not received. Please email them to both Leanne and I by the end of today if at all possible. We have to button this up to get the information to the Certification Boards for CEU approval. Thanks for bearing with us. As you might expect, coordinating 124 presentations between two people is a tremendous amount of work and coordination.

Tim Ball
Laurissa Cubbage
Paul C. Cate
Brent Tippey, PE
David Billings
Jana Fattic
John Watkins
Thomas R. Schaffer
Saya Qualls

Mike Bernard, P.E.
Smith Seckman Reid, Inc.
(615) 460-0582- Direct
(615) 386-8469- Fax
MBernard@ssr-inc.com

-----Original Message-----
From: Scott, Leanne (WS) [mailto:leanne.scott@nashville.gov]
Sent: Thursday, April 22, 2010 8:03 AM
To: glenn.weist@aecom.com; kevin.rhodes@woolpert.com; lcubbage@hazenandsawyer.com; pcate@ctiengr.com; ckeenan@hazenandsawyer.com; syonker@burnsmcd.com; abby@hallstrategies.com; Harvat, Sonia (WS); john.watkins@jjg.com; marialundin1@gmail.com; dowbigginwb@cdm.com; brent.tippey@hdrinc.com; joslyn@nkywater.org; tim.ball@jjg.com; pwood@qk4.com; saya.qualls@tn.gov
Cc: Mike Bernard
Subject: Biographical Information for WPC10

I reviewed the file on the KY-TN WPC10 website yesterday and did not find your biographical information submittal. There have been issues with the site availability, so your submittal may not have gone through. Please try to submit your information again and if you have any problems, just email your bio to Mike or me directly.

If any of you will not be able to fulfill your speaker commitment, please let us know immediately! The program has already been finalized and printed for the registration packets. We appreciate your contribution to making this a very successful conference!

Leanne B. Scott, P.E.
Metro Water Services
1600 Second Avenue North
Nashville, TN 37208
(615) 862-4877
leanne.scott@nashville.gov

Session T1D-1
Tom Moss

As of July 1, 2009, Tom Moss is acting Director for the Division of Water Supply in the Department of Environment and Conservation. Tom had been the Deputy Director for the Division since February of 2007. Prior to that, Mr. Moss was the Manager for the Ground Water Management Section in the Division of Water Supply for over 15 years. Mr. Moss was principle author of Tennessee's Drinking Water Source Protection Program and Regulations and played an instrumental role in the changes regarding public water source and supply protection in the 2002 Tennessee Safe Drinking Water Act amendments. Prior to his position with the Division of Water Supply, Mr. Moss worked for 5 1/2 years in the Division of Superfund. Mr. Moss holds a graduate degree in geology from the University of Tennessee and is a registered professional geologist.

Session T1D-2
Thomas Dumm

Session T1D
Title: Balancing Competing Uses for Comprehensive Regional Water Supply Plan in Central Tennessee

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

Session T1D
Title: Cost Savings Potential of Recycling Waste Streams at the City of Greensboro

Nicole Litton
Hazen and Sawyer, PC
704-357-3150
nlitton@hazenandsawyer.com

CREDENTIALS
Engineer In Training (EIT) since 2007

EXPERIENCE

6/07 - Present
Hazen and Sawyer, PC
Asst. Engineer

Summer '06
South Carolina Department of Health and Environmental Control
Bureau of Air
Air Pollution Inventory Statistics

Summer '05
South Carolina Department of Health and Environmental Control
Bureau of Water
Water and Wastewater Pipeline Construction Plan Permitting

EDUCATION

Undergraduate
B. S. Biosystems Engineering '07
Clemson University

Graduate (Expected Graduation 2011)
Civil Engineering
North Carolina State University

Session T2A-1
Stephen King

Session T8B
Title: Water for People Overview

Stephen H. King, P.E., BCEE
CDM
(865) 425-5405
kingsh@cdm.com

CREDENTIALS

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

EXPERIENCE - 26 Years

9/03 – Present	Principal/Senior Project Manager CDM- Oak Ridge
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

SESSION T2A
"INSIDE THE FENCE" ENERGY OPTIMIZATION APPROACH AND CASE STUDIES

JOHN C. PERRY
CH2M HILL
865-769-3200
john.perry7@ch2m.com

CREDENTIALS

Registered Professional Engineer (TN, MS)

EXPERIENCE

1998-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

Session T2A-3
Bob Wimmer

Session T2A

TANSTAAFL: The ESCO Energy Optimization Process at 4 WWTPs

Bob Wimmer, PE
Black & Veatch
410-259-6274
wimmerb@bv.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

10/08 to Present	WW Process Specialist Black & Veatch
1/02 to 10/08	Process Engineer and Vice President Johnson Mirmiran and Thompson
2/98 to 8/00	Laboratory Technician Sybron Chemicals

EDUCATION

Undergraduate
B.S. Dairy Science
Virginia Tech

Graduate
M.S. Environmental Engineering
Virginia Tech

Session T2B

"How Low Can You Go? When a BNR Oxidation Ditch Meets Low Phosphorus Limits"

Karen Harrison, P.E.
Jacobs | JJG
615-406-2749
karen.harrison@jjg.com

Karen has over 25 years of experience in municipal wastewater treatment, with particular expertise in biological process design and odor control. She has BSCE and MSCE degrees from Tennessee Technological University, and is a registered Professional Engineer. Karen currently services as Wastewater Treatment Practice Leaders for Jacobs JJG.

Session T2B-2

Steve Yonker

From: Yonker, Steve [syonker@burnsmcd.com]
Sent: Tuesday, April 20, 2010 5:26 PM
To: Mike Bernard
Subject: FW: Presenter Bio

See below.

Steve Yonker, P. E.
Principal, Infrastructure Group - Water Business Unit
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114
(816) 822-3102 - Office
(816) 807-1016 - Cell
syonker@burnsmcd.com
www.burnsmcd.com

From: Yonker, Steve
Sent: Tuesday, April 20, 2010 5:21 PM
To: 'mikebernard@ssr-inc.com'
Cc: Dittmaier, Thomas
Subject: Presenter Bio

Mike:

Here's a brief bio:

Steve Yonker is a Principal, senior project manager, and Water Business Unit Projects Group Leader at Burns & McDonnell's Kansas City Office. Steve has over 30 years of municipal wastewater engineering experience all at Burns & McDonnell. He has managed planning, design and construction phase services on a wide variety of municipal wastewater projects including new collection systems, collection system rehabilitation, large pumping stations, and advanced wastewater treatment facilities. He has completed studies and designs of several treatment plant projects that include biological, chemical and physical treatment facilities for removal of nitrogen and phosphorus for plant capacities up to 80 MGD.

Steve Yonker, P. E.
Principal, Infrastructure Group - Water Business Unit
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114
(816) 822-3102 - Office
(816) 807-1016 - Cell
syonker@burnsmcd.com
www.burnsmcd.com

Wastewater Treatment Operations - Session T2C
Biologically Enhanced High-Rate Clarification - A Pilot Study

Katherine (Kati) Y. Bell, Ph.D., P.E., BCEE
CDM
615-320-3162
bellky@cdm.com

CREDENTIALS
Registered Professional Engineer in Tennessee, Kentucky and Ohio

EXPERIENCE
Dr. Bell's primary experience includes selection, design and optimization of biological treatment and nutrient removal, membrane processes, sorption and advanced oxidation processes for microconstituents, and water/wastewater disinfection. In addition to plant process work, Kati is actively involved in integrated planning and watershed evaluations using hydraulic, hydrologic, and water quality models; this allows her to assist clients with watershed planning and permitting using cost-effective adaptive management techniques to work toward water quality goals.

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

Session T2C-2
Phil Wood

PHILIP F. WOOD, PE

Project Engineer

47 YEARS EXPERIENCE
2 YEARS WITH Qk4

EDUCATION
BS / 1974 / Civil Engineering
BS / 1967 / Industrial Engineering

REGISTRATIONS
PE / 1975 / KY / 9213
PE/ 1979 / IN / 60018415
PE / 2001 / TX / 88022
PE / 1987 / FL / 38288
PE / 1977 / IL / 62-36036

AFFILIATIONS
Tau Beta Pi – Engineering Honorary Society

Chi Epsilon – Civil Engineering Honorary Society

Water Environment Federation, Kentucky-Tennessee Section

American Water Works Association, Kentucky-Tennessee Section – Life Member

National Society of Professional Engineers, Kentucky Section

Mr. Wood has 49 years experience in the field of consulting civil engineering, with the majority devoted to the design and evaluation of wastewater treatment, collection, pumping and solids handling systems; and the evaluation and design of potable water treatment, pumping, raw water source evaluations, distribution and storage systems.

Mr. Wood's experience includes:

New Albany Sanitary Sewer Evaluation; New Albany, Indiana
Performed sewer system analysis for the City of New Albany, Indiana, and recommended a solution to the City's SSO problem.

Morris Forman Alternative Sludge Project; Jefferson County
Involved in the preliminary design of a $70 million project to convert the solids handling system in Louisville from a LPO process to a drying process.

Prologis Park Wastewater Treatment Plant; Brooks, KY
Prepared the preliminary design of a 150,000-gal/day wastewater treatment plant for a private industrial development in Bullitt County, Kentucky.

Shepherdsville Wastewater Treatment Plant; Shepherdsville, KY
Also prepared the preliminary design of a 3.5 MGD municipal wastewater treatment plant in Shepherdsville, Kentucky.

Peninsula Papagayo; Costa Rica
Prepared a preliminary design of a water supply system for a resort development in Costa Rica. This included water resources, transmission, distribution, and storage.

Indian Trail Waterline; Louisville, KY
Designed, in collaboration with Louisville Water Co. staff, the relocation of approximately 2 miles of 12-inch water main on East Indian Trail in Louisville, Kentucky.

Sellersburg Wastewater Treatment Plant Expansion; Sellersburg, Indiana
Mr. Wood was responsible for designing a treatment plant expansion from 1.4 MGD to 2.3 MGD for the wastewater treatment plant for the Town of Sellersburg, Indiana. The design used the high flow diversion technique to handle the peak flow without washing out solids.

Emergency Intake Structure; City of Jamestown, KY
This design was concerned with a floating platform for intake pumps on Lake Cumberland. The emergency was that the lake was being lowered to maintain the dam and the City would have been out of water without this new, 4 MGD pumping facility. Developed preliminary designs for two deep-cell lagoon plants— one for the Wood Creek Water District in Laurel County and one for Prestonsburg in Floyd County.

New Raw Water Supply System; Hopkinsville, KY
Prepared a preliminary design of a raw water pumping station and 24-miles of 36-inch pipeline from Lake Barkley to Hopkinsville, Kentucky. This consisted of a hydraulic of the system, preparation of preliminary drawings, and a preliminary cost estimate.

Guntersville Municipal WWTP; Guntersville, Alabama
Mr. Wood designed 4.6 MGD wastewater treatment plant improvements for the City of Guntersville, Alabama.

Spring Branch WWTP; Huntsville, Alabama
Mr. Wood designed improvements to the 45 MGD influent pumping station at the Spring Branch WWTP in Huntsville, Alabama.

Drinking Water Treatment Plant; Warren County, Ohio
Mr. Wood designed improvements to expand the Warren County, Ohio drinking water treatment plant from 6 MGD to 12 MGD.

Penn Street Pumping Station; Sellersburg, Indiana
Mr. Wood designed a pumping station with a peak pumping capacity of 3.3 MGD, one mile of 18" force main and approximately 2,000 feet of gravity sewer (8"-36") for the Town of Sellersburg, Indiana. The pump0111ing station featured variable frequency drives.

Sanitation District No. 1; Fort Wright, KY
Mr. Wood designed three interceptor sewer grit pits for the Sanitation District No. 1 in Ft. Wright, Kentucky.

Hamilton Ohio Municipal WWTP; Hamilton, Ohio
Mr. Wood performed preliminary work on a No Feasible Alternative Analysis for the City of Hamilton, Ohio. This was one of the first of this type analysis done in the U.S.

South Henry Regional Waste District WWTP; Lewisville, Indiana
Mr. Wood prepared a plant capacity analysis for the 300,000-gallon per day South Henry Regional Waste District WWTP in Lewisville, Indiana, and also, designed improvements to the aerobic digesters at the South Henry RSD WWTP.

Utility Center; Fort Wayne, Indiana
Mr. Wood performed a hydraulic analysis of the north and south portions of the water system for the Utility Center in Fort Wayne. Assistance included preparation of a water distribution system analysis for two areas of the Utility Center in Fort Wayne, Indiana. The south area consisted of a population of 35,000 and the north system has a current population of almost 24,000.

WWTP; City of Vicco, KY
Mr. Wood designed a 225,000 gal/day WWTP for the City of Vicco, Kentucky that consisted on flow meter installation and renovation of the disinfection system. In addition to the WWTP improvements, Mr. Wood designed the Acup-Millseed water line extension project for the City of Vicco. This project consisted of a water storage tank, main booster pumping station and two hydropneumatic pumping stations.

WWTP; Borden, Indiana
Mr. Wood designed a 300,000-gallon per day wastewater treatment plant for Borden, Indiana that is expandable to 600,000 gallons per day.

Beargrass Watershed; Louisville MSD
Primary responsibilities included preparing scopes of work and budgets for many, small drainage and sanitary sewer projects for MSD.

Regional Wastewater Treatment Plant; Hendricks, Indiana
Mr. Wood designed a 0.6 MGD expansion of the Hendricks County (Indiana) Regional Wastewater Treatment Plant.

Water Treatment Plant; Scottsburg, Indiana
Mr. Wood was involved in the design of a new 2 MGD water treatment plant for Scottsburg, Indiana.

Sewer System Improvements; Salem, Indiana
Mr. Wood was involved in designing sewer system improvements for Salem, Indiana including a major downtown pumping station.

Kokoku Steel Corp; Scottsburg, Indiana
Mr. Wood was involved in preparing a preliminary design report for the upgrade of the metals removal wastewater plant for Kokoku Steel Corp. in Scottsburg, Indiana.

Illinois State Capitol Building; Springfield, Illinois
Mr. Wood performed hydraulic analysis and final design of modifications to the fire pumping system at the Illinois State Capitol Building, Springfield, Illinois.

Illinois Department of Transportation; Various Locations
Mr. Wood designed water and sewer facilities for rest areas for the Illinois Department of Transportation.

WWTP; Clarksville, Indiana
Mr. Wood designed facilities and observed construction for the 5 MGD wastewater treatment plant in Clarksville, Indiana.

Emerald Drive Sanitary Sewer and Drainage Project; Louisville, KY
Mr. Wood performed construction observation services for Louisville MSD's Emerald Drive sanitary sewer and drainage project.

Water System Master Plan; Sycamore, Indiana
Mr. Wood assisted in the preparation of a water system master plan for the Town of Sycamore, Indiana.

Facilities Plan; Eminence, KY
Mr. Wood prepared an amendment to the Facilities Plan for the expansion of the wastewater system for the City of Eminence, Kentucky. The project consisted of designing an expansion of the plant and an 18-mile long effluent force main.

Sewage Force Main; Tell City, Indiana
Mr. Wood performed a hydraulic analysis of a 19-mile long sewage force main, including five pumping stations for Tell City, Indiana.

Oldham County Water District No. 1; Crestwood, KY
Mr. Wood designed 19,000 feet of 8-inch and 12-inch water main extensions for the Oldham County Water District No. 1 in Crestwood, Kentucky.

Facilities Plan Amendment/Treatment Plant Design; Findlay, Ohio
Mr. Wood prepared a Facilities Plan Amendment and designed an 11 MGD upgrade/expansion of the Findlay, OH wastewater treatment plant. The design consisted of refitting the existing plant to handle 5 MGD and the new oxidation ditch plant to handle 6 MGD.

Facilities Plan Amendment/Preliminary Design; Jeffersonville, Indiana
Mr. Wood Prepared a revision of the Facilities Plan and preliminary engineering design for the relocation and expansion of the 5-MGD Jeffersonville, Indiana wastewater treatment plant.

Lebanon Water Works Company; Lebanon, KY
Mr. Wood Prepared a long-range master plan and preliminary design of drinking water system improvements for the Lebanon Water Works Co. in Lebanon, Kentucky. The plan consisted of pumping from the river to an upland reservoir and expansion of the water treatment plant.

Morris Forman Wastewater Treatment Plant (MFWTP); Louisville, KY
Mr. Wood held the position of Senior Environmental Engineer responsible for the technical engineering aspects of the evaluations and designs required for the corrective action program at the 105 MGD Morris Forman Wastewater Treatment Plant (MFWTP) in Louisville.

Town Branch Wastewater Treatment Plant; Lexington, KY
Mr. Wood served as Project Manager for the Process Alternatives Study for the expansion (12 to 36 MGD) of the Town Branch Wastewater Treatment Plant in Lexington, Kentucky.

Milwaukee Metropolitan Sewer District; Milwaukee, Wisconsin
Mr. Wood served as Project Manager for the design of 1-mile of 120-inch diameter interceptor sewer in tunnel for the Milwaukee Metropolitan Sewer District.

Wastewater Treatment Plant; Winchester, KY
Mr. Wood prepared plant evaluation report at the 3 MGD Winchester, Kentucky.

Wastewater Treatment Plant; Bowling Green, KY
Mr. Wood prepared plant evaluation reports at the 8 MGD Bowling Green, Kentucky.

Oldham County Water District; Buckner, KY
Mr. Wood designed a 5-MGD water system for the Oldham County Water District, Buckner, Kentucky. This design included a well field consisting of 5 wells and clearwell with high service pumping.

Water System Improvement; Fort Knox, KY
Mr. Wood completed a long-rang planning study for water system improvement at Ft. Knox, Kentucky.

Trails of Olympia Fields; Olympia Fields, Illinois
Mr. Wood provided design support, which included all roads, sanitary and storm sewers, gas lines, water lines, storm water detention facilities and grading.

Wastewater Treatment Plant; Campbellsville, KY
Mr. Wood participated in the design of the 3.5 MGD wastewater treatment plant for Campbellsville, Kentucky. This was the first Carrousel oxidation ditch plant in the U.S.

Wastewater Treatment Plant; Danville, KY
Mr. Wood assisted in the design of the 3.2 MGD wastewater treatment plant for Danville, Kentucky. This was the second Carrousel oxidation ditch type treatment plant in the U.S.

Sewer System Design; Danville, KY
This projects consisted of designing approximately 10-miles of interceptor sewer ranging in size from 12-inch to 36-inch, and three major pumping stations. One of the pumping stations consisted of a two-stage pumping system.

North County Action Plan; Louisville, KY
Mr. Wood prepared the North County Action Plan for Louisville MSD which used an innovative approach to solve a difficult wastewater collection system problem resulting in a present worth saving of $60-million. The action plan resulted in the designed 9.5-miles of dual force main for Louisville MSD.

Shepherdsville Wastewater Treatment Plant Expansion; Shepherdsville, Kentucky
Mr. Wood has recently completed the designing of a major expansion for the Shepherdsville WWTP using Integrated Fixed-Film / Activated Sludge Process (IFAS) technology. This technology has never been used in Kentucky before allows the treatment of 3 times as much flow in a given tank size. The ultimate plant expansion will take the existing plant from 2 MGD initially to 5.043 MGD and ultimately to 7.5 MGD. The design saved the city approximately $7 million over using conventional technology. This technology has only been used twice in the U.S. – both west of the Mississippi.

Preliminary Engineering Design Report – City of Atlanta's 250 MGD Raw and Finished Drinking Water Pumping Systems; Atlanta, Georgia
This project consisted of evaluating the existing raw and finished water pumping systems at the Chattahoochee Raw Water Pumping Station and the Hemphill Water Treatment Plant. The City had relied on steam powered turbine pumps but they were old and very expensive. The recommendation was that they convert to electric motor driven pumps with a gas-fired turbine for reliable auxiliary power. .

Wastewater Treatment Plant; Bowling Green, KY
Designed a centrifuge sludge dewatering system for the Bowling Green, Kentucky municipal WWTP. The system was designed for a plant with a 12 MGD average daily flow capacity. The existing plant uses primary sedimentation and the secondary treatment system consisted of a fixed film process. As a result, the centrifuge is delivering a dewatered cake in

excess of 30% solids.

Sanitation District of Northern Kentucky; Ft. Wright, KY
Designed three grit pits for the SDNK. These are large pits located on major interceptor sewer to capture large quantities of grit before they reach the treatment plant or mayor pump stations.

Kokomo Municipal WWTP; Kokomo, Indiana
Mr. Wood performed a hydraulic analysis and designed facilities to treat a 40 MGD Combined Sewer Overflow (CSO) situation. The facilities consisted of flow measurement, fine screening, sedimentation, chlorination and dechlorination.

Pumping Station Evaluations; Lexington-Fayette Urban County Government; Lexington, Kentucky
Mr. Wood performed a evaluations of the Cane Run (4 mgd), Spindletop (125 gpm), and Kentucky Horse Park (800 gpm) pumping stations in Lexington. This included a hydraulic, mechanical, and electrical evaluation.

Utility Center; Fort Wayne, Indiana
Mr. Wood designed the Bittersweet project which consisted of a 2,000 gallon per minute wastewater pumping station, 1,200 feet of 24-inch gravity sewer, and approximately 7,200-feet of 14-inch force main. Also designed the Inverness Project, which consisted of 21,000-feet of sewer ranging in size from 8-inch to 30-inch diameter. Project also included a 2,200 gallon per minute pumping station and 3,200-feet of 14-inch force main.

Buchannan Street Pumping Station Upgrade; Louisville & Jefferson County MSD; Louisville, Kentucky
Mr. Wood designed modifications and upgrades for the Buchannan Street Pumping Station in Louisville. The BSPS is a major pumping station in the combined sewer system that also functions as a flood pumping station. The average flow was 35 MGD and the peak flow was 125 MGD. A subsequent part of this project was the emergency design and construction of a 43 mgd bypass pumping station.

Session T2C-3
Alonso Griborio

Session T2C

Title: Evaluation of Wet Weather Strategies and Clarifier Optimization Using State-of the Art Tools

Topic: Wastewater Plant Operations

Alonso G. Griborio, Ph.D., P.E.
Hazen and Sawyer, P.C.
agriborio@hazenandsawyer.com
954 987 0066
4000 Hollywood Blvd 750N
Hollywood, FL 33021

CREDENTIALS

Registered Professional Engineer in Louisiana
AWWA and WEF Member

Short Bio:
Dr. Griborio holds a Bachelor's Degree and a Master's Degree in Civil Engineering from Zulia University, Venezuela, and a Ph.D. in Engineering and Applied Sciences from The University of New Orleans. He has worked in wastewater treatment modeling for more than ten years with focus in process and optimization. He is a co-developer of the 2Dc Clarifier CFD model. Dr. Griborio joined Hazen and Sawyer in September 2006.

EXPERIENCE

September 2006 – Present	Process Engineer Hazen and Sawyer, P.C.
September 2004 – August 2006	Research Associate University of Louisiana at Lafayette
August 2001 – August 2004	Research Assistant University of New Orleans
August 1998 – July 2001	Design Engineer Consuvial Engineers

EDUCATION

Undergraduate	B. S. Civil Engineering University of Zulia, Maracaibo, Venezuela
Graduate	Master in Environmental Engineering University of Zulia, Maracaibo, Venezuela
Graduate	Ph.D. in Engineering and Applied Sciences University of New Orleans, New Orleans, LA, USA

Session
T2D-1
Maria Lundin

From: maria lundin [marialundin1@gmail.com]
Sent: Friday, April 23, 2010 12:40 PM
To: Mike Bernard
Subject: Re: Biographical Information for WPC10

LFUCG since July 2007

On Fri, Apr 23, 2010 at 12:33 PM, Mike Bernard <mbernard@ssr-inc.com> wrote:

Education:
B.S. Biology, May, 1995
Minor: Environmental Science

Relative Employment History:
Laboratory Analyst for the purification of Lexington's wastewater since July 2007.
Certification: Laboratory Analyst I

Mr. Latimer is a Senior Associate with Hazen and Sawyer. BCE and MS 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.

Robert M. Hench, GISP, GIS Manager

Mr. Hench is the GIS Manager and Technical Advisor of GRW's GIS Division. With over twenty years of GIS experience, he has specialized expertise in wastewater GIS database design and development. Mr. Hench has a Bachelor of Science degree in Computer Science from the Georgia Institute of Technology and is a Certified Geographic Information System Professional (GISP). He has managed numerous large GIS projects for utility companies, cities, counties, state, and federal clients across the Country. Under Mr. Hench's leadership and guidance, GRW has successfully implemented GIS programs across the nation, including national award-winning projects and innovative web-based GIS solutions.

Session T3A-1
Gloria Jackson-Campbell

Session T3A

Title: Customer Service Collection Customer Call Script

Gloria M. Jackson-Campbell
(615) 862-4632
Gloria.jackson@ Nashville.gov

Experience

2000-Current	Customer Service Training Coordinator, Instructor, and Project Manager
1989-2000	Customer Service Supervisor four Sections of the Division: Billing & Collections, Cash, Lobby, Call Center

Education

Undergraduate
Bachelor's Business Administration, Minor Accounting
Tennessee State University, Nashville, TN

Membership

Former: AWWA
ASTD, American Society of Training and Development
NNA, National Notary Association, Certified Signing Agent

Session T3A-2
Dave Vogel

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.

Session T3A

Title: Survey Says...Giles County Residents Respond to Safe Drinking Water Query

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 Gresham, Smith and Partners

Education

Bachelor of Science in Civil Engineering
Tennessee Technological University / December 1996

Session T3B

Topic: Finance

Title: Using Performance Contracting to Fund Infrastructure Improvements

Chris Downs
Johnson Controls, Inc.
(317) 917-5126
christopher.p.downs@jci.com

CREDENTIALS

Beta Gamma Sigma National Business Honorary Fraternity
Member – Kentucky League of Cities
Member – American Water Works Association
Engineer in Training (EIT)

EXPERIENCE

2006 – present	Johnson Controls, Inc. Account Executive – Municipal Solutions
2004 – 2006	Johnson Controls, Inc. Solution Design Leader
1997 – 2004	Johnson Controls, Inc. Energy Engineer
1988 – 1997	Allegheny Power System Project Engineer

EDUCATION

Undergraduate

B. S. Electrical Engineering
Purdue University

Graduate

MBA – Operations Management
University of Pittsburgh

KENNETH G. DIEHL, JR., P.E.
Smith Seckman Reid, Inc.
Senior Vice President

BIOGRAPHY

Kenneth G. Diehl, Jr., P.E., is Senior Vice President of Civil and Environmental Engineering in the Nashville office of Smith Seckman Reid, Inc (SSR). Kenny is a registered engineer in Alabama, Kentucky, South Carolina and Tennessee specializing in civil and sanitary engineering. Kenny is a 1975 graduate of Vanderbilt University with a Bachelor of Science degree in environmental and water resources engineering. He is a member of the American Water Works Association, Water Environment Federation, the American Public Works Association, and the American Council of Engineering Companies.

Session T3C-1
Darren Gore

MURFREESBORO
TENNESSEE

...creating a better quality of life

Biography Submittal

DATE: April 19, 2010

TO: WPC

FROM: Darren Gore

SUBJECT: Preparing for a Region 4 EPA Clean Water Act Section 308 Audit
WPC Conference Nashville TN – July 18-21, 2010

Darren Gore was raised in Rutherford County, TN and went down to Atlanta after High School to attend Georgia Tech where he received his Bachelors and Masters degree in Engineering. Darren co-op'ed through school as a process engineer at E.I. Du Pont de Nemours & Co. at their Old Hickory, TN site.

After graduating with his M.S. degree, Darren went on to work as an engineering consultant with Nelson & Company in Birmingham, AL. In 1998, Darren received his P.E. license and was able to move back to Rutherford Co. where he was a design consultant and project manager with Wiser Company, LLC. Darren became the office manager for Wiser's Murfreesboro office in 2003.

After 10 years of consulting in AL, TN and KY, Darren had the opportunity to come and work for the City of Murfreesboro as the Asst. Director of the Water and Sewer Dept. Darren has served in that capacity for the last five (5) years.

Water and Sewer Department
300 NW Broad Street · P O Box 1477 · Murfreesboro, TN 37133-1477 · Office 615 890 0862 · Fax 615 896 4259
TTY 615 848 3214 · www.murfreesborotn.gov

Session T3C-2
Michael Schober

Session T3C
Title: Writing an Inter-Governmental Agreement

Michael A. Schober, P.E.
Buchart Horn, Inc
800-274-2224
mschober@bh-ba.com

CREDENTIALS
Registered Professional Engineer

EXPERIENCE

08/08 - Present	Senior Vice President Buchart Horn. Inc
11/08 – 11/09	President Eastern PA Water Pollution Control Operators Association
04/96 – Present	Secretary / Treasurer Columbia Municipal Sewage Authority

EDUCATION
Undergraduate
B. S. Civil Engineering
Villanova University

Session T3C-3
:Lori McIlvaine

Session T3C
2:30pm
Title: Management of Consent Order Deliverables

Lori McIlvaine, EIT
Tetra Tech, Inc.
859-537-2650
lori.mcilvaine@tetratech.com

CREDENTIALS

Engineer in Training, NCEES

EXPERIENCE

August 2009-Present
Graduate Engineer
Tetra Tech, Inc.
Water, wastewater, and stormwater projects for municipal, federal, and industrial clients.

2008-Present
Executive Director
Salud del Sol, Inc.
Development of a solar autoclave for rural health clinics worldwide.

2006-2007
R&D Co-op
Ethicon Endo-Surgery, Inc.

2006
Engineering Intern
Grupo Fenix, Nicaragua

2005
Engineering Intern
Wadsworth City Engineering Department

EDUCATION

Bachelor of Mechanical Engineering
Summa Cum Laude
University of Dayton

SESSION T3D

"Watch Your Assets: Asset Management as a Tool and Mindset"

ADAM BYARD
CH2M HILL
865-769-3200
adam.byard@ch2m.com

CREDENTIALS

Engineer-In-Training (EIT)

EXPERIENCE

1995-Present	Project Engineer CH2M HILL Knoxville, TN

EDUCATION

Undergraduate
B.S. Biosystems Engineering
The University of Tennesee

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

C. Herschel Hall, P.E.
Knoxville Utilities Board
865.594.8234
Herschel.hall@kub.org

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

SESSION T3D
WATCH YOUR ASSETS: ASSET MANAGEMENT AS A TOOL AND A MINDSET

KAREN E. JOHNSON
CH2M HILL
865-769-3198
karen.johnson@ch2m.com

CREDENTIALS

Registered Professional Engineer (TN, KY)

EXPERIENCE

2002-Present	Associate Project Manager CH2M HILL Knoxville, Tennessee
2001-2002	Staff Engineer Hazen and Sawyer Raleigh, North Carolina

EDUCATION

Undergraduate
- B.S. Civil Engineering
- University of Louisville

Graduate
- M.Eng. Civil and Environmental Engineering
- University of Louisville

Edward D. Wetzel, Ph.D., P.E.

"Selling Your Utility Assets- A Good Idea or an Act of Desperation?"
Session T3D

Dr. Wetzel has over 30 years of consulting experience, primarily representing government water and wastewater utilities in planning studies, feasibility investigations, conceptual and detail designs, bond reports and engineering due diligence associated with utility valuations and acquisitions. He specializes in assignments that require a blend of technical expertise and business acumen, including large-scale program management activities.

Ed holds a Bachelor of Science degree in Civil Engineering from Lafayette College, and an M.S. and Ph.D. from Lehigh University. He is a registered Professional Engineer in three states.

Ed serves as the Executive Vice President for the Water and Waste Resources Sector of R.W. Beck and is located in their Hendersonville, TN office. He previously worked for MWH and Arcadis in several locations across the United States.

Session T3D-3
Daniel Haddock

Session T3D

Water Supply Adequacy - Understand Risk to Make Smart Decisions

Daniel F. Haddock, P.E.

Layne Christensen Company

317-696-6980

dhaddock@laynechristensen.com

CREDENTIALS

Registered Professional Engineer (IN, IL, MO, AR, WI, OH, VA, FL)

EXPERIENCE

2008 – Present	Senior Project Manager, Layne Christensen Company Integrated Water Supply Planning
2004-2008	Engineering Manager, American Water Capital Program Management & Project Delivery for 35 utilities in IN, IL, OH, MI
2002-2004	Operations Engineer, American Water Utility Planning & Project Delivery
1999-2002	International Delegate / Water & Sanitation Program Manager American Red Cross International Services – Honduras, Central America Post-hurricane reconstruction and utility organization & training
1995-1999	Engineer, American Water Project Delivery
1994-1995	Project Engineer, Wessler Engineering Water Distribution Modeling & Construction Administration
1991-1993	Project Engineer US Peace Corps / Honduran National Water Authority / USAID Rural Water & Sanitation, Honduras, Central America

EDUCATION

Undergraduate - B.S. Mechanical Engineering, Rice University, Houston, TX
Graduate – partial coursework MBA, Indiana University Kelly School of Business, Indianapolis, IN

AFFILIATIONS

American Society of Civil Engineers (ASCE), Environmental & Water Resources Institute (EWRI)
American Water Works Association (AWWA)
Water Environment Federation (WEF)
Indiana Utility Regulatory Commission (IURC) Water Rate Design Committee
AWWA Water Conservation Planning Evaluation & Research Committee
AWWA Water Resource Planning & Management Committee

Session T4A-1
Craig Hannah

CRAIG HANNAH, P.E., LEED™ GREEN ASSOCIATE

Johnson Controls, Inc.
(806) 632-0063
Craig.C.Hannah@jci.com

CREDENTIALS

Licensed Professional Engineer – Texas, Arkansas, Oklahoma
LEED™ Green Associate
American Water Works Association (AWWA)
- AWWA Water Loss Control Committee
- Customer Metering Practices Committee

Class D: Water Operator, Texas Commission on Environmental Quality

EXPERIENCE

2002 – Present Project Development Engineer
National Municipal Utility Solutions Team
Johnson Controls, Inc.

1997 - 2001 Program Manager
Eagle-Picher Industries, Construction Equipment Division,

1996 - 1997 Mechanical Engineer
Allied Associates Consulting Engineers

1995 - 1996 Mechanical Engineer
Chrysler Technologies Airborne Systems

EDUCATION

Undergraduate
B.S. Aerospace Engineering
Texas A&M University, College Station, TX

Graduate
M.A. History
Texas Tech University, Lubbock, TX
Thesis: *Counterflow: The USAF Tactical Air Command in the Vietnam Era.* Published as: *Striving for Air Superiority: The USAF Tactical Air Command in Vietnam* (College Station, TX: Texas A&M University Press, 2002)

Session T4A-2
Shannyn Walker

Kentucky American Water: Looking Ahead at Meter Strategy

SHANNYN C. WALKER, P.E.
Kentucky American Water
859-268-6351
Shannyn.Walker@amwater.com

PROFESSIONAL HISTORY

4/2009 to current	Kentucky American Water, Lexington, KY – Field Operations Supervisor
10/2005 to 4/2009	Kentucky American Water, Lexington, KY – Planning Engineer
6/2001 to 10/2005	Kentucky American Water, Lexington, KY – Engineer

CREDENTIALS

Registered Professional Engineer

EDUCATION

Master of Science in Civil Engineering – Purdue University, West Lafayette, IN, 2001

Bachelor of Science in Civil Engineering – Purdue University, West Lafayette, IN, 1999

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers, Associate Member
American Society of Civil Engineers, Kentucky State Section, Bluegrass Branch Past-President

Lyn Fontana
Nashville, Tennessee

Lyn was born and raised in Nashville, Tennessee. She attended St Cecilia Academy and Vanderbilt University where she received a bachelor of Enginering in Civil and Environmental Engineering.

Early in her career in 1986 , she worked with Tucker Hinson Associates in site planning and development design, performing traffic impact analyses. Her first experience with local government was in Gallatin, as City Engineer with the Public Works Department.

Lyn began with Metro Water Services in 1992 in the Overflow Abatement Program. She has provided project management, design, master planning and a wide range of computer and data usage coordination for the Department including GIS and Hansen Work Order system usage. Most recently, she teamed up on the Mobile Workforce Management project to take the System Services Division Work order system real time and in the field.

Lyn Fontana
Nashville, Tennessee

Experience

March 2006 To Present	**Metro Water Services, Nashville, Tennessee** **Engineer II** System Services Workflow Manager *Managing Water Distribution System Maintenance* Managing Sewer Collection System Maintenance
August 1997 to April 1999 and December 1999 To March 2006	**Metro Water Services, Nashville, Tennessee** **Engineer II** Master Planning Unit Leader
April 1999 to December 1999	**Metro Water Services, Nashville, Tennessee** **Engineer II** Development Services Unit Leader
October 1996 August 1997	**Metro Water Services, Nashville, Tennessee** **Engineer I** Design Unit
July 1992 to August 1997	**Metro Water Services, Nashville, Tennessee** **Engineer I (Engineer in Training July, 1992 to August, 1994)** Project Manager - Overflow Abatement Program
January 1991 to July 1992	**City Of Gallatin, Gallatin, Tennessee** **Engineer in Training - City Engineer**
June 1986 to May 1988 and May 1988 to February 1990	**Kevin Tucker & Associates, Nashville , Tennessee** **Engineering Aide** **Tucker Hinson Associates, Nashville, Tennessee** **Engineer in Training - Junior Engineer**

Education

Vanderbilt University, Nashville, Tennessee
Bachelor of Engineering, May 1988
Major: Civil and Environmental Engineering
Concentration: Transportation and Structural

Certifications

Professional Engineer, State of Tennessee

Session T4B
Title: Water Supply and Reuse Strategies in the Southeastern United States

Joseph K. Robinson, PE
Woolpert
704-526-3016
joe.robinson@woolpert.com

CREDENTIALS

Licensed Professional Engineer: North Carolina, South Carolina, Virginia, Georgia and Florida
Over 20 Years of Experience in Water, Wastewater, Reuse, and Environmental Projects

EXPERIENCE

2009 to Present	Practice Leader/Project Director Woolpert Charlotte, NC
2005 to 2008	Project Manager WK Dickson Charlotte, NC
2000 to 2005	Project Manager HDR Charlotte, NC
1990 to 2000	Senior Environmental Engineer/Project Manager CH2M Hill Gainesville, FL

EDUCATION

Undergraduate
B.S. Civil Engineering
Virginia Polytechnic Institute and State University

Graduate
M.S. Environmental Engineering
Virginia Polytechnic Institute and State University

Title: Stewardship of a Critical Resource: KAW Reviews Conservation Plan and Adds Water Balance and AWWA/IWA Parameters

Preston Pendley
Strand Associates, Inc.
859-225-8500
Preston.Pendley@Strand.com

Linda Bridwell
Kentucky American Water
859-268-6373
Linda.Bridwell@amwater.com

PENDLEY CREDENTIALS
Registered Professional Engineer
Certified Class IV Wastewater Plant Operator
Certified Class IV Water Plant Operator

PENDLEY EXPERIENCE

11/04 – Present:	Project Engineer Strand Associates, Inc.

EDUCATION
Graduate
M.S. Civil Engineering
Michigan Technological University

Undergraduate
B. A. Physics
Transylvania University

Session T4C-1
Timothy Soward

Session 24C

Title: Monitoring and Assessments under the Revised Total Coliform Rule

Timothy E. Soward

IntelliTech Sytems

513-910-0317

tim.soward@itsyteminc.com

Credentials: Senior Scientist

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**)

Session T4C-2
Neal Stubblefield

SPEAKER DATA FORM

NAME: Neal D. Stubblefield, P.E.

TITLE: PRACTICE LEADER – DISTRIBUTION & COLLECTION

COMPANY: JORDAN, JONES AND GOULDING, INC.

SHORT PERSONAL RESUME SUITABLE FOR INTRODUCTION: **Mr. Stubblefield directs business development and services roll-out for linear construction projects for Jacobs JJG, including water distribution/transmission, wastewater collection and fuel gas pipelines, ground and elevated storage tanks, and water and wastewater pumping stations. His practice includes design of new installations, condition assessment and rehabilitation of existing infrastructure. He was formerly design manager for JJG's 60-person Water/Wastewater Group and previous to that, the firm's electrical/building mechanical department manager.**

Mr. Stubblefield is a mechanical engineering graduate of the Georgia Institute of Technology. A veteran long distance runner, he has completed 35 marathons...and ran with the bulls in Pamplona, Spain in the summer of 2005!

Session T4C-3
Paul Schumi

Presentation: "Asset Management in the Fast Lane for Water Distribution Systems: An Interim Report (City of Houston)"

Presenter Bio:

Paul Schumi
Business Development Manager
Wachs Water Services
pschumi@wachsws.com
mobile: (630) 485-9870

Mr. Schumi specializes in water distribution system asset management and rehabilitation programs. He has worked with numerous communities to implement efficiency programs across the country, including recent projects in Detroit, Houston, Phoenix, Atlanta, Fort Lauderdale, Washington DC and Tampa. He is an active member of the AWWA, published author in AWWA's Opflow and other publications. He is a graduate of Marquette University, worked in design and construction for over 15 years, and has been the Business Development Manager for Wachs Water Services for the past 6 years.

Wachs Water Services is the nation's premier provider of distribution system solutions in asset management, operations improvement, information services and engineering support. Their solutions include having located, assessed, repaired, flushed, flow tested and GPS mapped over 750,000 valves and hydrants in the last decade.

End.

Session T5A

Title: A Tank in the Rough – From Brownfield to Wastewater Facility
The Story of the KUB Second Creek Wastewater Storage Facility

Anthony Crist, P.E.
Gresham, Smith and Partners
865-521-6777
Anthony_crist@gspnet.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

11/2006 – Present	Project Engineer/Project Manager Gresham, Smith and Partners
7/2004 – 11/2006	Project Manager Jordan, Jones and Goulding
9/2003 – 7/2004	Project Engineer/Project Manager Tetra Tech, Inc.
3/2000 – 9/2003	Project Engineer ARCADIS
1/1997 – 3/2000	Engineer in Training Wiedeman and Singleton, Inc.

EDUCATION

B.S. Civil Engineering
Tennessee Technological University

William B. Dowbiggin, P.E., BCEE

Senior Engineer

Education

M.S. – Environmental Engineering, University of North Carolina at Chapel Hill, 1987

B.S. – Civil Engineering, University of Tennessee, 1984

Registration

Professional Engineer: North Carolina (1989), South Carolina, Virginia, Tennessee

Experience Highlights

- Author of "Cost-Effective Stage 2 D/DBP Compliance Options." AWWA Annual Conference and Exposition (San Diego, California: June 2009).
- Developed toolbox of over 50 techniques for Disinfection Byproduct (DBP) Control
- Over 50 major WTP and distribution designs
- 10 water supply intake projects
- 12 water plant uprating/optimization projects
- 12 bench and pilot testing projects
- Over 40 papers and presentations
- Past adjunct professor for WTP design at UNC Chapel Hill and past professor for WTP design at Duke University. Also taught water treatment processes at the operators schools.

Mr. Dowbiggin has over 25 years of experience in water and wastewater studies, design, permitting, research, pilot testing, and the preparation of environmental impact statements. He has designed over 50 major water plant and water distribution projects in the past 23 years with CDM. He also has regulatory and project review experience from previous employment with the U.S. Environmental Protection Agency. Mr. Dowbiggin monitors the drinking water industry and related regulations in his role with CDM and in his role as an adjunct professor of water treatment plant (WTP) design.

Mr. Dowbiggin is a water treatment specialist with CDM and has designed water treatment plant and distribution facilities ranging from 1 mgd to 225 mgd in capacity. He has also completed twelve water treatment bench/pilot plant projects and prepared over 40 presentations and publishings including ten 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, and is a Waterworks Operators School Instructor. Mr. Dowbiggin is on the AWWA National Standards Committee for Granular Activated Carbon (GAC).

Mr. Dowbiggin's bench and pilot testing experience includes jar tests, corrosion control tests, conventional treatment, tube and plate settlers, superpulsators, direct filtration, filter media optimization, air-water backwash, GAC, membranes, and comparisons of chlorine, ozone, chloramine, chlorine dioxide, potassium permanganate, THMR, peroxide, polyaluminum chloride, ferric, and alum. His plant design experience includes in-depth experience with various clarification technologies, filtration options, and residuals handling.

Mr. Dowbiggin's is one of CDM's top water treatment engineers. His water treatment plant experience includes:

- Technical advisor for Pittsburg 225-mgd WTP rehabilitation projects
- Technical advisor for Louisville 60 mgd WTP and 225-mgd WTP rehabilitation projects
- Technical Reviewer for Crescent Hill Filter Plant filter upgrades and Project Engineer for Ozone Pilot Testing and System Master Plan for Louisville Water Company
- Technical advisor for master planning of WTP's in Indianapolis of size 96, 32, 24, 12 and 16 mgd
- Project Manager/Engineer for design of WTP expansion from 150 to 225 mgd for Fairfax County VA Corbalis WTP
- Technical Reviewer for Kickapoo WTP Upgrades

- Project manager for new 30-mgd river intake and pump station structure and new 4.4/6-mgd Bladen Bluffs Regional Water Treatment Plant for the Lower Cape Fear Water and Sewer Authority in North Carolina
- Project manager for new 2.2-mgd Pender County Surface Water Treatment Plant in North Carolina
- Lead design engineer for evaluations and upgrade of the 65-mgd nominal capacity Tennessee-American Water Company WTP, which consists of Aldrich treatment units in parallel with conventional treatment basins. This project included a disinfection byproduct (DBP) control study.
- Project manager/engineer for the Neuse Regional Water and Sewer Authority new 15-mgd water supply and treatment plant in North Carolina
- Project manager/engineer for a new 5-mgd WTP for the Regional Water Authority in Asheville, North Carolina. He was also responsible for related pilot testing and DBP control studies.
- Project engineer for a 25-mgd to 31-mgd WTP expansion for the Asheville-Buncombe Water Authority in North Carolina
- Project engineer for a 150-mgd upgrade to the Chattahoochee WTP in Atlanta, Georgia
- Project manager/engineer for a 16-mgd to 40-mgd expansion of the Cary/Apex WTP in North Carolina. He was also responsible for related pilot testing and DBP control studies.
- Project manager/engineer for a 60-mgd to 72-mgd WTP uprating, 72-mgd to 96-mgd expansion, 96-mgd to 132-mgd expansion, and 132-mgd to 156-mgd uprating for Charlotte-Mecklenburg Utilities in North Carolina
- Technical reviewer for the Scott Candler WTP (150 mgd permitted and 200 mgd hydraulic capacity) in DeKalb County, Georgia
- Assistant to project engineer for the Duck River Utility Commission's 7.5-mgd WTP upgrade and 15-mgd intake upgrade in Tennessee
- Project engineer for a new 1-mgd WTP for Dupont in North Carolina
- Project engineer for a 12-mgd to 30-mgd WTP expansion in Durham, North Carolina
- Project manager/engineer for a WTP expansion from 150 mgd to 200 mgd for the Fairfax County Water Authority in Virginia
- Project manager for a 32-mgd and an 18-mgd WTP study in Fayetteville, North Carolina
- Project engineer for a new 10-mgd WTP in Florence, South Carolina
- Project manager/engineer for a 27-mgd WTP study and bicarbonate system design in Gastonia, North Carolina
- Technical reviewer for a 4-mgd membrane plant in Gloucester County, Virginia
- Project engineer for a 30-mgd to 60-mgd expansion and evaluations for uprating to 90 mgd in Greenville, South Carolina
- Project engineer for a 15-mgd to 22.5-mgd expansion for the Greenville Utility Commission in North Carolina
- Assistant to the project engineer for a 100-mgd to 150-mgd expansion in Gwinnett County, Georgia

Honors/Awards

Board Certified Environmental Engineer (BCEE), American Academy of Environmental Engineers

AWWA National Best Masters Thesis Award

Reviewer for Journal AWWA

Kentucky-Tennessee AWWA Best Paper Award 1997

- Technical reviewer for the new Shoal Creek WTP, a 75-mgd permitted and 92.5-mgd hydraulic capacity plant in Gwinnett County, Georgia
- Project engineer for a new 55-mgd WTP in Henrico County, Virginia. Project manager for subsequent uprating/upgrades to this plant.
- Technical reviewer under the project engineer for the Miami-Dade Water and Sewer Authority's 165-mgd Preston WTP upgrade and a 60-mgd to 70-mgd expansion of the Hialeah WTP in Florida
- Project manager/engineer for a 62.5-mgd to 78-mgd upgrade/expansion, Phase I and Phase II 78-mgd upgrade with ozone in Raleigh, North Carolina
- Project engineer for the Rivanna Water and Sewer Authority's 6-mgd WTP disinfection upgrade and a 9-mgd to 12-mgd WTP expansion in Virginia
- Value engineering reviewer for the Buckman Direct Diversion Intake and Treatment Project including a new 15-mgd membrane WTP in Santa Fe, New Mexico
- Project manager/engineer for a 15-mgd to 25-mgd WTP expansion in

Uprating Projects	Capacity of Uprating
City of Raleigh, NC	62.5 to 78 mgd (4 to 5 gpm/sf)
City of Raleigh, NC	78 to 86 mgd (5 to 5.5 gpm/sf with emergency rating of 6 gpm/sf)
Charlotte-Mecklenburg Utilities, NC – Franklin West 1	24 to 33 mgd (4 to 5.5 gpm/sf with emergency rating of 6 gpm/sf)
Charlotte-Mecklenburg Utilities, NC – Franklin West 2	36 to 49.5 mgd (4 to 5.5 gpm/sf with emergency rating of 6 gpm/sf)
Charlotte-Mecklenburg Utilities, NC – Franklin East	Summer rating 72 to 90 mgd (4 to 5 gpm/sf)
Greenville Utilities Commission, NC	12 to 15 mgd (4 to 5 gpm/sf, engineering support only, GUC coordinated with the State and did all testing)
Town of Cary, NC	Emergency rating prior to expansion 16 to 19 mgd (4 to 4.75 gpm/sf filter rate)
City of Wilmington, NC – North Plant	10 to 12.5 mgd (4 to 5 gpm/sf)
Gwinnett Co., GA – Lanier Filtration Plant	100 to 150 mgd (5 to 7.5 gpm/sf)
Henrico County VA WTP	55 to 80 mgd (4 to 5.2 gpm/sf with 1 less spare filter)
Rivanna WASA, Charlottesville VA – South Rivanna WTP Uprating	8 to 12 mgd (4 to 6 gpm/sf)

Wilmington, North Carolina

- Technical advisor for evaluations of alternate measures to control disinfection by-products for the Cobb County-Marietta Water Authority in Georgia. This project included multiple studies and pilot tests.

Water Plant Uprating Experience. Mr. Dowbiggin's water treatment facility uprating experience includes the following:

Water Distribution System Experience. Mr. Dowbiggin is one of CDM's water distribution system experts with experience in water distribution system modeling, studies of corrosion control, flushing, distribution system operation and maintenance (O&M), storage evaluations and other related work, and related teaching assignments. He has written numerous related papers including "IDSE Compliance Options" which was presented at the 2005 AWWA National Conference in San Francisco, "Corrosion Control Testing for Three Municipalities" and co-authored "O&M Strategies to Evaluate and Control Biological Activity in the Distribution System" (2005 AWWA National Conference) and "Vulnerability Assessment and Distribution System Water Quality Modeling Working Together for Utilities". Mr. Dowbiggin's water distribution system experience includes project engineering and management for the following projects:

- Asheville, North Carolina - The Asheville-Buncombe Water Authority sought to reduce their lead levels in the distribution system, so they contracted CDM to perform corrosion optimization studies. CDM bench-tested a variety of conditions for lead, copper, and steel/iron corrosion. Testing included multiple types of corrosion inhibitors, along with alternative pH and alkalinity conditions using caustic, lime, and bicarbonate to adjust the pH. A revised corrosion control approach was recommended by CDM, with improvements designed and implemented on a fast-track basis by CDM. Lead levels were lowered dramatically within 6 months of start-up.

- Apex, North Carolina - CDM is providing Initial Distribution System Evaluation (IDSE) compliance assistance and has provided past vulnerability analysis for the distribution system in Apex.

- Bahamas (New Providence Island) - Mr. Dowbiggin was project engineer for the water distribution system improvements project for New Providence Island, Bahamas. Responsibilities included water network analysis modeling and preparation of recommendations for distribution system improvements for a system of six pump stations and 250 pipes.

- Brunswick County, North Carolina - Brunswick County contracted with CDM to evaluate their water distribution system, update their master plan, and provide water distribution study, design, and construction for one new pump station, an elevated tank, upgrades at two pump stations, and 28 miles of water mains. The water mains were implemented in multiple projects over a six-year period and also included a directional drill crossing of the intra-coastal waterway. All of these projects were implemented successfully.

- Cary, North Carolina - The Town of Cary selected CDM to provide a comprehensive water quality in the distribution system evaluation. CDM has provided regulatory evaluations and continues to provide IDSE assistance. Evaluation and benchmarking of distribution system O&M practices has been provided. Water distribution system modeling is underway and includes the use of fluoride tracer testing to validate the water quality (time of travel) model. CDM's also provided a previous water distribution master plan for Cary under Mr. Dowbiggin's direction that included the establishment of two new pressure zones to keep up with the Town's rapid rate of growth. CDM also designed a transmission main to convey water from the treatment plant well into the distribution system along with design of an upgrade and expansion to the water plant.

- Charleston, South Carolina - CDM has recently completed a water distribution system master plan that included water demand projections, distribution system modeling using an "all-pipe" model, advising on regulatory issues such as IDSE, making recommendations for capital improvements programming, evaluating existing systems with respect to infrastructure rehabilitation and replacement including developing a program that prioritizes improvements based on issues such as past pipe breaks, corrosion concerns, and criticality.

- Fayetteville, North Carolina - The Public Works Commission of the City of Fayetteville has been served by CDM over the past 20 years on a variety of distribution system projects including master planning with modeling covering plotting time-of-travel contours, assistance in implementing uniform-directional flow (UDF) flushing, design and engineering services during construction for two elevated, two pump stations, and related pipelines.

- Florence, South Carolina - As part of the study and implementation of a new surface water system engineered by CDM for Florence, water distribution master planning was supplemented by corrosion control testing to evaluate the unique conditions of blending existing groundwater supplies with surface water from the new system being implemented. The corrosion control testing and evaluations addressed corrosion of iron/steel, lead, and copper.

- Gastonia, North Carolina - The City of Gastonia sought to reduce their lead levels in the distribution system, so they contracted with CDM to perform corrosion optimization studies. CDM bench-tested a variety of conditions for lead, copper, and steel corrosion. Testing included multiple types of corrosion inhibitors, along with alternative pH and alkalinity conditions using caustic, lime, and bicarbonate to adjust the pH. A revised corrosion control approach was recommended by CDM, with improvements designed and implemented on a fast-track basis by CDM. Lead levels were lowered dramatically within 6 months of start-up. This project also involved the implementation of corrosion testing pipe loops throughout the distribution system.

- Iredell County, North Carolina - Mr. Dowbiggin served as project engineer for a county-wide water and sewer systems study for Iredell County that included investigations of water supply options.

- Raleigh, North Carolina – Multiple studies have been provided by CDM to assist the City of Raleigh with the control of water quality in the distribution system. The city uses chloramines and has had past concerns of nitrification and elevated numbers of coliform detections. CDM provided numerous related recommendations which have assisted the city in improving water distribution system water quality. CDM also assisted the city with implementation of a pilot uniform directional flow (UDF) flushing area. Past distribution system designs for the City of Raleigh include the upgrade/expansion of 4 pump stations and the design of transmission mains including a 42" ductile iron main.

- Santee Cooper, South Carolina – The master plan provided by CDM for this South Carolina utility included distribution system modeling and master planning related to 21 cities and counties in South Carolina.

Water Supply Intake and Raw Water Pump Station Experience. Mr. Dowbiggin's water supply intake and raw water pump station experience includes the following:

- Lower Cape Fear Regional Water and Sewer Authority, North Carolina – new 30-mgd intake with wedge wire screens on piles and caisson intake pump station.
- Neuse Regional Water and Sewer Authority, North Carolina – new 30-mgd intake with wedge wire screens on piles and caisson intake pump station
- Asheville, North Carolina – new 30-mgd Mills River intake with wedge wire screens in an off-river structure, and preliminary engineering for multiple intake and water supply options in a water supply master plan
- Atlanta, Georgia – modifications to the existing Chattahoochee River sill/dam to supply 210 mgd
- Duck River Utility Commission, Tennessee – 15-mgd intake modifications to add another intake level to the intake tower in a lake intake/pump station
- Florence, South Carolina – new 30-mgd caisson pump station and wedge wire screens on piles
- Greenville, North Carolina – addition of a higher level screen for 22.5-mgd plant and design for contract dredging
- Greenville, South Carolina – replacement of intake structure for Table Rock Lake, includes a new 35-mgd intake in the lake and a tunnel through rock to convey water from the lake to a raw water pump station
- Greenville, South Carolina – addition of a new traveling screen and separate additions of raw water pumps to an existing side of lake intake and pump station structure

- Henrico County, Virginia - new 55-mgd intake and water treatment plant
- Winston-Salem, North Carolina - Preliminary engineering for environmental impact statement (EIS) for a new dam and intake.
- Charlotte NC – Raw water pump additions for an existing intake and pump station structure
- Fairfax County, Virginia – Additions for raw water pumping for increasing the capacity of a raw water pump station structure from 150 to 225 mgd.

Mr. Dowbiggin has served as project manager for water supply and treatment projects valued as high as $160 million over the past 20 years. He has been trained and certified for project management and now teaches project management as part of CDM's internal certification process. Mr. Dowbiggin's project management experience includes:

- Pender County new 2.2-mgd surface water treatment plant in North Carolina
- Lower Cape Fear Water and Sewer Authority new 30-mgd intake and raw water pump station structure with new 4.4/6-mgd water treatment plant in North Carolina
- Neuse Regional Water and Sewer Authority new 15-mgd surface water treatment plant with UV extra disinfection barrier in North Carolina
- Fairfax County Water Authority water plant expansion from 150 mgd to 200 mgd with ozone and GAC in Virginia. This plant includes a 10-mgd plate settler facility for residuals flow streams.
- Cary/Apex water plant expansion from 16 mgd to 40 mgd with Superpulsators, conventional anthracite/sand filters and ozone in North Carolina
- Raleigh multiple water plant upgrades and upratings over the past 10 years for capacities up to 86 mgd in North Carolina
- Charlotte-Mecklenburg Utilities two successful uprating projects and assisted in project management for two WTP expansions from 72 mgd to 96 mgd with tray sedimentation and from 96 mgd to 132 mgd with full conventional treatment in North Carolina
- Water supply and treatment studies for Fayetteville and Gastonia, North Carolina, and Duck River Utility Commission, Tennessee
- Wilmington water plant expansion from 15 mgd to 25 mgd and upgrades with Superpulsators, ozone, and GAC over sand filters, including intake/pump station upgrades in North Carolina
- Henrico County WTP uprating and upgrades in Virginia
- Brunswick County water distribution study, design, and construction for one new pump station, an elevated tank, upgrades at two pump stations, and 28 miles of water mains in North Carolina
- Asheville new 5-mgd WTP for the Regional Water Authority in North Carolina

Master Planning Experience. Mr. Dowbiggin's master planning experience includes master plans for Cary, Neuse Regional Water and Sewer Authority, Wilmington, Florence, Brunswick County, Gastonia, Charleston, New Providence Island, Iredell County, the Duck River Utility Commission, Charlotte-Mecklenburg Utilities, the Asheville-Buncombe-Henderson Regional Water Authority, and for 21 counties and cities in South Carolina in a master plan for Santee Cooper.

Expanded descriptions on several of Mr. Dowbiggin's key assignments are listed below.

Lead Design Engineer, Water Treatment Plant, Chattanooga, Tennessee. Tennessee-American Water Company selected CDM to evaluate and upgrade the existing water treatment plant, which consists of Aldrich treatment units in parallel with conventional treatment basins. The upgrade is to include pre-treatment improvements with tube or plate settlers as well as miscellaneous upgrades.

Project Manager, Water Treatment Plant, Kinston, North Carolina. Mr. Dowbiggin served as project manager for the Neuse Regional Water Treatment Plant. This project includes the design of a new 30-mgd intake and raw water pump station along with a new 15-mgd water treatment plant that uses conventional treatment supplemented by GAC over sand filtration and ultraviolet (UV) supplemental disinfection. The mixers and flocculators are vertical turbine style and the sedimentation basins include chain and flight sludge scrapers.

Project Engineer, Water Treatment Plant Expansion and Upgrades, Greenville, South Carolina. Mr. Dowbiggin served as project engineer for the design of an upgrade and expansion of the Adkins Water Treatment Plant for the Greenville Water System. This project included upgrade and expansion of the plant's raw water intake and raw water pump station, addition of a new raw water transmission main, upgrades of existing conventional treatment to add Claritrac sludge collectors to the existing sedimentation basins and air-water backwash underdrains to the existing filters. A new 30-mgd conventional treatment train including horizontal paddle flocculators, conventional sedimentation with Claritrac sludge removal, and air-water backwashed filters with anthracite over sand media was also added. The project utilized uprating and staging of improvements to cost-effectively add 60 mgd of treatment capacity (from 30 to 90 mgd) at a cost of about $40 million. Standby power and pumping were designed for 60 mgd since they can be increased as needed – e.g. spare slots were left for future pumps.

Project Engineer, Water Treatment Plant, Florence, South Carolina. Mr. Dowbiggin served as project engineer for the Pee Dee Regional Water Treatment Plant for the City of Florence. This project included the design and construction services for a new 10-mgd water treatment plant along with a new intake, raw water pump station, and transmission main.

Project Manager, Water Treatment Plant, Fairfax County, Virginia. Mr. Dowbiggin served as project manager for the Corbalis Water Treatment Plant expansion from 150 mgd to 200 mgd with a 225-mgd bid alternate for the Fairfax County Water Authority. This plant includes settled water ozonation and GAC biofilters as well as conventional coagulation, paddle wheel flocculators, and conventional sedimentation.

Project Manager, Water Treatment Plant, Cary, North Carolina. Mr. Dowbiggin served as project manager for the Cary/Apex Water Treatment Plant expansion from 16 mgd to 40 mgd. This project included new rapid mixing, superpulsators, GAC-sand deep-bed filters with air water automated sequence backwash, baffled clearwells, a finished water pump station with standby power facilities, chemical storage and feed facilities, residuals handling facility with thickening and high-speed centrifuges, and SCADA control upgrades. This project won a Construction Partnership award. Also, the Town received the Director's Award under the Partnership for Safe Water within 1½ years after the plant project which shows how well the plant and the Town's operations staff actually perform.

Project Manager/Project Engineer, Various Water Treatment Plants, Charlotte, North Carolina. For Charlotte-Mecklenburg Utilities, Mr. Dowbiggin served as project engineer for several projects including: design and construction services for an expansion from 72 to 96 mgd for the Franklin Water Treatment Plant, a subsequent design to expand the Franklin plant from 96 mgd to 132 mgd including full chemical facility upgrades and SCADA implementation, a feasibility study for upgrading the 24-mgd Vest Water Treatment Plant to 48 mgd, and a comprehensive water supply study which included the development and application of a computer model to disaggregate and project changes in population and water demand. Statistical analyses were applied to the evaluation of alternative supplies. Mr. Dowbiggin served as project manager to successfully uprate both of these expansion modules.

Project Manager, Water Treatment Plant, Raleigh, North Carolina. Mr. Dowbiggin served as project manager for the City of Raleigh's E.M. Johnson Water Treatment Plant upgrade and expansion project and two uprating projects. These projects involve designing ozone, SCADA, standby power, and hypochlorite facilities and administrative facility upgrades for the 78-mgd E.M. Johnson Water Treatment Plant. Past work at this plant included one year of ozone/biological activated carbon (BAC) pilot testing and full-scale testing to uprate the plant from 62.5 mgd to 78 mgd.

Also for the City of Raleigh, he served as project manager for the design and shop drawing review for modifications to the North Hills and Shelley Road Pump Stations. He was also project engineer for the design and construction of the Litchford Road Water Transmission Main for the City. Responsibilities included preparation of specifications and primary responsibility for shop drawing review for this 42-inch diameter, 13,200-foot long water main. For the city's Neuse River/Perry Creek Sewer project, he performed surface water and groundwater impact evaluations for an environmental impact statement. He also was responsible for preliminary and final design of chloramine facilities for the City of Raleigh. This assignment included assisting Towns that purchase Raleigh water in planning for chloramines. For the towns of Wake Forest and Zebulon (purchase Raleigh water), Mr. Dowbiggin was responsible for preliminary design of chloramine facilities.

Project Manager, Water Treatment Plant, Wilmington, North Carolina. Mr. Dowbiggin served as project manager/engineer for the Sweeney Water Treatment Plant in Wilmington. This project included pilot testing processes such as conventional coagulation/filtration treatment, GAC, and alternate oxidants and disinfectants such as ozone, chlorine dioxide, and chloramines. He was responsible for the design of a 10-mgd expansion and upgrade at the plant and reviewed the city's water system master plan recommendations. Mr. Dowbiggin was also responsible for a later uprating project for this plant.

Project Manager and Engineer, Water Treatment Plant, Asheville, North Carolina. For the Asheville-Buncombe Water Authority, Mr. Dowbiggin served as project engineer for a two-phased improvements program to meet the water supply, treatment, and transmission needs of the area. The program required fast-track design and construction of major facility improvements as well as implementation of a multi-faceted program to conserve the Authority's high quality water supply. The four components of Phase I included the North Fork Water Treatment Plant upgrade and expansion from 25 to 31 mgd, design of a new 36-mgd East Asheville Booster Pump Station, design of five miles of new 24-inch diameter water transmission pipeline (West Asheville Connector), and a new SCADA system to provide centralized communication and control of 50 water pump stations, treatment plants, and storage tanks from the North Fork Water Treatment Plant. Mr. Dowbiggin was project engineer for the evaluation of water supply alternatives, led the water quality bench scale and pilot testing efforts, and was involved in preliminary design of dam diversion structures and intakes. Phase II involved the design of the new Mills River Regional Water Treatment Plant, which is a complete new 5-mgd plant, designed for readily expanding to 30 mgd. This plant includes a new intake, raw water storage reservoir, raw and finished water pumps, ozonation, rapid mixing/ flocculation, sedimentation, filtration, maintenance, administration and laboratory facilities, chemical storage and feed, and residuals facilities.

Project Engineer, Water Treatment Plant, Durham, North Carolina. Mr. Dowbiggin was project engineer for design and construction services for an expansion from 12 mgd to 30 mgd for the Brown Water Treatment Plant in Durham. This project included the addition of new conventional treatment basins, and expansion of all related facilities for pumping and chemicals. A backwash equalization basin was also added along with sludge drying beds.

Project Engineer, Water Treatment Plant, Greenville, North Carolina. Mr. Dowbiggin was project engineer for the 1996 study for the Greenville Utilities Commission and for follow-up improvements to meters and raw and clearwell pumps at the GUC plant. CDM was later selected to provide a master plan for water supply expansion and then to provide preliminary and final design of the WTP expansion from 15 to 22.5 mgd. Mr. Dowbiggin was project engineer for each of these projects.

Project Engineer, Water Treatment Plant, Gwinnett County, Georgia. Mr. Dowbiggin was a project engineer for the Lanier Filter Plant upgrade and expansion to 150 mgd and was responsible for pilot testing including direct filtration and ozonation.

Project Manager, Water System Improvements, Brunswick County, North Carolina. Mr. Dowbiggin served as project manager for water system improvements in Brunswick County, including 28 miles of water lines ranging in size from 6 to 24 inches in diameter, a 300,000-gallon elevated tank, and a 10-mgd booster pump station with chlorination facilities and a standby power generator.

Project Engineer, Water and Sewer System, Iredell County, North Carolina. Mr. Dowbiggin served as project engineer for a county-wide water and sewer systems study for Iredell County that included investigations of water supply options.

Project Engineer, Water Treatment Facilities, Duck River, Tennessee. Mr. Dowbiggin prepared a master plan for water treatment facilities and designed modifications to the raw water intake structure and filter backwash system for the Duck River Utility Commission in Tullahoma-Manchester, Tennessee.

Project Engineer, Water Distribution System, New Providence Island, Bahamas. Mr. Dowbiggin was project engineer for the water distribution system improvements project for New Providence Island. Responsibilities included water network analysis modeling and preparation of recommendations for distribution system improvements for a system of six pump stations and 250 pipes.

Project Engineer, Wastewater Treatment Plant, High Point, North Carolina. Mr. Dowbiggin was a project engineer for the evaluation of nitrification at the City of High Point's East Side Wastewater Treatment Plant.

Project Engineer, Wastewater Treatment Plant Evaluation, Concord, North Carolina. Mr. Dowbiggin performed an evaluation of existing ozonation facilities and alternative disinfection facilities for the Rocky River Regional Wastewater Treatment Facility in Concord. This project included pilot testing of ultraviolet radiation disinfection.

Alternative Disinfectant Experience. Mr. Dowbiggin's experience with alternative disinfectants includes evaluations of chlorine gas versus hypochlorite in Raleigh, Charlotte, Greenville, and Wilmington, and the design of chlorine gas, hypochlorite, and ozone facilities each in multiple facilities including hypochlorite design and construction services projects for Wilmington, GUC, Cary, Asheville and Raleigh. He was project manager for the design of chlorination/dechlorination facilities for the Water and Sewer Authority of Cabarrus County, North Carolina.

Prior to joining, CDM, Mr. Dowbiggin worked for the Environmental Protection Agency in Region IV as an intern (co-op) on alternating quarters for three years. Mr. Dowbiggin prepared and issued wastewater discharge permits and assisted in the review of 201 wastewater facility plans and infiltration/inflow analyses for sewer system evaluations. Responsibilities included the application of stream and estuary models to establish effluent limitations, researching promulgated effluent guidelines and writing NPDES discharge permits, and reviewing engineering design and cost estimations in the 201 plans and infiltration/inflow analyses.

He was also a co-author of an EPA manual on the preparation of interim NPDES regulations for sludge handling.

While enrolled at the University of Tennessee and consequently at the University of North Carolina, he conducted research over a four-year period as a research assistant that included evaluation of parameters related to the sequestering of iron and manganese in drinking water treatment (at UT) and the evaluation of benefits from ozonation water treatment (at UNC).

Professional Activities

Member, 5 S Society

Member American Water Works Association

Member, Water Environment Foundation

Member, IOA

Publications

Dowbiggin, W. "Cost-Effective Stage 2 D/DBP Compliance Options." AWWA Annual Conference and Exposition (San Diego, California: June 2009).

Dowbiggin, W., B. Brewer, S. Smith, M. Edwards, K. Parker, and M. Shamel. "Testing Long-Term Changes for Compliance with Lead and Copper Rule Revisions." AWWA Annual Conference and Exposition (San Diego, California: June 2009).

Dowbiggin, W. "The Fate of Pharmaceuticals, Personal Care Product Chemicals, and Endocrine Disruptors in our Water Treatment Plants."North Carolina AWWA/WEA Conference (Winston-Salem: 2008).

Johnson, B., L. McMillan, and W. Dowbiggin. "Evaluation and Improved Control of Coliform Occurrence in the City of Raleigh Distribution System." AWWA Annual Conference and Exposition (Atlanta, Georgia: June 2008).

Dowbiggin, W. and L. McMillan. "Responding to Proposed Rule Changes and Trends Related to Lead Corrosion Control and Simultaneous Compliance with all Rules." AWWA Annual Conference and Exposition (Toronto, Canada: June 2007).

Dowbiggin, W. "Pilot Testing for a New Regional WTP with Multiple Barriers for Multiple Parameters." South Carolina Environmental Conference (Myrtle Beach: March 2007).

Dowbiggin, W., S. Brown and R. Huggins. "Responding to the Immediate Requirements of the Stage 2 DBPR and LT2ESWTR." North Carolina AWWA Conference (Greensboro: November 2006).

Dowbiggin, W. "Ultraviolet Disinfection Design and Operation for Low-Pressure High Output (LPHO) and Medium Pressure (MP) Systems." Virginia AWWA Annual Meeting (October 2006).

Dowbiggin, W. "Effective Ozonation - Gwinnett County's Success." Drinking Water Technology Forum (Charleston, South Carolina: September 2006).

Dowbiggin, W., S. Brown and R. Huggins. "Responding to the Immediate Requirements of the Stage 2 DBPR and LT2ESWTR." AWWA Annual Conference (San Antonio, Texas: June 2006).

Dowbiggin, W. "Optimizing Disinfection and the Control of Disinfection By-products." Water Treatment Plant Optimization Seminar, North Carolina AWWA (Huntersville: June 2006).

Herring, H., W. Dowbiggin, S. Smith, and W. Miles. "Designing a New Regional WTP with Multiple Barriers for Multiple Parameters - Moving Beyond Crypto." South Carolina Environmental Conference (Myrtle Beach: March 2006).

Dowbiggin, W. "Examples of Alternate Approaches to IDSE Compliance." AWWA Annual Conference (San Francisco, California: June 2005).

Spiesman, A. and W. Dowbiggin. "O&M Strategies to Evaluate and Control Biological Activity in the Distribution System." 2005 AWWA National Conference (San Francisco, California: June 2005).

Dowbiggin, W. "Various Design & Delivery Techniques in North Carolina." AWWA Young Professionals Seminar (September 2004).

Dowbiggin, W. "Ultraviolet Disinfection System Design and Operation for Drinking Water." Georgia/South Carolina Drinking Water Technology Forum (September 2004).

Dowbiggin, W. "Ultraviolet Disinfection System Design and Operation." North Carolina AWWA Annual Conference (Charlotte: November 2004).

Dowbiggin, W. "Compliance Strategies for the Stage 2 Microbial & Disinfection Byproduct Rules." Kentucky-Tennessee Joint AWWA Meeting, (Nashville: July 2004).

Dowbiggin, W. and R. Bonne. "Reuse Comes to Water Systems in the United States." the AWWA Annual Conference (Orlando, Florida: June 2004).

Dowbiggin, W. and T. Frederick. "Emergency Response Planning." AWWA sponsored training seminars in Asheville, Greenville, and Concord, North Carolina, February 2004.

Dowbiggin, W. "The Use of Ferric Coagulants & Chloramines for Compliance with the Disinfection Byproduct Rule." North Carolina AWWA/WEA Annual Conference (Greensboro: November 2003).

Treadway, J. and W. Dowbiggin. "Vulnerability Assessment and Distribution System Water Quality Modeling Working Together for Utilities." North Carolina AWWA Annual Conference, 2003.

Dowbiggin, W. "Bench and Pilot Testing Various Technologies for DBPR and ESWTR Compliance." South Carolina Environmental Conference (Myrtle Beach: March 2003).

Dowbiggin, W. "Regional Conjunctive Use of Groundwater, ASR, and Surface Water - A Renewed Focus for Reliability and Reduced Vulnerability." AWWA Annual Conference (Anaheim, California: June 2003).

Dowbiggin, W. "Water System Security." North Carolina AWWA Drinking Water Regulations Update Seminar, Raleigh, North Carolina, July 31, 2002.

Dowbiggin, W. and C. Ferguson. "Chloramination - Rules and Guidance - Variations from State to State." AWWA Annual Conference and Exposition (New Orleans, Louisiana: June 2002).

Dowbiggin, W. and M. Richardson. "Operators Opinion - Changes Needed to Help Operators Cope with Recent Regulations." AWWA Annual Conference and Exposition (New Orleans, Louisiana: June 2002).

Dowbiggin, W. "Ultraviolet Disinfection and Chloramination." South Carolina Environmental Conference (Myrtle Beach: March 2002).

Dowbiggin, W. "An Investigation into the Operation of Ozone Biofiltration at Four Recently Completed Ozone Facilities." AWWA Annual Conference and Exposition (Washington, D.C.: June 2001).

Dowbiggin, W. "Advanced Water Treatment without Advanced Costs." AWWA Annual Conference and Exposition (Washington, D.C.: June 2001).

Dowbiggin, W. "Complying with the D/DBPR, ESWTR, and Backwash Recycle Rule at 12 Water Treatment Plants in the Southeast." AWWA Annual Conference and Exposition (Denver, Colorado: June 2000).

Dowbiggin, W. and J. Huber. "Techniques, Tricks, and Treatment Ideas for Reducing Water System O&M Costs: A Survey of 50 Water Treatment Plant Superintendents." AWWA Annual Conference and Exposition(Denver, Colorado: June 2000).

Dowbiggin, W. "Performance of Advanced Technologies in Five Water Treatment Facilities in the Southeast." South Carolina Environmental Conference (North Myrtle Beach, South Carolina: March 2000).

Dowbiggin, W., M. Richardson, M. Kennedy, and J. Garland. "Biofiltration: Operational Issues and DBP Benefits." North Carolina AWWA/WEA Annual Meeting and Conference (Asheville, North Carolina: November 1999).

Dowbiggin, W. "Biofiltration: Operational Issues and DBP Benefits." Kentucky-Tennessee AWWA Annual Meeting and Conference (Louisville, Kentucky: September 1999).

Dowbiggin, W., T. Jackson, K. Christmas, F. DiGiano, J. Riddick, and C. Hartmann. "Granular Activated Carbon, Membranes, and the Information Collection Rule." AWWA National Conference (Atlanta, Georgia: June 1997).

Dowbiggin, W., R. Langley, R. Elks, D. Zimmer, and R. Spruill. "Cost-Effective Water Supply through Surface Water, Groundwater, and Demand Management." North Carolina Section AWWA/WPCA Annual Conference, (Pinehurst, North Carolina: November 1996).

Dowbiggin, W. "Optimizing Water Treatment for Cryptosporidium Control." North Carolina Section AWWA/WPCA Annual Conference (Greensboro, North Carolina: November 1995).

Dowbiggin, W., with J. Garland, K. Best, and L. McMillan. "Filtration Operations for Removing Particulates, DBP Precursors, and Manganese." the AWWA National Conference (Anaheim, California: June, 1995).

Dowbiggin, W. "Complying with the D/DBPR, ESWTR, and ICR in the Carolinas." AWWA National Conference (Anaheim, California: June, 1995).

Dowbiggin, W. and K. Tsang. "Minimization of Water Treatment Residuals." North Carolina Section AWWA/WPCA Annual Conference (Asheville: November 1994).

Dowbiggin, W., L. McMillan, J. Garland, and K. Best. "Full-Scale GAC Testing in Raleigh." North Carolina Section AWWA/WPCA Annual Conference (Asheville: November 1994).

Dowbiggin, W. "Complying with the Disinfectants/Disinfection By-Products Rule, Enhanced Surface Water Treatment Rule, and Information Collection Rule in North Carolina." North Carolina Section AWWA/WPCA Annual Conference (Asheville: November 1994).

Dowbiggin, W., M. Nouvel, L. McMillan, J. Garland, B. Gurganious, and V. Hagans. "State-of-the-Art Pilot Testing of Conventional Treatment, Upflow Clarification, Ozonation, and GAC Filtration." International Ozone Association 1994 Pan America Group Conference (Richmond, Virginia: September 1994).

Dowbiggin, W. "Pilot Testing and Design of North Carolina's First Biological Activated Carbon Facility." AWWA Annual Conference (New York, New York: June 1994).

Dowbiggin, W., , C. Duffie, R. Guggenheim, E. Cross, S. Medlar. "Corrosion Control Testing for Three Municipalities." South Carolina Environmental Conference (Myrtle Beach: March 1994).

Dowbiggin, W. "Chlorination/Dechlorination Facilities Design, Practical Aspects." Wastewater Disinfection Workshop (Atlanta, Georgia: March 1994).

Dowbiggin, W. "Water Treatment Pilot Testing with Ozone, Upflow Clarifiers, and GAC Filtration." South Carolina Environmental Conference (Hilton Head Island: March 1993).

Dowbiggin, W. "Operation and Maintenance Strategies Developed by Plant Personnel Lead to Improved Effectiveness." AWWA Distribution System Symposium (Philadelphia, Pennsylvania: 1992).

Dowbiggin, W. and C. Cross. "Impacts of Raw Water Quality and the SDWA on Water Treatment," *Journal North Carolina AWWA/WPCA* (1992).

Dowbiggin, W. "Assessing Particles and Particle Stability in Suspensions of Varied Chemical Composition." AWWA Water Quality Technology Conference (Toronto, Ontario: November 1992).

Dowbiggin, W., P. Prendiville, R. Rice, M. Nouvel, H. Crisp, L. McMillan, and J. Garland. "Pilot Testing in Raleigh." North Carolina AWWA/WPCA Annual Conference (Charlotte: November 1992).

Dowbiggin, W. "Preparing for the Disinfection By-Products Regulation-Case Studies." AWWA Annual Conference (Cincinnati, Ohio: June 1990).

Dowbiggin, W. and J. Thompson. "An Update of SDWA Regulations and Their Implications." North Carolina AWWA/WPCA Annual Conference (Asheville: November 1989).

Dowbiggin, W. "Complying with the Safe Drinking Water Act." Advanced Class of the 50th Annual Meeting of the North Carolina Waterworks Operators School, Raleigh, North Carolina, July 26, 1989.

Dowbiggin, W. and P. Singer. "Effects of Natural Organic Matter and Calcium on Ozone-Induced Particle Destabilization." *Journal of the American Water Works Association* (June 1989).

Dowbiggin, W. "Treatment Processes for Microbiological Contaminants in Drinking Water." Advanced Class of the 49th Meeting of the North Carolina Waterworks Operators School, Raleigh, North Carolina, July 27, 1988.

Dowbiggin, W. and A. Cole. "Watershed Management and Water Treatment." Piedmont Section Meeting of the North Carolina Water Operators Association (Carrboro/Chapel Hill, North Carolina: March 1988).

Dowbiggin, W. and P. Prendiville. "Ozone Applications in Water Treatment." North Carolina AWWA/WPCA Annual Conference (Pinehurst: November 1987).

Dowbiggin, W. "Safe Drinking Water Act-Design Considerations." Advanced Class of the 48th Meeting of the North Carolina Waterworks Operators School, Raleigh, North Carolina, July 1987.

Dowbiggin, W. and P. Singer. "Factors Affecting the Stability of Particles in Natural Waters and their Susceptibility to Ozone-Induced Microflocculation." AWWA Annual Conference (Kansas City, Missouri: June 1987).

Dowbiggin, W., J. Felix-Filho and P. Singer. "Effect of Humic Substances on the Colloidal Stability of Particles." Division of Environmental Chemistry, American Chemical Society (Denver, Colorado: April 1987).

Brent A. Tippey, P.E.

Vice President, HDR/Quest Engineers, Lexington, KY

Brief Biography

Mr. Tippey is a vice-president in the areas of potable water treatment and transmission/distribution systems design. He is a frequent presenter at the WPC and has 18 years experience. Notable projects include:

- First Actiflo high-rate settling process designed in KY
- First ultraviolet disinfection (UV) system for water in the state of Kentucky.
- First MIEX reactor for DBP control in Portsmouth, Ohio as part of a design build team (1st municipal design build in Ohio on a water project.).
- Part of the design team on the recently bid Advacned tretametn Project for Northern KY Water District. Project included installation of granular activated carbon and UV disinfection at two WTPs.
- Project manager for the design of 30 miles of 42" waterline as part of the High Service Main project for Kentucky American Water.

Brent has worked with over 35 communities in Kentucky, Ohio and West Virginia on their potable water needs including regulatory compliance. Brent has previously presented at the AWWA KY-TN conference as well as at KWWOA conferences. He is graduate of the University of Kentucky where he earned a Civil Engineering degree. He is hear to talk about the 1st D/B WTP project in KY.

Session T5B
Title: Performance Monitoring and Evaluation of Recent Surge Improvements at a 21 MGD Pump Station

Bo Copeland, P.E.
Hazen and Sawyer, P.C.
(513) 469-2750
bcopeland@hazenandsawyer.com

CREDENTIALS

Registered Professional Engineer

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

Session T5B
Title: Construction Startup of the World's Only Riverbank Filtration Tunnel (co-presenter with Kay Ball, Louisville Water Company)

David L Haas, PE
Jordan, Jones and Goulding, Inc., A Jacobs Engineering Group company

770.455.8555
David.Haas@jjg.com

CREDENTIALS
Registered Professional Engineer in KY, TN, GA
Member, AWWA Water Treatment Facilities Design & Construction Committee

EXPERIENCE

Mr. Haas joined JJG in 1985 and has 25 years of experience in process engineering and project management with emphasis on water treatment. He has served as project manager or technical lead on many new water treatment designs, plant expansions, and renovations to existing plants. Currently, David is serving as JJG's Water Treatment Practice Leader. David has served as the Project Manager on Louisville Water Company's Riverbank Filtration project for the past 10 years.

EDUCATION
Undergraduate - B. S. - University of Louisville
Graduate - Environmental Engineering - University of Louisville

Louisville Water Company Riverbank Filtration Program:

Kay D. Ball
Louisville Water Company

Kay Ball has over 24 years of experience including design, construction and implementation of strategic initiatives of the Louisville Water Company including the Main Replacement Rehabilitation program, the County-wide Extension Program, and currently serves as Manager of the Advanced Treatment technology/ Riverbank Filtration Program. Her experience includes budgeting, program planning, project management, public information and Wellhead Protection. Kay is active in the American Water Works Association, currently serving as Chair–elect of the Kentucky Tennessee AWWA section. In addition to AWWA, she has participated in the Kentucky Water Resource Commission, the American Society of Civil Engineers, the American Groundwater Association, and River Fields. Kay is married, has five children, and two grandsons. Ms. Ball has a degree in Civil Engineering from the University of Louisville Speed Scientific School.

Session T5C-1
Jessica Rader

Session T5C

Topic: Ten Small Water Systems Benefit from Drinking Water Mentoring Initiative

Jessica Rader

TDEC- Fleming Training Center

Jessica.rader@tn.gov

(615) 898-6507

Education

M.S. Biology- Middle Tennessee State University, 2007

B.S. Environmental Science- Middle Tennessee State University, 2003

Experience

2008-Present Water Treatment Instructor

Department of Environment and Conservation-Fleming Training Center

Session T5C

Technical Assistance Center Network (TACNet): Tools and Training for Small Systems

Jana Fattic
Center for Water Resource Studies
Western Kentucky University
270-745-8706
Jana.Fattic@wku.edu

CREDENTIALS

KY Certified Microbiological Analyst
KY Registered Environmental Sanitarian

EXPERIENCE

2006-Present	Associate Director, Center for Water Resource Studies Western Kentucky University
2004-2006	Operations Director, WATERS Laboratory Western Kentucky University
2000-2003	Environmental Specialist III, Water Supply Program Maryland Department of the Environment
1999-2000	Environmental Scientist/Project Manager The Green Environmental Group

EDUCATION

Undergraduate
B.S. Geography/ Environmental Studies
Western Kentucky University

Graduate
Pursuing M.S. in Geoscience
Western Kentucky University

Session T5C-3
Paul Steele

Session T4C
Title: When Conventional Doesn't Apply: Exploring Wastewater Disposal Options

Paul Steele
Gresham Smith and Partners
865-521-6777
Paul_Steele@gspnet.com

CREDENTIALS

Registered EIT
Master of Science in Environmental Engineering

EXPERIENCE

4/06 – 6/08 & 12/08 – Present	Student Intern & Engineering Intern Water Services Gresham Smith and Partners

EDUCATION

Undergraduate
B. S. Civil Engineering
University of Tennessee at Knoxville

Graduate
M.S. Environmental Engineering
University of Tennessee at Knoxville

Session T6A-1
Geoff Grant

Geoffrey M. Grant

Project Manager

Education

MS, Civil Engineering, University of New Hampshire, 2003

BS, Marine and Freshwater Biology, University of New Hampshire, 1997

Licenses/Registrations

PE, # 11650, NH , Expires 01/31/2011

Training and Certifications

National Association of Sewer Service Companies PACP/MACP Trainer Certification

Employment

AECOM – 1997-Present

Mr. Grant is a project manager based in Cincinnati with expertise in wet weather programs, hydraulic modeling, and infrastructure asset management. He has worked for AECOM for the past 13 years and worked on a number of different wet weather programs. He has developed and calibrated sewer system models, evaluated wet weather control alternatives, analyzed water quality data in receiving waters, and developed the detailed design of large-scale combined sewer overflow treatment facilities.

Session T6A
Topic: Collection System Issues
Minimizing Model Simulation Times by Selecting Representative Periods for Long-Term Simulation

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 eight 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

Session T6A
Paducah-McCracken Joint Sewer Agency
Sanitary Sewer Hydraulic Model Development and Calibration

Joe Henry, P.E.
GRW Engineers, Inc.
(859) 223-3999
jhenry@grwinc.com

EDUCATION
B.S., Civil Engineering, 1979, University of Kentucky
M.S., Civil Engineering, 1990, University of Kentucky

REGISTRATION
Professional Engineer - Civil, KY
Professional Engineer - Structural, KY
Professional Engineer, OH
Professional Engineer, TN

PROFESSIONAL AFFILIATIONS AND TRAINING
American Water Works Association

Water Environment Federation

EXPERIENCE

1980-1982	Project Engineer GRW Engineers, Inc. Lexington, KY
1982-1984	Project Engineer Texas Gas Transmission Corporation Owensboro, KY
1984-1987	Owner Henry Engineering and Construction Lexington, KY
1987-Present	Vice President GRW Engineers, Inc. Lexington, KY

Session T6A-3
Joe Henry

Adalyn Haney, E.I.T.
GRW Engineers, Inc.
(502) 489-8484
ahaney@grwinc.com

EDUCATION

Undergraduate
B.S. in Civil Engineering
University of Kentucky
Graduate
M.S. in Civil Engineering
University of Kentucky

CREDENTIALS

Engineer- in-Training, KY
LEED AP

EXPERIENCE

2007 – Present
Project Engineer
Sanitary Division
GRW Engineers, Inc.
Louisville, KY

PROFESSIONAL AFFILIATIONS

American Water Works Association
Kentucky Society of Professional Engineers

Session T6B
Title: Application of Multiple Technologies Reduces CSOs from Nashville's Boscobel CSO

David W. Bible, P.E.
ARCADIS U.S., Inc.
423.756.7193
David.bible@arcadis-us.com

CREDENTIALS
Registered Professional Engineer – Tennessee, Georgia
Member: Water Environment Federation
American Society of Civil Engineers

EXPERIENCE

September 2000 to present	Project Manager ARCADIS U.S, Inc. – Chattanooga, TN
1990 to August 2000	Project Manager Nashville Overflow Abatement Program Consoer Townsend Envirodyne Engineers, Inc. – Nashville, TN
January 1988 to 1990	Staff Engineer Consoer Townsend and Associates, Inc. – Nashville, TN

EDUCATION

Undergraduate
B. S. Civil Engineering
Tennessee Technological University

Session T6B-2
Mark Sneve

Mark Sneve, P.E.
Senior Associate

Strand Associates – Louisville
502-583-7020

Mark.sneve@strand.com

BS Civil Engineering – University of Iowa, 1987
MS Civil & Environmental Engineering – University of Iowa, 1987

Information you would like to include in an introduction:

Mark has worked for Strand Associates for 20 years where he currently manages wastewater projects and staff at several Strand offices. Mark is a licensed engineer in 6 states. Mark has presented over 20 papers at local and national wastewater conferences. Mark is the Assistant Project Manager for the Columbus City Utilities CSO Pumping and storage project.

Session T6C

Title: Cleaning Large Diameter Interceptors: Everybody Knows They Need To Do It, But Doesn't Want To Admit It

Christopher W. Pawlowski
AECOM
513-878-6864
christopher.pawlowski@aecom.com

CREDENTIALS

Registered Professional Engineer, Ohio

EXPERIENCE

8/2007 – Present	Technical Specialist AECOM Water
1/2006 – 8/2007	Project Engineer RD Zande (currently Stantec Consulting)
7/2001 – 6/2005	Postdoctoral Fellow US EPA

EDUCATION

Ph.D.	University of California, Berkeley
MS	University of Minnesota, Minneapolis
BME	University of Minnesota, Minneapolis

Session T6C

Title: Rehabilitating the Benefit Cost Model for Investing in Infrastructure Renewal

S. Wayne Miles, PE, BCEE
CDM
(919) 787-5620
milessw@cdm.com

Wayne Miles is a Vice President in the Raleigh office of CDM where he has been for 22 years. He is a registered professional engineer in North Carolina and Georgia, is Board Certified by the American Academy of Environmental Engineers, and has Bachelors and Masters Degrees in Environmental Engineering from the University of Florida. His expertise includes infrastructure planning and management, hydrologic and hydraulic modeling, financial analysis, and infrastructure rehabilitation design and construction.

Session T6C
Title: Grease (FOG) Program Developed by Application of CMOM Requirements

Hugh T. Garrison
Metro Water Services
(615) 862-4590
Hugh.Garrison@Nashville.gov

EXPERIENCE

12/07 – Present	Environmental Lab Manager Operations/Laboratory – Environmental Compliance Section Metro Water Services
7/96 – 12/07	Environmental Compliance Officer III Operations/Laboratory – Environmental Compliance Section Metro Water Services
6/95 – 6/96	Chemist IV Operations/Laboratory – Industrial Compliance Section Metro Water Services
10/85 – 6/95	Chemist III Operations/Laboratory – Industrial Compliance Section Metro Water Services
1/80 – 9/85	Chemist II Operations/Laboratory – Industrial Compliance Section Metro Water Services
9/79 – 1/80	Lab Technician 1 Air Pollution Control Metro Health Department

EDUCATION

Undergraduate
B. S. – Biology
Tennessee Technological University – Cookeville, TN

Session T6D-1
Kevin Enfinger

Session T6D
Tractive Force Design for Self-Cleansing of Sanitary Sewers
Evaluating Design Guidance Based on the Performance of Existing Sewers

Kevin L. Enfinger, P.E.
ADS Environmental Services
256.430.3366
256.508.4880 (cell)
kenfinger@idexcorp.com

CREDENTIALS

Registered Professional Engineer – AL, KY, NC, SC, TN, TX
Certified PACP Trainer

EXPERIENCE

2002 – Present	Senior Project Engineer ADS Environmental Services Huntsville, AL
2000 – 2002	Project Engineer ADS Environmental Services Murfreesboro, TN
1995 – 2000	Project Manager Marshall & Associates Clarksville, TN
1995 – 1995	Environmental Engineer Tecumseh Products Company Douglas, GA
1994 – 1995	Project Manager M&W Environmental, Inc. Clarksville, TN

EDUCATION

Undergraduate	B.S. Chemical Engineering University of Florida

Session T6D

Title: Evaluation of Four Parameters for Estimating RDI/I

George E. Kurz, P.E., DEE
Barge Waggoner Sumner & Cannon, Inc.
615-252-4441
George.Kurz@bwsc.net

CREDENTIALS

Registered Professional Engineer
Diplomate of the American Academy of Environmental Engineers
Certified Class IV Wastewater Plant Operator

EXPERIENCE

May 2006 – Present	Senior Technical Advisor Water Resources Group Barge Waggoner Sumner & Cannon
Sep 2001-May 2006	Senior Engineering Consultant Nashville Overflow Abatement Program Consoer Townsend Envirodyne Engineers
Jul 2000-Aug 2001	Director of Engineering ADS Environmental Services
Oct 1993-Jul 2000	Senior Project Engineer Nashville Overflow Abatement Program Consoer Townsend Engineers
Jan 1991-Oct 1993	Senior Engineer Nashville Overflow Abatement Program PSI Engineers
Feb 1978-Dec 1990	System Engineer Interceptor Sewer System City of Chattanooga
Sep 1976-Feb 1978	Environmental Engineer Tennessee Division of Water Pollution Control

EDUCATION

B.S. Civil Engineering – Environmental Engineering
Tennessee Tech University

Session T6D-3
John Loechle

JOHN D. LOECHLE, EIT

Louisville MSD
502-540-6209
loechle@msdlouky.org

WORK EXPERIENCE

1991 - Present **Metropolitan Sewer District**
Louisville, Kentucky

Mechanical Engineer I (1991-1996)
Mechanical / Electrical Group

Technical Services Engineer (1997 – 1999)
Engineering Design Department

Area Team Customer Specialist II (2000 – 2007)
Floyds Fork/North County/MFWTP Area Team

Area Team Leader (2007 – 2008)
Floyds Fork/North County/MFWTP Area Team

Regulatory Services Engineer (2008 – Present)
Project WIN Department

EDUCATION

1988 - 1994 **University of Louisville Speed Scientific School**
Louisville, Kentucky

Bachelor of Science: Mechanical Engineering
Master of Engineering: Mechanical Engineering

Session T6D-3
Vincent Bowlin

Session T6d

Title: Camp Taylor Sanitary Sewer Evaluation Study
Challenges and Opportunities

Vincent Bowlin, PE
Stantec Consulting Services, Inc.
502-212-5000
vince.bowlin@stantec.com

Education:

Purdue University, Majored in Civil Engineering

Registration:

Kentucky Licensed Professional Engineer

Work History:

2008 – Present	Project Manager Stantec Consulting Services, Inc. Louisville, KY
2006 – 2008	Executive Director Oldham County Sewer District Lagrange, KY
2005 – 2006	Project Manager Fuller, Mossbarger, Scott and May Louisville, KY
1980 – 2005	Chief Planning Engineer Louisville and Jefferson County Metropolitan Sewer District Louisville, KY

Session T7A

Title: Metro Water Services Private Fire Hydrant Program

Linda Green, Administrative Manager
Metro Water Services
615-862-4828
Linda.Green@nashville.gov

CREDENTIALS

Certified Class IV Wastewater Plant Operator
Certified Class IV Water Plant Operator

EXPERIENCE

1/2005 – Present	Administrative Manager System Service Division Metro Water Services
4/1997 – 1/2005	Treatment Plant Manager Operations Division Metro Water Services
4/1990 – 4/1997	Assistant Treatment Plant Manager Operations Division Metro Water Services

EDUCATION

Master of Science – Organization Management
Trevecca Nazarene University
Nashville, TN

Bachelor of Science – Biology
University of Tennessee
Knoxville, TN

Lyn Fontana
Nashville, Tennessee

Lyn was born and raised in Nashville, Tennessee. She attended St Cecilia Academy and Vanderbilt University where she received a bachelor of Enginering in Civil and Environmental Engineering.

Early in her career in 1986 , she worked with Tucker Hinson Associates in site planning and development design, performing traffic impact analyses. Her first experience with local government was in Gallatin, as City Engineer with the Public Works Department.

Lyn began with Metro Water Services in 1992 in the Overflow Abatement Program. She has provided project management, design, master planning and a wide range of computer and data usage coordination for the Department including GIS and Hansen Work Order system usage. Most recently, she teamed up on the Mobile Workforce Management project to take the System Services Division Work order system real time and in the field.

Session T7A-1
Lyn Fontana

Lyn Fontana
Nashville, Tennessee
Experience

March 2006 To Present	**Metro Water Services, Nashville, Tennessee** **Engineer II** System Services Workflow Manager Managing Water Distribution System Maintenance Managing Sewer Collection System Maintenance
August 1997 to April 1999 and December 1999 To March 2006	**Metro Water Services, Nashville, Tennessee** **Engineer II** Master Planning Unit Leader
April 1999 to December 1999	**Metro Water Services, Nashville, Tennessee** **Engineer II** Development Services Unit Leader
October 1996 August 1997	**Metro Water Services, Nashville, Tennessee** **Engineer I** Design Unit
July 1992 to August 1997	**Metro Water Services, Nashville, Tennessee** **Engineer I (Engineer in Training July, 1992 to August, 1994)** Project Manager - Overflow Abatement Program
January 1991 to July 1992	**City Of Gallatin, Gallatin, Tennessee** **Engineer in Training - City Engineer**
June 1986 to May 1988 and May 1988 to February 1990	**Kevin Tucker & Associates, Nashville , Tennessee** **Engineering Aide** **Tucker Hinson Associates, Nashville, Tennessee** **Engineer in Training - Junior Engineer**
Education	**Vanderbilt University, Nashville, Tennessee** **Bachelor of Engineering, May 1988** Major: Civil and Environmental Engineering Concentration: Transportation and Structural
Certifications	**Professional Engineer, State of Tennessee**

KY/TN Water Professionals Conference
Session T7A
"The Anatomy of a Chlorine Emergency"

Biography for: Alice L. Cannella, P.E.
City of Chattanooga, Tennessee

Current Position: Plant Superintendent of Moccasin Bend Wastewater Treatment Plant, Chattanooga, Tennessee.

Also serves as Chattanooga's Environmental Management System (EMS) Coordinator for the National Biosolids Partnership biosolids beneficial reuse program.

Previous Positions: Ms. Cannella has concentrated in the field of environmental engineering throughout her career, specifically in the area of water pollution, wastewater collection and wastewater treatment. She has held the following previous positions:

- City of Chattanooga System Engineer
- Hamilton County Government Director of Engineering Development
- Tennessee Valley Authority Research Analyst

Education: Ms. Cannella graduated from Tennessee Technological University in 1978 with a bachelor's degree in Civil Engineering. She is currently pursuing a Master's Degree in Engineering Management at the University of Tennessee at Chattanooga.

Credentials: Registered Professional Engineer
Certified Grade IV Wastewater Plant Operator
Certified Grade II Collection System Operator

Session T7A

Title: "How a Legal Loophole Could Change the Chemical Makeup of Your Utility"

(co-presenter with David Billings; Frankfort Electric and Water Board)

David L Haas, PE
Jordan, Jones and Goulding, Inc., A Jacobs Engineering Group company

770.455.8555
David.Haas@jjg.com

CREDENTIALS
Registered Professional Engineer in KY, TN, GA
Member, AWWA Water Treatment Facilities Design & Construction Committee

EXPERIENCE

Mr. Haas joined JJG in 1985 and has 25 years of experience in process engineering and project management with emphasis on water treatment. He has served as project manager or technical lead on many new water treatment designs, plant expansions, and renovations to existing plants. Currently, David is serving as JJG's Water Treatment Practice Leader. David served as the Technical Advisor on Frankfort Electric and Water Plant Board's chemical feed upgrades project that included the conversion to on-site generation of sodium hypochlorite to replace chlorine gas.

EDUCATION
Undergraduate - B. S. - University of Louisville
Graduate - Environmental Engineering - University of Louisville

Session T7A

Title: How a Legal Loophole Could Change the Chemical Makeup of Your Utility

Sharmista Dutta
Frankfort Electric & Water Plant Board
502 352 4407
sdutta@fewpb.com

CREDENTIALS

Engineer – in – Training

EXPERIENCE

01/2007 – Present	Water Engineer Water Engineering Department Frankfort Electric & Water Plant Board
6/2002 – 8/2004	Environmental Project Manager Division of Environmental Analysis Kentucky Transportation Cabinet
2/2000 – 5/2002	Environmental Technologist Division for Air Quality Kentucky Environmental Protection Cabinet

EDUCATION

B.S. Biology
University of Kentucky – May 1999

B.S. Civil Engineering
University of Kentucky – December 2006

Session T7B-2
Abby Trotter

CSO Public Participation Plan

Presenters are: *Sonia Harvat, Metro Water Services*
Paul Stonecipher, AECOM
Abby Trotter, Hall Strategies

Sonia Harvat, Public Information Officer
Metro Water Services
Nashville, Tennessee
615-862-4494
Sonia.harvat@nashville.gov

Ms. Harvat, a Nashville, Tennessee native, is the Public Information Officer (PIO) for the Department of Water and Sewerage Services, a department of the Metropolitan Government of Nashville and Davidson County. She received a degree in Biology from the University of Tennessee in Knoxville. Prior to becoming PIO for Metro Water Services (MWS), she was an Environmental Compliance Officer in the Stormwater Division. Ms. Harvat works closely with the media to keep the public informed about routine and emergency situations that affect consumers. As part of outreach and education, she prepares and presents programs in schools and coordinates tours of the utility's facilities. She updates the department's website where information is available about ways members of the community can learn where their water comes from and how to conserve and use it wisely. She also coordinates the department's involvement in local events such as the Music City Marathon, the Nashville Lawn and Garden Show, and Earth Day.

Paul A. Stonecipher, P.E.
AECOM
615-313-0365
paul.stonecipher@aecom.com

Mr. Stonecipher is an AECOM national practice leader for sewer collection system rehabilitation and focuses currently on wastewater projects management. He is a graduate of Tennessee Technological University practicing engineering in the water field for over 36 years. He has served as Program Manager for the Nashville Overflow/bypass Abatement Program in the past decade. He is responsible for the management of municipal wastewater projects from inception to construction, overseeing the planning, design and construction of projects by engineering staff and sub-consultants. His responsibilities included identifying and preparing initial project scopes, insuring technical compliance with acceptable standards, reviewing progress from technical, financial and schedule standpoints, goal assessment, budget preparation, manpower assignments, coordination of multiple concurrent projects, project communication efforts and engineering personnel management. Paul has prepared and presented studies pertaining to sewer rehabilitation at state and national conferences and has published articles in national trade magazines. He current directs the preparation of the CSS Long Term Control Plan for Metro Nashville for his firm and several major treatment improvements projects.

Abby Trotter, Partner
Hall Strategies
615-242-8856
abby@hallstrategies.com

Abby Trotter joined Hall Strategies as a partner in 2004 after 10 years as a principal and partner at The Ingram Group. She specializes in issues campaigns, high-impact public events and media relations.

Her client experience includes the Tennessee Economic Partnership, a premier economic organization that works closely with the State of Tennessee to attract new business expansion and relocation. She has managed multiple grassroots campaigns, specifically on public health issues including Cover the Uninsured Week for the Robert Wood Johnson Foundation and the campaign that successfully brought Tennessee's first smoke-free workplace legislation.

She has worked with former Nashville Mayor Bill Purcell and current Mayor Karl Dean to build and sustain the Mayor's First Day Festival, a national model for community education celebration.

Currently, she is a subcontractor to Metro Water Services for the Combined Sewer Overflows Long Term Control Plan working on the public participation component of the plan.

A native of Oak Ridge, she is an executive board member of the Nashville Zoo.

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 more than 18 years of experience in marketing communications and public relations for both private and public employers.

A member of AWWA's Public Information committee for the Kentucky-Tennessee section, Thomas serves on the board of directors for both Utility Communicators International (UCI) and the National Association of Government Communicators (NAGC). He also serves on communications committees for the American Public Power Association (APPA) and the Tennessee Valley Public Power Association (TVPPA).

Session M6B
Title: Developing Nashville's Nine Minimum Controls Plan

Paul A. Stonecipher, P.E.
AECOM
615-313-0365
paul.stonecipher@aecom.com

BIOGRAPHY

Mr. Stonecipher is an AECOM national practice leader for sewer collection system rehabilitation and focuses currently on wastewater projects management. He is a graduate of Tennessee Technological University practicing engineering in the water field for over 36 years. He has served as Program Manager for the Nashville Overflow/bypass Abatement Program in the past decade. He is responsible for the management of municipal wastewater projects from inception to construction, overseeing the planning, design and construction of projects by engineering staff and sub-consultants. His responsibilities included identifying and preparing initial project scopes, insuring technical compliance with acceptable standards, reviewing progress from technical, financial and schedule standpoints, goal assessment, budget preparation, manpower assignments, coordination of multiple concurrent projects, project communication efforts and engineering personnel management. Paul has prepared and presented studies pertaining to sewer rehabilitation at state and national conferences and has published articles in national trade magazines. He currently directs the preparation of the CSS Long Term Control Plan for Metro Nashville for his firm and several major treatment improvements projects.

CREDENTIALS

Registered Professional Engineer in Tennessee

EMPLOYMENT HISTORY

1974 – Present	Associate Vice President AECOM, USA Inc. (previously Metcalf & Eddy merged with Consoer Townsend)

EDUCATION

B. S. - Civil Engineering
Tennessee Technological
University

Session T7C-1
Emily Fritz

Date: Tuesday, July 20
Room: 209
Session: T7C
Time: 1:30 p.m.
Topic: Drinking Water Quality
Title: Protecting Our Future: Partnering with Schools to Implement Critical Water Quality Programs

Emily Fritz
Louisville Water Company
502-569-3600 x 2419
efritz@lwcky.com

Emily Fritz has been an employee of Louisville Water Company for 9 years and currently holds a position as Water Quality Analyst II. She has maintained analytical certification in the heavy metals laboratory for the last 5 years along with serving as the primary coordinator for LWC's School Lead Monitoring Program. Emily received her Bachelor of Science degree in Biology from the University of Louisville (2001).

Session T7C-2
Brent Fulghum

Session T7C
Title: Ceramic or Polymeric Membranes:
What is Your Application?

Brent L. Fulghum, P.E.
Jacobs – JJG, Nashville
615.254.6002
Brent.fulghum@jjg.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

5/05 – Present   Water/Wastewater Process Engineer
Jacobs – JJG

Over the past 5 years, Brent has been a project engineer on many projects involving the design, construction and evaluation of water treatment plant processes. He is currently the lead engineer for a 28-MGD retrofit utilizing membrane filtration technology at the Clarksville WTP in Clarksville, Tennessee.

EDUCATION

B.S. Civil Engineering
Georgia Institute of Technology

B.S. Biology
University of Tennessee at Chattanooga

Session T7C-3
Alexander Leff

Alexander Leff
Managing Partner
Sher Leff, LLP
450 Mission Street, Suite 400
San Francisco, CA 94105
http://www.sherleff.com
Office: (415) 348-8300
Cell: (415) 531-3659
aleff@sherleff.com

Biography

Alexander Leff is the Managing Partner of the law firm, Sher Leff, LLP. Sher Leff is dedicated exclusively to the representation of water suppliers in cases involving water contamination. Sher Leff is a pioneer in using the courts to pressure polluters to reimburse water suppliers for the cost of water treatment. Since it was founded seven years ago, Sher Leff has obtained over $400 million of settlements and judgments for its water supplier clients. In 2009 Sher Leff won a $104.7 million jury verdict for the City of New York against ExxonMobil in a case involving five wells contaminated by MTBE. Sher Leff represents water suppliers across the county as well as several states. Sher Leff also specializes in the representation of rural water suppliers impacted by emerging agricultural contaminants such as TCP and fertilizer-based perchlorate.

Alexander Leff graduated Phi Beta Kappa in 1979 from Stanford University where he earned degrees in both Economics and Human Biology. He received his J.D. degree from Yale Law School in 1983 and is a member of the State Bar of California. After graduating from law school, Mr. Leff joined McKinsey & Company, an international management consulting firm, where he advised Fortune 500 companies on issues of corporate strategy. Mr. Leff co-founded the law firm of Sher Leff LLP in 2003 in order to apply his experience in law and strategy to the resolution of the difficult infrastructure challenges facing the nation's water suppliers.

Session T7D

Title: The Use of UV/Peroxide For Taste and Odor Treatment

Rob Haas, P.E., PMP
Trojan Technologies
519-457-3400
rhaas@trojanuv.com

Credentials:

Registered Professional Engineer, Province of Ontario
Registered Project Management Professional (PMP)

Experience:

2007 to Present	Sales Manager, Environmental Contaminant Treatment Division Trojan Technologies
1997 to 2007	Senior Project Manager Trojan Technologies
1993 to 1997	Project Engineer General Motors of Canada Ltd. (now General Dynamics)
1992 to 1993	Manufacturing Engineer Northern Telecom Canada Ltd.

Education:

Bachelor of Engineering Science: Mechanical Engineering
University of Western Ontario, Canada

Joel Neulight Bio

Joel Neulight is the northeast regional sales manager for Severn Trent Services. In this role, he is responsible for the sales of all disinfection, instrumentation, engineered products and packaged membrane systems and will work with consulting engineers, contractors and the company's manufacturer's representatives and distributors throughout the northeast region. Neulight also serves as the Director at Large for American Water Works Association.

Prior to joining Severn Trent Services, Neulight was employed by Calgon Carbon Corporation, a global provider of water purification technologies. Most recently, he served as the company's municipal sales manager. Neulight earned a bachelors degree in chemical engineering from Drexel Institute of Technology and an MBA from Temple University.

Comparison of On-line Chlorine Analysis Methods and Reagent Discharge implications"

Terry L. Engelhardt
Application Sales Engineer
Hach Homeland Security Technologies
tengelha@hach.com
800-227-4224, ext. 2327
FAX 970-619-5726

Terry Engelhardt currently serves in a dual role at Hach company as a Application Development Manager for Drinking Water and as an application sales engineer with Hach Homeland Security Technologies. Mr. Engelhardt has an MS degree in Natural Science – Chemistry and Physics. He joined Hach Company in 1983. Prior to joining Hach, Mr. Engelhardt had extensive experience in water treatment including water distribution mechanic, water plant operator, water treatment superintendent and water/wastewater operator instructor at a vocational school. He s a member of AWWA, ASTM, WEF and AFS.

Session T8A-1
Robert Borneman

Session T8A

Title: Selecting a Sustainable and Beneficial Reuse Biosolids Processing System – The DeKalb Experience

Robert C. Borneman, P.E. BCEE
ARCADIS, Inc.
423-756-7193

CREDENTIALS

Registered Professional Engineer
Board Certified Environmental Engineer

EXPERIENCE

During his 25 year carrier he has been the project manager and lead designer of over 40 water and wastewater facilities in the southern US, Mexico and China.

Mr. Borneman's project work has allowed him to be part of several innovative and leading edge initiatives including;

- EPA Region IV best large water plant design in 1997.
- The fist municipal SBR treatment facility to meet the Florida 5/5/3/1 BNR treatment limits
- The first closed cycle water treatment facility in EPA Region IV
- First membrane water treatment facility in Alabama
- First permitted receiving wetland facility in NW Florida
- First no discharge industrial treatment facility in Mexico to receive a Presidential (Mexico) award for outstanding environmental protection.
- Five USEPA innovative project grant awards for using new and energy efficient project designs.

Mr. Borneman joined ARCADIS in 2002 in its' Chattanooga office to serve as the Mid-South area Business Practice Manager for Water Resources Operations. The Mid-South design center in Chattanooga services operations in Tennessee, North Georgia, Alabama, Mississippi and portions of Kentucky.

Today Mr. Borneman is an associate vice president for ARCAIS and continues to serve as area wide Water Resources Manager as well as senior process design engineer.

EDUCATION

Undergraduate
B. S. Civil Engineering
University of South Alabama
Graduate
Environmental Engineering, sanitary
Auburn University

Session T8A-2
Thomas Wynn

Name: Thomas W. Wynn, P.E.

Title: Senior Process Engineer

Company: Jordan, Jones & Goulding, Inc., A Jacobs Engineering Group Company

Title: How Do You Like Your Eggs? - Alternative Design Concepts For Egg-Shaped Digesters

Thomas Wynn graduated from Louisiana Tech University in 1982 with a BSCE. He is currently a senior process engineer with Jacobs-JJG in Atlanta, Georgia. Over the past 20 years, he has been a project engineer on many projects involving the design, construction and rehabilitation of digesters, both aerobic and anaerobic. He was the area design manager for the Phase 2 Expansion of the F.W. Hill Water Resources Center and the ongoing Solids Handling Improvements at the Yellow River Water Reclamation Facility in Gwinnett County, Georgia.

Session T8A-3
Steven Reese

Session T8A

Title: Dewatering Technology: Traditional Versus New

Steven C. Reese, P.E.
Hazen and Sawyer, P.S.C.
513-469-2750
sreese@hazenandsawyer.com

CREDENTIALS

Registered Professional Engineer

EXPERIENCE

2005 – Present	Principal Engineer WWTP Design & Consulting Hazen and Sawyer, P.S.C.
2003 – 2005	USEPA Trainee Research Traineeship USEPA and University of Cincinnati
2000 – 2003	Cooperative Education Student Environmental Health & Safety General Electric
1999 – 2000	Cooperative Education Student Environmental Consulting Malcolm Pirnie

EDUCATION

Undergraduate
B. S. Civil Engineering
University of Cincinnati

Graduate
M. S. Environmental Engineering
University of Cincinnati

Session T8B
Title: Water for People Overview

Stephen H. King, P.E., BCEE
CDM
(865) 425-5405
kingsh@cdm.com

CREDENTIALS

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

EXPERIENCE - 26 Years

9/03 – Present	Principal/Senior Project Manager CDM- Oak Ridge
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

Session T8B-2
Kimberly Martin

Session T8B
Topic: Special Topics
Engineers Without Borders – Nashville: From Chapter Creation to Project Design

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

Ms. Martin is a founding member, a former president, and the current project lead of the Nashville Professionals Chapter of Engineers Without Borders. When she's not volunteering her engineering skills with EWB, she works on sanitary sewer and combined sewer system hydraulic modeling, rehabilitation, and design for CDM, where she's been employed for the last eight years, beginning in Baton Rouge before transferring to Nashville in 2007.

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

Session T8C-1
Jan Pickrel

Jan Marie Pickrel
U.S. Environmental Protection Agency
Office of Water/Office of Wastewater Management
Water Permits Division
1200 Pennsylvania Avenue, NW
Mail Code 4203M
Washington, DC 20460
(202) 564-7904
Pickrel.jan@epa.gov

Jan Pickrel is EPA's National Pretreatment Program Coordinator in the Water Permits Division of the Office of Wastewater Management (OWM) as well as the OWM Climate Change Coordinator. She coordinates the implementation issues regarding industrial wastewater permits and the development of technology-based effluent guidelines and categorical standards with EPA's Office of Science and Technology and other EPA offices. She has taught over 30 intensive courses on the pretreatment program across the nation with the Water Environment Federation and spoken at many other various venues on the development and implementation of pretreatment programs and the regulation of industrial wastewater discharges.

Prior to coming to EPA in 1997, Jan worked for 13 years in Virginia Department of Environmental Quality's Northern Virginia Regional Office, where she served as the Pretreatment Coordinator and Senior Environmental Engineer with the region's VPDES Program. During her tenure at VDEQ, she also served as the Chief Regional Geologist and has extensive experience in land application of biosolids, ground water and surface water investigations, and oil spill remediation efforts.

Ms. Pickrel received her B.S. in Geology from the College of William & Mary and a Masters of Engineering Administration from George Washington University.

Ms. Yatasha Moore received her Bachelors degree in Chemical Engineering from Vanderbilt University, Nashville, Tennessee in 2004. While at Vanderbilt, she participated in research on foam fractionation. Upon completion of her degree, Ms. Moore participated in an internship with Advanced Environmental Consultants in Jackson, Mississippi and worked for over a year as an environmental consultant for Conestoga-Rovers & Associates. Since, July 2006, Ms. Moore has worked for the Tennessee Division of Water Pollution Control, Pretreatment Program.

Chuck Durham bio:

Chuck Durham is an Associate Director and Project Manager for Tetra Tech, Inc., with over 20 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.

BIOGRAPHY OF LARRY W. MOORE, PH.D., P.E.

Dr. Moore received his B.S. in Civil Engineering from the University of South Alabama in 1973 and his M.S. and Ph.D. in Environmental Engineering from Mississippi State University in 1974 and 1983, respectively. He worked with the Mississippi Bureau of Pollution Control from 1974 to 1978, writing NPDES permits for industries. During the last 25 years, Dr. Moore has taught undergraduate and graduate environmental engineering courses at the University of Memphis. He has helped to solve wastewater problems at about 200 Tennessee industries and municipalities in the last 27 years.

Jeffrey Uhler is currently employed as the Industrial Pretreatment Coordinator for the City of Portland in Tennessee. He has been in the environmental field for 22 years. Past employers include the City of Cape Canaveral and the City of West Palm Beach in Florida. He has completed the highest level of certification for Industrial Pretreatment and is a state certified wastewater treatment operator in both Florida and Tennessee.

Session T8D-3
Kandyce Groves

Bio for Kandyce Groves to present Implementation of MSDs FOG Program Presentation at the 2010 Water Professionals Conference Tuesday, July 20th

Kandyce has been an employee of the Louisville and Jefferson County Metropolitan Sewer District since January 1995. She earned a Bachelor of Science Degree from Western Kentucky University in 1990 and started her environmental science career with the Louisville and Jefferson County Board of Health in 1991. As an employee with the Board of Health she worked in the rodent control program, food services and hazardous materials team. Her experience guided her to further her career with the Metropolitan Sewer Districts Industrial Waste Department. Since her employment with the Metropolitan Sewer District, she has been tasked with taking the lead on working with food service establishments and working with the customer base to help reduce and eliminate grease blockages. She has additional experiences on writing industrial wastewater permits and responding to hazardous material releases in the county. However, due to the most recent requirements made by the Federal EPA and consent decree, she has been focusing on the implementation of the newly enhance Fats, Oils and Grease Program.

Real World Experiences in Reducing Real Water Losses through Automated Leak Detection Systems

There are two major sources of non-revenue water: real and apparent losses. While apparent losses consist of customer use that is not recorded due to metering error, incorrect assumptions of unmeasured use, or unauthorized consumption, real losses involve the physical escape of water from the distribution system prior to the point of end use.

Real losses require a utility to provide more water than is actually required by the end user, which wastes both energy and chemicals. Scarce capital funds may be allocated to constructing additional production facilities that might be unnecessary. Leaks may damage buried infrastructure and possibly pollute an aquifer. Leaks often infiltrate into the sanitary sewer system, which is expensive, inefficient, and may create treatment plant capacity issues. High levels of real losses may force a utility to implement unpopular conservation programs and place limitations on future growth. Negative pressure transients allow for backsiphonage of contaminants into the distribution system through leaks.

Leakage at the service branch takeoff from the distribution line accounts for approximately 80% of real losses, whereas leaks and breaks on the distribution line account for the remaining 20% of real losses. Thus, finding and repairing leaks is critical to reducing real water loss. Acoustic leak detection has been available for well over a hundred years. After World War II, some utilities began taking either aerial or infrared photographs of service lines since the area around a leak may have increased vegetation and produce a different thermal image. Most of these methods are used annually—if ever, which prevents leaks from being discovered quickly.

Automated leak detection systems provide an inexpensive and timely method of finding leaks and breaks. Water leaking from a pipe produces a vibration, and a leak detection sensor mounted on a service line upstream of a water meter can monitor these vibrations during the early morning hours when customer usage is minimal and system pressure is at a maximum. The data is recorded daily and is then transmitted via radio signal for engineering analysis. If the data indicates a probable or possible leak, the source of the leak can be found using digital correlating devices and digital leak detectors. Through performance contracting projects, Johnson Controls has installed automated leak detection systems throughout the entire service areas of at least nine utilities in seven states. This presentation will provide a summary report on the performance of these systems since installation and a review of lessons learned.

Craig Hannah, PE
Johnson Controls, Inc.
1603 Loop 289 West
Lubbock, TX 79416
(806) 795-8800 x 239 {Office}
(806) 632-0063 {Cell}
(806) 795-0323 {Fax}
craig.c.hannah@jci.com

Name John L. Willis PE, BCEE
Title Vice President, SE Region Wastewater Practice Leader

Firm Brown and Caldwell

BC Contact *For additional information and coordination of conference attendance/activities, please contact:*
Donna Corlew, SE Regional Marketing Manager

Email dcorlew@brwncald.com **Phone** 615-250-1270

Session Title Got Gas? Making the Most out of Digester-Gas-Fueled Combined Heat and Power (CHP)

Session Abstract Brown and Caldwell is nearing completion of a "Digester-Gas-Fueled CHP Technology Evaluation" for the USEPA, set for publication in the summer of 2010. This effort provides guidance to wastewater utility staff, management, and engineering on appropriate technology selections and other considerations for effective production of electricity and heat from digester gas. Guidance is also provided on configuring CHP for highest overall efficiencies and options for gas treatment and storage. The following technologies are considered:

- Various Reciprocating Engines including New, High-efficiency, Low-emissions Models
- Combustion Turbines
- Mircroturbines
- Fuel Cells
- Boilers/Steam Turbines

The project also presents case studies from a number of full-scale operations using a new CHP Data Sheet, summarizing the performance of each installation. This Data Sheet was developed with funding and guidance from the Water Environment Research Foundation (WERF project number U2R08) and normalizes electrical and thermal system efficiencies by including consideration of significant surrogate loads such as fuel compression and air-cooled dissipation of excess heat.

This paper will provide an overview of the guidance document and some of the associated decision-assistance tools. One CHP Data Sheet and the associated case study will be reviewed.

WWTP Plant Optimization to Maximize Rate of Return for Combined Heat and Power System

[1]Scott A. Hardy, PE, [2]Srinivas Jalla, PE, [3]C. Michael Bullard, PE, and [1]Ron Latimer, PE

[1] Hazen and Sawyer, PC
5775 Peachtree Dunwoody Rd.
Suite D-520
Atlanta, GA 30342
PH: 404-459-6363

[2] Gwinnett County Department of
Water Resources
684 Winder Highway
Lawrenceville, GA 30045
PH: 678-376-6700

[3] Hazen and Sawyer, PC
4011 Westchase Blvd.
Suite 500
Raleigh, NC 27607
PH: 919-833-7152

The F. Wayne Hill Water Resources Center (FWHWRC) is Gwinnett County, Georgia's advanced wastewater treatment facility that has a design capacity of 60 million gallons per day (mgd) and is currently operating at an average flow of 30 mgd. The facility has primary clarification followed by biological nutrient removal (BNR) activated sludge process. Primary sludge and waste activated sludge are digested in five 1-million gallon egg-shaped anaerobic digesters. Gwinnett County received ARRA funding for a design/build project to utilize digester gas in an engine-generator to produce electricity and heat to offset purchased power and for digester heating.

This paper and presentation is a case-study of optimizing the F. Wayne Hill WRC for the production of digester gas to be used for power generation and heat recovery to maximize cost saving and minimize green house gas emissions. The optimization process includes:

- Primary clarifier performance to increase primary sludge flow to digester and decrease loading on biological process consisting of CFD modeling, special sampling and stress testing.
- Evaluation of co-thickening of primary and waste activated sludge to increase digester capacity
- Digester capacity analysis and design of a fats, oil and grease (FOG) or high strength waste receiving facility to the anaerobic digesters
- Engine-generator sizing and selection process taking into account current and future digester gas flows
- Life cycle cost with selected engine generator at various digester gas flows
- Comparison of peak cycling versus continuous duty operation of engine generator to maximize cost savings
- Gas sampling results from 6 months of digester gas sampling for micro-constituents and hydrogen sulfide and how results are used for selection of gas treatment systems
- Gas treatment technologies and selection criteria
- Heat recovery system integration into existing digester heating system
- Overall system efficiency and impact of gas compression system and other parasitic loads

Technical In's and Out's of Implementing the Gas-to-Energy Project at the F. Wayne Hill Water Resources Center

[1]Scott A. Hardy, PE, [2]Srinivas Jalla, PE, [3]C. Michael Bullard, PE, and [1]Nubea Lima, PE

[1] Hazen and Sawyer, PC
5775 Peachtree Dunwoody Rd.
Suite D-520
Atlanta, GA 30342
PH: 404-459-6363

[2] Gwinnett County Department of Water Resources
684 Winder Highway
Lawrenceville, GA 30045
PH: 678-376-6700

[3] Hazen and Sawyer, PC
4011 Westchase Blvd.
Suite 500
Raleigh, NC 27607
PH: 919-833-7152

The F. Wayne Hill Water Resources Center (FWHWRC) is Gwinnett County, Georgia's advanced wastewater treatment facility that has a design capacity of 60 million gallons per day (mgd) and is currently operating at an average flow of 30 mgd. The facility has primary clarification followed by biological nutrient removal (BNR) activated sludge process. Primary sludge and waste activated sludge are digested in five 1-million gallon egg-shaped anaerobic digesters. Gwinnett County received ARRA funding for a design/build project to utilize digester gas in an engine-generator to produce electricity and heat to offset purchased power and for digester heating.

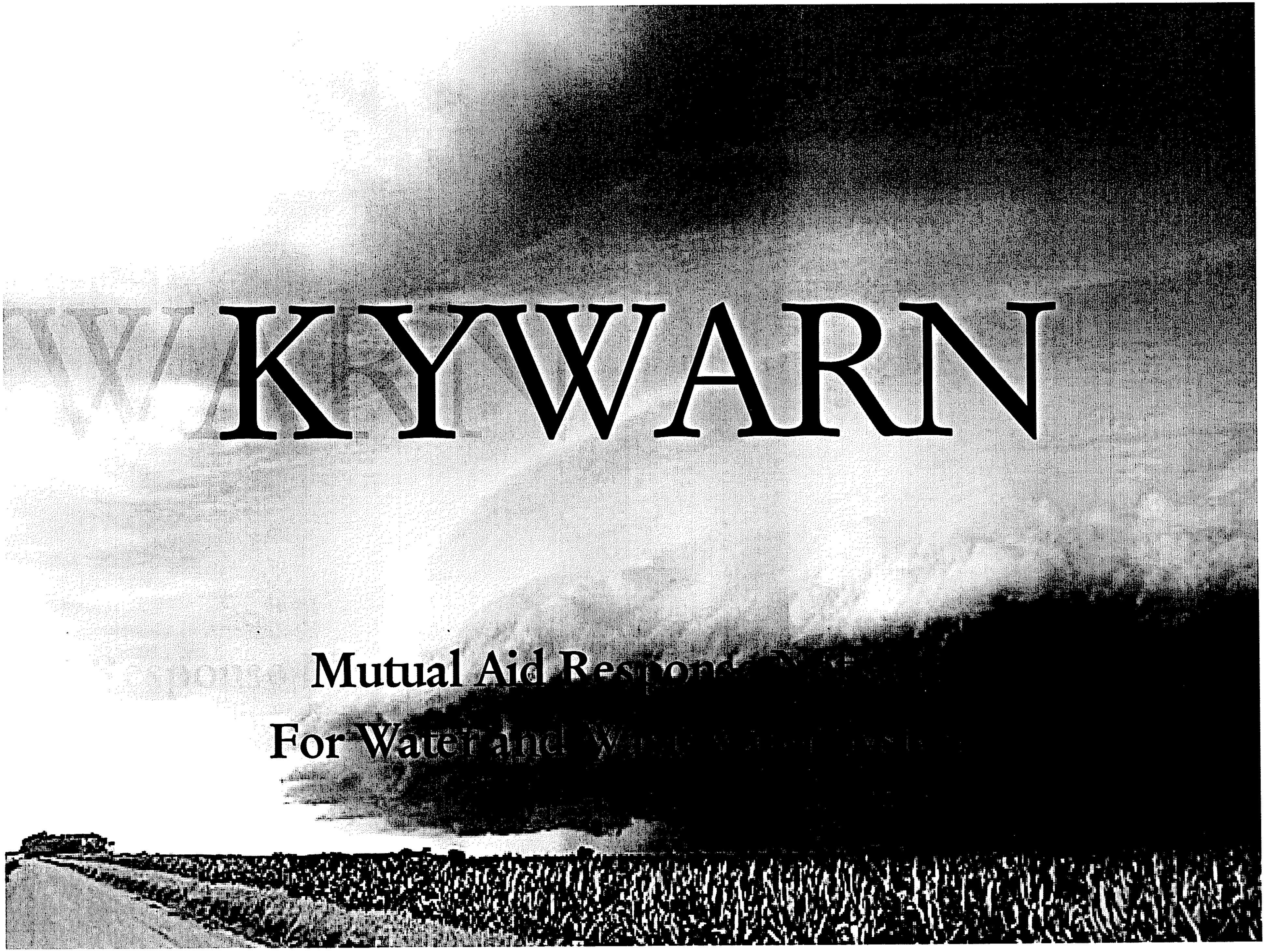
This paper and presentation will cover the following topics specific to the F. Wayne Hill WRC Gas-To-Energy Project:

- Engine-generator sizing and selection process taking into account current and future digester gas flows, including a future fats, oil, grease (FOG) stream into the anaerobic digesters
- Life cycle cost with selected engine generator at various digester gas flows
- Comparison of peak cycling versus continuous duty operation of engine generator
- Gas sampling results from 6 months of digester gas sampling for micro-constituents and hydrogen sulfide and how results are used for selection of gas treatment systems
- Gas treatment technologies and selection criteria
- Heat recovery system integration into existing digester heating system
- Engine generator integration into plant's existing power distribution system
- Overall system efficiency and impact of gas compression system and other parasitic loads
- Greenhouse gas reduction benefits
- Flexibility of the Design/Build delivery system to provide CHP system that meets county's available project funding
- Details on the ARRA funding mechanism for this project

Regulatory Updates for Kentucky and Tennessee

Sessions M1A-1, M1A-2, M2A-1, M2A-2

Julie Roney will present updated regulatory information for both water and wastewater for the State of Kentucky. Tom Moss will present updated regulatory information for water for the State of Tennessee. Saya Qualls will present updated regulatory information for wastewater for the State of Tennessee. The information will generally cover proposed and impending changes to the regulatory framework for both states, and will assist managers, operators, and engineers with preparation for the future of the water and wastewater industries.


KYWARN
Mutual Aid
For

Groups Represented at Chattanooga

- American Water Works Association
- National Rural Water Association
- Water Environment Federation
- Water and Wastewater Utilities
- Association of State Drinking Water Administrators
- State Environmental Protection Departments
- Local Emergency Management Agencies
- Kentucky League of Cities

Who and What is a WARN

- Water/Wastewater Agency Response Network
- Simply an Agreement between two Utilities
- Statewide Resources from all other Utilities
- United by a Common Enemy
  - Natural Disasters
  - Manmade Disasters
- Utilities Organized within a State
  - Private
  - Public

What a WARN is Not

- Not a Corporation
- Not Federal Government (FEMA)
- Not State Government
- Not Connected to any Funding Source
- Not Required for any Utility to Participate in

Article I - Purpose

- Recognizing that emergencies may require assistance in the form of personnel, equipment and supplies from outside the area of impact, the signatory utilities have established an intrastate program for mutual aid and assistance. Through the mutual aid and assistance program, members may coordinate response activities and share resources during emergencies. This agreement sets forth the procedures and standards for the administration of the KYWARN Intrastate Mutual Aid and Assistance Program.

ARTICLE II.
DEFINITIONS

- A. **Emergency**— A natural or manmade event that is, or is likely to be, beyond the control of the services, personnel, equipment, and facilities of one or more Mutual Aid and Assistance Program member.
- B. **Member**— Any public or private water or wastewater utility that manifests intent to participate in the Mutual Aid and Assistance Program by executing this agreement.
- C. **Authorized Official**— An employee of a member who is authorized by the member's governing board or management to request assistance or offer assistance under this Agreement.
- D. **Requesting Member**— A member who requests assistance under the Mutual Aid and Assistance Program.

Definitions

- E. **Responding Member**— A member that responds to a request for assistance under the Mutual Aid and Assistance Program.

- F. **Period of Assistance**— A specified period of time when a responding member assists a requesting Member. The period commences when personnel, equipment, or supplies depart from a responding member's facility and ends when the resources return to their facility (portal to portal). All protections identified in the agreement apply during this period. The specified period of assistance may occur during response to or recovery from an emergency, as previously defined.

- G. **National Incident Management System (NIMS)**— A national, standardized approach to incident management and response that sets uniform processes and procedures for emergency

Article III
Administration

- The Mutual Aid and Assistance Program shall be administered through a statewide committee. Under the leadership of the Chair, the statewide committee members shall plan and coordinate emergency planning and response activities for the Mutual Aid and Assistance Program.

Notes on Article III

- Committee to be from all parts of the State
- Statewide not Regions

Article IV
Procedures

- In coordination with emergency management and the public health system of the state, the statewide committee shall develop operational and planning procedures for the Mutual Aid and Assistance Program. These procedures shall be updated at least annually

Notes on Article IV

- Allows development of additional procedures
- May include Program Manual and/or Handbook
- State Committee has responsibility to develop and update

Article V
Request for Assistance

- Members Responsibilities
  - Select Authorized Official with contact information
  - Assistance Request may be oral or written
  - Followed up with written soon

- Response to a Request for Assistance
  - Determine if Resources are Available
  - Respond to the Requesting Member as soon as possible

Article V Continued

- Discretion of Responding Member
  - Execution of this agreement does not create any duty to respond to a request for assistance. When a member receives a request for assistance, the authorized official shall have absolute discretion as to the availability of resources. An authorized member's decisions on the availability of resources shall be final.

Article VI
Responding Member Personnel

- National Incident Management System
  - When the situation dictates

- Control
  - You are in charge of your own people
  - Requesting Member coordinates activities

- Food and Shelter
  - Requesting Member to provide or reimburse costs
  - Prepare to be self sufficient for up to 72 hours

Article VI

- Communication
  - Requesting Member to Provide
- Status
  - Responding Members retain same rights as at home
- License and Permits
  - Most likely not an issue Intrastate
- Right to Withdraw
  - May withdraw any or all of Resources at any time

Article VII
Cost Reimbursement

- Personnel
  - Responding Supervisor must keep accurate records
  - All costs, salaries, hourly wage fringe and indirect

- Equipment
  - FEMA rates to be used as a minimum
  - If rate differs from FEMA Members must agree in writing prior to dispatch

Article VII

- Materials and Supplies
  - Actual costs or replacement plus handling

- Payment Period
  - Itemized bill sent within 90 days
  - Bill to be paid within 45 days
  - Late payment interest

Article VIII
Disputes

- Negotiations between Utilities
- Mediation by third party
- Arbitration under American Arbitration rules

Article IX
Requesting Member's Duty to Indemnify

- Each party shall be responsible for its own actions as with its day to day operation

- Each party determines type and amount of insurance

Article X
Signatory Indemnification

- Members providing or receiving assistance agree to indemnify other members from any claim

- A member utility cannot be sued for simply signing the Agreement.

Article XI
Workers Compensation Claims

The Responding Member is responsible for providing worker's compensation benefits and administering worker's compensation for its employees.

Article XII
Notice

- Notice required to members of any suit or claim

- Each member may provide its own defense

Article XIII
Insurance

- Each member of the Agreement must carry their own insurance

Article XIV
Effective Date

- Agreement must be executed by the utility's authorized representative

- The Statewide Committee Chair receives it

Article XV
Withdrawal

- Withdrawal complete 60 days after notification to the Statewide Committee Chair

Article XVI
Modification

- Modification by majority vote of Members

Article XVII
Prior Agreements

- This Agreement supersedes all prior Agreements between Members to the extent that such prior Agreements are inconsistent with this Agreement

Article XVIII
Prohibition of Third Party Rights

- No third party beneficiaries

- No assignment of benefits

- No delegation of duties

Article XIX
Intrastate and Interstate Programs

- Coordination with statewide mutual aid program

- Allows participation in an interstate water and wastewater mutual aid program

What's in it for Me?

- No cost to participate
- Increased planning and coordination
- Enhances access to specialized resources
- Single Agreement provides access statewide
- Avoids federal bureaucracy
- Provides contact list of emergency resources
- Greater chance you'll hear "Help is on the way!"

The First Year of Operational Experience at Tennessee's Largest Membrane Filtration Plant

Michael Bernard, PE- Smith Seckman Reid, Inc
Alan Cranford- Murfreesboro Water & Sewer Department

The Stones River Water Treatment Plant in Murfreesboro Tennessee is now the largest membrane filtration plant in the State of Tennessee. The 20 million gallon per day facility is also unique in that it is the only lime softening water treatment plant in Tennessee. This combination of technologies, in addition to granular activated carbon adsorption and sodium hypochlorite generation contribute to this being one of the most advanced treatment processes in the state. The membrane filtration system was commissioned at the Stones River Water Treatment Plant in December 2008. Since that time, the membranes have performed exceptionally well in every regard and have exceeded the City's expectations.

This presentation will summarize the design criteria for the treatment plant and will evaluate the data generated from the first year of operation to confirm that the design criteria were appropriate. The presentation will also discuss some of the design considerations inherent with adding membrane filtration to an existing treatment facility. Despite an aggressive design flux of 90 gfd, membrane fouling has been minimal and cleaning intervals have subsequently been extended to 8 weeks. The daily maintenance cleans have also been discontinued due to the extremely low fouling rates. Membrane integrity has been exceptional, with only five compromised fibers in a year of operation. All five of these integrity breaches occurred in one day and were in one module rack, which is a likely indication that a foreign material passed the screens and caused the damage. Recovery cleaning has been successful at returning each of the membrane modules to greater than 99% of their initial permeability, disproving the perception that high flux in itself contributes to irreversible fouling of the membranes.

Removal efficiencies with the membranes for targeted constituents including turbidity, TOC and manganese will also be compared to performance from the granular media filters. Data will also be presented illustrating disinfection byproduct formation before and after commissioning of the membrane filters, as well as before and after commissioning of the granular activated carbon contactors.

BROWN AND CALDWELL

Name Kelly Comstock PE, BCEE
Title Principal Engineer
Firm Brown and Caldwell
BC Contact *For additional information and coordination of conference attendance/activities, please contact:*
Donna Corlew, SE Regional Marketing Manager
Email dcorlew@brwncald.com **Phone** 615-250-1270

Session Title Cost Effective Approaches to Unlocking Hidden Capacity and Efficiency in Your Water Treatment Plant

Session Abstract Faced with continuing uncertain future economic conditions and ever tightening budgets for operations, many utilities are making difficult decisions in terms of balancing current system operational costs with investment in future capacity and infrastructure. More and more, utilities come to the realization that all future significant capital improvements will face careful scrutiny as to necessity and payback on investment.

Within any existing facility, there is opportunity to unlock hidden potential and develop cost effective additional capacity. This paper will discuss an approach of developing a comprehensive hydraulic model of the facility, coupled with an evaluation of each treatment process, to identify any potential hydraulic or loading limitations that may be limiting overall capacity. Newer technologies in high rate clarification, solids removal, and filter design support cost effective high-rating of existing facilities to achieve additional capacity. Several case studies will be presented that show this success.

In addition, many facilities have potential for operational efficiency improvements. Some of the key areas with a high potential for efficiency improvement include filter backwash optimization through enhanced instrumentation and monitoring, chemical feed optimization, and improving mixing and pumping efficiency to help a utility reduce their operational costs. Approaches to benchmarking, assessing current operations, and implementing new tools in operational efficiency will be reviewed. In addition, newer innovative approaches to power reduction in plant operations, including integrating feedback for realtime power pricing into operational decisions and using energy recovery systems such as microturbines, will be reviewed. This paper will provide utilities, large or small, with creative approaches to cost-effectively unlock hidden capacity and efficiency in their water treatment plants.

Alternative Solutions to Upgrade and Expand a Large Water Treatment Plant's

Coagulation Feed and Storage System

Michelle Hatcher, hatchermm@cdm.com
Ronald Abraham, P.E., BCEE, abrahamrg@cdm.com
CDM, 210 25th Avenue North, Suite 1102, Nashville, TN 37203,

Currently, the City of Nashville's (City) Omohundro Water Treatment Plant (WTP) has a capacity of 90 mgd and treats surface water from the Cumberland River. The City projects the future water needs for the plant will approach a maximum required capacity of 120 mgd. In order to meet future increasing needs, the City is looking towards expanding necessary components of the WTP to include the alum (aluminum sulfate) coagulation facility. Components of this system include bulk storage, transfer pumps, piping, day storage, metering pumps, and controls.

The challenges faced to select an alternative for expanding the coagulant system capacity include:

- Evaluating and selecting chemical metering technology suitable to accurately feed chemical during a wide range of flow and dosage conditions,
- Working within existing conditions and limited available space,
- Keeping existing facilities operational during construction phases,
- Improving system reliability and redundancy of an essential WTP component,
- Providing reliable and operator friendly components and controls,
- Minimizing costs, and
- Evaluating current and future regulations on the State and Federal level.

These alternatives were evaluated to determine the most feasible solution for the City at the Omohundro WTP. The evaluation includes typical pros and cons of designing and retrofitting a chemical feed system for present day conditions. It also includes a cost matrix and lifecycle analysis.

Biosolids In Tennessee: The Road Ahead

Robert G. O'Dette, M.S., P.E.
State of Tennessee, Division of Water Pollution Control
Nashville, TN

This paper offers perspectives from the State of Tennessee Biosolids Coordinator who has been involved with wastewater treatment, residuals management and biosolids recycling issues for almost forty (40) years and for more than a quarter of a century as a regulator. The discussion in this paper will cover the present situation and activities in Tennessee with regard to biosolids, and will then focus on the "Road Ahead" and what is expected to happen in the future.

The Present. This section of the paper will discuss various case histories that demonstrate why public perception and politics are key factors in biosolids management. It is shown that in the past many beneficial biosolids recycling programs have been destroyed because of just one careless or stupid mistake.

It is true that history repeats itself—and so it is with biosolids recycling efforts in the State of Tennessee. It will be shown that the same problems and mistakes of the past are still be made today. To complicate the situation further, there is lack of adequate oversight and enforcement. In any business the statement is true that "What gets inspected--gets managed." The discussion in this section of the paper concentrates on the huge national (and State of Tennessee) problem relative to the fact that regulatory priority for biosolids recycling activities is very low. There are some exceptions and these will be noted. However, the vast majority of biosolids projects have little if any inspection and are thus prone to fall into operating conditions that are in violation of applicable laws and regulations. Specific case histories (names will be withheld) in Tennessee will be provided showing some of the more common problems and lapses that have occurred primarily because of the lack of adequate regulatory oversight.

Additionally, the impact of biosolids research will be discussed. The discussion in this section will cover the author's first-hand experience with activities involving research conducted by the Water Environment Research Foundation (WERF) and the National Science Foundation's (NSF) only Water Quality Center located in Arizona. It will be shown how this research is being accepted and is not being accepted. Several case histories will show the ramifications as to how state and local decision makers have used (accepted or rejected) biosolids research information. Included in this discussion will be the various reactions that groups across the country have had to the two National Academy of Sciences (NAS), National Research Council (NRC) reports.

The Road Ahead. The paper will conclude by taking a look into what the author sees in the future for biosolids recycling in Tennessee. The primary issue discussed in this concluding section is the new initiative in Tennessee to develop and implement State Rules for Biosolids.

PROTECTING YOUR INVESTMENT THROUGH OPERATOR TRAINING

Kenneth Schnaars, P.E. – AECOM
Ron Taylor, P.E. – Metro Water
Joe White – Metro Water

ABSTRACT

Municipalities expend large sums of money for new facilities or modifications to existing facilities. Once these new facilities are operational they are turned over to the Owner's personnel to operate and maintain. These new facilities can be very sophisticated, complicated, or they can have many safety concerns, such as methane gas, high operating pressures, process chemicals, potential fires and other dangers. If Operators and Maintenance personnel are not provided with the knowledge of their system, then personnel safety will be a concern. Also, if plant personnel do not have the proper operating and maintenance knowledge of their system, then equipment damage, shorten equipment operating life, process issues, non-compliance issues, and fines can result from improper knowledge and training.

It is the responsibility of all parties involved with the project to ensure that plant personnel are well trained and given the knowledge to safely and effectively operate and maintain the facility. This responsibility must be shared in a cooperative manner by the Contractor, Manufacturer, Engineer and Owner. It is not only the responsibility of the Contractor to construct a safe facility but they are also required to contact and assist in the scheduling of the manufacturers to perform equipment commissioning and operator training. It is the responsibility of the Manufacturer to ensure all operating, maintenance and safety aspects of their equipment is provided to the plant personnel operating and maintaining that equipment. It is the responsibility of the Engineer to provide specifications that have adequate time for the manufacturer to come on-site to commission their equipment and properly train the plant personnel. The Engineer's specifications must be very detailed and descriptive on what training aspects are required by the Contractor and Manufacturer to ensure that the needs of the plant personnel are properly met. It is important that the Owner ensures that their personnel are receiving the training they need. The Owner must meet with the Engineer during the design phase of the project and review with the Engineer the following information:

- the type of material the Owner can be expecting at the end of the project
- the type and length of operator training they will be receiving
- will there be any follow-up training
- are maintenance classes scheduled only on-site
- will the maintenance training be provided on-site and at the manufacturer's factory.

This paper will discuss the following items to ensure that the Owner, Engineer, and Manufacturer meet the needs of the end user, which are the Operators and Maintenance personnel working with the equipment and/or process:

- *Scheduling of equipment manufacturer* personnel to do equipment training.
- Ensuring the proper qualifications of the equipment manufacturer personnel doing the training.
- Training location and noise levels.
- The engineers overall process and system training schedule, training materials, instructors, etc.
- Electrical and instrumentation training aspects and pitfalls.
- The need for follow-up training.

By the time the Contractor, Manufacturer and Engineer are off the site after the project is completed, the Owner's personnel must have a thorough knowledge in order to operate and maintain the systems provided to them. Plant personnel must effectively adapt to changes in process conditions in order to efficiently control their process. In order to meet this goal the plant personnel must be properly trained.

Lead Author Information

Kenneth Schnaars, P.E.
AECOM Water
220 Athens Way, Suite 200
Nashville, TN 37228
(615) 244-8864

Abstract for 2010 Kentucky-Tennessee Water Professionals Conference

Making Regional Wastewater Treatment a Reality
Thomas R. Schaffer, P.E.

The communities of Centertown, Hartford and Beaver Dam in Ohio County, Kentucky each operated and maintained their own wastewater treatment facilities. Back in 2000, these three communities and Ohio County started discussions about forming a wastewater district to handle regional treatment of wastewater. The district formed a board that includes seven individuals, two representatives from each of the communities and one from the county. Following the formation of the wastewater district, the steps that made regional treatment a reality included:

- Prepare update to Wastewater Facilities Plan
- Site the regional wastewater treatment plant (WWTP)
- Obtain funding for WWTP and related collection system improvements
- Design WWTP and collection system
- Obtain all permits including KPDES permit and KDOW construction permit
- Bid WWTP and collection system
- Construct and start up WWTP and collection system
- Confirm rates through rate study
- Hire operations and maintenance staff
- Startup and on-going facilities operation

This presentation will review all the steps necessary to make regional wastewater treatment a reality in Ohio County. The process took tremendous cooperation by city, county, community, and state representatives to work together to put the good of all ahead of the good of individual entities. Nine years after embarking on this effort, the Ohio County Regional Wastewater District is treating wastewater, meeting their KPDES permit and providing a valuable service to the residents of Ohio County.

Reduce Operating Costs by Eliminating Aeration in an Aerobic Digester

The aerobic digestion process is a popular method for vector attraction reduction and disinfection of municipal wastewater treatment plant sludges. Although the process is inherently stable and easy to operate, a major disadvantage of the process is the large amount of energy needed to provide oxygen for bacteria and for mixing.

In an effort to reduce electrical costs for digester aeration, the Newport Utility Board of Newport Tennessee undertook a pilot study in June 2009. The study compares a novel approach for the digestion of wastewater sludge, the Ennix Process, with the results obtained through the conventional operation of their aerobic digester system at the James S. Franks Newport Wastewater Treatment Plant. With the Ennix process, selected bacteria and bio-chemicals are periodically added to waste activated sludge entering the digester system to maintain a favorable environment for sludge biodegradation. This bio-augmentation process allows the digester to operate in a hybrid facultative mode, without aeration or mixing.

The Newport WWTP is designed to treat both industrial and municipal wastewater. It has an average daily flow of 2.8 MGD. Biosolids historically have been stabilized in two 350,000 gallon capacity Aerobic Digesters with coarse air diffusers. Aeration is provided by one 250HP blower operated 24/7. The Digesters are followed by two Filter Belt Presses and polymer mixing and feeding equipment. The sludge is dried in a Sludge Dryer at greater than 90% solids to produce a Class "A" Bio-Solids.

This presentation will compare results from June 2008 through May 2009 during which the two digester cells were under full aeration to June 2009 through May 2010 during which the digester system used the Ennix bio-augmentation process rather than aeration.

This paper will summarize the comparative results of the study relative to digester health and performance, mass solids reduction, polymer use and sludge dewatering. Comparisons of operational cost savings associated with aeration, mixing and dewatering will also be included.

The first five months of comparative data have produced the following findings:

1. The digester cells have not required mechanical aeration allowing the plant to reduce electrical consumption by approximately 134,000 kWH per month.

2. The un-aerated digester achieved a 30% mass solids reduction rate compared to a rate of 29% with conventional aeration.

3. Sludge pressed from the un-aerated digester used 8.57 lbs. polymer per dry ton of solids processed compared to 25.34 lbs. polymer per dry ton processed after conventional aeration.

4. Digester health during the trial to date has been maintained as evidenced by the absence of odors, a stable pH of 6.9 and positive levels of DO.

Improving Customer Service and Generating New Utility Revenues through Homeowner Warranty Plan Marketing – A Case Study Synopsis "In 2008, the Louisville Water Company made a groundbreaking entry into the field of marketing homeowner protection plans for water service lines to its residential customers. The presentation will examine the background to the program's launch, the mechanics of its operations, and the impact it has had on customer service, utility revenues, and public education on homeowner infrastructure responsibilities." Louisville Water Company – Background Louisville Water Company (LWC) is a quasi-municipal corporation, which is owned by Louisville Metro Government in Kentucky. The Louisville Metro Government is the company's sole shareholder and receives a quarterly dividend. The Board of Water Works governs the company. LWC is exempt from Federal, State and Local income and property taxes. LWC provides water and fire service free of charge to the Louisville Metro Government in lieu of payment of taxes. LWC employs over 440 employees, approximately 215 of which are represented by AFSCME Local 1683. LWC has a corporate headquarters, two water treatment plants, three distribution centers, two intake pumping facilities and three warehouses. LWC has approximately 282,000 customer accounts providing water services to 800,000 consumers within the retail service. Approximately 238,800 of these accounts are residential. The retail service area includes all of Jefferson County (217,450 accounts), portions of Bullitt County (13,500 accounts) and portions of Oldham County (7,850 accounts). The majority of LWC residential customers are billed bimonthly. Beginning in the summer of 2007 LWC began transitioning some customers to monthly billing and now approximately 7,800 residential customers are billed monthly. In addition to water, LWC bills wastewater and/or storm water for several public and private sewer entities. The average bimonthly bill with water, wastewater and storm water ranges from $89 - $105. LWC's Customer Information and Billing System is provided by Alliance Data Systems (previously Orcom Solutions). The system resides on an IBM iSeries. The system is capable of billing the protection plan to the customer. The homeowner's problem Many of LWC residential customers are unaware that they are responsible for the water line on their property from the meter to the house and many of them call LWC when they have a leak or a problem. LWC checks the meter and, if it is determined that the water leak is not the responsibility of LWC, informs the customer that they must arrange and make the repairs. LWC does not make the repairs or recommend any contractor to provide the work. The customer is not usually prepared for the expense of paying for the repair or aware of contractors to provide the repair. LWC's proposed solution LWC decided to explore the award of a contract to a third party contractor to provide residential customers with the opportunity to purchase an insurance protection plan to cover the repair and or replacement of a residential water supply line from the meter to the home. LWC launched a Request for Proposals (RFP) process in July 2007 that sought a contracted partner to manage and fund all aspects of marketing and development of a Water Line Service Protection program for LWC residential customers. The program would provide coverage for the repair and or replacement of the customers' water line from the meter to the house, as well as labor and materials to complete all repairs and/or replacement. Under the terms of the RFP, LWC would provide billing for the approved fees established pursuant to the contract and under the program to its residential customers on either a bi-monthly or monthly billing cycle. LWC would provide the selected contractor its customer mailing list. LWC would bill, provide the contractor with the use of the name "Louisville Water Company" only for the purposes of co-branding the program's products and services to LWC's residential customers. LWC emphatically stated that the chosen contractor could use the LWC mailing list only for the purposes of this contract and that it would be strictly prohibited from selling, trading or in contracted partner to manage and fund all aspects of marketing and development of a Water Line Service Protection program for LWC residential customers. The program would provide coverage for the repair and or replacement of the customers' water line from the meter to the house, as well as labor and materials to complete all repairs and/or replacement. Under the terms of the RFP, LWC would provide billing for the approved fees established pursuant to the contract and under the program to its residential customers on either a bi-monthly or monthly billing cycle. LWC would provide the selected contractor its customer mailing list. LWC would bill, provide the contractor with the use of the name "Louisville Water Company" only for the purposes of co-branding the program's products and services to LWC's residential customers. LWC emphatically stated that the chosen contractor could use the LWC mailing list only for the purposes of this contract and that it would be strictly prohibited from selling, trading or in anyway distributing LWC's mailing list to any entity or individual not associated directly with the provision of the program. The RFP stated a variety of standards for the evaluation of proposals, including: Services Deliver a water service line protection plan that will meet the needs of residential (homeowner) customersan to cover the repair and or replacement of a residential water supply line from the meter to the home.

LWC launched a Request for Proposals (RFP) process in July 2007 that sought a contracted partner to manage and fund all aspects of marketing and development of a Water Line Service Protection program for LWC residential customers. The program would provide coverage for the repair and or replacement of the customers' water line from the meter to the house, as well as labor and materials to complete all repairs and/or replacement. Under the terms of the RFP, LWC would provide billing for the approved fees established pursuant to the contract and under the program to its residential customers on either a bi-monthly or monthly billing cycle. LWC would provide the selected contractor its customer mailing list. LWC would bill, provide the contractor with the use of the name "Louisville Water Company" only for the purposes of co-branding the program's products and services to LWC's residential customers. LWC emphatically stated that the chosen contractor could use the LWC mailing list only for the purposes of this contract and that it would be strictly prohibited from selling, trading or in anyway distributing LWC's mailing list to any entity or individual not associated directly with the provision of the program. The RFP stated a variety of standards for the evaluation of proposals, including: Services Deliver a water service line protection plan that will meet the needs of residential (homeowner) customersan to cover the repair and or replacement of a residential water supply line from the meter to the home.

LWC launched a Request for Proposals (RFP) process in July 2007 that sought a contracted partner to manage and fund all aspects of marketing and development of a Water Line Service Protection program for LWC residential customers. The program would provide coverage for the repair and or replacement of the customers' water line from the meter to the house, as well as labor and materials to complete all repairs and/or replacement. Under the terms of the RFP, LWC would provide billing for the approved fees established pursuant to the contract and under the program to its residential customers on either a bi-monthly or monthly billing cycle. LWC would provide the selected contractor its customer mailing list. LWC would bill, provide the contractor with the use of the name "Louisville Water Company" only for the purposes of co-branding the program's products and services to LWC's residential customers. LWC emphatically stated that the chosen contractor could use the LWC mailing list only for the purposes of this contract and that it would be strictly prohibited from selling, trading or in anyway distributing LWC's mailing list to any entity or individual not associated directly with the provision of the program. The RFP stated a variety of standards for the evaluation of proposals, including: Services Deliver a water service line protection

Why Care About Customer Satisfaction?

Author: Douglas Brock, Stacy Owens, and Cristina Marciani

Customer service plays a vital role in all commerce including the utility business. While a past monopolistic approach has not always prioritized customer satisfaction, today's customer requires and deserves a voice. Our focus as we evolve in the water industry is to educate every member of our team about the importance of caring as much about our customer as we do our product and placing pride in every step of the cycle of service. Through our customer satisfaction studies, we have found completely satisfied customers have a positive impact on our employee retention, business growth, and overall profit. Completely satisfied customers help prevent turnover which saves the business dollars associated with losing an employee and replacing that experienced member of our team. Great customer service drives revenue in the non-regulated fields, lowers costs as fulfilled customers cost less to serve, and are the best form of advertising in their word-of-mouth efforts. Our attention to the details and needs of the customer gives us value in the community. Beyond all that we have listed, caring about customer satisfaction is simply the right thing to do. Take care of the people in our business, both customers and employees, and success will happen naturally.

Caring about the customer requires an investment and every team member demonstrating behaviors that conveys a commitment to improving the customer experience. An emphasis on internal relationship building, accountability, effective communication and technological advancements are vital in delivering quality customer service. As water professionals we can not afford to be complacent or stagnant, our customers expect and deserve more. As we continue to view our organization through the eyes of our customer, listening to their voices, we pave a clear road to success. As conference presenters we will share ideas and actions that demonstrate how and why we care about customer satisfaction.

ABSTRACT_WATERLEAKADJUSTMENTS_CHRISGOODLOE

The discussion will begin with a detailed explanation of the water leak adjustment policy of Louisville Water Company. During the presentation, the water leak adjustment policies of other companies will be compared and beneficial ideas shared.
The Louisville Water Company's adjustment policy, effective since November 1985, is designed to assist the customer with a high bill resulting from a leak on the customer's property. Important policy considerations will be discussed, including adjustment qualifications, necessary documentation/steps taken by the customer, and policy limitations. Involvement of other areas, such as budgeting and the *tiered approval process for adjustments exceeding a certain dollar value will be explained. Based-on sewer adjustment calculations* will be discussed as they vary based on the leak type (underground vs above ground). Also, extenuating circumstance leaks, such as vandalized property, will be discussed.

The second portion of the discussion will focus on the non-leak adjustment policy of Louisville Water Company. Louisville Water Company recently created an Adjustment Committee (which includes membership from MSD our sewer partner) to deal with the growing number of complaints related to spikes in water usage. These spikes were not the apparent result of a water leak as there were no repairs made by the property owners, yet after the disputed bill cycle the water usage fell back to normal levels. The discussion will include real life examples of cases that were presented to the committee, decisions rendered, and the documenting process for future consistency. Again, best practices and ideas will be shared relating to non-leak adjustments.

Title: Succession Planning and Educating a Sustainable Workforce

Main Author: Christal Wade, WTI Program Coordinator
Employer of Author: Water Training Institute (WTI), Center for Water Resource Studies, Western Kentucky University
Contact Information for Author: christal.wade@wku.edu, Phone: 270.780.2565
Address: 1906 College Heights Blvd, Bowling Green, KY 42101

Abstract Selection
The looming 'brain drain' coupled with non-competitive wages, an increasing training burden, and the perception that water and wastewater operator and technician positions are professions of last resort, create a challenge acknowledged by both state regulatory agencies and the water resource professionals charged with maintaining capacity. The effects of the retiring Baby Boomer generation have been exacerbated in the water and wastewater industry. The large numbers of Baby Boomers working for water/wastewater utilities will result in a large wave of retirements in the next 10 years. The water/wastewater industry will lose a great deal of tacit (undocumented) knowledge. As much as 80% of useful operational knowledge is tacit. Certain skills that utilities need when replacing workers are in short supply and are forecasted to get worse. In addition, few utilities report that they have succession plans in place and many publically-owned utilities operate under personnel rules that limit the ability to implement succession planning. Where plans are in place, much attention has been placed on succession planning for leadership positions and less emphasis has been paid to mission critical professional level positions.

Current training levels need to be upgraded and expanded. As regulations in the water and wastewater industry become more stringent, there is a lack of quality people entering the field and operators are being required to take on increasing responsibilities and to understand complex regulatory issues. Operators face increased expectations in both occupational and professional competencies. Increasing automation of utilities calls for more technically skilled workers. To complicate the matter, today's pool of non-degreed workers has fewer skills than candidates have displayed in the past. The available supply of desirable workers is thin and water/wastewater utilities have difficulty competing with other employers for the best hires. The achievement of a post-secondary education may be the key to acquiring the skills needed in today's water/wastewater workforce. Graduates of post-secondary programs tend to possess critical-thinking skills with the foresight to recognize potential problems and be more adaptable to change. However, competition for employees entering the workforce from colleges and trade schools is fierce. Potential entry-level employees are being lured away by higher-paying, higher-prestige jobs in consulting and other technical industries such as petroleum.

This presentation/paper includes information collected about succession planning and the benefits of post-secondary education from an intensive literature review as well as from experiences as the program coordinator for the new Water Training Institute.

Turning Wastewater Utility Challenges into Effective Advocacy

Mike Apgar (SD1), Carrie Turner (LimnoTech), Adrienne Nemura (LimnoTech)

Wastewater utilities around the nation are confronting significant challenges with respect to permitting, operation and maintenance of their collection system, and emerging issues. Examples include more restrictive numerical permit limits, controlling wet weather-related flows such as sewer overflows, increased pressure to limit pollutants in municipal separate storm sewers, treatment of and monitoring for pharmaceuticals and personal care products, and new nutrient treatment requirements. These challenges are different than the challenges that were present when the Clean Water Act was adopted in 1972.

Each of these issues alone can require an enormous financial commitment by a utility. In addition, utilities often need to invest in legal and technical expertise to address these kinds of challenges. However, the economic reality is that at some point it will be simply infeasible for the utilities to continue to raise their rates to the level needed to cover all of the costs associated with these challenges under the current regulatory paradigm. This paradigm often locks regulators into a stovepipe mentality where funds are spent trying to achieve 100 percent control of each individual challenge, without regard to actual environmental benefit.

The concerns of wastewater utilities are often overshadowed or usurped by political considerations or focus on more media-friendly infrastructure projects (new roads). Sanitation District No. 1 (SD1) has been at the forefront of advocating for utilities so that their concerns with these challenges are well understood and so that effective changes can be implemented. This presentation will describe the efforts that SD1 has been leading at the national, state and local level. Nationally, SD1 is one of several utilities working through the U.S. Conference of Mayors that has obtained an audience with high-ranking EPA officials to discuss their economic and technical challenges. The utilities, mayors, lawyers and consultants working on this initiative have drafted six points of change that are needed at the federal level. SD1 is also working with the State legislature to mandate common-sense changes and clarifications to affordability and other aspects of wet weather-related Consent Decrees. Finally, SD1 will describe successes at the local level, which has resulted in more community support for SD1's proposed infrastructure and watershed projects planned for the next five years. This presentation will describe how SD1 has turned these wastewater challenges into effective advocacy and will explore the benefits of multiple utilities working collectively to pursue solutions to shared challenges.

Name Bob Carmon, CMRP
Title Maintenance and Reliability Specialist
Firm Brown and Caldwell
BC Contact *For additional information and coordination of conference attendance/activities, please contact:*
Donna Corlew, SE Regional Marketing Manager
Email dcorlew@brwncald.com **Phone** 615-250-1270

Session Title Plant Maintenance Optimization

Session Abstract This paper describes a systematic approach to improving the maintenance performance of a continuous process industry, where capacity depends on design throughput and equipment availability. Raising the design throughput takes capital dollars, while raising availability focuses on improving what you already own. Well-selected maintenance improvements can be more cost effective than capital improvements.

A maintenance manager contemplating improvement is faced with an overwhelming array of improvement options: technology, re-organization, training, planning, scheduling, TPM, Lean, etc. Almost all have some benefit, but following one, at the expense of others, can lead to disappointing results. One example we have seen is paying for a good vibration PdM program, but failing to complete the resulting action items because the work processes and prioritization are not working at the site.

The maintenance improvement program is best done in phases: Evaluation, Recommendations, Implementation Planning, Implementation, and Follow Up.

Evaluation shows where improvement is needed the most, so no time is spent bolstering or re-designing something that is working well. The critical deficiencies are found, and the low hanging fruit are also discovered.

Recommendation selection requires judgment to select the appropriate improvement ideas for the site, so planned changes fit the location and the current circumstances.

The recommendations then have to be turned into an Implementation Plan and schedule. An organization cannot do too many things at the same time, and many items are predecessors for other improvements. A common sequencing mistake, seen in all industries, is buying and

installing a CMMS before improved work processes are defined – the CMMS may or may not support the improved processes.

Maintenance affects almost every part of an organization so the management of change is critical in the Implementation phase. Fear of change must be replaced by understanding and acceptance. Each new venture has to be nurtured and supported through the awkward beginning steps, and obstacles and small problems have to be addressed honestly and openly. Adjustments must be made as necessary, while still implementing the overall program. As each improvement item stabilizes, the next step in the plan is started.

The most often overlooked step is a sustained Follow Up. We must confirm we are staying with the improved procedures and not lapsing into other directions. Unexpected events, particularly in the maintenance world, often overcome and delay plans. However, a delay need not be the end of a program, if there is an established plan to resume.

The next step is to repeat the process. The original improvement recommendations were based on the original conditions, and those have changed once the planned improvements have been achieved. Repeating the cycle will provide continuous improvement of the maintenance function and benefit the entire organization.

Breathing New Life into Old Water Pipelines: A Renewal Case Study in Charleston, SC

Authors: Tim Ball, Jordan, Jones & Goulding (JJG); Bill Young, P.E. (JJG)

Key Terms: lining, distribution system, water quality, asset management

Abstract

Water utilities across the Unites States are rapidly realizing that their existing buried infrastructure has a finite useful life. Many, like Charleston (SC) Water System (CWS), are embarking on aggressive pipeline renewal programs. As utility's budgets continue to decrease it is imperative to find the most cost effective methods to preserve and extend the life of existing assets. Prior to initiating the construction phase of a renewal program, utilities must analyze their existing water distribution systems, develop long term strategies, and reach consensus on appropriate renewal methods and materials.

A first step in any water pipeline renewal program is to develop a realistic set of goals and objectives. Several factors can influence the program objectives such as, main break/leak frequency, existing system materials, poor flow capacities, chronic discolored water, etc. These issues, as well as many other factors will likely be considered as the goals and objectives are developed. A thorough review of the original installation records will help determine the system composition. Classification of pipe types, pipe sizes, and determining installation dates are among the more important tasks associated with this step of program development. A review of pipe performance history is equally important. By correlating break and leak historical information with infrastructure composition and installation dates, trends in pipeline performance will likely become evident. These activities will lead to prioritizing where the overall renewal program needs to focus.

A review of a pilot installation of approximately 2,000 feet of 8 inch diameter cured-in-place pipe (CIPP) liner for CWS at the former Charleston Navy Yard was conducted to establish performance parameters for future effective pipe renewal efforts anticipated by the utility. The location was fairly isolated which reduced many of the typical pedestrian and vehicular traffic concerns. The length of pipe that was lined was composed of both cast iron pipe and ductile iron pipe. Most of the cast iron main had been lined in situ with cement mortar, but there was some footage that was unlined and heavily tuberculated. There were no active services on the pipeline; therefore no temporary water main was required. A thorough evaluation was conducted to determine if CIPP lining systems could be easily adapted for use in densely populated and historic areas of Charleston.

Abstract for 2010 Kentucky/Tennessee Water Professionals Conference

Title: Planning Distribution Systems for New Supply Sources

Submitted by: Jeff Cruickshank, PE
Hazen and Sawyer

629 Green Valley Road, Suite 200
Greensboro, NC 27408
336-292-7490
jcruickshank@hazenandsawyer.com

Abstract:

The cities of High Point and Greensboro, North Carolina, soon will receive water from a new supply source, a treatment plant currently under construction by the Piedmont Triad Regional Water Authority. The plant will treat water from the Randleman Reservoir, which was created by a dam that was recently completed on the Deep River. Each city has an initial allocation for 2010 and an ultimate allocation that is significantly larger.

Water from the new source will enter the southern part of High Point's distribution system, which is a sparsely populated area with low ground elevations. A new low pressure zone will be needed, including a new elevated tank and a pump station to boost some of the water from the new source into the main pressure zone.

Greensboro will receive water in a small pressure zone where demands are much smaller than the initial take-or-pay allocation. A pressure zone boundary must be eliminated, which will have a significant effect on elevated tank performance.

This paper describes hydraulic modeling that studied pressure zone boundaries, the phasing of new transmission mains and the performance of pumps and elevated tanks with the new source supplying each system.

The model compared several alternatives for pressure zone boundaries in order to provide acceptable pressures and match demands as closely as possible with the take-or-pay allocations, thus reducing double pumping and improving energy efficiency.

Modeling identified a phased approach for transmission mains to keep initial costs as low as possible. Existing pipes were used to full advantage in order to minimize the cost of improvements.

Water quality was a key consideration. Initial simulations showed poor turnover in some of the elevated tanks, due to low demands and constant pumping rates from the new supply source. Booster pumps were designed to promote tank turnover. Water quality modeling traced the movement of water from the new source through each distribution system.

This paper may help other utilities planning new supply sources by demonstrating the value of models for balancing hydraulic performance and water quality issues.

<u>ABSTRACT</u>
"REPLACEMENT OF WATER LINES ON LOOKOUT MOUNTAIN BLUFF"

Presenter: Jerry Hightower
CTI Engineers, Inc.

This project was a challenging and important project that involved the replacement of approximately 1,000 feet of 8-inch and 12-inch cast iron pipe which have been in use for up to 90 years. These existing lines were replaced with two 12-inch steel and 12-inch ductile iron pipelines on the bluff of Lookout Mountain. The higher pressure and aerial portion included parallel 12-inch steel pipes, while the lower pressure, underground portion included parallel 12-inch ductile iron pipes.

Challenges associated with the project were due in large part to its location, which is unusually steep and is in proximity to sites of significant historic and economic value. The project is only 0.25 mile south of the world famous Incline Railway (the "world's steepest railway") overlooking downtown Chattanooga. In addition, the route passes through properties owned by one of Chattanooga's wealthiest families above the bluff and the U.S. National Park Service (NPS) below the bluff. The latter property comprises part of the Chickamauga and Chattanooga National Military Park. Obtaining easements and permits through these properties required many months of negotiation and the placement of numerous special conditions on construction.

The original water line serving Lookout Mountain was installed in the late 1800s during the period of restoration following the Civil War. Although historically significant battles occurred on the side of Lookout Mountain less than 0.5 north of the project site, NPS experts do not believe that the project site itself was involved. Nevertheless, the NPS permit required notification and work stoppage in the event of discovery of any artifacts during construction. The original water line construction is reported to have included the use of mules and difficult manual labor. In the 1920s, the original pipeline was replaced with an 8-inch CIP, which remains in service today. It was leaking in several locations and had undergone numerous repairs by contractors using rock climbing equipment.

A second pipeline, the 12-inch CIP, was installed in the early 1950s and had required repairs similar to the 8-inch line. Both existing lines were installed just above the surface of the ground using varied methods of anchorage. One section below an overhanging rock ledge had been damaged by falling rocks as well as corrosion.

Over 10 years ago a replacement project was designed and bid, but budget constraints prevented construction from going forward at the time. In 2008 CTI was retained to prepare a new preliminary design. Topographic surveying was completed, following by detailed design and bidding in 2009. As noted above, delays were incurred due to the process of easement acquisition and permitting. CTI's design includes a different concept than the previous plan, intended to not only reduce construction costs but also prevent recurrent damage to the pipelines by corrosion and rockfalls. In order to prevent external corrosion, the steel pipelines were coated first with 20 mils of mill-applied fusion-bonded epoxy, followed by a second milll-applied coating of 40 mils of abrasion-resistant epoxy-based polymer concrete (Powercrete). Field-welded joints were x-ray tested and coated with catalyzed liquid epoxy. In order to prevent damage by falling rocks and to reduce construction cost by minimizing the length of pipe required, a 600-foot section of the project was designed to be installed 10 to 22 feet

aboveground, away from the overhanging rock ledge. The two 12-inch steel pipes with 0.5-inch wall thickness were designed to be installed parallel 5.0 feet apart, serving as structural elements of a "pipe bridge" supported by concrete abutments at each end and steel structural tube at three intermediate points.

In order to ensure constructability, CTI's structural engineers devised a construction plan including the use of a "zip line." Steel cables with a pulley system could be attached to a temporary steel tower at the base of the aerial portion and a truck crane at the top of the mountain in East Brow Road. The "zip line" would allow the movement of materials from unloading at the top of the mountain to the base of the bluff at the lower end of the project. Construction of the concrete footings for the five support points were the most challenging portion of the project, since it required the use of hand and power tools by workers suspended using rock climbing equipment on a slope that averages 110 percent and in a few places is nearly vertical.

Conditions of the NPS permit required an existing NPS hiking trail to pass unimpeded by the water line. Therefore CTI designed a wooden pedestrian bridge over the lower section of the pipe.

To preserve the natural appearance of the area, the concrete and exterior color of were designed to blend in to the natural colors of the rock bluff.

Planning also included design of a traffic and road closure plan to re-route local and tourist traffic to the historic sites of the Incline Railway and Point Park for a period of 3 months.

Despite its many challenges, the project was vital to maintaining reliable drinking water service to residents of Lookout Mountain, who were relying on failing water pipes up to 90 years of age.

Kentucky/Tennessee WPC 2010

Calibrating a Large Water Distribution System Model

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

Zack Daniel, P.E. – CDM, 210 25th Avenue North, Suite 1102, Nashville, TN 37203, danielza@cdm.com

Calibrating a hydraulic model of a water distribution system is always challenging. The calibration effort for the Metro Water Services (MWS) distribution system hydraulic model was no exception. Due to the size of the system and the number of pressure zones, the MWS water model calibration effort was enormous.

The MWS water distribution system encompasses the majority of Davidson County in Nashville, TN. The service area stretches nearly 244,000 acres and is divided into 78 pressure zones due to the large variability of elevation. The system contains 2 water treatment plants, 53 pump stations, and 41 reservoirs responsible for conveying flow through over 2,800 miles of piping. It is responsible for producing and distributing an average daily flow of 90 million gallons per day (mgd).

CDM was contracted by MWS to assist with the calibration of MWS's existing water distribution system hydraulic model. Over 130 two-hydrant flow tests were conducted in the field over a 5-week period to collect the data used for calibration. Additionally, hydrant test data was aided with the use of over 20 Telog pressure recorders placed strategically throughout the field during each day of testing. MWS SCADA data was also used in conjunction with the field testing to clarify boundary conditions during the test.

The large number of hydrant flow tests, Telog pressure recorders, and SCADA data for the many pump stations and tanks within the system were the foundations of calibration; however, the large amount of data made the calibration effort larger than anticipated, which made data management and reporting cumbersome. Coordination of the field tests and placement of the Telog pressure recorders became a project in itself.

This paper describes how calibration of this water distribution system model was achieved and the steps to move forward to continue to improve the operation of the model.

Abstract for: **2010 KY/TN WATER PROFESSIONAL & CONFERENCE**

Title: **A Study on the Impact of Water Chemistry in Water Treatment Plant to Lead and Copper Corrosion in Distribution System**

Authors: Z. Michael Wang, PhD, PE, DEE, Hazen and Sawyer
John Garland, WTP Superintendent, City of Raleigh
Wayne Zhang, PhD, PE, Hazen and Sawyer

Main Presenter: Z. Michael Wang
Vice President
Hazen and Sawyer
4011 Westchase Boulevard, Suite 500
Raleigh, NC 27607
Phone: 919-833-7152
Fax: 919-833-2558
mwang@hazenandsawyer.com

Subject of Paper: Water
Distribution

Abstract:

This paper summarized a recent study to evaluate City of Raleigh E. M. Johnson Water Treatment Plant (WTP) water chemistry relative to Corrosion Control Treatment (CCT) performance, and to determine if correlations exist between the performance of Pb and Cu corrosion control treatment and the changing conditions for climate, raw water quality, WTP operations strategies, and WTP process control strategies.

The assessment was based on plant water quality records from 2006 to 2008, the lead and copper compliance data from 2006 to 2007, and lead and copper data collected from a special study in 2008. The study found no strong correlations between raw water/finished water quality parameters and lead and copper level in the distribution system. The results imply that the dominating factors for lead and copper corrosion may exist outside of the water treatment plant, such as local pluming material and stagnant time in the pluming system.

The study further concluded that providing non-corrosive finished water at E. M. Johnson WTP is the first barrier to stop metal leaching into the tap water. Keeping water quality in compliance at a consistent level is critical to prevent a sudden change of various water quality parameters, including pH, alkalinity, sulfate, chloride, phosphate, silicates, organics, dissolved oxygen, disinfectant residuals and many other factors related lead and copper corrosion, which can destroy the established balanced water chemical environment between water and pipe wall surface in the distribution system. The audience will be cautioned that care must be taken to ensure that the proper mixes and proportions of chemicals are used. Excessive application of these treatment compounds raises the probability of corrosion and other undesirable effects.

After reviewing WTP process data, this study recommended a routine monitoring program be established for controlling the source water and treatment processes to ensure the CCT performance.

EVALUATING AND IMPROVING STORAGE FACILITY IMPACTS ON WATER AGE IN DISTRIBUTION SYSTEMS

Speaker: Kevin T. Laptos, P.E., Infrastructure Planning Practice Leader, Black & Veatch

Abstract

Aging water in distribution systems can have a detrimental impact on the quality of water delivered to customers. Excessive water age can result in increased disinfection by-product (DBP) formation and loss of chlorine residual. Utilities that use chloramination for final disinfection in efforts to minimize DBP formation often experience nitrification events in distribution systems as a result of extended water age.

This paper presents a review of the types of typical distribution system storage facilities and the factors that influence the selection of storage facilities. It summarizes several case reports of distribution system water quality issues that have recently been reported in professional publications. The results from recent extended period simulation (EPS) water age and source trace analyses which were used evaluate the impact of the operation, type, and location of storage facilities on distribution system water quality for a sample pressure zone are presented. These EPS analyses results show the relative impact that type and location of a storage facility can have on water quality in the distribution system.

Paper Title: Inflatable dam technology provides solution to community water needs

Abstract:

To meet the needs of its expanding population and as a response to existing and future development, the City of Marysville embarked on a project to upgrade its water storage and delivery system. With a budget of $24 million, the Marysville Upground Reservoir Project consisted of five contracts providing a complete system to capture water, pump it to the new reservoir and ultimately deliver the water to the Marysville Water Plant. In 2007, H.R. Gray was retained as the construction manager for this project.

One of the four contracts encompasses the construction of the dam, intake structure and pump station building in addition to the installation of an inflatable dam purchased under a separate contract with the dam manufacturer. Depending upon the flow rates and water levels in Mill Creek and other environmental conditions, the pump station will be capable of providing water to the reservoir at a rate of up to 40 million gallons per day. In addition to the control center in the pump station that monitors stream flows and levels at the dam, the City of Marysville is be able to maintain historical data and report all of the data to the main water plant. The City of Marysville can also monitor water levels in the reservoir via remote transmitters.

In order to meet the City's desired completion date, an additional contract was issued for the design and procurement of an inflatable dam and associated controls. The inflatable dam system monitors upstream water levels and downstream water flow, as well as adjusts the amount of water diverted to the reservoir in order to maintain environmentally-friendly flow conditions. One of the challenges on this project was that the manufacturer of the original inflatable dam specified in the contract documents was unable to meet the delivery schedule. As a result, H.R. Gray researched alternate manufactures to find a similar product that would provide the same functionality and control. The team was actually able to find a new product that exceeded the contract specifications, met the delivery schedule, and was less expensive than the original. This new dam also provides the city operators more control of the water level and flows across the dam. The multiple air bladders are able to be inflated independently, which allows the operator to vary the amount of air in the dam on a day-to-day basis making the dam a more efficient and effective tool.

The upground reservoir was constructed under Contract 3. Key to success of this project included a quality control and assurance program that included thorough inspection of concrete work, a complete punch list, and coordination of issues between the contractor, the City, and a third-party stakeholder, the County. This quality control provided assurance that the City received the project, and product, that they had paid for under the contract.

The fourth contract encompassed the construction of the dam, intake structure and pump station building in addition to the installation of an inflatable dam purchased under a separate contract with the dam manufacturer. Depending upon the flow rates and water levels in Mill Creek and other environmental conditions, the pump station will be capable of providing water to the reservoir at a rate of up to 40 million gallons per day.

25 word summary of your abstract:

New inflatable dam technology provides solution to community water needs.

How does your paper relate to operations of a water or wastewater plant and assist an operator in performance of his/her duties? (75 words maximum)

The inflatable dam system monitors upstream water levels and downstream water flow and provides operators more control of the water level and flows across the dam. The multiple air bladders are able to be inflated independently, which allows the operator to vary the amount of air in the dam on a day-to-day basis making the dam a more efficient and effective tool.

Author:

Kristen Braden, 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.

Presenter's previous experience as a presenter (i.e. other conferences) or instructor:

Kristen Braden has been a guest speaker at the 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?"

BIM and IPD – Are you ready? Should you be?

John Watkins
Jordan, Jones & Goulding (JJG)
678-333-0258
John.watkins@jjg.com

BIM stands for *Building Information Modeling* which is part of a relatively new approach to project delivery used primarily (so far) for "buildings". IPD stands for *Integrated Project Delivery,* which is a project delivery method that utilizes input from many sources (Engineer, Owner, Operator, General Contractor, Specialty Subcontractors, Manufacturers, Suppliers, Permitting Agencies, etc.) from the earliest planning phase to when the plant is fully operational. So why should a water or wastewater utility investigate and need to understand these methods for the design and construction? Because of the huge potential they have for predicting (and controlling) the cost to plan, design, construct, start-up, operate, maintain, renovate, expand, and (eventually) decommission the utility's infrastructure assets, such as water and wastewater treatment plants...and the utility will be able to do all this before the first yard of dirt is moved!

This session will include the following main topics:

1. An overview of BIM and IPD and the current state of their use / implementation in the water industry infrastructure market.
2. Recommendations for the steps a utility should take to evaluate BIM and IPD.
3. Recommendations for the how to proceed with using BIM and IPD.
4. Two case studies will be presented:
   - The benefits during construction to the Owner, Engineer, and Contractor of a BIM type 3-dimensional (3-D) model for the expansion of an existing 20-MGD Water Reclamation Facility (WRF).
   - The benefits of forming an IPD team during design, construction, and start-up for the complete renovation of an existing 16-MGD WRF.

Abstract: Design-Build in the Water Industry - How to make it a Success

This presentation will look at the Design-Build method of project delivery in the Water Industry and discuss what makes this process successful. The presenters are with Burns & McDonnell and Garney Construction who have successfully completed over 20 water and wastewater Design-Build projects together. They will represent the perspectives of the Owner, Engineer and Contractor for a full range view of the process and its impacts. The presentation includes:

- Review various forms of Design-Build contracts and their impacts
- Owner's issues related to Design-Build procurement
- Engineer's perspective and concerns with Design-Build
- Contractor issues related to Design-Build
- Design-Build Team Composition
- Example projects
- Summary of independent evaluation of Design-Build for Water projects

Overall, the presentation will discuss various issues and concerns posed by all parties in the Design-Build process and outline what makes this process successful.

Presenters:

Thomas A. Dittmaier, P.E.
Burns & McDonnell
P.O. Box 34037
Knoxville, TN 37930
865-246-8566
tdittmaier@burnsmcd.com

Scott Terry
Garney Construction
6401 Centennial Blvd.
Nashville, TN 37209
615-350-7975
sterry@garney.com

STARTUP OF A 200-MGD INFLUENT PUMP STATION

Jonathan S. Lapsley, PE – CDM
301 South McDowell Street, Suite 512
Charlotte, NC 28204
Phone: 704-342-4546
Fax: 704-342-2296

Julie McLelland, PE – Charlotte-Mecklenburg Utilities

ABSTRACT

Charlotte-Mecklenburg Utilities has recently completed the construction and startup of one of their largest wastewater pumping stations at the Sugar Creek Wastewater Treatment Plant. The influent pump station at the Sugar Creek WWTP will convey base flows from existing interceptor sanitary sewers as well as wet-weather flows from the newly constructed Briar Creek relief sewer in order to reduce sanitary sewer overflows (SSOs) in the Briar Creek sewer shed.

The project included the construction of improvements to the influent sewer system on the plant site, construction of new influent screens, 130 mgd of high head and 70 mgd of low head pumping capabilities, wet scrubber odor control, grit removal systems, and a flow equalization basin. The pump station design includes a self-cleaning trench type wet well with submersible pumps mounted in a dry-pit application.

This paper will present topics relative to the lessons learned during startup of each of the facilities constructed as part of this project including improvements to the influent sewer system, bypass pumping operations to place the new system online, operation of the self-cleaning wet well, issues with wet-weather use facilities, specialty coating applications, and other construction issues faced during the startup phase of the project.

Condition Assessment of Pre-Stressed Concrete Main

On May 13, 2009, the Louisville Water Company (LWC) experienced a major failure on a critical 60-inch diameter pre-stressed concrete cylinder pipe (PCCP) that is a primary source of water for the elevated service area in the eastern portion of the LWC Distribution System. The break resulted in the sudden loss of over 10,000,000 gallons of finished water, repair and claim costs approaching $1,000,000 and the issuance of a Boiled Water Advisory to over 23,000 customers.

The presentation will provide a brief discussion of the failure, possible causes, and the repairs undertaken by LWC. The presentation will also review the "emergency" condition assessment performed on two miles of PCCP shortly after the break occurred, results of the assessment, and the remedial measures taken by LWC as a result of the assessment to prepare the 60-inch main for return to service.

Looking ahead, the presentation will provide an overview of the condition assessment technology currently available and under development for concrete pipe, and the new LWC program to perform condition assessment on the remaining 105 miles of pre-stressed concrete pipe. In developing the 10-year, $18,000,000 program, LWC prioritized the remaining concrete pipe by criticality, accessibility, system redundancy, and availability of capital resources and technology.

While a break in a 60-inch transmission main is always a significant event; the location, time of year, low system demand, and availability of a redundant supply, combined to make the event less a crisis, and more a valuable learning experience.

Value Engineering and Constructability Reviews – Saving Money while Implementing Advanced Treatment Processes at Northern Kentucky's Water Treatment Facilities

Bari Joslyn, Vice President, NKWD
700 Alexandria Pike
Fort Thomas, KY 41075
859 547-3272
joslyn@nkywater.org

The Northern Kentucky Water District (NKWD) operates three water treatment plants (WTPs): 44-MGD Fort Thomas Treatment Plant (FTTP), 10-MGD Memorial Parkway Treatment Plant (MPTP), and 10-MGD Taylor Mill Treatment Plant (TMTP). To meet upcoming regulations associated with the Stage 2 Disinfectants/Disinfection Byproducts (D/DPB) Rule, NKWD has chosen to install post-filtration granular activated carbon (GAC) at all three plants. Additionally, ultraviolet (UV) light disinfection systems will be installed.

With a combined estimated construction value of $100 million for these three projects, NKWD elected to perform a value engineering (VE) review for the design of both the FTTP and TMTP projects at the 30% design completion stage. The MPTP design was similar to FTTP, so concepts developed for FTTP were applied to both projects. A final review was completed on both FTTP and MPTP at the 90% design stage and one is planned for TMTP.

The VE review for each project consisted of a five-day workshop conducted by a multi-disciplinary team of professional engineers, project control specialists, and NKWD staff. The value engineering review was directed at analyzing the functions of systems for the purposes of achieving the lowest life cycle cost consistent with the required performance, reliability, quality and safety. The VE review was an integral part of the overall project delivery process and was not a separate effort intended to second-guess the engineering of the project. The workshop initiated with the Information Phase and was followed by Functional Analysis/Creative Phase, Ranking of Alternatives, and Development Phase. The VE effort also addressed observations regarding the Basis of Design documents and the project risk and schedule.

Over 100 ideas were generated during "brainstorming" of the team in the combined Functional Analysis and Creative Phases of the projects. During the Development Phase, these ideas were further refined and discussed. These alternates represented an individual potential life cycle cost savings ranging from $15,000 to over $4.8 million. Options were evaluated by the NKWD to determine which ones offered a cost savings while still meeting project goals and schedule. The combined construction cost savings of the VE items selected for incorporation in the projects was over $5 million.

The constructability review focused on aspects of the project that may be unclear in the documents or could place undesirable risk on the NKWD or the contractor. Questions presented by contractor during the biding period focused on relatively minor details and required minimal effort by the engineer to clarify. It is believed the review effort produced a clear set of bidding documents that placed appropriate risk on each entity. This position is further supported by the construction bids received for the MPTP project. The four lowest bids were separated by less than 10% and were one-half the engineer's estimate, which suggests the contractors were not placing much contingency in their bids. Bids for the FTTP project are expected in January 2010 and will be incorporated into the presentation.

Name Scott Hall PE
Title Associate

Firm Brown and Caldwell

BC Contact *For additional information and coordination of conference attendance/activities, please contact:*
Donna Corlew, SE Regional Marketing Manager

Email dcorlew@brwncald.com **Phone** 615-250-1270

Session Title Don't Let Water Hammer Ruin Your Day…the Importance of Transient Analysis in the Design Process

Session Abstract Hydraulic transients (commonly referred to as "water hammer") are common in pumping station and pipeline systems. The phenomena is generally characterized by positive or negative pressure waves that travel up and down the length of a pipeline and can be caused by a variety of operating conditions, ranging from normal pump startup and shutdown to sudden valve closure or even power failure. In smaller systems, the positive and negative pressures developed are usually within the design limitations of the piping materials and equipment comprising the system. In larger systems, however – particularly ones with high flows (greater than one million gallons per day) and/or higher operating pressures (greater than 150 feet of head), the pressures that develop can be extreme (up to several hundred psi). If not dealt with carefully, these conditions will lead to, at a minimum, increased wear-and-tear and significantly reduced operating life for piping, valves, and equipment. In worst case conditions, significant damage and potential injury or loss of life can result.

Typical means of controlling water hammer pressures include the use of variable frequency drives (VFDs), flywheels, open and pressurized surge tanks, vacuum breaker and air release valves, spring- or weighted arm-actuated swing check valves in pump discharge lines, and the controlled closure of critical system valves. The correct application of these measures requires careful analysis, along with a thorough understanding of system hydraulics and control strategies. All too often, this is overlooked or given far too little consideration during the design process, leaving owners to suffer the consequences in reduced life of facilities, increased maintenance, and numerous emergencies due to sudden failures.

This presentation provides an overview of the topic broken down into the follow considerations:

- Overview of Transient Phenomena ...a brief summary of the theory and causes of transients
- Analysis Methods ...a brief overview of available software and methods for analyzing transients
- Surge Control Measures ...discussion of the various surge control measure available including their application and effectiveness
- Design Consideration *...in addition to specific surge control* equipment that may be needed, the effects of transients on other system components and the associated design considerations will be discussed.

To illustrate the concepts, a number of case studies will be provided from recent projects that highlight the potential effects of transient pressures along with examples of the various analysis considerations, design issues and solutions.

KNOWING YOUR PUMP STATION'S STRESS LEVEL CAN MAKE FOR A MORE PEACEFUL O&M PROGRAM

Glenn Weist, AECOM
Brandon C. Vatter – Sanitation District No. 1 of Northern Kentucky
Geoffrey M. Grant – AECOM

Glenn Weist, AECOM
4219 Malsbary Street
Cincinnati, OH 45242
Email: glenn.weist@aecom.com
Phone: 513-878-6865

ABSTRACT

The District currently operates 132 sewage pump stations (PSs) as well as 15 flood pump stations. The older sewage PSs were not designed to the more rigorous standards used by the District today and as a result are in varying degrees of disrepair. In April of 2007 the District entered into a Consent Decree (CD) with the USEPA, the Kentucky Environmental and Public Protection Cabinet and the US Department of Justice. Certain aspects of the CD, including the Capacity, Management, Operation and Maintenance (CMOM) program, the Pump Station Operational Plan for Backup Power (PSOPBP) the Pump Station Overflow Elimination Plan (PSOEP) direct the District to gather data at each PS.

As part of the continuing efforts to manage the District's critical assets and satisfy the CD requirements, and best focus O&M and rehab efforts, the PS Operations Staff visited each individual sewage PS to evaluate and score 9 categories in the spring of 2008. The scores where then input to a spreadsheet where a weighted percentage was applied to the score to reflect the importance of a particular category and provide a final weighted score for each PS for prioritizing purposes.

The District prioritized all the pump stations using the weighted scores in a spreadsheet from most critical to least critical while also creating a top 40 Stressed Pump Station List. The spreadsheet also tracked every individual operator comment to track trends within a particular criterion. For example, over 70 comments were recorded for PS control panels under the Electrical Category leading the District to create an in-house control panel shop to help control costs and quality by stocking standard parts and to utilize staff that may otherwise be on downtime due to weather or other circumstances.

The Stressed PS top 40 list provided the District with a tool to better define the PS upgrade task and develop costs for inclusion in the Capital Improvement Plan. The Top 40 list was also mapped into GIS allowing the District to look at cross over projects with other CD activities such as the PSOPBP, PSOEP and water quality improvement projects as defined in the Watershed Plan (WSP). The District plans to progress through the Stressed PS list in a systematic fashion by addressing the deficiencies at each the PS in order of criticality.

The Stressed Pump Station effort enabled SD1 to better understand the condition of critical pump station assets and through this characterization efforts, enabled a more optimized O&M program, allowing for limited dollars to be focus where they will provide the greatest benefit, and grouped with other projects in an effort to save time and money.

Name Jay Fulmer, PE
Title Senior Engineer

Firm Brown and Caldwell

BC Contact *For additional information and coordination of conference attendance/activities, please contact:* Donna Corlew, SE Regional Marketing Manager

Email dcorlew@brwncald.com **Phone** 615-250-1270

Session Title Getting the Most Out of Your Existing Infrastructure: Case Study for Wet Weather Storage for a Wastewater Pumping Station

Session Abstract The Long Creek Pumping Station and Flow Equalization Facility is used by Charlotte Mecklenburg Utilities (CMU) to manage wet weather flows by storing flow volume from wet weather events and releasing stored flow back to the system once conveyance capacity becomes available. This system enables Charlotte-Mecklenburg Utilities to:

- Serve new growth and development without inundating their existing system
- Optimize the use of available capacity
- Reduce the risk of sanitary sewer overflows (SSOs)

The facility consists of a pumping station with wet-wells for both export and storage pumping, a force main, and two flow equalization tanks with a combined storage volume of 6 million gallons. The control system for this facility uses real-time feedback from the downstream collection system to control diversion to and return from the flow equalization tanks. The downstream data is linked to the control system via SCADA.

This paper presents the development process for the control logic for this facility, including scenarios for:

- Normal, dry weather conditions
- Diversion to flow equalization (storage)
- Return from storage

During normal operation, the facility performs like any conventional variable speed pumping station. When downstream conditions indicate the need for flow reduction, the control system begins diverting flow to the flow equalization tanks. As flows subside and capacity becomes available in the downstream collection system, the control system will return flow from the flow

equalization tanks. This sequence of events is controlled by real-time monitoring of downstream conditions and multi-tiered control logic to optimize the use of available system capacity.

The control logic was developed using flow monitoring and pumping station data to set control parameters. This paper will also compare design parameters to actual performance data and present system enhancements developed since the start of operation.

Staging Inline Storage and Green Infrastructure for CSO Control

G. Goulding, Malcolm Pirnie, Inc*
B. Vatter, J. Turner, Sanitation District No. 1 of Northern Kentucky
S. Glossner, Strand Associates, Inc.
*1515 E. Woodfield Road, Suite 360
Schaumburg, IL 60173

Introduction

With little outside funding for infrastructure improvements, municipal utilities must develop cost-effective wet-weather compliance plans funded by their customers. As an alternative to traditional plans, Sanitation District No. 1 of Northern Kentucky (SD1) chose a staged approach for reducing overflows at their largest CSO. Relying on inline storage and green infrastructure demonstration projects, the Willow Run CSO overflow abatement program showcases short-term improvements that will complement any potential long-term directions.

Case Study

Accounting for almost 40% of the system's total CSO volume, Willow Run is SD1's largest CSO with annual overflows exceeding 600 MG. Willow Run is a classic case where typical control levels require massive infrastructure, which may provide limited water quality benefits and little long-term flexibility. Flexibility is essential for Willow Run, given plans to replace the Brent Spence Bridge, which carries I-71/75 traffic across the Ohio River, and is directly coincident with the Willow Run outfall. With construction starting in 2015, this major infrastructure project will parallel SD1's watershed improvement program under its Consent Decree. While the bridge upgrade could increase CSOs with more highway runoff, the project could also reduce CSOs through coordination and cost-sharing for potential stormwater controls. Such stormwater controls also offer integration opportunities with potential Willow Run green infrastructure features.

Given these uncertainties, SD1 chose a staged approach for reducing overflows. First, SD1 implemented a static weir inline storage program, demonstrating that a 2-foot increase in weir height substantially reduced overflows while maintaining a risk-based Level of Service. Second, SD1 examined the potential for overflow reductions by using dynamic controls to maximize inline storage of wet weather flows. In comparison with typical gray infrastructure solutions, dynamic controls for inline storage are still relatively low cost, and Willow Run's potential benefits were substantial with model-predicted overflow reductions of 53 MG annually.

Third, SD1 developed a green infrastructure opportunities plan for the I-71/75 corridor in the Willow Run CSO drainage basin and selected several specific projects for the 2009 Watershed Plans. Three projects currently under construction or just completed include two stormwater detention basin retrofits and terraced reforestation of a portion of the I-71/75 right-of-way. Construction and monitoring of these projects and their impacts on the Willow Run CSO will allow SD1 to effectively integrate gray and green infrastructure controls into the overall CSO control program.

Developing Nashville's Nine Minimum Controls Plan

Mike Burgett
Gresham, Smith and Partners
511 Union Street, Suite 1400
Nashville TN 37219
(615) 770-8531
mike_burgett@gspnet.com

Wes Frye[1]
Paul Stonecipher[2]

In March 2009, the US District Court for Middle Tennessee entered a Consent Decree between Metro Water Services (MWS) of Nashville and the United States Environmental Protection Agency (EPA). The Consent Decree contains remedial measures that must be completed, including the preparation and submittal of a Nine Minimum Controls Compliance Plan (NMCP). It further stipulates that the NMCP should evaluate and identify corrective actions needed for compliance with the Combined Sewer Overflow strategy of the Clean Water Act, and specifically requires that corrective actions be designed to control solid and floatable materials at combined sewer outfalls.

This presentation discusses the requirements of proper Nine Minimum Controls, the development of Metro Nashville's NMCP, and the plan's recommendations for reducing CSO impacts. Emphasis is given to the approach taken by MWS and its consulting engineers in preparing the plan. The goal of that approach was to include MWS personnel and other stakeholders and develop effective, low-cost, and short-term corrective actions as recommended in the EPA's *Guidance for Nine Minimum Controls, 1995.*

The NMCP was continually refined during its development with internal and off team reviews by MWS and it consultants. Additionally, the final draft of the plan underwent two peer reviews by outside consultants.

The completed plan documents the activities and measures that have been and will be undertaken by MWS to comply with the Nine Minimum Controls. The NMCP addresses how MWS has strived to minimize the impacts of CSOs by complying with each control and presents recommendations for future projects by which MWS can improve their implementation. The NMCP was submitted to the Tennessee Department of Environment and Conservation (TDEC) and the EPA in September 2009. MWS is awaiting responses from both agencies.

---

[1] Metro Water Services; 1600 Second Avenue North; Nashville, TN 37208; (615) 862-4525; wes.frye@nashville.gov
[2] AECOM; 220 Athens Way Suite 200; Nashville, TN 37228; (615) 244-8864; paul.stonecipher@aecom.com

ABSTRACT
2010 WATER PROFESSIONALS CONFERENCE
WARNER PARK CSO CONTROL FACILITY

Paul C. Cate, P.E.
Executive Vice President/Senior Project Manager
CTI Engineers, Inc.
1122 Riverfront Parkway
Chattanooga TN 37402
pcate@ctiengr.com

The Warner Park CSO Control Facility is the ninth structure constructed by the City of Chattanooga as a part of its CSO control program. It is one of several separate components constructed within the drainage area which are designed to work in combination to address the frequent flooding within the park and prevent combined wastewater from escaping from the collection system. The need for the facility was identified during extensive storm water flow analyses of the surrounding area. The analyses involved some of the most complex hydrologic and hydraulic modeling efforts conducted to date for Chattanooga's combined collection system. These efforts have been reported on at previous Kentucky-Tennessee Water Environment Association Meetings.

An underground structure approximately 200 feet long by 100 feet wide with an average depth of 15 feet, the facility is divided into 8 "cells" with a combined working storage volume of 1.6 million gallons. Included are inlet screening, drainage pumps, a washdown system, a primary ventilation system (with odor control), a secondary ventilation system, a combustible gas detection system (with emergency ventilation operational mode), and fully automated controls. Its roof forms a fully lighted and landscaped parking lot for approximately 100 vehicles. The facility is located immediately adjacent to the Warner Park Pool (the largest public swimming pool in the City of Chattanooga) and Frost Stadium (the "world-class" home of the University of Tennessee at Chattanooga's girl softball team). In July 2009, the facility was accepted as substantially complete.

This paper will briefly address the history of the area, the modeling effort which identified the need for the facility, the planning and design of the facility itself (including considerations of the very limited space and very public site), and the construction program. A photographic tour of the completed facility will close the presentation.

Incorporating Human Health Risk into Stormwater and CSO Management: Implications of a new WERF-funded Study of Pathogen Discharges

Dustin Bambic[1,*], Stefan Wuertz[2], Graham McBride[3], Woutrina Miller[4]

[1]AMEC Earth & Environmental, 3800 Ezell Road Suite 100, Nashville, TN 37211

[*]Presenter

[2] Department of Civil and Environmental Engineering, University of California, Davis, 2001 Engineering III, One Shields Ave., Davis, CA 95616

[3] NIWA (National Institute of Water and Atmospheric Research), P.O. Box 11-115, Hamilton 3251, New Zealand

[4]Department of Pathology, Microbiology & Immunology, School of Veterinary Medicine, University of California, One Shields Avenue, Davis, Davis, CA 95616

Urbanized watersheds across the nation are subject to long-term stormwater and combined sewer overflow (CSO) management plans. Often, a major goal of these plans is reduction of bacteria and/or pathogen discharges to recreational waters. In most cases, however, the corresponding reduction of human health risk due to water contact is not quantified, and thus the risk-based benefits of stormwater/CSO management plans are unknown. The results of an ongoing project funded by the Water Environment Research Foundation (WERF) are intended to inform public agencies facing the challenge of controlling pathogen discharges to receiving waters. The risk management tool employed by this project is quantitative microbial risk assessment (QMRA), which can potentially be used to quantify human health risks under a variety of scenarios, including wet weather events and varying levels of stormwater/CSO treatment. Potential inputs for QMRA were both compiled from existing literature and collected with an extensive sampling program of sources including municipal stormwater, CSOs, agricultural runoff, and natural runoff. In fact, the analytical "toolkit" is one of the most comprehensive to date, including *Salmonella*, *Campylobacter jejuni, Vibrio cholerae*, *Cryptosporidium, Giardia, Toxoplasma gondii*, adenoviruses, enteroviruses, noroviruses, rotaviruses, *Bacteroidales, Enterococcus,* and *Escherichia coli*. A number of different risk assessment frameworks and QMRA models were assessed to highlight the most promising approaches and associated data gaps. Developing robust QMRA requires capturing and quantifying data for many variables including contributing fecal sources, types of pathogens, individual exposure levels, and dose-response relationships. An important consideration of this project is the role of QMRA for development of site-specific criteria for recreational waters that are not well-represented by "default" USEPA recreational water quality criteria (i.e., criteria based on *E. coli* and/or *Enterococcus*). For instance, QMRA could be used to develop site-specific criteria for watersheds dominated by non-human sources of fecal pollution (USEPA criteria are generally based on epidemiological studies performed at beaches impacted by human fecal pollution). Overall, the results of this project have advanced the state of the science for recreational water quality and risk assessment tools. Most importantly, the approach developed by this WERF project will allow stakeholders and agencies involved in implementing and complying with recreational criteria to more accurately predict health risks and mitigate waterborne sources of pathogen pollution.

Presenter:
Scott Morgan, P.E.
City of Memphis
Department of Public Works
125 North Main Street
Memphis, TN 38103
scott.morgan@memphistn.gov
901-576-7124 (office)

Co-Presenter:
Zack Daniel, P.E.
CDM
Client Service Manager
210 25th Avenue North, Ste. 1102
Nashville, TN 37203
danielza@cdm.com
615-320-3161 (office)

Funding a Large Stormwater System: The First Four Years

The City of Memphis was faced with increasing stormwater issues; including localized flooding, aging infrastructure, and the increasing regulations associated with the NPDES Phase 1 permit, which led the Public Works staff to look for a financial solution to help assist with these stormwater needs. In the early part of 2005, Memphis decided to move forward with the development and implementation of a stormwater utility to help meet their needs for stormwater funding of system improvements and NPDES compliance. After approximately a year of development work, meetings with a Storm Water Advisory Board, and an extensive City wide public relations campaign, the initial customer bills were sent to over 260,000 accounts in May of 2006. Since the stormwater enterprise fund was implemented in 2006, it has been extremely successful in allow the City of Memphis to meet its stormwater needs.

In this presentation, we will present a brief background of the stormwater system and the specific issues that were facing the City of Memphis prior to the development of the utility. In addition, we will describe the stormwater utility development and implementation process specifically highlighting the method of billing customers, the extensive public relations conducted and the other critical success factors that allowed the implementation to be widely accepted and supported by the City Council and citizens of Memphis. Finally, we will highlight the benefits that have resulted and specific projects that have been completed by the stormwater program staff in regards to flood mitigation, infrastructure rehab, additional staffing and NPDES compliance since the enterprise fund has been in operation. This presentation will also discuss some of the unexpected outcomes that have resulted from the utility implementation, most of which were unexpected at the outset of the program.

This presentation will provide a great look into how to develop, implement and successfully operate a stormwater utility that allowed the City of Memphis to move from a City struggling to meet their stormwater needs to one that can now be proactive in stromwater management.

No More "Rain Tax" Talk: Turning the Public into Stormwater Stewards

Terry Cole, Communications Practice Director
Jordan, Jones & Goulding
678-333-0203
terry.cole@jjg.com

Communities across the country are facing the challenge of implementing fees to pay for necessary repairs to the aging stormwater system, as well as maintaining and installing new structures. Despite dramatic evidence during rain storms that the stormwater system is failing – flooding, washed out roads, property damage - many citizens have a difficult time understanding and accepting what has been dubbed the "rain tax" in many communities.

This presentation will focus on the unique efforts of one utility to not only educate its local residents about the need for the stormwater fee, but actually turn citizens into "stormwater stewards" who advocate to others about the need for stormwater management. Specifically discussed will be a program that was designed targeting stormwater credits for churches. By encouraging church members to attend a 3-hour course on stormwater management, the local Water and Sewer Authority allowed each attendee to "earn" a monthly dollar amount credit that could be applied to the stormwater bill of the church of their choice. The course was a strategically designed indoctrination of citizens covering the broad range of stormwater management issues, with particular focus on the staggering cost of repairing damage to property when funds are not available to investment in stormwater management. Messages also centered around building ownership in the issue by local residents who were educated on how each person contributes to the problems of stormwater, and can therefore contribute to the solutions.

The program was incredibly successful with hundreds of area residents participating. In fact, calls are now received by the Authority from residents reporting stormwater violations such as someone cleaning a paint brush in a local stream or a contractor with no silt fence installed. And the truest testament to the success of the program was the lack of complaint calls received when the next phase of stormwater fees was introduced to citizens of the County who are not Authority water and/or sewer customers.

An Integrated Solution for Biosolids Data Management Utilized by the Moccasin Bend WWTP, Chattanooga, TN

Aaron B. Stephens, Material Matters, Inc.[1]; Jerry Stewart, City of Chattanooga; Alice Cannella, City of Chattanooga; Trudy E. Johnston, Material Matters, Inc.

The Moccasin Bend Wastewater Treatment Plant in the City of Chattanooga (Chattanooga) sought to resolve biosolids program data management challenges by utilizing an electronic tool that integrates data from 1) biosolids transportation, 2) laboratory analytical reports, 3) land application activity, and 4) nutrient management. The end goals were to:

- Meet regulatory compliance,
- **Simplify annual reporting,***
- Provide the agronomically appropriate amount of nutrients to the farmer,
- Enhance oversight of contractor(s),
- **Monitor and report land application program operational activity,***
- Provide auditing and checksum tools,
- Simplify data warehousing and retrieval, and
- **Integrate and enhance the existing Environmental Management System (EMS) program.***

*Identified by Chattanooga personnel as high-value benefits.

The need for electronically-assisted data management among biosolids generators and managers is increasing at a rapid rate. Regulatory reporting requirements are more demanding and beneficial use programs are scrutinized by an ever-growing community of stakeholders. The data management system automatically imports scale ticket data as well as laboratory analytical data, and each biosolids load is associated with the proper biosolids analytical data report. The automated data import represents the vast majority of data entry needed by the system to provide the user with regulatory compliance and nutrient status at each biosolids land application site. The automated data import functions provide a means to ensure that all scale tickets are properly assigned to land units and significantly streamline data entry into the system, greatly reduce the likelihood of data entry errors.

Chattanooga wants to ensure that its material is being land applied at appropriate agronomic rates, which means that scale tickets must remain intact and be properly assigned to fields. When hauling and/or land-application activities are outsourced, the ability to audit activity is essential. Both the generator and contractors want to have accurate hauling records to ensure the integrity of invoicing and payment. Ultimately everyone involved wants to know that they are part of a biosolids management program that responsibly handles material, efficiently does business, and submits accurate regulatory reports.

The role of efficient data management in the Chattanooga EMS program has also proven to be essential, as recordkeeping and response requirements for public requests for biosolids program information become more sophisticated.

The Chattanooga experience in using a relational database system for improving its biosolids management program will be presented. Increases in data management efficiency and access can and will be demonstrated.

[1] AStephens@materialmatters.com

Abstract Form

Title of Presentation: **Exploring the Feasibility of Biosolids-to-Energy**
Name of Presenter(s): **Kevin Rhodes, P.E.**
Organization: **Woolpert, Inc.**

Abstract Summary:

Mr. Rhodes has been active in the energy industry for over 26 years. More specifically, he has been developing and studying the feasibility of energy plants utilizing biomass/biosolids for the last four years. He holds a BSME from The Pennsylvania State University and is a licensed Professional Engineer in Ohio and Pennsylvania.

This 30 minute presentation provides an overview of renewable energy, particularly biomass/biosolids, and showcases an actual study performed to explore the feasibility of using undigested sewage sludge (biosolids) as a fuel source for a bioenergy plant that generates steam and/or electricity. The study describes thermal processes that make use of the biosolids as fuel, discusses project costs and compares several alternatives utilizing a net present worth analysis. The study also explores factors affecting feasibility and the sensitivity of those factors.

Key words: **biomass, biosolids, sewage sludge, renewable energy, combined heat and power**

KRÜGER

Beneficial Reuse of Biosolids with Lower Disposal Costs

Abstract

The City of Buffalo, MN has installed a Thermal Convection Belt Dryer and an Energy Recovery System to reduce their fuel costs by over 80% and their biosolids disposal costs by 95%. Facing growth, increasing amounts of biosolids, rising landfill costs, odors, and public opposition to land application the City choose a unique solution for minimize their operating cost and reuse the biosolids as fuel within their own plant. In 2008, the City purchased and installed a belt dryer to process dewatered WAS sludge and then use the dried biosolids as a fuel to produce heat for the dryer. This paper describes the overall configuration of the plant, drying system, energy recovery system, air permits, and flue gas treatment system as well as the quantifiable benefits of reduced operating costs, disposal costs, and reduced carbon footprint for the plant.

VEOLIA
WATER
Solutions & Technologies

Name T. Houston Flippin PE, BCEE

Title Industrial Wastewater Process Leader

Firm Brown and Caldwell

BC Contact *For additional information and coordination of conference attendance/activities, please contact:* Donna Corlew, SE Regional Marketing Manager

Email dcorlew@brwncald.com **Phone** 615-250-1270

Session Title Beneficial Use of Dairy And Carbonated Soft Drink Wastes In POTWs

Session Abstract Publicly Owned Treatment Works (POTWs) increasingly face more restrictive effluent nutrient limits as Total Maximum Daily Loads (TMDLs) are applied to receiving waters that are impaired, due to the presence of excessive nutrients. These limits are causing an increasing number of POTWs to upgrade to provide total nitrogen control (denitrification and nitrification) and total phosphorus control. The cost of iron addition and subsequent excess sludge handling and disposal cause more POTWs to upgrade to biological phosphorus removal. The readily biodegradable chemical oxygen demand (CODrb) naturally present in domestic sewage is inadequate for the denitrification and total phosphorus removal needs of these facilities. Historically, these facilities have added methanol as an additional source of CODrb. The cost of methanol had increased 123 percent through the 5-year period of 2003 through 2008. Additionally, the safety and security risks of handling methanol pose concerns. These concerns cause many of these facilities to turn to 56 percent by weight acetic acid as the current low cost source of CODrb. The cost of this material has increased by 48 percent during this same 5-year period. In either case, the cost of this type of supplemental CODrb is only expected to increase for POTWs, making the operating costs of denitrification and biological phosphorus removal escalate with time, while continuing to be influenced by market conditions. In addition, POTWs face increasing energy costs (greater than 37 percent increase over the last 5 years). This has caused an increasing number of POTWs to implement energy recovery with anaerobic digestion facilities. This practice will expand as energy costs continue to rise.

Within 200 miles of nearly all POTWs, there are fluid milk plants and carbonated soft drink bottling plants that supply our nation's demand for beverages. These plants dispose of highly concentrated wastes, at a considerable expense to the plants. These concentrated wastes offer a source of CODrb.

There is a "win-win" solution for POTWs, the dairy industry, and the carbonated soft drink bottling industry with a combined savings for all three groups, projected at greater than $126 million per year. One group needs a low cost source of CODrb; the other two groups provide this source and would benefit from a lower cost disposal option. This paper contains greater details of this synergy and concludes with case histories of those who have benefited from implementing this solution. Furthermore, the paper provides a comparative summary of the costs of six commercially available co-substrates that are often used by POTWs.

Local Limits Re-Evaluation for Louisville and Jefferson County MSD - 5 WQTCs, 80 SIUs, 4 Receiving Streams, 1 Class A Biosolids Product

Bradford E. Derrick, P.E., Strand Associates*
Daymond Talley, Louisville and Jefferson County Metropolitan Sewer District

*Contact Information: phone: (502)583-7020, e-mail: brad.derrick@strand.com

The Louisville and Jefferson County Metropolitan Sewer District initiated a detailed re-evaluation of technically based local limits for five of its regional Water Quality Treatment Centers (WQTCs) that treat a total of 150 million gallons per day on average. Louisville and Jefferson County MSDs Pretreatment Program covers over 80 Significant Industrial Users (SIUs) and 45 Categorical Industrial Users

In addition to normal considerations, this re-evaluation considered implications of the consolidated solids handling process used by Louisville MSD. Biosolids generated at all MSDs WQTCs are transferred to the Morris-Forman WQTC for further treatment and processing to produce over 60 tons per day of Louisville Green organic fertilizer.

A two-tier approach was taken. The first-tier analysis considered any known or observed issues indicating that a re-evaluation was necessary, such as observed upset conditions, known hazards, and environmental impacts. The second-tier analysis was performed through the use of the spreadsheet-based local limits model provide by USEPA Region 5. The second-tier analysis allowed for identification of pollutants of concern that were not obvious from already observed problems.

Topics addressed through the re-evaluation included:

- Review of applicable state and federal water quality and biosolids standards.
- Handling discrepancies between treatment plant influent and background concentration observed in the collection system.
- The impact of low level analytical detection methods on Local Limits
- Determination of site specific removal efficiencies and process inhibition levels.
- Development of mass based limits and assignment of mass allocations where large contributions by specific dischargers make concentration based limits unfeasible.
- Demonstration of alternate water quality criteria based on biomonitoring data.
- Recommendations to help utilities prepare for future re-evaluations.

The re-evaluation was submitted to Kentucky Department for Environmental Protection Division of Water (DOW) for review and approved without comment. New limits were incorporated in to MSD's Waste Discharge Regulations in 2009.

STRAND ASSOCIATES INC. ENGINEERS

Louisville Green

MSD
Metropolitan Sewer District

What if Industrial Flows Don't Make It to the Plant? SD1's Determination of Potential Water Quality Impacts from Non-Domestic Dischargers in their Combined Sewer System

C. D. Courter, Hazen and Sawyer, P.C. (Speaker)
B. Vatter, Sanitation District No. 1 of Northern Kentucky
ccourter@hazenandsawyer.com
(513) 469-2750
11311 Cornell Park Drive, Suite 135
Cincinnati, Ohio 45242

The Sanitation District No. 1 of Northern Kentucky's (SD1) Consent Decree (CD) required SD1 to submit documentation to support compliance with the Nine Minimum Controls (NMCs) for combined sewer overflows, including NMC No. 3, the review and modification of pretreatment. As part of this effort, SD1 evaluated the impacts of discharges into the combined sewer system (CSS) from non-domestic sources during wet weather

A Non-Domestic Discharger (NDD) does not generally have a measurable impact on SD1's collection system. However, groups of these industries that discharge like pollutants may contribute to higher than expected concentrations and therefore analyses were undertaken to determine the potential for impacts related to discharges into the CSS during wet weather events. GIS information was analyzed to determine if there were clusters of NDDs that discharge similar pollutants and require further evaluation. This analysis identified six clusters of NSUs that discharge like pollutants. The pollutants of concern within each cluster, their process sources, and proposed action levels were also determined. Follow up steps were taken, which can include meetings with cluster industries, NDD cluster sampling and potentially permitting.

A separate analysis procedure was devised for Significant Industrial Users (SIUs). The analysis determined:

- If WQS are being exceeded at the outfall
- If the SIU permit limits are protective of WQS
- If there is a risk of a particular SIU causing a water quality violation at the outfall
- If a particular SIU is a major contributor to the pollutant load at the outfall

First CSO water quality was evaluated and data showed levels of some pollutants in the CSOs that exceed the acute end-of-pipe WQS, in both the SIU influenced CSOs and at CSOs not influenced by SIUs. Additional analyses were performed to determine if a particular SIU is a significant contributor to the high levels of pollutants in the CSO and if the SIUs permit limits are protective of WQS. The analyses showed that, under certain circumstances, discharges at the permit limits from two SIUs could lead to pollutant concentrations at a CSO in excess of the acute end-of-pipe criteria. These industries maximum historical discharge sample results were substituted for their permit limits and the analysis re-run and only one industry flagged as a risk for impairment. As a result of this analysis, SD1 negotiated with the industry and they modified their process to mitigate this potential.

Based on the above analyses, only one SIU was shown to be a direct risk to water quality at the outfall. However, it was also confirmed that three others were contributing something to already high levels of some pollutants, so synoptic sampling results were further evaluated to determine if the contributions from these other industries is significant. Further analysis confirmed that the remaining SIUs were not significantly contributing to high concentrations at CSOs. Therefore, no other permit revisions were recommended. However, increased sampling was recommended for the second SIU whose permit limits were found to be not protective of WQS.

A Comprehensive Approach to Address Black Water Complaints

Rengao Song, Chris Bobay, Eric Zhu, and Emily Fritz
Louisville Water Company
550 South 3rd Street
Louisville, KY 40202

In all water systems, there are times that the water may appear discolored. In addition, discolored water complaints can account for as much as 80% of customer water quality complaints.

Excess manganese in the Louisville Water Company's (LWC)'s finished water led to seasonal spikes in black water complaints, most notably in June 2007 when 104 complaints were recorded.

This presentation will address the following topics:

- How LWC transfers the customer complaint data into useful water quality information and help diagnose the root-cause of black water complaints

- What treatment methods LWC has employed to minimize manganese levels in finished water. More importantly, LWC's operational and process engineering experience can be utilized to develop a Trigger Point and Action Level for manganese control. A series of treatment methods and their effectiveness will be presented including:
    - Lime softening
    - Chlorination-filtration
    - Permanganate application (liquid and solid forms)

- How LWC addresses the manganese that is already built-up in the distribution system through modified flushing activities.

LWC's experience to address black water complaints can serve as a road-map for other utilities to effectively improve distribution water quality. In turn, water utilities can provide high quality safe water to their customers.

2010 Kentucky-Tennessee Joint Professionals Conference Abstract

Setting up a Certified Bacteriological Lab-It is more than just buying lab equipment

In July of 2010 Kentucky American Water (KAW) is scheduled to begin producing water from the new 20 MGD Kentucky River Station II plant located in Owen County, Kentucky. The new water treatment plant will have the facilities to support a certified bacteriological lab. The WQ department at KAW has evaluated whether or not it would be cost effective to establish a certified bacteriological lab at the facility or to continue processing samples through the certified lab located at KAW's Richmond Road Station. This presentation will review what steps were taken to evaluate the need of a new lab and the costs of setting up the lab. Along with setting up the lab with equipment the presentation will explore what all is required to set up a lab from certification (inspection by certification officer, training of personnel, etc). The presentation will also discuss the advantages a certified bacteriological lab gives utilities.

Key Design Parameters of Advanced Oxidation Processes for Emerging Contaminant Destruction

Scott M. Alpert, PhD, PE
Hazen and Sawyer, P.C.

Emerging contaminants are becoming a critical and controversial issue for water treatment utilities, regulators, and design engineers. As the use of pharmaceuticals, personal care products, and endocrine-disrupting compounds continues to rise, utilities will face increasing pressure by regulators and the public to remove emerging contaminants within the water treatment process. Advanced oxidation processes (AOPs) are an attractive alternative for the destruction of emerging organic contaminants that are not easily removed using conventional water treatment processes. The primary objective of this presentation is to educate water professionals on the evaluation of advanced oxidation processes for incorporation into the treatment system.

Various types of advanced oxidation processes have been developed for emerging contaminant destruction. The two most relevant AOPs for water treatment utilities are those processes using hydrogen peroxide combined with either UV radiation (UV/H_2O_2) or ozone (UV/O_3). Analysis of these systems must consider reactor design hydrodynamics, UV or O_3 dose distributions, and chemical kinetics including reaction mechanisms and kinetic rate constants. Design factors such as upstream hydraulic configurations may also influence process performance. Perhaps most importantly, water quality effects, including the impact of radical scavengers, must be considered. This presentation will examine the key parameters in selecting and sizing appropriate AOPs, the performance comparison between AOPs and other advanced treatment processes for emerging contaminant removal, and the major cost components for installation and operation of these processes. As an example of a design tool, this presentation will also introduce numerical modeling using computational fluid dynamics (CFD) to simulate UV/H_2O_2 AOPs.

By attending this presentation, the audience will gain further insight into the concepts of advanced oxidation and the use of AOP in addressing the emerging contaminant issues now relevant to all water utilities.

Ways to Meet New Rules: Meeting Stage 2 D/DBP Rule in 2010

Frank Rombardo, P.E., Jordan, Jones & Goulding, Inc.

Frank.Rombardo@jjg.com, **678-910-0304**

Stage 2 D/DBP Rule was implemented to strengthen public health protection for customers by tightening compliance monitoring requirements for two groups of DBPs, trihalomethanes (TTHM) and haloacetic acids (HAA5).

With water systems serving over 50,000 customers having IDSE evaluation reports that were due by July 2009 and smaller water systems having IDSE evaluation reports that will be due in 2010; utilities are investigating alternative strategies to the control DBP formation, both in the treatment plant and in the distribution system.

Columbus Water Works (CWW) investigated several alternatives for meeting upcoming requirements of the Stage 2 D/DBP Rule at its 70-MGD North Columbus Water Resources Facility. Six alternative approaches for establishing reliable compliance were considered during the study. These alternatives included:

1. **Magnetic Ion Exchange (MIEX)**: Treating the full raw water flow or a portion of the raw water flow to remove DBP pre-cursors using MIEX.
2. **Lower pH**: Replacing the existing distribution system corrosion control method of adjusting to pH 9 with maintaining a lower pH and introducing a corrosion inhibitor to the distribution system.
3. **Chloramines**: Switching to chloramines from free chlorine for residual disinfection to lower DBP formation.
4. **Optimize Coagulation**: Optimizing coagulant and pre-oxidant use to increase DBP pre-cursor removal.
5. **Powdered Activated Carbon (PAC)**: Feeding PAC to remove DBP pre-cursors.
6. **Distribution System Management**: Modifying distribution system operation to reduce detention times in pipes and storage tanks.

This paper presents results of the study and compares the listed alternatives for DBP control. The alternatives are evaluated based on DBP removal percentages and the cost of implementation. The paper will close by discussing ways to implement the evaluated alternatives for limiting the formation of DBPs to meet compliance monitoring by 2012.

Evolution of a SCADA System

Doug Kimbler -- Bowling Green Municipal Utilities
Terry Hendrick – Bowling Green Municipal Utilities
Jordan Blacklock – Bowling Green Municipal Utilities

Contact information: Doug Kimbler, Treatment Plants Superintendent
Bowling Green Municipal Utilities
P.O. Box 10300
Bowling Green, KY 42102-7300

270-782-4548 (o)
270-792-9941 (m)
dkimbler@bgmu.com

SCADA has become an integral and invaluable part of plant operations. This paper will review the process of selection and implementation of our plant's current SCADA system and the familiarization of plant personnel with SCADA operations and functions. It will also review the evaluation process of maintaining and upgrading the system. Finally, it will explore the long term prospects for data acquisition and analysis and new technology evaluation and utilization.

Capital Planning in an Uncertain Economy – SJWD's Water Plant Capacity Expansion

Clint Shealy
Paul Hargette
Black & Veatch
201 Brookfield Parkway, Suite 150
Greenville, SC 29607
Telephone: (864) 234-6678
Fax: (864) 234-0784

Mike Caston, SJWD Water District
Billy Cothran, SJWD Water District

ABSTRACT

The SJWD Water District owns and operates water resources, a surface water treatment plant, and a potable water distribution system in Spartanburg County, SC. A capital improvement plan (CIP) was developed in 2008 that included a phased implementation plan for capacity expansion at the water treatment plant and improvements to the distribution system. Since that time, the economic downturn and increased rainfall have impacted water sales and revenue and created the need to re-evaluate the planned capacity expansion increment and timing.

The WTP has a present capacity of 14 million gallons per day (mgd) and the previously developed CIP recommended an 8 mgd expansion to provide capacity for future residential, commercial and industrial growth. SJWD contracted with Black & Veatch to assist in revising the CIP and develop a plan to increase the WTP capacity while balancing reduced revenues and capital expenditure restrictions. The evaluation included the following elements:

- Review of demand projections in light of economic downturn;
- Consideration of proposed water rate structure modifications and conservation efforts on future water demands;
- Review of recommended water resource and distribution system improvements to determine which projects could be delayed;
- Phasing plan for WTP expansion to allow deferment of capital expenditures;
- Development of revised CIP to coincide with reduced revenues.

This paper will present all aspects of the planning and decision making process to defer or proceed with capital projects, with particular emphasis on the decision to proceed with a 4 mgd WTP expansion. The paper will also present a summary of results from onsite pilot-scale testing of inclined plate settlers in conjunction with both conventional granular media filtration and membrane filtration technologies, with membrane filtration selected as the most appropriate treatment technology for the 4 mgd WTP expansion.

Abstract

Title: Lessons Learned from Start-Up of New Membrane Filtration Water Treatment Plant in Upper East Tennessee

Main Author: David L. Jones, P.E.
Employer: CTI Engineers, Inc.
Contact Information: 112 Durwood Rd., Suite A
Knoxville, TN 37922
Phone: 865-246-2750
Fax: 865-246-2755
Email: djones@ctiengr.com

In July 2009, after almost two years of construction, the First Utility District of Hawkins County began operations of its new 5.2-MGD membrane filtration water treatment plant along the Holston River in Church Hill, TN. The size and complexity of the project lend itself to a review of "lessons learned" regarding construction and operational start-up of a new enhanced coagulation membrane filtration water treatment plant.

A pictorial review of the project from membrane pilot testing through the construction of the treatment plant and raw water intake will be presented. Lessons learned will focus on the areas of construction and operational start-up of the new plant and intake. These lessons will be referenced back to the original engineering design concepts.

Operational start-up issues will specifically address the membrane filtration performance testing protocol and results. The quality of finished water is quite different than that of the District's older water plants. Short-term impacts of the new plant operations on the District's existing water distribution system will be discussed. In addition to the new physical process of membrane filtration, new chemical processes in the membrane plant include the capability of pre-feeding powdered activated carbon, hydrogen peroxide, and coagulant (aluminum chlorhydrate) ahead of the membrane filters and post-feeding the finished water with sodium hypochlorite (bleach) and fluorosilicic acid (fluoride). Except for fluoride, all of these are different than the District's previously used water treatment chemicals.

Resulting water quality data (e.g., turbidity, total organic carbon, alkalinity, hardness, pH, etc.) for the new water treatment plant and its impact on the existing water distribution system in terms of disinfection byproducts, corrosivity, etc., after almost a year of operation will be summarized.

On-Site Hypochlorite Generation: A Look at the Numbers

Authors: Catherine Keenan, P.E., Alana Loughlin, P.E., David Laliberte

Disinfection using sodium hypochlorite has become more and more attractive as an alternative to chlorine gas because of the hazards associated with handling chlorine as well as regulations affecting the shipping, storage and feed of chlorine gas and design and operation of chlorine facilities. Bulk sodium hypochlorite storage and feed systems are being used very successfully at many water and wastewater treatment plants throughout the country. However, issues such as degradation, corrosivity, and cost of bulk hypochlorite have caused many utilities to consider generating hypochlorite on-site as an alternative to purchasing hypochlorite in bulk.

In on-site generation facilities, salt and conditioned water are mixed to form a brine solution. This brine solution is passed through an electrolytic cell where a low-voltage DC current is applied to convert the brine to a dilute (0.8%) sodium hypochlorite solution. The dilute hypochlorite solution is stored in bulk tanks and fed using conventional metering pumps. On-site generation of hypochlorite is an attractive option for providing disinfection at water and wastewater facilities because of the low cost of salt and the low concentration of hypochlorite solution produced.

This paper will review the design, installation, and operation of an on-site sodium hypochlorite generation facility provided for a new 15 mgd water treatment plant. The new treatment plant was commissioned in December of 2008, and the sodium hypochlorite system has been in operation since November of 2008.

Preliminary design of this disinfection system included an evaluation of bulk hypochlorite vs. hypochlorite generated on-site. This paper will compare the equipment and operation and maintenance requirements for the two alternatives. A cost comparison of bulk hypochlorite vs. on-site generation will also be included.

Design details of the final on-site hypochlorite generation system will be provided in the paper. One 59-ton brine tank was provided to supply brine to the generators. Three skid-mounted hypochlorite generation systems were installed to provide a firm capacity of 1,000 pounds per day of chlorine. Two 17,000-gallon storage tanks were installed, and four peristaltic metering pumps with capacities ranging from 313 to 625 gallons per hour were provided. The system was designed to allow for feed of bulk hypochlorite as well as on-site generation, and information on designing for flexibility will be included.

Lessons learned during installation and start-up of the system will be included in the paper. In addition, detailed information on operation and maintenance of an on-site hypochlorite generation facility will be provided.

Riding the Wave of Community Energy Planning:

Why Energy Efficient Utilities are a Key Player in Urban Energy Management

Authors: Amelia Ravin, CDM, 1515 Poydras Street, Suite 1350, New Orleans, LA 70112, 504-799-1100

Rob Phocas, City of Charlotte; Jackie Jarrell, Charlotte Mecklenburg Utilities; and Jeff Payne, CDM.

United States cities and counties are currently utilizing more than $2 billion of Energy Efficiency and Conservation Block Grant (EECBG) stimulus funding to develop comprehensive energy management strategies for public facilities and the broader community, including programs for residential and commercial energy management. The new EECBG program provides an unprecedented level of funding for local governments to develop strategic energy management plans. As water and wastewater often represent the highest energy-consuming facilities within a local government, typically accounting for 20 to 50 percent of energy consumption, these utilities are critical components of community energy planning.

This paper will provide an overview of the EECBG program and its importance to local government energy management, discuss the opportunities for utilities in using these funds, provide data from U.S. Department of Energy on how the EECBG funding is benefiting the water industry, and highlight ongoing examples of community energy planning where water and wastewater agencies are involved in a multi-stakeholder process.

One initiative discussed in detail will be a project conducted for the City of Charlotte, North Carolina, in which CDM was retained to assist the City in developing an Energy Efficiency and Conservation Strategy and long-term Energy Action Plan in support of EECBG funding. A total of 18 projects were included in the multi-faceted Energy Strategy that consisted of projects that have a high level of community support, provide educational opportunities, are highly visible, and have the potential to serve as a catalyst for future projects. It is estimated that implementation of the Energy Strategy will result in an annual greenhouse gas emissions reduction of 37,000 metric tons and an annual energy savings of 41 million kWh, or $2.54 million in annual energy savings.

Charlotte Mecklenburg Utilities (CMU) has been a key stakeholder in the process of assessing energy use across all City departments and developing a plan for using the EECBG funds as well as the longer-term strategy, the Energy Action Plan. In Charlotte, CMU's energy and greenhouse gas emissions contribute to 29 percent of the total for city operations. As a significant energy user, CMU has made several proactive steps to engage in the Energy Action Plan process and find innovative ways to lower energy consumption within their facilities and fleet, including the use of methane and grease for energy projects at its wastewater treatment facilities and use of low-fuel/hybrid fleet vehicles. Key lessons learned and next steps will be presented from both the utility's and the City's perspective.

Achieving Economic and Environmental Sustainability Objectives Through On-Site Energy Production from Digester Gas

[1]C. Michael Bullard, PE, [1]Matthew A. Fishman, PE,
[1]Bryan R. Lisk, PE and [2]Scott A. Hardy, PE

[1]Hazen and Sawyer, PC
4011 Westchase Blvd.
Suite 500
Raleigh, NC 27607
PH: 919-833-7152

[2]Hazen and Sawyer, PC
5775 Peachtree Dunwoody Rd.
Suite D-520
Atlanta, GA 30342
PH: 404-459-6363

Anaerobic digestion is commonly utilized for wastewater residuals stabilization and the resultant methane rich digester gas (biogas) stream is commonly utilized for digestion process heating. It is estimated that of the 16,000 centralized wastewater treatment facilities in the United States approximately 3,500 utilize anaerobic digestion for residuals stabilization. However, only about three percent (~100) of those facilities are currently utilizing biogas to produce electricity and thermal energy in combined heat and power systems (USEPA Combined Heat and Power Partnership, 430R07003, April 2007). Increasingly, wastewater treatment facilities that utilize anaerobic digestion are examining biogas beneficial use projects for energy recovery that transcend the current, and most common, practice of only capturing heat energy for process heating and flaring surplus biogas.

Evaluating biogas-to-energy beneficial utilization projects must account for a wide range of site specific criteria in determining the quantity of usable energy that can be extracted from the biogas while simultaneously balancing process heating demands which are essential to anaerobic digestion process stability. These on-site criteria include primary and secondary sludge mass fractions, digester residence time, seasonal heating demands, and local electrical energy costs. In many cases these on-site criteria will determine the economic viability of converting digester gas to electrical/mechanical energy in a combined heat and power system.

Specifically, we will present selected results from several biogas utilization studies conducted for facilities ranging in size from 15-MGD to 75-MGD covering a wide range of site specific operational criteria. These case studies will identify factors which contribute to both the economic viability and environmental sustainability of combined heat and power (CHP) projects. The goal is that by identifying these factors utilities considering CHP projects can make reasoned choices with regard to digester gas utilization.

The paper and presentation will cover the following major topics:

- Typical Site Specific Demands and Constraints for Gas Utilization
- Typical Digester Gas Energy Recovery Systems
- Siloxane and Micro-Constituent Impacts on Biogas Beneficial Use
- Combined Heat-and-Power Energy Recovery System Process Configurations
- Lifecycle Cost Assessment with Variable Biogas Production
- Economic Benefits Assessment and Cost Recovery
- Environmental and Climate Change (Greenhouse Gas Reduction) Benefits

A Green Alternative for Dissolved Nutrient Recovery in Wastewater Side Streams

Main Author: Laurissa Cubbage – Hazen and Sawyer
4011 WestChase Blvd., Suite 500, Raleigh, NC 27607, 919-833-7152

Co-Authors: Alan Stone, Katya Bilyk, Paul Pitt – Hazen and Sawyer, P.C.
John Dano, Bill Balzer, Charles Bott – Hampton Roads Sanitation District, VA
Aynul Dharas, Ahren Britton – Ostara Nutrient Removal Technologies, Inc.

Abstract

Wastewater treatment utilities expend significant sums of money and energy every year to remove nitrogen and phosphorus from wastewater, yet these same nutrients can be valuable feedstocks in other applications, such as agriculture. It is predicted that sufficient, readily available, minable phosphorus will not be available in the near future to support current and future agricultural demand. One process to beneficially recover these nutrients from wastewater is a centrate treatment process aimed at simultaneously recovering both phosphorus and nitrogen by creating a sustainable end-product which can be marketed as a slow-release fertilizer. The centrate treatment technology evaluated for this nutrient recovery project is manufactured by Ostara Nutrient Removal Technologies (Ostara).

This paper will present the results of the technical and economic evaluation of the Ostara-Pearl™ process for the 30-mgd Hampton Roads Sanitation district (HRSD) Nansemond Treatment Plant (NTP). The Ostara process allows the NTP to capture nitrogen and phosphorus which would be discharged to the James River, a tributary of the Chesapeake Bay, and convert it to an agriculturally beneficial product. Based on the pilot tests, the Ostara-Pearl™ process is expected to reduce the centrate phosphorus load up to 90%, and centrate ammonia load up to 10%. The Ostara process was compared with a more traditional nutrient removal alternative of ferric chloride precipitation of phosphorus for the evaluation. The cost evaluation demonstrated that the Ostara process is cost competitive compared to ferric chloride addition and these results will be presented in the paper.

Design, construction, and operational aspects of the Ostara facility, named the Struvite Recovery Facility (SRF), will also be discussed in this paper. Due to time constraints set forth by the Chesapeake Bay Initiative, the SRF will be delivered using a fast-track design and construction schedule, with the SRF expected to be complete by March 2010, and producing twenty (20) tons of fertilizer per month by April 2010. When completed, the NTP facility will be the second and the largest full-scale Ostara-Pearl™ installation in the United States. Operational data is expected to show reductions in recycle side stream phosphorus and nitrogen loads and increased liquid stream process efficiency, which will be presented with this evaluation when available.

TENNESSEE'S APPROACH TO REGIONAL WATER RESOURCE PLANNING: MEETING FUTURE WATER NEEDS THROUGH SUSTAINABLE SUPPLIES

Tom Moss[1]
Paul Davis[2]

INTRODUCTION

The Tennessee Department of Environment and Conservation is partnering with the U.S. Army Corps of Engineers, the Tennessee Advisory Commission on Intergovernmental Relations, the USGS, The Nature Conservancy and others to develop a water resources regional pilot plan in each of two areas of the state. The study will assess the existing water resources for the two specific areas and project the preferred alternative for water supply to meet future needs.

The purpose of this paper will be to present and discuss the two pilots, and more broadly to discuss the model for regional water resource planning in Tennessee that is being developed through this process. It is anticipated that this paper could be presented as part of series, with companion presentations from others who are also involved in the development of the pilot plans, such as USGS, The Nature Conservancy, modeling consultant Hydrologics, USACOE, or TACIR.

MODEL REGIONAL WATER RESOURCE PLANS

The benefits of a regional water plan have been discussed and recommended by the department's Water Resources Technical Advisory Committee. See http://tn.gov/environment/boards/wrtac/. In order to develop a process and demonstrate the utility of regional planning, two pilot areas were selected for initial planning efforts. Those two pilot areas are North Central Tennessee, including Portland, Gallatin, Castalian Springs, Bethpage, White House and Westmoreland and the South Cumberland Plateau consisting of portions of Franklin, Grundy, Marion and Sequatchie counties and the towns of Tracy City, Sewanee, Altamont and Monteagle.

At this point, the Corps of Engineers has completed Phase I of the pilot, which focused on the collection of existing background data for the study area. A series of meetings was held over the summer and early fall 2009 to introduce these communities to the regional planning process and to provide participants with the opportunity to ask questions about the information presented. In addition to the general public, mayors, water department management, planners, county commissioners and other local elected officials attended these meetings.

We continue to work on the next phases of the pilot that will include the steps required for us to recommend a preferred alternative for meeting the future water supply needs of the region. The current focus is on developing the water availability data and water demand projections, using baseline data from the utilities and some modeling. We are gathering input from the public on alternatives to be considered.

It is anticipated that actual compilation and writing of the pilot plans, a task that is being undertaken by the Tennessee Advisory Commission on Intergovernmental Relations, will be well underway by the date of presentation.

PRESENTERS

1 – Tom Moss, Acting Director, TDEC, Division of Water Supply
615-523-0170
tom.moss@tn.gov

2 – Paul Davis, Director, TDEC, Division of Water Pollution Control
615-532-0632
paul.estill.davis@tn.gov

Balancing Competing Uses for Comprehensive Regional Water Supply Plan in Central Tennessee

Thomas E. Dumm, PE [1], George Rest [1], Doug Murphy [2], Joe Bishop, PE [3]

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 reached record low water levels during the 2007 drought. This drought highlighted the complicated balance of the competing uses for the Duck River which include wasteload assimilation, environmental flow for threatened and endangered species, municipal and industrial water supply, irrigation, and recreation. The Duck River is nationally recognized as one of the most biologically diverse rivers in the United States. The key study objectives include 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.

This presentation will include a chronology of the challenges and findings from the comprehensive regional water supply plan 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.
- 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

Title: Cost Savings Potential of Recycling Waste Streams at the City of Greensboro

Authors: Nicole Litton (Asst. Engineer) – Hazen and Sawyer, PC
Jay Jackson (Senior Associate) – Hazen and Sawyer, PC
Steve Drew (Water Supply Manager) - City of Greensboro

With recent droughts affecting the Carolinas and much of the Southeastern U.S., the City of Greensboro (NC) elected to evaluate the potential for reinstating a recycle system at the Mitchell WTP to recover spent backwash water, filter-to-waste water and supernatant from clarified sedimentation basin sludge. Currently, these streams are discharged to either a permitted creek location or to the sanitary sewer. Recycle water could potentially offset costs associated with purchasing water from other municipalities during times of drought or high demand, offset raw water pumping electrical demand and associated costs, as well as reduce the potential introduction of diminished quality raw water resulting from low reservoir water levels during droughts.

The purpose of this presentation is to review Greensboro's potential to recover recycle water at the Mitchell WTP. This review included an estimate of recycle water volumes, evaluation of recycle water quality and an evaluation of treatment alternatives such as ultraviolet disinfection. Additionally, the required modifications to retrofit the existing backwash equalization facilities to permit recycle were determined.

The evaluation provided preliminary design and construction cost estimates for the recycle stream treatment system alternatives. Net present worth cost analyses for implementing recycle treatment alternatives were also included. The analyses were compared to the costs associated with purchasing finished water from neighboring municipalities and raw water pumping electrical demands to determine the net savings of recycling backwash water.

After attending this presentation, listeners will understand the factors related to recycling of waste streams within a water treatment plant, the infrastructure modifications necessary to retrofit an existing plant, and the potential cost savings that can be achieved as by implementing a recycle system.

ABSTRACT_KINGSPORT WWTP STARTUP- IS THIS GOING TO WORK?_STEPHEN H. KING.

Title: Kingsport Wastewater Treatment Plant Startup – Is this Going to Work?

Main Author: Stephen H. King

Employer of Author: CDM

Contact Information for Author:

CDM
800 Oak Ridge Turnpike
Suite B200
Oak Ridge, TN 37830
Direct Phone/Fax: (865) 425-5405
Office Phone: (865) 482-1065
Mobile: (615) 828-9480

Abstract Selection: General Issue Topics- Engineering and Construction

Kingsport Wastewater Treatment Plant Startup – Is this Going to Work?

This presentation will review the equipment startups for the Kingsport Wastewater Treatment Plant (WWTP) upgrade scheduled for completion in March 2010. The presentation is planned to cover the lessons learned of the startup process at the plant. Topics that will be discussed include:

- **Startup of the Sludge Heating System:** Issues with the MCC, problem with the flame sensor on the boiler, and getting natural gas to the site when needed.
- **Startup of the sludge grinders in the primary head house**: When the electrician was checking for proper rotation of the grinder, he removed a cover plate and caused sludge to spray out of the hole as the tank was full the valve was not closed.
- **Startup of the intermediate pumps:** Problems with the variable frequency drives prevented the pumps from starting. After several hours the problem was corrected.
- **Aeration system startup:** The aeration system startup proved that the system provided too much air and had to be throttled back to almost blower shutoff.
- Most of the startups were videotaped to document the process. This process and the results will be discussed.
- Additional equipment startups are planned between now and the conference. These will also be included in the presentation.

Title: "Inside the Fence" Energy Optimization Approach and Case Studies
Main Author: John Perry, PE
Co-authors: Chris Carr, PE; Stuart Jeffcoat, PhD, PE
Main Author's Contact:
CH2M HILL
2095 Lakeside Centre Way
Suite 200
Knoxville, TN 37922
Office: 865.769.3200
Cell: 865.274.2519
email: john.perry7@ch2m.com

Energy costs at treatment plants can consume as much as half of the utility's operating budget. Energy costs continue to rise and the market will remain volatile for the foreseeable future. Some utilities are experiencing increased costs due to utility rate increases at the same time revenue is declining due to decreased demand brought on by drought conditions. Some are facing deregulation of the utility markets while others are faced with utilities that are shifting to more market based rate structures. All of these reasons add to the importance of achieving better optimized facilities and operations "inside the fence" at water and wastewater treatment facilities.

The key to an effective energy evaluation is to avoid limiting the focus of the effort to equipment efficiency. Energy optimization of treatment facilities is as much, if not more, about process than it is about equipment and electricity. Process and operational opportunities should be the initial focus in order to obtain cost savings with minimal capital investment. This is the "low hanging fruit" that can generate significant energy cost savings by making adjustments to operating procedures.

Elements of successful energy optimization evaluations will be presented. These elements include: 1) a chartering workshop with the owner and operators to define the utility's goals for the evaluation, 2) collection and evaluation of site specific data which includes electrical billing charges, equipment efficiencies, process operations, energy source options and rate structures, and management practices, 3) site visits to evaluate the operation and infrastructure at the facilities, 4) development of a baseline electrical usage model that is calibrated and used to analyze alternate operating scenarios, 5) workshops with the owner to review identified energy saving opportunities with estimated capital investment and payback period calculations, and 6) preparation of the final energy optimization report.

Results and findings from several recent assessments for both water and wastewater treatment facilities will be presented to demonstrate how significant energy cost savings can be generated through the optimization of operations at treatment facilities.

TANSTAFL: The ESCO Energy Optimization Process at 4 WWTPS

Robert F Wimmer, PE

The Washington Suburban Sanitary Commission (WSSC) serves 1.8 million residents with water and wastewater service with 2 surface water treatment facilities and 5 wastewater treatment plants. In an effort to reduce operating costs and encourage sustainable practices the Commission entered into a series of agreements with an Energy Services Company (ESCO) to perform Energy Performing Contract (EPCs). These alternative delivery projects involved the Commission conducting upgrades to water and wastewater treatment facilities based on guarantees of reduced operating expenditures.

In this project delivery and financing method, the ESCO in conjunction with the Commission and the owners engineer conducted preliminary evaluations of treatment processes in an effort to identify opportunities for reduction in operating expenses (power consumption, demand management, solids disposal and fuel usage, based on a 15 year payback period. Upon agreement between the owner and the ESCO as to the process improvement, construction cost and reduction in operating costs, the owner and ESCO entered in an agreement whereby the ESCO designed and constructed the improvement (under a modified design-build process) and the ESCO guaranteed the projected operations savings for a 15 year period.

The first series of project involved the expenditure of $10.2 M in construction and design cost with a guaranteed annual savings of $700,000 per year. In the first two years of operation, these projects have saved $1,500,000 per year. While these figures indicate that the Commission has been able to have its cake and eat it too, "There ain't no such thing as a free lunch" (TANSTAFL). The process and implementation of these projects demonstrated a number of lessons to the Commission in how to conduct the initial evaluation, design, construction and verification of energy savings. This paper will detail the challenges and lessons learned from the ESCO process and demonstrate the path to success for future ESCO projects.

The process demonstrated the importance of well defined and consistent design standard, particularly for instrumentation and control, electrical and HVAC systems. The Commission was challenged with developing and writing appropriate contractual terms at the preliminary design stage, as that is stage at which the project cost is established and requirements for equipment are developed. In addition, the Commission was challenged with balancing the desires and requirements of multiple groups including operations, engineering, finance, and power management. The paper will present examples of each of the challenges, along with solutions to the challenges that allow the Commission to continue with this project delivery method with greater success.

How Low Can You Go? When a BNR Oxidation Ditch Meets Low Phosphorus Limits

Karen Harrison, P.E., Jordan, Jones & Goulding, Inc.
678-333-0259
karen.harrison@jjg.com
Keith Higgs, DDCWSA

Faced with the need to increase wastewater treatment capacity and comply with strict effluent limits, Douglasville-Douglas County Water and Sewer Authority [GA] determined that they wanted to use oxidation ditch technology to construct a new greenfield wastewater treatment plant (WWTP) called the South Central WWTP.

The 6.0-MGD facility was designed to meet the following monthly average effluent limits: $cBOD_5$ of 2.9 mg/L; total suspended solids (TSS) of 5 mg/L; ammonia-nitrogen (NH_3-N) of 0/5 mg/L; and total phosphorus of 0.3 mg/L. Treatment processes include screening and grit removal, flow equalization, biological treatment using oxidation ditch technology with anaerobic and anoxic sections upstream of the ditches, secondary clarifiers, tertiary clarification, tertiary filtration, ultraviolet disinfection and post aeration. The plant was designed to remove a portion of the phosphorus biologically and the remainder using ferric chloride precipitation.

The plant has been in operation for about a year, and is operating at design load, since the influent flow averages 2.9 MGD and only one of the two process trains are being operated. The plant currently produces effluent that averages less than 1.0 mg/L $cBOD_5$, less than 2.0 mg/L TSS, less than 0.2 mg/L of NH_3-N, and 0.13 mg/L of phosphorus without ferric chloride addition.

This paper will present design details of the biological and tertiary treatment processes, along with detailed operating data.

Program Abstract

Title of Presentation: Phosphorus Removal How To's

Abstract

Over the past 10 years, several wastewater treatment plants in the southwest Missouri and northwest Arkansas region have added facilities for removal of phosphorus meeting effluent limits as low as 0.5 mg/l. These plants include biological phosphorus removal processes, as well as chemical addition and effluent filters in order to meet low effluent phosphorus limits. The basics of these processes will be briefly explained. The presentation will be focused on experiences gained from the operation of phosphorus removal processes at five different treatment plants in the region, highlighting how the unique circumstances of each of the treatment plants dictate various operating strategies in order to meet low effluent phosphorus limits. These operating lessons provide a knowledge base that can be applied by designers and operators to other treatment plants that are planning new facilities for meeting low effluent phosphorus limits.

Co-Authors:

Steve Yonker, P. E.*
Project Manager
Burns & McDonnell
9400 Ward Parkway
Kansas City, Missouri 64114
816-822-3102
syonker@burnsmcd.com

Mike Ray
Division Head of Public Works Administrative Services
City of Branson, Missouri

Tom Holst
Plant Superintendent, Southwest WWTP
City of Springfield, Missouri

Harold Hull
Wastewater Facility Director
Springdale Water Utilities
City of Springdale, Arkansas

*Presenter

BIOLOGICALLY ENHANCED HIGH-RATE CLARIFICATION – A PILOT STUDY

Katherine Bell, Ph.D., P.E.[1], BCEE; Bernard Maloy, P.E., BCEE[3]; Joshua Johnson[2]; and Joshua Norton, P.E., BCEE[3]

[1]Corresponding Author, CDM, 210 25th Avenue North, Suite 1102, Nashville, TN 37203
[2]Knoxville Utilities Board, Knoxville, TN
[3]CDM, Oak Ridge, TN

Abstract

Despite being able to remove 60 percent of biochemical oxygen demand (BOD) and greater than 90 percent of total suspended solids (TSS), high-rate clarification (HRC) has been limited by its inability to remove dissolved BOD. HRC-treated effluent must typically undergo secondary treatment or be blended with secondary or tertiary treated wastewater to meet discharge limits. However, recent research has demonstrated that biologically enhanced high-rate clarification (BEHRC), a process that adds active biosolids to the HRC system for dissolved BOD adsorption, can meet secondary treatment requirements (CDM, 2006). The BEHRC process uses return activated sludge (RAS) that is capable of absorbing BOD and storing it as food to utilize as a nutrient source under favorable conditions. The contact/stabilization process was developed using this theory and has been practiced successfully for many decades. Soluble BOD absorption is a function of contact time and RAS concentration engaged in this process.

Thus, by achieving as much as 90-percent total BOD removal and 99-percent TSS removal, BEHRC meets discharge regulations without the need for additional treatment or blending. Field tests have indicated better-than-anticipated performance, showing that during peak wet-weather flows, BEHRC can remove 85 to 90 percent of total BOD and 95 to 99 percent of TSS from dilute raw wastewater. Proven successful, implementation of the newly patented process has been approved by the U.S. Environmental Protection Agency (EPA) to eliminate the need for additional secondary treatment or blending at two wastewater treatment plants (WWTP) in the Knoxville Utilities Board service area.

Because HRC is an established process, the development of design criteria for implementation is fairly straightforward for TSS removal. However, as BEHRC is a relatively new process application, it is necessary to develop site-specific data for predicting performance and adjusting design criteria to optimize soluble BOD removal for full-scale treatment. As a result, a piloting program has been implemented for testing BEHRC at both the Kuwahee WWTP and the Fourth Creek WWTP. The focus of the pilot study was to establish the biosolids contact time and biosolids concentrations that will be used as the basis of full-scale design, with the mixed liquor suspended solids (MLSS) concentrations of 200 to 800 milligrams per liter (mg/L) being tested.

This paper will present results of the characterization of soluble BOD and its relationship with soluble chemical oxygen demand (COD), which can be analyzed in a short turn-around time to allow pilot process adjustment without waiting for a 5-day test. The results of the pilot test will also be discussed with respect to selection of design criteria for full-scale process contact time and MLSS concentration.

FULL SCALE EXPERIENCE OF IFAS SYSTEMS AND APPLICATION IN KENTUCKY

Phil Wood, G.A. Thesing, D.O. Foster

Qk4, 815 West Market St., Suite 300, Louisville, KY 40202

Kruger, Inc. 401 Harrison Oaks Blvd., Suite 100, Cary, NC 27513

Integrated Fixed-Film Activated Sludge (IFAS) for municipal wastewater treatment is gaining acceptance in the U.S. because of its unique features such as year-round ammonia removal, adaptability for retrofitting, and ability to utilize existing tankage. The technology combines beneficial features of fixed-film biomass with activated sludge. In particular, the fixed-film component of the system allows slower growing nitrifying bacteria to remain in the biological inventory, even during periods of colder water and slow growth. Faster growing heterotrophic bacteria remain largely in the mixed liquor suspended solids phase of the biomass, and they mediate the oxidation of organic compounds to remove BOD.

This paper will investigate several full-scale U.S. installations of the IFAS system, with a focus on the system designed and bid for the Shepherdsville, Kentucky WWTP. A design overview, effluent objectives, and special features from each plant will be presented.

The City of Shepherdsville, KY retained Qk4 to investigate design options for upgrading treatment capacity of its municipal wastewater treatment plant. The need for this expansion was driven by the fact that the City was going to be taking on a new industrial customer with a strong wastewater in the range of 1,500 to 1,600 milligrams per liter. In addition, the plant is currently at 90% of its hydraulic treatment capacity. The plant expansion will have a rated initial capacity of 5.00 MGD (average) and will be required to meet limits for BOD, TSS and ammonia. The plant was also to be able to be easily expanded to 7.50 MGD in the near future. Furthermore, the peak hourly treatment capacity would have to be 18 MGD initially and 23 MGD ultimately. Other requirements from the City are that they wanted to construct a new aeration tank for the expansion to look exactly like the existing Carrousel oxidation ditch plant and to do all of the expansion on the existing plant site.

Because of all this, Qk4 chose to construct a new treatment train consisting of an IFAS system operating in parallel with and existing oxidation ditch system. The IFAS treatment train will consist of anaerobic, pre-anoxic and aerobic treatment stages. The IFAS media is contained within the first aerobic stage. The adaptability of the IFAS technology allowed that train to be shaped similarly to the existing oxidation ditch, for aesthetic consistency. A summary of the design objectives and constraints will be presented.

Evaluation of Wet Weather Strategies and Clarifier Optimization Using State-of-the-Art Tools

Alonso Griborio[1]*, Joe Rohrbacher[1], James Gellner[1], Paul Pitt[1], and Mike McGehee[1]
[1]Hazen and Sawyer, P.C.
*To whom correspondence should be addressed. Email: agriborio@hazenandsawyer.com

ABSTRACT

Wet weather events usually pose additional challenges to the unit treatment processes and the retention of the solids inventory and maintenance of the microbial population in a healthy and viable state is a key factor in ensuring adequate treatment after the storm event has passed. As indicated by Pitt et al. (2007), Biological Nutrient Removal/Enhanced Nutrient Removal treatment plants are particularly susceptible to wet weather events as they rely on several microbial populations to achieve nitrogen and phosphorus removal and some populations are more sensitive and difficult to restore.

Several strategies have been recommended and implemented on wastewater treatment plants to deal with wet weather events (Pitt et al. 2007). State of the art tools can be used to ensure optimum performance of wet weather treatment strategies. BioWin™ is an example of a state of the art tool that can be used to evaluate the performance of the biological and chemical units during and after the storm event. Perhaps, one of the BioWin™ limitations is the modeling of the secondary clarifiers since it models these units as one-dimensional units and cannot account for the major effects of the clarifier hydrodynamics.

Secondary clarifiers are a key unit to ensure retention of the solids inventory and the maintenance of an active biomass. These treatment units need to be carefully evaluated whenever they are involved in the wet weather strategy. Computational Fluid Dynamics (CFD) modeling is a powerful tool for clarifier optimization and performance evaluation. This paper presents the use of a quasi 3-D clarifier model for the assessment, design and retrofitting of secondary clarifiers. The CFD model was also used in conjunction with a calibrated BioWin™ model to verify the impact of different wet-weather strategies on clarifier performance. The paper focuses on three wet weather strategies and uses examples to illustrate their application. The three wet weather strategies presented in the paper are:

- Reducing the solids loading rate to the clarifiers using step feed or contact stabilization.
- Using polymer addition to enhance the settling properties.
- Increasing the RAS flow to control the sludge blanket depth, i.e., avoiding thickening failure.

Two case histories are presented to illustrate the use of CFD model for the evaluation of wet weather strategies and clarifier optimization. In the first case, the calibrated CFD model was applied to asses the capacity of existing 130-ft diameter clarifiers and to the design of a new 160-ft clarifier. In conjunction with BioWin™, the CFD model was used to evaluate the impact of using step-feed, non-step feed and polymers during a storm event. The results show that the combined used of step-feed and polymers during a wet-weather event can improve the

performance of the secondary clarifiers by 80%, reducing the effluent suspended solids from around 160 mg/L to below 30 mg/L. In the second case, the CFD model was applied to identify geometry and operation limitations of existing clarifiers that could not be identified by traditional evaluation methods such as the state point analysis.

REFERENCES

Pitt, P., van Niekerk, A., Garret, J., Hildebrand, L., and Bailey, W. (2007). Management of wet weather storm flow conditions at BNR/ENR treatment Plants. Proceedings of the Water Environment Federation Nutrient Removal Conference – The State of the Art. Baltimore, March 4 – 7, pp. 170 - 185

MICROSCOPIC POPULATION DYNAMICS AND THEIR RELATIONSHIPS TO THE ACTIVATED SLUDGE PROCESS IN A 30 MGD WASTEWATER TREATMENT PLANT

Maria J. Lundin
Lexington-Fayette County Government Division of Water Quality
301 Lisle Industrial Avenue, Lexington, KY 40511
(859) 425-2416
marialundin73@hotmail.com

David J. Price, Ph.D.
Lexington-Fayette County Government Division of Water Quality
301 Lisle Industrial Avenue, Lexington, KY 40511
(859) 425-2415
dprice@lfucg.com

Population dynamics of protozoa and higher-life forms in the activated sludge can provide useful information in monitoring and optimizing operations, and for toxicity assessments of wastewater treatment facilities. Monitoring of protozoan abundance in mixed liquor (ML) from the Town Branch Wastewater Treatment Plant (TBWWTP), Lexington, KY was initiated by the Town Branch Lab in July 2009. The TBWWTP is classified as a single-stage conventional activated sludge system with an average design flow of 30 MGD, which can hydraulically treat a maximum flow of 64 MGD. Protozoan counts were grouped into four categories: amoebae/flagellates; free-swimming/crawling ciliates; stalked ciliates; and rotifers/nematodes. Trends in protozoan numbers (No./mg MLVSS) were compared with several parameters, including ML temperature, pH, alkalinity and TSS; F/M ratios; and sludge age. Although trend analyses were preliminary at press time, protozoan dominance was observed to be cyclical over time. As expected, dominance by amoebae/flagellates corresponded with decreases in abundance of both free-swimming/crawling ciliates and stalked ciliates, with converse results observed over time. Even though rotifers/nematodes tended to be less abundant, trends of their numbers over time were similar to those of the amoebae/flagellates. Protozoan's growth phases correlated with nutrient availability (F/M ratios), settleable solids, and sludge density indices (SDI). Along with protozoan enumerations, the Town Branch Lab is currently conducting filamentous bacteria identification. Data generated will be compared to the above metrics providing a comprehensive view of the activated sludge treatment processes. In addition, similar studies are being conducted at the West Hickman Creek WWTP (WHCWWTP), Nicholasville, KY. The WHC plant is classified as a two-stage activated sludge nitrification system with an average flow of 22.3 MGD, but can hydraulically treat 52 MGD.

Development and Application of BioWin Process Modeling for Biological Nutrient Removal Process Design and Optimization

Ron Latimer, P.E., Paul Pitt, PhD, P.E.
Hazen and Sawyer

Contact Information for Main Author, Ron Latimer:
5775 Peachtree Dunwoody Road, Suite D-520, Atlanta, GA, 30342
rlatimer@hazenandsawyer.com

Wastewater treatment plant simulators such as the BioWin process model are powerful tools for the evaluation, sizing and optimization of the activated sludge process, particularly biological nutrient removal (BNR) facilities. These whole plant simulators incorporate the latest advances in technical knowledge and can reliably predict performance if properly calibrated. These simulators can model activated sludge systems, aeration, fixed growth processes, clarification, chemical reactions, pH and solids handling processes. They are often used in the design of new BNR facilities and to optimize, troubleshoot, and re-rate existing plants.

Calibration is the key to successful use of activated sludge process models, and detailed wastewater characterization beyond that which is typically available in the historical data is required. Long-term dynamic simulations are necessary to appropriately calibrate these models to ensure accurate solids production simulation and effluent predictions. Short-term dynamic model outputs are compared to site specific data collected during detailed characterization.

Understanding what process models cannot tell you related to activated sludge treatment (e.g., sludge bulking, SVI control, foam control) as well as potential pitfalls in model calibration and application is also critical to successful process modeling projects.

This paper will draw on the author's experience with applying the BioWin process simulation software for over 25 projects and will summarize the data requirements including special sampling, calibration steps, and approaches for application of process simulators to BNR design, optimization, and capacity evaluations. Three case studies will be used to demonstrate the application of the BioWin model to BNR design and optimization and for troubleshooting of biological phosphorus and nitrogen removal processes using full scale plant performance data. In addition, the three case studies will also be used to demonstrate potential pitfalls in model calibration and application.

Title: Web-Based WWTP O & M Manual Using GIS Technology

Main Author: Rob Hench, GISP

Employer : GRW, Inc.

Contact Information:

Business Phone: 859-223-3999
Cell Phone: 859-338-3721
Email: rhench@grwinc.com

Abstract:
Sanitation District No. 1 (SD1) and GRW recently completed the design and construction of the Eastern Regional Water Reclamation Facility (ERWRF). SD1 is the second largest public sewer utility in Kentucky, with ownership and maintenance responsibilities for all of the sanitary sewer systems in Northern Kentucky, with the exception of Florence and Walton. The District maintains more than 1,500 miles of sewer lines, 128 pump station, 15 flood pump station, eight package wastewater treatment plants, and two major wastewater treatment plants. SD1 employs more than 200 persons and serves approximately 95,000 customer accounts.

The ERWRF is a new 4.0 MGD nominal capacity wastewater treatment plant located on a "greenfield" site just south of Alexandria, Kentucky. In addition to normal domestic wastewater flow, the plant is designed to accommodate the wide range of existing wet weather flow due to infiltration/inflow. This plant has an initial design average flow capacity of 4 million gallons per day (MGD), a peak daily flow capacity of 12 MGD and a peak hourly flow capacity of 20 MGD. The site was designed to accommodate a modular future expansion to 8 MGD design average flow, 24 MGD peak daily flow and 40 MGD peak hourly flow.

The project was funded entirely by a low-interest loan through Kentucky's Clean Water Revolving Fund (CWRF). It was a requirement of the CWRF that SD1 develop an Operations and Maintenance Manual for the new facility. The ERWRF O & M Manual is not the typical set of three-ring binders that collects dust on a shelf. Instead, it takes the form of a computerized web-based Geographic Information System (GIS) that houses all applicable facility data and includes a graphical interface that enables users to quickly locate and view such information as manufacturer manuals, as-built drawings, exhibits, O & M Manual text and project photographs. These documents can be retrieved, viewed and printed by clicking on facilities on the screen or by entering a specific custom search.

The initial ERWRF O & M Manual was originally implemented based on ESRI ArcIMS software and was later upgraded to ESRI ArcGIS Server. Users of the on-line O & M Manual need nothing more than web browser and Adobe Reader software. The presentation will cover the details of the on-line O & M Manual and will include a real-time demonstration. SD1 intends to expand the on-line manual to include its existing Dry Creek Wastewater Treatment Plant and its Western Regional Water Reclamation Facility, which is currently under construction.

Conclusion:
The new web-based O & M Manual technology produces a much more usable and interactive product than conventional hard-copy manuals and greatly reduces the time required to locate critical information.

Collection Customer Call Script

The decline of our nation's economy and jobs has its effect on the majority of our US citizens. Most customer's of Metro Water Services view our utility company as a monopoly. Granted we are the only supplier in Davidson County, we have a moral obligation to assist the community that we serve. Times are hard, we must teach our Customer Service Specialist how to offer assistance to those in need while conforming to the companies Policy and Business Rules.

Key components of a successful call:

- Know your companies Policies and Business Rules
- Know what tips you can offer the customer
- Repeat your interpretation of the caller's need
- Never state what you can't do, but begin by saying what you can do
- Be consistent with the language you use from customer to customer
- Offer an explanation when needed
- Dissatisfied customer: We made an error, fix the problem
- Manage the customer's feelings, don't let the customer manage you, you have control

Script:

- Greeting
- Verify/Update customer info
- Determine Caller's Need
- Take appropriate action
- Conclusion/Goodbye

Gloria M. Jackson-Campbell, (615) 862-4632
Metro Water Services, Customer Service

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 17-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.

Survey Says...Giles County residents respond to safe drinking water query

Jason Griffin, PE / Greg Sanford, EI
Gresham, Smith and Partners

When water utilities formed throughout the region over 50 years ago they had one common goal: to provide the public with safe drinking water. That goal is still the same today. However, most utilities have maximized their distribution networks to provide potable water to rural customers in a financial feasible manner. Without increasing water rates substantially, utilities cannot extend water lines into rural areas. Thus, those who do not have access to water source go without or are forced to haul water from public sources. Either scenario is not one that is desirable. Giles County requested that Gresham, Smith and Partners recommend a plan of action to provide water accessibility to residents without access to a safe and reliable drinking water source.

Gresham, Smith and Partners recommended a program that would fund the installation of water lines within existing county budget constraints. Giles County appropriates $250,000 annually into a water line extension matching program that each of the four utility districts can request funding from. Requests for the appropriated funds have declined largely in part due to the increasing costs of construction for such a small projected return on the investment. GS&P recommended that a broad planning study be conducted to identify the population who do not have access to potable water and plan for water line extensions thereto. The funding of the program was proposed to be attained through the State Revolving Fund Loan Program based on their low interest rate, fixed term loans.

Field data was collected using a handheld geographic positioning system (GPS) device. This data was used to geographically map the population who did not have access to potable water. Direct mail response cards were delivered to each resident during the data collection phase to increase our knowledge of the study group and their particular water supply situation. For example, some residents may have adequate well sources and do not foresee the need to have access to potable water. This level of detail was critical in prioritizing the areas in which the planning study would recommend implementation.

Over 1,900 survey cards were distributed to residents who do not have access to potable drinking water. This confirmed the actual count that was estimated at over 2,400 under the 2005 Tennessee Rural Water Needs Report. Over 700 cards were returned. Of those, 550 responded in a positive manner desiring public water service. A county wide water line extension master plan was developed based on the survey response. Utilizing hydraulic modeling for all existing utility districts, the evaluation identified over 94 miles of water line that should be installed. Of those 550 residences that responded positively, only 400 could be made accessible to public water under the derived extension plan. Project funding is expected in 2010 with a goal to have some residents tapped into safe drinking water by summer 2010.

Using Performance Contracting to Fund Infrastructure Improvements

In order to improve the quality of life for its residents, to improve the level of service provided by the city, and to serve as good stewards of natural resources, many cities need to make significant infrastructure improvements. Funding these much-needed improvements, however, is difficult given the current state of the economy. Many cities do not wish to use their reserve capital to fund these types of projects, and other traditional funding methods, such as raising taxes and user fees, increasing utility rates, and selling revenue bonds are not politically acceptable.

To solve this dilemma, a city may choose performance contracting. While the enabling legislation varies by state, performance contracting basically provides a way for governmental entities to implement resource efficiency improvements with minimal initial investment. The benefits from reducing utility expenditures, from increasing billable consumption, and from reducing operations and maintenance expenses are used to fund the project over time. The performance contract provider must financially guarantee that the calculated benefits will be realized, and the benefits must be measured and verified according to International Performance Measurement and Verification Protocol (IPMVP) and Federal Energy Management Program (FEMP) standards.

Water loss optimization projects have proven to be very compatible with performance contracting. Some commonly implemented measures include: automated leak detection systems, pressure management projects, transient pressure analysis, SCADA system enhancements, AMR/AMI system installation, water meter sizing and typing, water meter repair and replacement, and large water meter set analysis. Other related services that can be provided through performance contracting include water audits, billing system analysis, and detailed water and sewer rate schedule analysis.

Performance contracting is not limited to the utility distribution system, however. The enabling legislation also allows local governments to fund such things as renewable energy technologies, utility conservation measures, and improvements to the building envelope. The presentation will provide examples of how cities across America have used performance contracting to fund necessary improvements. Agents from various cities who have used performance contracting to implement water loss optimization projects will serve as co-presenters and discuss their experiences with performance contracting.

Miles Mennell
Public Sector Solutions
Johnson Controls, Inc.
306 Starling Lane
Franklin, TN 37064
(615) 418-9702
Leslie.m.mennell@jci.com

Kentucky/ Tennessee Water Professionals 2010

ABSTRACT

Wholesale Water Contracts:
Common Practices & Pitfalls

Kenneth G. Diehl, Jr., P. E., Senior Vice President
Smith Seckman Reid, Inc.

There are numerous instances across Tennessee and Kentucky where one utility supplies water to another utility on a consistent basis. In most instances water is provided by the producer to the buyer at a wholesale rate. The current emphasis in both states on regional water planning may increase to occurrence of these contracts in the future.

Wholesale water contracts vary to a wide degree. This paper will examine common practices and pitfalls of wholesale water contracts based on a state-wide survey researching existing contracts. Guidance from AWWA *Manual of Water Supply Practices M 1 – Principals of Water Rates, Fees and Charges* will also be incorporated. The paper will review the typical elements of wholesale water contracts, look at options based on the research data, review legal issues, and provide guidance to producers and buyers for future contracts.

Preparing for a Region 4 EPA Clean Water Act Section 308 Audit

The Murfreesboro Water & Sewer Department (MWSD) was solicited by the United States Environmental Protection Agency (USEPA) – Region 4 Water Programs Enforcement Branch in November 2008 for specific information regarding MWSD's sanitary sewer overflow (SSO) program, pursuant to Section 308 of the Clean Water Act (CWA), 33 U.S.C. § 1318. MWSD responded in February 2009 and was notified in September 2009 by a Region 4 USEPA Enforcement Officer that a collection system inspection, including interviews and document review was requested of the Department at the end of September.

The following information represents a portion of what was requested for review as part of the scheduled inspection:

- Information about bypasses at the wastewater treatment plants, pump stations, or sewer overflows in the wastewater collection system.
- Latest Sewer Overflow Response Plan (SORP), or similar document describing procedures used by the utility to respond to unintentional wastewater discharges from the collection system.
- Program, plan or procedural documents for the following:
    - Grease Control
    - Root Control
    - Capacity Assurance
    - Preventive Maintenance and Inspections
    - Emergency Response
    - Pump Station Back-Up Power
- Sewer Use Ordinance
- O&M plans for the wastewater treatment plants and wastewater collection system
- Work orders, O&M work documentation, O&M checklists, etc.
- Annual Budget and explanation of items (capital improvements, O&M, operation, etc.)

MWSD underwent an inspection by Region 4 of the USEPA on October 26-27, 2009. We have not received comments back from the Region 4 Enforcement Officer as of this date. The inspections centered on Management, Operations and Management (MOM) of the sanitary sewer collection system.

While USEPA checklist items were discussed to varying degrees, MWSD focused on the Department's long-standing programs to eliminate SSO's within our system, focusing on our bi-annual contracts for permanent flow monitoring, wet weather CCTV, and system rehabilitation and replacement. MWSD believes presentation of our Section 308 information submittal and the highlighting of MWSD's SSO elimination program elements during our Region 4 inspection would benefit other wastewater utility providers in preparing and responding to like USEPA requests and follow-up inspections.

November 19, 2009

Darren W. Gore, P.E.
Murfreesboro Water & Sewer Department

Writing an Inter-Governmental Agreement

Michael A. Schober, PE

Summary of Project

With increasing frequency, municipalities are finding it necessary to join forces with other municipalities to continue to provide efficient water & sewer services. As populations grow and move toward each other, our water resources are stretched. Many times, the most efficient means to continue to provide or receive utility service is to team with a neighboring municipality or utility. These arrangements are not always amicable and are almost always governed by some sort of inter-governmental agreement.

These inter-governmental agreements can range from a simple letter of understanding to a more complex contract that determines how and who will spend millions of dollars for capital and operational expenses. It is imperative for the utility manager to understand these agreements in order to avoid many of the common pitfalls. This paper will discuss in detail the myriad issues that must be dealt with in an inter-governmental agreement (IGA); it will provide specific examples to illustrate some complex issues; and it will provide sample tables, maps and charts that can be used to describe the interrelationships between the contracting parties. Methods for cost sharing for both capital and operational expenses will be discussed. This will include treatment plant costs as well as collection, conveyance and distribution costs.

Introduction

This paper is intended to introduce you to some of the concepts of an IGA. Some can be simple while others can be very complicated. A lot of it has to do with the relationship between the parties. Stressed relationships usually require more involved agreements while the opposite is true for amicable relationships. Regardless, the concepts discussed here should be included in all agreements to some degree.

An inter-governmental agreement is a document that spells out the financial and operational understandings between two or more parties for the Treatment and Transportation of sewer or water. Transportation may include collection, interceptors, pump stations & force mains. The document may address such things as allocations, surcharges, definitions, capital and operating costs, operations and maintenance, pretreatment regulations, schedules, debt service, planning and on and on and on.

What are the basic components

There are many basic components to an IGA that are the bare minimum required to adequately address the foundational inter-governmental issues. These include Purpose, Definitions, Allocations & Surcharges, Operating Costs, Measurements, and Prohibited Practices.

Purpose

You don't see this component in most agreements. The purpose identifies the non-legal issues such as the individuals involved in the agreement, the assumptions made, the reasons for certain decisions. I recently worked on a large IGA that included a 'Preface" which identified some of the people who worked on the Agreement and some of the underlying assumptions on which the agreement was built. Providing the "History" of an agreement may be very beneficial to those who follow you. I wish I could have been in the room 40 years ago when some of these agreements were written. That background & foundation is critical to know how to implement the agreement. Similar to those who try to interpret the Constitution, they always go back to the beginning and try to put the writings in the context of the day.

Definitions

Definitions for such terms as Allocation, Average Daily Flow, Cost, EDU (Equivalent Dwelling Unit), Operating Expense, Surcharge, Prohibited Practices are critical to the success of the agreement. This paper will discuss each of these issues in detail so the reader will understand the subtle nuances within the definitions.

Finally, the paper will include a detailed analysis of cost sharing strategies. These will include sample allocation tables for treatment plant cost sharing as well as similar exhibits for sharing costs associated with interceptors and conveyance. The reader will learn the difference between cost factors for treatment and conveyance and what controls the sizing and cost of the facilities.

The ultimate goal is to create a living document that fairly treats all parties. It should be flexible enough to withstand 50 years of change and be capable of understanding when the next generation picks it up and is tasked with implementing it.

EXHIBIT NO. 1

A sample allocation table showing the respective allocations to a wastewater treatment plant and various pump stations. The allocations will be used to determine capital contributions as well as ongoing operation & maintenance costs.

ALLOCATION					
USER	FLOW TO WASTEWATER TREATMENT PLANT (MGD)	FLOW TO PUMP STATION No. 1 (MGD)		FLOW TO PUMP STATION No. 2 (MGD)	
	THREE-MONTH AVERAGE FLOW	DAILY FLOW	HOURLY FLOW	DAILY FLOW	HOURLY FLOW
Municipality A	6.03	15.20	18.99	0.00	0.00
Municipality B	0.71	2.00	2.50	0.00	0.00
Municipality C	4.79	3.22	3.77	0.00	0.00
Municipality D	4.48	0.00	0.00	7.50	11.27
Municipality E	16.07	9.00	11.39	8.83	8.23
TOTALS	32.08	29.42	36.65	16.33	19.50

EXHIBIT NO. 2

A sample allocation table showing the capacity allocation along an interceptor shared by nine municipalities. This allocation uses the gallon-mile method to allocate capital, operation and maintenance costs.

EXHIBIT B

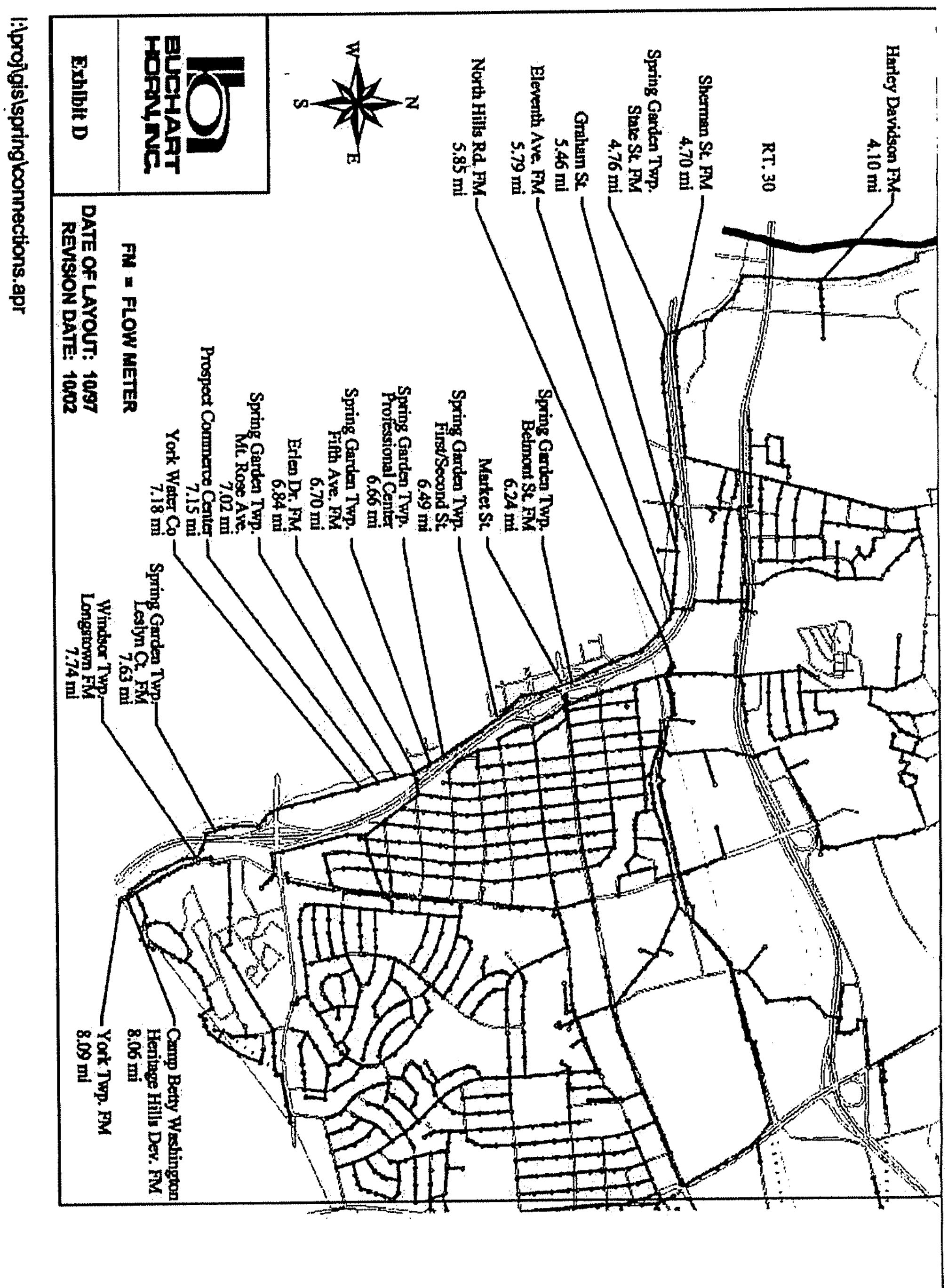
SUMMARY BY MUNICIPALITY

Connecting Municipality Name(s)	Percent of Capacity	Allocated Pipeline Capacity (GPD)	Weighted WWTP (miles)	Total Gallons Miles	Percent Gallon Miles
Manchester Township	5.69%	1,126,700	1.19	1,340,773	1.03%
Springettsbury Township	44.21%	8,753,550	5.75	50,320,518	38.80%
Spring Garden Township	5.53%	1,095,000	6.35	6,951,710	5.36%
Windsor Township	13.00%	2,574,250	8.00	20,595,383	15.88%
York Township	19.99%	3,958,100	8.07	31,942,429	24.63%
Red Lion Borough	5.85%	1,158,500	8.09	9,372,265	7.23%
Dallastown Borough	3.74%	741,300	8.09	5,997,117	4.62%
Yoe Borough	0.69%	137,350	8.09	1,111,162	0.86%
Windsor Borough	1.29%	255,250	8.09	2,064,973	1.59%
Totals:	**100.00%**	**19,800,000**	**N/A**	**129,696,328**	**100.00%**

Notes:

EXHIBIT NO. 3

A sample map showing graphically the gallon-mile inter-relationship between nine municipalities who share a common interceptor.



Management of Consent Order Deliverables

A local municipality seeks a consultant's approach to responding to a Consent Decree by the Environmental Protection Agency. Together, Winchester Municipal Utilities and Tetra Tech, Inc. respond through implementing Capacity, Management, Operation and Maintenance (CMOM) programs. Each program varies in its compliance schedule, physical and economic requirements, and required deliverables. As such, the client and consultant are working together to create and implement a management system to track the milestones toward completion of each program. The program requirements involve entities from many organizations, so the management response is a combination of periodic meetings and a tracking document. One program in particular, the Fats, Oils, and Grease Control Program, requires knowledge and resources beyond the past experience of the municipality. Implementing the program has been a unique effort, assisted by the strong relationship between the client and consultant. The municipality has been able to tap into its existing resources in many unique ways, especially in regards to staffing for the program. The program consists of applications for the Food Service Establishments in the area to be permitted to discharge to the sewer system, compiling this application data, ranking the Food Service Establishments according to risk of grease production, and permitting and inspecting accordingly. The program has just begun to be implemented, but has already seen successes, including increased grease trap awareness throughout the municipality.

Watch your assets: Asset management as a tool and a mindset

BY: Karen Johnson/CH2M HILL
2095 Lakeside Centre Way Suite 200
Knoxville, Tennessee 37922
865-560-2801

Adam Byard/CH2M HILL
Herschel Hall/Knoxville Utilities Board
Yanti Miller/Knoxville Utilities Board

DATE: December 15, 2009

In today's tough economic climate, maintaining the value of investments or assets for communities is more crucial now than ever. Budgets are being stretched to keep pace with the declining economy and real estate markets, growing population, and an aging infrastructure. Community managers are facing challenges to maintain high level of services related to their water distribution systems, as well as wastewater collection systems and treatment plants. Therefore, it is important for communities to implement sound asset management practices to maximize the efficiency of funds used to maintain their assets. Wastewater collection systems in particular represent major infrastructure assets and capital investments for communities. For this reason, it is essential for community managers to ensure that those assets are managed properly, and that their value is maintained.

The Knoxville Utilities Board (KUB) Collection System Improvement (CSI) Department recognized the importance of effectively maintaining their assets, and implemented an asset management system for their Gravity Line Preventative Maintenance Program called "Blockage Abatement". The Blockage Abatement Program was initiated as one of KUB's Capacity Management Operations and Maintenance (CMOM) Programs required as a result of a Consent Decree signed in 2004. The Blockage Abatement Program was intended to help eliminate overflows, ensure collection system sustainability, and maximize service and reliability in a cost effective manner. As maintenance activities have increased, the Blockage Abatement Program has become more difficult to maintain and manage. Recently, KUB's CSI Department identified the need to enhance the Blockage Abatement Program to better optimize investments in maintenance activities, while still minimizing collection system blockages.

This presentation will highlight the steps taken to develop and implement KUB's enhanced Blockage Abatement Program. It will also summarize the benefits of targeted preventative maintenance using asset management systems. In addition, this presentation will detail the future plans for asset management in the KUB CSI Department.

Title: **Selling Your Utility Assets- A Good Idea or an Act of Desperation?**

Presenter: Edward D. Wetzel
Executive Vice President
R.W. Beck, Inc.

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. A number of governments are looking to their most valuable assets, the water, wastewater and storm water utilities, as a possible source of funds to meet such needs. 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.

The concept of privatization through either an asset sale or long-term concession is not new to the public water utility industry. Large French water companies such as Companie General and Lyonnaise des Eaux were actively promoting concession agreements throughout the United States 15 to 20 years ago. Inherent tax advantages and lower cost of capital for government-owned systems, combined with a fear of "foreign ownership", resulted in few true privatizations, although a number of systems retained contract operators for operational efficiency.

Today, municipal government finds itself in a far more difficult circumstance than they did in the late 1980s and early 1990s, particularly in older communities with deteriorating infrastructure, a smaller industrial base, reduced population and unfunded pension liabilities. These circumstances are causing governments to find ways to monetize their assets through privatization or other forms of asset sale or transfer.

Specifically, this presentation investigates a number of case studies, including Milwaukee, Indianapolis, Cincinnati and Winnipeg, who have recently considered alternative approaches to water and wastewater system monetization. Since decisions regarding privatization are often made at a political level above the utility manager, it is important to understand what makes government-owned utilities vulnerable to privatization. One of the common drivers for privatization is when systems are facing significant rate increases to pay for large capital programs, such as an EPA consent order or upgrades to meet future regulatory requirements. Politicians perceive a benefit to private ownership under an increasing rate scenario, where the utility is subject to state Public Service Commission rate regulation without the need for City Council approval. Guidance will be provided to utility managers on how best to position their system to mitigate this concern.

Alternatives to privatization, such as private equity investment or sale to an existing or created public authority or agency will also be presented. One example is the ownership model used in Louisville, where the water company operates like a private company, with

the City as its' lone shareholder. This arrangement allows the company to return a sizeable annual dividend to the City, an amount far in excess of the typical PILOT paid by most utilities back to their host government. In most cases, a public alternative to private ownership or concession can generate more up-front cash, and still allow the utility to maintain operational and management control over its' system.

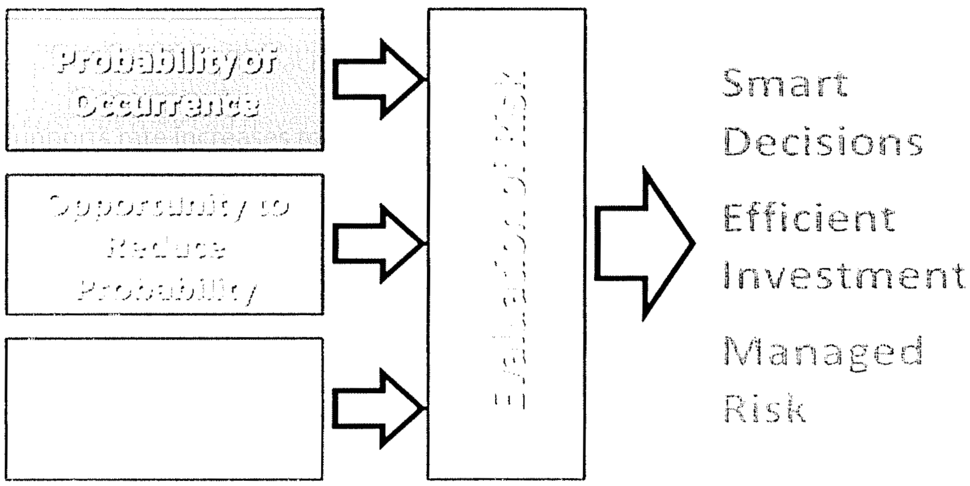
Water Supply Adequacy - Understand Risk to Make Smart Decisions

Daniel Haddock, P.E., Layne Christensen

Though we weigh risks every day, our perceptions of risk are not always well-informed. A systematic evaluation of risk requires consideration of the probability of occurrence, opportunities to reduce that probability, and the severity of the consequences. Utilities tend to be risk averse, attempting to eliminate risk rather than managing it. Risks can be reduced at a cost but they can never be eliminated entirely. Is the cost of reducing rather than managing risk always justified?

Utility managers consider risk when making decisions to ensure the adequacy of supply for their customers. Decisions to invest rely on forecasts of growth in population and water use. Forecasts are based on probabilities of peak demands occurring. Supply and treatment facilities are designed for these occurrences, even though they are generally very infrequent.

The most common way to reduce the probability of exceeding capacity is to invest in expansion. This approach is taken when water resources are available, and the community supports rate increases to finance the investments. However, when resource availability or rates are a concern, a risk-based approach to decision-making may provide a community with more cost-effective alternatives, including optimization and conservation.



The presentation will provide examples of risk assessment applied to adequacy of water supply, and discussion of alternatives for managing these risks.

Real World Experiences in Reducing Real Water Losses through Automated Leak Detection Systems

There are two major sources of non-revenue water: real and apparent losses. While apparent losses consist of customer use that is not recorded due to metering error, incorrect assumptions of unmeasured use, or unauthorized consumption, real losses involve the physical escape of water from the distribution system prior to the point of end use.

Real losses require a utility to provide more water than is actually required by the end user, which wastes both energy and chemicals. Scarce capital funds may be allocated to constructing additional production facilities that might be unnecessary. Leaks may damage buried infrastructure and possibly pollute an aquifer. Leaks often infiltrate into the sanitary sewer system, which is expensive, inefficient, and may create treatment plant capacity issues. High levels of real losses may force a utility to implement unpopular conservation programs and place limitations on future growth. Negative pressure transients allow for backsiphonage of contaminants into the distribution system through leaks.

Leakage at the service branch takeoff from the distribution line accounts for approximately 80% of real losses, whereas leaks and breaks on the distribution line account for the remaining 20% of real losses. Thus, finding and repairing leaks is critical to reducing real water loss. Acoustic leak detection has been available for well over a hundred years. After World War II, some utilities began taking either aerial or infrared photographs of service lines since the area around a leak may have increased vegetation and produce a different thermal image. Most of these methods are used annually—if ever, which prevents leaks from being discovered quickly.

Automated leak detection systems provide an inexpensive and timely method of finding leaks and breaks. Water leaking from a pipe produces a vibration, and a leak detection sensor mounted on a service line upstream of a water meter can monitor these vibrations during the early morning hours when customer usage is minimal and system pressure is at a maximum. The data is recorded daily and is then transmitted via radio signal for engineering analysis. If the data indicates a probable or possible leak, the source of the leak can be found using digital correlating devices and digital leak detectors. Through performance contracting projects, Johnson Controls has installed automated leak detection systems throughout the entire service areas of at least nine utilities in seven states. This presentation will provide a summary report on the performance of these systems since installation and a review of lessons learned.

Craig Hannah, PE
Johnson Controls, Inc.
1603 Loop 289 West
Lubbock, TX 79416
(806) 795-8800 x 239 {Office}
(806) 632-0063 {Cell}
(806) 795-0323 {Fax}
craig.c.hannah@jci.com

Meter Strategy – Looking Ahead at the Next Step for Kentucky American Water

Kentucky American Water is currently developing a meter strategy for the Central Division system, which is centered in Lexington and expands to 6 outer counties. We currently have approximately 125,700 meters in the Central Division. 123,000 are 5/8-inch and 1-inch meters and 2,700 are 1 ½-inch and larger meters. Approximately 1,500 are fire service meters. The majority of our system consists of Neptune meters with some Trident and Badger meters as well.

Kentucky American Water currently staffs 15 meter readers that read approximately 124,140 meters 12 times per year or every month. We have approximately 87,000 direct read meters and approximately 38,670 radio read meters or 30%. Of this 30%, 26% are Neptune radio reads and 4% are Badger/Itron radio reads. A meter reader will commonly read 400-500 direct read meters on a given day. Fire service meters are currently read annually. Since many of our meters are still direct read meters, much of a meter reader's day is spent walking, turning meter keys and bending over to open lids.

Cost, safety and customer service are just some of the issues that we are studying to make sure that our meter reading strategy is optimal. Kentucky American Water is studying the cost effectiveness for continuing to read direct read meters when compared to mobile AMR, Fixed Network and other technologies. Costs for company labor, vehicles, equipment, work related injuries and vehicle accidents are some of the areas that we are reviewing for comparison. We are also evaluating the number of injuries associated with meter reading. Due to the repetitive nature of reading direct read meters, wrist, back, and knee injuries can be common. In addition to making it difficult to accomplish our daily assignments when there are employee injuries, we just don't want our folks to get hurt. Customer service is also being evaluated, as we are currently comparing our direct read meters to our mobile AMR meters. We continue to strive to keep estimates and adjustments at a minimum by getting a good reading the first time.

We have looked at 2 business case models including Neptune Technology's model for mobile AMR and our own American Water model to evaluate our direct read system, mobile AMR and Fixed Network. Current results show that mobile AMR is the most favorable. In 2009, we installed approximately 1500 mobile AMR meters and continue to strategically plan each future year with additional AMR replacement. We will also continue to evaluate Fixed Network, Mesh Technology and other upcoming technologies as these may prove to be more favorable in the future.

Shannyn Walker, P.E.
Field Operations Supervisor
Kentucky American Water
2300 Richmond Rd
Lexington, KY 40502
Shannyn.Walker@amwater.com

Title: **Mobile Order Management – Real Info You Can Really Use**

Author: **Lyn Fontana, PE**
Metro Water Services
System Services Division
Workflow Manager

Metro Water Services (MWS) has approximately 20,000 public fire hydrants to maintain within its 400+ sq mi service area. Until October of 2008, all the planning and work order completion was managed on paper and stored "after the fact" in its computerized maintenance management system (CMMS), Hansen. In October of 2008, MWS implemented a real-time Mobile Workforce Management system(MWM) which provides real time completion information for all MWS distribution and collection system asset maintenance.

Computerization of the order completion information directly from the field technician has provided more complete planning and resolution of work. This paper explores the methods used to plan hydrant inspection, flow testing and follow-up maintenance and repairs, while documenting system water quality.

Hydrants require periodic inspection to verify mechanical function, flow capability and system flushing for water quality. Balancing these requirements, while maximizing work force efficiency, is a daunting task for distribution system managers. Tracking the work, verifying results and trending changes in the system has been vastly improved in the industry during the last 20 years with computerized maintenance management systems.

The Mobile Workforce Management (MWM) system provides a structured environment to receive and submit information about the assets in the field. This gives supervisors and managers opportunities to respond and adjust planned work from real-time information. Scheduling and resource planning is vastly improved, as well as accuracy of information documented.

WATER SUPPLY AND REUSE STRATEGIES IN THE SOUTHEASTERN UNITED STATES

Joseph K. Robinson, PE, Woolpert*
Kent Veech, PE, Woolpert

*Woolpert, 8731 Red Oak Boulevard, Suite 101, Charlotte, NC 28217

ABSTRACT

Potable water supplies throughout the United States have been under ever increasing demands, due to population growth, urban migration, and several multi-year droughts in certain areas. Fresh water resources serve a variety of users, including residential, commercial, agricultural, industrial, recreational and environmental. Furthermore, wastewater disposal alternatives are often limited due to water quality concerns or the needs of downstream users. The recent economic downturn has cause operators to reduce costs and consider energy conservation. Therefore, many municipalities in the region are turning to alternative water sources and water reuse to help them address their water supply and wastewater disposal needs.

This paper explores a variety of strategies employed by water users throughout the Southeast, many of which are applicable to Kentucky and Tennessee. These strategies include indirect potable water reuse in northern Virginia, stormwater capture and reuse in North Carolina, alternative water supply development in South Carolina, and landscape irrigation in Florida. We will include a discussion of how the applications and lessons learned on these projects can be put into practice in Kentucky and Tennessee.

Use of reclaimed water for non-potable demands is consistent with the concept of sustainability. By using reclaimed water and captured stormwater to help satisfy non-potable water demands, less pressure is placed on our current water resources. This practice also reduces the amount of wastewater being released into our waterways and also conserves energy. Furthermore, this practice promotes the culture of sustainability and environmental stewardship within our communities. At one time wastewater was considered a waste product, however now reclaimed water is a valuable resource in many parts of the country. Traditional water supplies can be preserved for potable demands, thus extending their service life. Where traditional water supplies are jeopardized, or where reuse is not a viable alternative, then alternative water supplies must be developed. Additional drivers for alternative water supply development include capacity use limitations and salt water intrusion.

Along with the case studies, this paper explores the benefits and challenges of implementing water supply alternatives and reuse strategies. It also addresses some of the regulatory and economic issues that go along with these strategies.

Stewardship of a Critical Resource:
KAW Reviews Conservation Plan to Add Water Balance
and Other AWWA/IWA Parameters

Preston Pendley, Strand Associates, 1525 Bull Lea Road, Suite 100, Lexington, KY 40511
Linda Bridwell, P.E., Manager – Water Supply, Kentucky American Water,
2300 Richmond Road, Lexington, KY 40502

Background

Kentucky American Water (KAW) operates potable water facilities for Lexington, Kentucky and surrounding areas, serving over 115,000 customers. As construction of a new 20-million-gallon-per-day water treatment plant on Pool 3 of the Kentucky River is underway, KAW retained Strand Associates to review the existing Water Conservation Plan and make recommendations for improvements. The effort was to emphasize the implementation of strategies and the ability to track the impact of conservation efforts.

The existing Conservation Plan, developed between 1991 and 1994, reflects the difficulties inherent in programs that rely on the participation of customers, including audits and retrofits. Over the years of implementation, KAW had shifted away from those programs, focusing instead on its programs of public education, sponsorships, and media.

Guidance from the AWWA and IWA

Over the past decade, the American Water Works Association (AWWA) and the International Water Association (IWA) have developed methodologies and best practices for water loss control, non-revenue water analysis and water conservation. At the core of the best practices is the formalized development of a water balance, to be updated regularly (recommended annually).

A water balance is a compilation of the consumptive uses and losses of water managed in a single system. The resulting data allows a utility to quantify areas of nonrevenue water, comparatively over time or to other areas of consumption.

The IWA also has developed a reference of 160 'performance indicators', covering six categories, including Water Resources, Personnel, and Operational Parameters. These performance indicators allow more analysis related to optimization of operations. Many of these indicators are related to the water balance. Some indicators relate operational parameters to their expenses, so that the optimization of different areas can be compared in financial terms.

Recommendations

The recommendations from Strand included establishing an annual update, including a water balance and an audit worksheet comprised of selected performance indicators. After several years of establishing a baseline of data, an annual press release can be prepared for the Conservation Plan information.

The press release contains information with which the public at large may not be aware, such as the annual reinvestment KAW commits to the distribution system for leak detection, meter testing accuracy, and water main rehabilitation and replacement.

Other parameters that were evaluated included the current rate structure, methods of billing and providing usage charts and pressure management. Other recommendations consist of a review of procedures and decision-making of the Drought Management Appeal Board, which is established by ordinance in times of water shortage.

KAW will of course continue to provide information and public education, but the emphasis of the Conservation Plan can shift to internal operations, to quantitatively address parameters of the distribution system. With this emphasis, the Conservation Plan can provide a baseline to more efficiently direct the limited resources of a utility.

Distribution System Monitoring and Assessment under the Proposed Revised Total Coliform Rule

Timothy E. Soward

IntelliTech Systems Inc.

EPA is required to review existing national primary drinking water regulations every six years. In 2003, EPA completed its review of the Total Coliform Rule (TCR) and 68 NPDWRs for chemicals that were established prior to 1997. The purpose of the review was to identify current health risk assessments, changes in technology, and other factors that would provide a health or technological basis to support a regulatory revision that will maintain or improve public health protection. In the Six-Year Review determination published in July, 2003, the U.S. Environmental Protection Agency (EPA) noticed its intent to revise the Total Coliform Rule (TCR).

From July 2007 through September 2008, EPA convened a federal advisory committee under the Federal Advisory Committee Act (FACA), the Total Coliform Distribution System Advisory Committee (TCRDSAC). One of the goals of convening the TCRDSAC was to make recommendations to EPA on revisions to the Total Coliform Rule (TCR) promulgated in 1989 (54 FR 27565, June 29, 1989).

The TCRDSAC included organizational members selected by EPA based on the diverse perspectives, expertise, and experience needed to provide balanced recommendations to EPA on issues related to the TCR and issues related to distribution systems. The committee met 13 times in Washington, DC. The TCRDSAC considered the technical and the policy issues involved in the monitoring, assessment and corresponding corrective actions of distribution systems to better understand and address public health impacts from degradation of drinking water quality due to sanitary defects in the distribution system. The RTCR applies to all public water systems nationwide.

The goal of the TCRDSAC in developing the proposed revised TCR (RTCR) is to achieve the objectives of the 1989 TCR more effectively and efficiently, taking into account the changes in the regulatory framework for implementing the SDWA over the past twenty years and experience with the TCR since it was promulgated in 1989. The TCRDSAC drew on a variety of data sources to capture experience with the rule, on analyses conducted for TCRDSAC, and on the collective experience of the member organizations.

In concert with other rules promulgated by EPA under SDWA, the revised rule construct will better address the TCR objectives and enhance the multiple barrier approach to protecting public health, especially with respect to smaller groundwater systems. The RTCR paradigm is designed to trigger systems with positive total coliform (TC)/*E. coli* monitoring results to do an assessment, to identify whether a sanitary defect(s) is (are) present, and to correct such defects accordingly. This is an improvement over the current TCR framework in that it takes a more proactive approach to identifying and fixing problems that affect or may affect public health.

The follow-up actions described in the proposed RTCR also will improve the cost-effectiveness of the rule as investigations and corrective actions provide an opportunity to improve public health. The core elements of the proposed RTCR are as follows:

1) Keeps *E.coli* as a health indicator based on an MCLG of zero and an MCL similar to the current TCR
2) Associated Public Notification (PN) requirements are maintained with respect to *E.coli*
3) Total Coliform is utilized as an indicator that a potential pathway for contamination of the distribution system exist however does not in and of itself trigger PN
4) Requires systems to investigate and correct defects found whenever monitoring results indicate a system may be vulnerable to contamination.
5) There are two levels of assessment depending on the severity and frequency of the contamination
6) PN is required for failure to find and fix
7) Provides criteria that well operated ground water small systems must meet to qualify and stay on reduced monitoring.

In development of the RTCR the US EPA was committed to stakeholders for guidance. A proposed rule was published based on the TCRDSAC recommendations. EPA also committed to making timely modifications to the data tracking systems within 18 months of publishing the final rule as well as having annual stakeholder meetings to monitor the rule. The proposed rule is scheduled for August 2010 and the final rule is scheduled to be published in October of 2012.

This presentation relates my experience serving on a technical work group (TWG) supporting the TCRDSAC in the development of the RTCR as well as co-authoring the RTCR Technologies and Cost Document and the RTCR Assessments and Corrective Actions Guidance Manual. It will highlight the nuances of the RTCR within the framework of the US EPA negotiated rule making process.

Keeping Water Quality from Tanking: How Inspecting Tanks Improves Service Life

Authors: Charles D. Barnes, P.E., Jordan, Jones & Goulding (JJG); Thomas N. Miller, P.E. (JJG); Wayne E. Price, P.E. (JJG); Neal D. Stubblefield, P.E. (JJG); Wally Cathey, Metro Water Services (Nashville/Davidson Co. Metro Government, TN)

Key Terms: coating, corrosion, security, tank, water quality

Abstract

Water storage tanks are increasingly being depended upon as a water quality mainstay in many utilities' distribution system as well as a buffer against insufficient delivery pressure, inefficient energy use, and distribution security challenges. This paper examines the inspection process undertaken for 44 tanks of ranging in size from 35,000 gallons to 25,500,000 gallons capacity (some dating back to 1887) and configurations from ground storage tanks to elevated storage, from site-built steel tanks to cast-in-place clearwells and reservoirs holding raw and finished water for Metro Water Services (MWS) in Nashville, TN. As part of a 5 yr. cycle of inspections for all tanks handling potable and treatable raw water required by the Tennessee Dept. of Environment and Conservation (TDEC), MWS conducted in 2008-2009 top-to-bottom evaluations using:

- Internal visual surveys – following AWWA C652 disinfection procedures, having divers video tank interiors.
- Structural and corrosion evaluations – visual inspections following NACE, OSHA, and SSPC guidance for foundations, anchorages, ladders and other safety devices, and overall tank integrity, water quality data, including internal coatings and external painting and any evidence of corrosion-related damage.
- Security survey – vandalism, access control, site lighting, intrusion alarms, fencing, including similar protection for collateral facilities such as booster pump stations.
- Water quality recommendations – how current tanks could be readily brought into compliance with EPA's Stage 2 Disinfection By-Products Rule by 2012.

A final report summarizing the physical inspections, recommendations on structural and coating enhancements, and suggested on-going maintenance and longer term capital measures was developed for each tank. Additionally capital, repair and ongoing maintenance costs were projected for each tank over the next 25 years. The resulting reports pointed to a program that would extend the useful service life of MWS's storage tank assets as well as make them safe for operating personnel and the public.

A Tank in the Rough – From Brownfield to Wastewater Facility
The Story of the KUB Second Creek Wastewater Storage Facility

Anthony Crist
Gresham, Smith and Partners
1111 N. Northshore Drive, S-400
Knoxville, TN 37919
865.521.6777

This presentation is a case study chronicling the story of the Knoxville Utilities Board's (KUB's) Second Creek Wastewater Storage Facility, which is being constructed at the former location of a Manufactured Gas Plant (MGP), a brownfield site in Knoxville Tennessee. The project is chronicled from the initial site selection process to the decision to utilize KUB's former MGP brownfield site as the location for the new wastewater storage facility. The 5.5 MG Second Creek Wastewater Storage Facility, located within KUB's Second Creek sanitary sewer basin, will work in conjunction with a separate 6.5 MG storage facility being constructed in KUB's Third Creek sanitary sewer basin to limit flows to KUB's main wastewater treatment plant. The site selection process began with site suitability evaluations of 10 sites within the Second Creek basin. The selection process gave the heaviest weight to sites having minimal environmental contaminant constraints and the site ultimately selected was initially rejected due to environmental concerns. However, it eventually won out due to its ease of property acquisition and the desire to return the inactive brownfield site to beneficial use. There were many challenges associated with construction of the facility due the coal tar/creosote-contaminated soil and groundwater, a result of the former MGP activities. The primary challenges included the need to initiate the project as a soil and groundwater remediation activity under the regulations of the OSHA 40 Hour HAZWOPER Standard; the difficulties of coordinating the remediation activities with the construction of the wastewater storage facility; the challenge of finding waterstop, rock anchor grouting, piping, and manhole materials to be compatible with potential chemical corrosion of the MGP contaminants; the need to conduct portions of the non-remedial wastewater work under the regulations of the OSHA 40 Hour HAZWOPER Standard; and the difficulty in finding municipal wastewater contractors capable of and willing to work under the HAZWOPER Standard. Additional challenges on the project included a very small site, with the storage facility occupying approximately 90 percent of area within the property boundaries; height restrictions on the storage tank; the requirement to provide permanent access easement and a driveway to a land-locked property and active warehouse facility adjacent to the project site and a laydown and staging area located across a busy urban street from the construction site. The major lesson learned on this project was that a brownfield site remediated to levels suitable for future aboveground and shallow soil industrial use is not necessarily a suitable site for deep excavation and wastewater facility construction.

Cost Saving Ideas and Experiences that Maintain Regulatory Compliance

William B. Dowbiggin, P.E., BCEE – CDM
5400 Glenwood Avenue, Suite 300, Raleigh, NC 27587, 919-787-5620, dowbigginwb@cdm.com

The balance of microbial protection vs. control of disinfection byproducts has illustrated the competing objectives faced by water treatment plant operators for years. The more recent challenge is to balance regulatory compliance with cost control. Water systems are being forced to implement mandatory budget cutbacks. This paper will assist water systems with a variety of cost-saving ideas that do not compromise regulatory compliance and help lessen the need for staffing cutbacks to satisfy cost-saving directives. Cost-saving ideas are presented in the following major categories:

Capital cost saving concepts for:

a. Expansion
b. Compliance with the Disinfectants and Disinfection Byproducts Rule (D/DBPR)
c. Compliance with the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
d. Compliance with the recent Groundwater Rule (GWR)
e. Compliance with the recent Lead and Copper Rule Amendments requirement to evaluate corrosion control impacts before making long-term process changes
f. Alternatives to chlorine gas to prepare for possible further restrictions on gas use
g. Obtaining grants and low-interest loans to lessen the burden of selected projects

Operating cost saving concepts for:

a. Optimizing chemical usage and modifying which chemicals are used in response to cost fluctuations
b. Taking advantage of alternate electrical rate schedules, careful operations on electrical peaking, and using generators for electrical cost savings
c. Labor cost savings such as finding qualified staff within budget (perhaps the Number 1 challenge faced by water systems today) and some ideas on cost reductions without firing staff

Examples will be presented for each category, such as:

- The use of uprating to obtain additional capacity at minimal cost
- Over 20 options for tweaking existing processes for D/DBPR Compliance
- The use of filter optimization for 0.15 NTU 95% of the time to allow LT2ESWTR compliance without new facilities even if in bin 2
- The use of remote monitoring and SCADA to avoid a $0.5 million staffing increase for GWR compliance
- The use of corrosion testing with lead solder in copper pipe to optimize a change in coagulant needed for D/DBPR compliance
- The use of chlorine gas and the use of onsite generation where it saved operations and maintenance costs relative to bulk bleach purchase
- Examples of funding sources to reduce capital costs including State and Federal grants and low interest loans such as through the USDA, State and EPA, and the Rural Center.
- A brief review of the impact of the past large jump in chemical prices followed by the more recent drop in some chemical prices and how to be flexible to take advantage of these fluctuations
- The use of storage, generators and variable speed drives to minimize on-peak electrical charges
- Examples of alliances with local community colleges to provide a consistent supply of capable operating staff.

Water systems are desperately seeking ideas on cost savings. This paper will assist them and hopefully save the jobs of some operators in systems with directives to provide budget cuts.

A Better Mousetrap? - Lessons from the 1st Design /Build WTP in Kentucky

Brent Tippey, PE - HDR/Quest (Brent.Tippey@hdrinc.com)

In 2007, Hardin County Water District No.1 (HCWD1) was at a crossroads. Years of increasing demand had placed the district in a tough situation. The Pirtle Springs Water Plant (PWP), their only WTP and primary potable water supply source, was in need of a significant modernization project. Built over 30 years ago on a shoestring budget when HCWD1 was a smaller entity, PWP had several treatment elements that were deficient by industry metrics. These included filter capacity, backwash system, filter to waste and chemical storage /feeding systems. In addition, the operations, maintenance and management facilities at PWP were insufficient for the needs of a growing utility.

Understanding the urgency of the situation, the HCWD1 staff and board acknowledged the importance of the project and the need to get it right. They determined to look at all project delivery methods to identify the process that would yield the highest probability of success for their project. After looking into design-build, they were compelled that it had several unique advantages including:

- Enhanced project design by getting the Contractor(s) at the table with the Owner and Engineer during the early stages of project. This can produce built-in cost effectiveness and improve constructability.
- Enables a more complete understanding of the project scope and potential areas of difficulty by all parties.
- Facilitates communication between Owner's and Contractor's staffs that will build a working relationship that can aid in the identification of potential problems.
- Yield a better construction price for the reasons identified above.

The presentation will also note that the selection of design-build for this project was not without drawbacks. A couple notable items include:

- Contractor base had limited experience with municipal design build projects.
- Uncertainty about the reaction of regulatory agencies (KDOW and PSC) to the method of delivery

Bearing all this in mind, HCWD1 selected the team Judy Construction, Jenkins-Essex Construction and HDR/Quest in late 2007 to design and build the PWP Renovation project. The details of the project include the construction of 4 new conventional mixed media filters, high service/backwash pumping, new chemical feed facilities, laboratory and an operations/maintenance complex. The project is currently over 90% complete with construction completion expected in January 2010. The original contract amount for the work was $5.7 million and final construction cost is actually expected to be slightly less than this amount.

In addition to previously described topics, the presentation will look at other unique design/build issues such as:

- Procurement and selection
- Guaranteed Max Pricing,
- Working together to match project with budget
- Overcoming unexpected setbacks
- Working cooperatively to make the vision a reality

PERFORMANCE MONITORING AND EVALUATION OF RECENT SURGE IMPROVEMENTS AT A 21 MGD PUMP STATION

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. The Lakeview Pump Station (PS) is the hub of SD1's collection system in southern Kenton County. It was constructed in the mid 1970s and has 8 pumps (4 sets of 2 pumps in series) with a capacity over 21 MGD & over 3 miles of 30" force main (FM). The system operates at discharge pressures over 200 psi and was experiencing transient pressures (surge) up to 500 psi. Full vacuum conditions & subsequent vapor cavity collapse were occurring in the higher portions of the FM during surge events, which had routinely generated vibrations & noise at nearby homes resulting in customer complaints. In June 2009, a power outage at the PS created surge conditions that split a 14" gate valve in the PS.

To alleviate both the vacuum & high-pressure surge conditions resulting from power outages & other emergency pump shutdowns as well as normal pump starts & stops, two 7,500 gallon bladder surge tanks & fast-closing check valves were installed at the PS in 2009. In order to confirm the effectiveness of the surge tanks & more precisely calibrate the surge model that was created & calibrated during project design, the contractor & surge tank manufacturer coordinated with SD1 & the engineer, Hazen and Sawyer, to conduct startup testing (including simulated power fail conditions) & extended performance monitoring of flow rates, water levels in the surge tanks, & transient pressures (at the PS & a remote location on the FM). The data were analyzed & compared to pre-construction conditions & to the specified design criteria & performance conditions. SD1 will continue monitoring performance data throughout the 5-year warranty period & beyond to ensure the long-term reliability of the recent improvements. Also, the refined surge model that resulted from this effort was used to evaluate alternatives for future PS & FM upgrades.

This paper will discuss the startup process, surge tank operation and maintenance considerations, & the performance monitoring procedures & results–precisely demonstrating the actual improvement in surge conditions achieved by the recent surge improvements. Discussion will include the following:

- Comparison of actual pre- & post-construction surge conditions
- Evaluation of surge tank performance vs. specified design conditions & performance criteria
- Comparison of actual post-construction surge conditions to model-predicted surge conditions and model calibration
- Use of the calibrated surge model to evaluate proposed pump & FM upgrades
- Successes, challenges & lessons learned from the project.

This project demonstrates a successful approach to evaluating transient pressures & the effectiveness of surge attenuation devices in an existing pumping system, and it affords credibility to modern surge modeling & design methodologies.

Construction and Startup of the World's Only Riverbank Filtration Tunnel

Kay Ball
Louisville Water Company
550 S. Third Street, Louisville, KY 40202
(502) 569-3688
kball@lwcky.com
Co-Presenter: Steve Holtermann, JJG (steve.holtermann@jjg.com)

For the past 2.5 years, construction has been underway of the Louisville Water Company's (LWC) Riverbank Filtration (RBF) Tunnel and Pump Station at their B.E. Payne Water Treatment Plant (WTP). This project, coupled with a 15-million gallon per day (MGD) horizontal collector well that was constructed in 1999, will provide 100% RBF supply for this 60-MGD treatment plant. While the initial collector well was constructed with an above-grade pump station to demonstrate RBF technology, this project needed to be completed with minimal above-grade structures to satisfy the local community. This innovative design consists of four horizontal collector wells connected into an 8,000-ft long tunnel in bedrock and a new pump station located on the B.E. Payne WTP property.

Two years ago at the KY-TN WPC held in Knoxville, an update on the construction progress of this unique project was provided. Since that time, construction of the tunnel and collector wells have been completed, and the pump station is currently being constructed with startup activities slated to begin in April 2010. This paper will provide an update on the construction and startup activities associated with RBF tunnel and will discuss some of the unique challenges experienced in building and starting up this one-of-a-kind project, including:

- During excavation of the 12-ft diameter tunnel, water zones were encountered that needed to be addressed to minimize impact on the tunneling operation. Challenges of encountering this water during mining required additional tunnel crown support to stabilize the rock during construction.
- A blind bore technique was used to make the critical connection between the collector wells in the soil and the tunnel in the bedrock. This connection is what allowed the RBF system to be constructed without above-grade pump stations at each collector well.
- While the RBF system was providing the source water for further treatment in the existing treatment plant, it was determined as part of the project requirements that all materials used in the tunnel construction needed to be NSF certified. A detailed chlorination plan was developed to disinfect the tunnel prior to operation. This plan included provisions for measuring the dosed chlorine to ensure a consistent residual and methods for disposal of this chlorinated water.
- Startup issues with transitioning from a partial RBF supply to a 100% RBF supply.

To complete the presentation, an update of the preliminary work of Phase 3 RBF investigations will be included. This third phase is planned to provide up to 180 MGD of RBF water for LWC's Crescent Hill WTP. The Phase 3 investigations include a review of water quantity, water quality, potential natural gas in the bedrock, constructability of the project, and cost comparison to another advanced treatment alternative that includes ozone and biologically active filtration treating surface water from the Ohio River.

Ten Small Water Systems Benefit From Drinking Water Mentoring Initiative

Jessica Rader

The American Recovery and Reinvestment Act of 2009 is currently funding a Drinking Water Mentoring Initiative in the State of Tennessee. Ten small water systems across the state were selected to receive grants from the program. To qualify for the grants, the drinking water systems had to serve fewer than 10,000 people and be located in a county with an unemployment rate of more than 10 percent at the time of application. The grants are providing the systems with free training materials, training courses, and $15,100 in salary support to hire and train the next generation of drinking water professionals in Tennessee. Grant recipients are required to hire and retain trainees for at least 12 months. Tennessee Department of Environment and Conservation (TDEC)'s staff are required to make site visits throughout the year to ensure trainees are being adequately mentored. All training courses will be held at the Fleming Training Center, which is operated by TDEC and provides water and wastewater training, certification, and technical assistance to systems across the state. The ultimate goal of the Drinking Water Mentoring Initiative is have the trainees become certified water treatment operators. The paper will illustrate how federal stimulus funding can be used to improve training for small water utilities and to create jobs/careers in the process.

Abstract for
2010 Water Professionals Conference

Title: Technical Assistance Center Network (TACNet): Tools and Training for Small Systems
Authors: Jana Fattic, Andrew Ernest
Agency: Western Kentucky University – Center for Water Resource Studies

The Safe Drinking Water Act (SDWA) authorized the U.S. Environmental Protection Agency to make grants to institutions of higher learning to establish and operate technical assistance centers (TACs) for small public water systems. Western Kentucky University (WKU) is one of eight universities around the country that houses a TAC. The Technical Assistance Center Network, or TACNet, works with the common goal to protect public health, improve water system sustainability, and enhance compliance. They do this by applying university resources to address the needs of rural and small public water systems in the areas of technology verification, pilot and field testing of innovative technologies, training and technical assistance. This consortium is comprised of Centers in Alaska, Montana, Missouri, Illinois, Kentucky, Mississippi, Pennsylvania, and New Hampshire.

Together, the TACs and state and federal regulatory agencies work with small water systems to assist them in acquiring and maintaining the technical, managerial, and financial capacity needed to consistently provide safe drinking water and meet the public health protection goals of the SDWA. Resources available include, but are not limited to, on-site technical assistance, training for water system operators and managers, technical assistance in conducting sanitary surveys and self-assessments, water treatment technology research and evaluation, computer training including database and web page development and management, systems finances, and monitoring. Some of the tools and trainings that have been developed by the TACs include:

- *Operator Basics* Training Courses
- Utility Management Institute
- Resource Guide to Financial and Technical Assistance
- Emergency Response Planning Guide CD and workbook
- Corrosion Control in Small Public Water Systems
- Filter Evaluation and Optimization Training Materials
- Sanitary Survey Fundamentals Prep Course
- POU-RO Basics
- Microbial Risk Toolkit
- Source Water Protection Guides
- Technology Demonstration Summaries
- DBP Control in Small Water Systems Fact Sheet

This presentation will give a brief background of the TACNet, and then give an overview of several of the tools and trainings available to small water systems, focusing on products that are relevant to Kentucky and Tennessee.

When Conventional Doesn't Apply: Exploring Wastewater Disposal Options

Paul Steele, Gresham Smith and Partners
paul_steele@gspnet.com, 865-521-6777

In 2007, The University of Tennessee hired Gresham Smith and Partners to design site infrastructure for a new, state-of-the-art research and technology campus called Cherokee Farm. Cherokee Farm is relatively isolated from publicly owned wastewater infrastructure. This isolation, combined with the University of Tennessee's commitment to cost-effective, sustainable design solutions, prompted the need for an evaluation to determine the most appropriate wastewater disposal solution for the site.

The purpose of the study was to evaluate various options for disposing of sanitary wastewater generated on the Cherokee Farm and to recommend the solution most appropriate for the site based on cost-effectiveness, with consideration given to sustainability. The scope of this study is to evaluate the following:

- Off-site disposal options via force main;
- On-site treatment and disposal options; and
- Wastewater collection system options.

The various options were evaluated on the basis of life-cycle costs with consideration given to sustainability. The life cycle cost calculations assume a 30-year development period, and wastewater generation is modeled to increase at a constant rate over the 30-year period.

The study included three collection system options, eight off-site force main routes and six on-site wastewater treatment and disposal options. The collection system options included a low pressure grinder pump system and two different configurations of a gravity collection system. The off-site disposal options all involved a pump station and included force main routes to various locations, all of which had complications. The treatment options included lagoon treatment augmented by solar-powered aerators/circulators, two modular proprietary treatment systems, a proprietary packed media treatment system, a membrane bioreactor, and a recirculating sand filter.

All of the options were evaluated based on feasibility, life-cycle cost, sustainability and other factors that may impact the design, such as the likelihood to produce odors.

GS&P recommended that the University pursue a low-pressure grinder pump system leaving the site and terminating via manifold into a private 12" wastewater force main across the controlled access highway. The on-site treatment options were fairly competitive in price to the off-site options due to the lack of a wastewater bill, but were still slightly more expensive than connections to the public wastewater system due to the required cost of a subsurface disposal system.

DON'T LET YOUR HYDRAULIC MODEL GO TO WASTE: USING YOUR MODEL ON A DAILY BASIS

Eric D. Onderak, Geoffrey M. Grant - AECOM
Brandon C. Vatter – Sanitation District No. 1 of Northern Kentucky

Corresponding Author:
Eric D. Onderak, AECOM
2800 Corporate Exchange Dr.
Columbus, OH 43231
Email: eric.onderak@aecom.com Phone: 614-901-6028

ABSTRACT
Sanitation District No. 1 of Northern Kentucky (SD1) recently updated their hydraulic model as part of their Watershed Plans. Included was a calibration and verification effort based on year long flow monitoring at 250 locations to develop a model that could be run in continuous simulation to support future improvements. Having produced a detailed model, SD1 worked to identify how this tool could be used beyond long-term planning and in support of day to day operations.

Quarterly Model Updates: With over $450M to be spent in the next 5 years, the SD1 system will be changing significantly. SD1 did not want the model to quickly become outdated. SD1 developed a program to update the model quarterly to track the implementation of their projects. SD1 can monitor the benefits of the projects as they are constructed.

Field Verification: SD1 has used the model to help guide crews in inspecting potential SSO locations. Based on model prediction, SD1 has developed field investigation routes based on storm events. The inspection results are compared to model predictions quarterly to identify discrepancies. In the last two quarters, over 90% of all overflow locations were predicted by the model. That information is used to help refine routes, identify model updates, and provide confirmation of model accuracy.

Monitoring and SSES Testing: SD1 is conducting SSES evaluations across the system. Updating the model on a regular basis will allow for SD1 to make more effective decisions on prioritization of I/I reduction. I/I reduction is an important part of the Watershed Plans and accurately representing system hydraulics is critical in an SSES program.

Staff Training: SD1 is working on building staff knowledge of the model and utilizing consultants to provide regular training and interaction. As more individuals become familiar with the model, the model can be used to optimize a number of different tasks.

Summary: SD1 has developed a detailed model and is working to use the model so that it becomes more than a long-term planning tool and can be used daily for:

- *Evaluating capacity requests*- SD1 must evaluate the impact of planned development
- *Examining green infrastructure* – Several green projects are under construction in the SD1 service area and the model must be able to represent these projects accurately
- *Refining field investigation* – SD1 is working to optimize inspection of overflow locations based on rainfall volume and season
- *Prioritizing capacity improvements* – Understanding the severity of capacity limitations will help prioritize future projects

Minimizing Model Simulation Times by Selecting Representative Periods for Long-Term Modeling

Kimberly M. Martin, P.E.
CDM
210 25th Avenue North, Suite 1102, Nashville, TN 37203
martinkm@cdm.com

As part of the development of its Long-Term Control Plan (LTCP), the Paducah-McCracken Joint Sewer Agency is working with CDM to develop a hydraulic model of its combined sewer system, which serves an area of approximately 6,780 acres and consists of 11 combined sewer overflows (CSOs). In order to assess average annual volume, duration, and frequency of CSOs for the LTCP, a long-term continuous period was simulated using the hydraulic model.

Ideally, CSOs statistics would be developed using a complete historical precipitation record for the area, such as a 50-year record. However, simulation times associated with such a lengthy record often make this approach impractical, and a shorter, representative period is typically selected.

Selection of an appropriate representative period then becomes a critical component in the analysis process. It must consider not only annual precipitation but also the presence of large storm events that may skew model results. It should also consider distribution of significant storm events in comparison to the full historical dataset. Once a representative design period is selected, it is important to compare runoff simulated by the model for the design period to that simulated by the historical dataset.

This presentation will discuss how long-term simulation modeling differs from event-based modeling, the process for selecting a representative design period, and preliminary results of the use of that period for Paducah's LTCP.

Paducah-McCracken Joint Sewer Agency
Sanitary Sewer System Hydraulic Model Development and Calibration

Joe Henry, P.E. and Adalyn Haney, E.I.T.
GRW Engineers, Inc.
11909 Shelbyville Rd, Louisville, KY 40243
Tel: 502-489-8484

This study developed and calibrated the Paducah-McCracken Joint Sewer Agency's (JSA's) Reidland, Woodlawn, Lone Oak, and West Paducah sanitary sewer system hydraulic models utilizing XP-SWMM sewer modeling software version 10.5. The geometric network of each of the JSA sewer systems was created from a collection of data at the system elements whose sources included surveys, plans, and GIS. Dry and wet weather model development and calibration of each of the systems was completed using flow data collected at metered manholes, as well as rainfall data collected at various rain gauges throughout the systems.

The Reidland sewer system was created from survey data at 235 manholes, field and plan data at 12 pump stations, and GIS data for all network components including manholes, sewer mains, pump stations and force mains. The Reidland system was calibrated for both dry and wet weather utilizing flow monitoring results from nine (9) manholes and one (1) rain gauge location.

The Woodlawn sewer system was created from survey data at 178 manholes, field and plan data at nine (9) pump stations, and GIS data for all network components. The Woodlawn system was calibrated for both dry and wet weather utilizing flow monitoring results from seven (7) manholes and two (2) rain gauge locations.

The Lone Oak sewer system was created from survey data at 210 manholes, field and plan data at 19 pump stations, and GIS data for all network components. The Lone Oak system was calibrated for both dry and wet weather utilizing flow monitoring results from 14 manholes and three (3) rain gauge locations.

The West Paducah sewer system was created from survey data at 300 manholes, field and plan data at eight (8) pump stations, and GIS data for all network components. The West Paducah system was calibrated for both dry and wet weather utilizing flow monitoring results from 12 manholes and five (5) rain gauge locations.

Dry weather models were developed by assigning calculated baseflow and temporal factors from meter data to each system element. Model-predicted flow results were compared to metered flow data over the chosen dry weather period. Dry weather demand parameters were adjusted until the model-predicted values agreed with the metered values and the models were considered calibrated.

Wet weather models were developed by defining "catchment" inflow and infiltration parameters at system elements. Model-predicted flow results were compared to metered flow data over the chosen wet weather period. The "catchment" parameters were adjusted until the model-predicted values agreed with the metered values and the models were considered calibrated.

Calibrated wet weather models were validated on an independent set of flow and rain data to verify that they were applicable to other rain and flow conditions. They were then run on design storm events, which were used to identify sanitary sewer overflows and surcharged pipes.

Based on model results, system improvements were recommended to eliminate existing overflows.

Application of Multiple Technologies Reduces CSOs from Nashville's Boscobel CSO

David Bible, PE, Greg Ballard, PE, and Phil Regen, PE

Metro Nashville Department of Water Services is under an Order from the Tennessee Department of Environment and Conservation (TDEC) to address overflows from its combined sewer system. The Boscobel Combined Sewer Overflow (CSO) system is not one of the larger CSO basins but presented some unique challenges to address CSOs. The CSO regulator is under a neighborhood street, almost in one resident's driveway. The regulator discharges to a storm sewer in an urban neighborhood during periods of heavy rainfall. Also numerous blockages and backups were experienced in the downstream sewer line, causing overflows. Metro and ARCADIS successfully implemented a plan using several trenchless technologies coupled with replacement to bring the CSOs in compliance with TDEC's requirements while minimizing impact on the residential neighborhood.

Metro's original concept involved constructing a large sewer to relocate the regulator from the residential neighborhood and constructing an improved regulator structure to reduce CSOs and to address solids and floating material in discharges to the Cumberland River.

ARCADIS completed topographic surveying and preliminary design of the project in accordance with Metro's concept. Preliminary routing of a large sewer line through the densely developed neighborhood would greatly disturb a residential street, require expensive tunneling and could affect several houses, potentially requiring purchase of some homes. The construction cost of the original concept would greatly exceed Metro's budget. So, Metro and ARCADIS brainstormed to modify the project scope to still meet the goals and bring the project within budget.

The revised scope integrated several construction technologies, both trenchless and conventional excavation, to meet the project goals and stay within the owner's budget. The project included implementing simplified modifications to the existing regulator, sliplining a 20-inch high density polyethylene pipe inside the existing 72-inch storm sewer pipes to increase conveyance capacity and reduce CSOs, rehabilitating existing 12 and 15-inch sanitary sewer lines with cured-in-place pipe, and upsizing the downstream reaches of the sanitary sewer to 24-inches to increase conveyance capacity and eliminate blockages. The 20-inch HDPE pipe was connected to the new 24-inch sewer downstream to convey combined sewage to the plant for treatment.

The construction project was completed in 2008 for total cost of $1,445.105.44. The project has reduced CSO frequency and volume, increased conveyance capacity, and eliminated hydraulic restrictions. Utilizing multiple technologies to solve this challenging project kept the project within budget, reduced impact on homes and residents, and reduced CSOs. The project also included replacement of undersized and aging water lines in the affected area along Village Court. Metro's long-range plan is to separate the combined sewer system, which will eventually eliminate the CSO regulator.

Title of Paper: **Innovative CSO Conveyance, Headworks and Storage Project Addresses Columbus City Utilities Long Term Control Plan**

Authors: **Mark Sneve, P.E. (Presenter), Mike Meyer, P.E. and Keith Reeves, P.E.**

Abstract:

The City of Columbus is one of over 100 Combined Sewer Overflow (CSO) communities in the State of Indiana. The Long Term Control Plan completed for the City of Columbus identified the need to convey combined sewage through a series of large diameter gravity sewers from downtown Columbus to a new headworks facility. The 240 mgd capacity Headworks is equipped with two deep influent screens and six primary CSO pumps. The headworks facility is located near the confluence of Haw Creek and the East Fork of the White River. Combined sewer flow from this pumping station is pumped into a series of wet weather storage lagoons located across Haw Creek from the Pumping Station with a total storage capacity of 18 million gallons. After the subsidence of wet weather flows, the lagoons are drained back to the pumping station where they are pumped to the existing wastewater treatment plant.

The headworks facility includes wet weather pumps designed to pump combined sewage to the storage lagoons as well as normal flow pumps designed to dewater the lagoon by pumping stored flow back to the existing wastewater treatment plant. The facility was designed to be easily upgraded to a wastewater pumping station that will convey flow from the majority of the City's sewer service area through two 30-inch force mains to the proposed new wastewater treatment plant located approximately 2 miles south of town. The new treatment plant is currently under construction.

The project included the construction of several large diameter interceptor sewers, including the 108-inch Water Street interceptor sewer, two 78-inch influent sewers into the headworks facility and the 66-inch Noblitt interceptor sewer. The construction of these large diameter interceptor sewers in an urban area presented several challenges during design and construction.

The CSO storage lagoons were constructed at the site of the Mariah Packing Company's abandoned sequencing batch reactor plant located across Haw Creek from the Headworks structure. The facility included approximately 18 million gallons of lagoons that were used for biosolids storage. The plant had been abandoned for approximately 15 years. The lagoons were filled with biosolids and overgrown with vegetation. The project included the removal of approximately 10 million gallons of biosolids, the removal of the existing vegetation, the installation of concrete base slabs, HDPE liners for the sides of the lagoon, and floating aerators. The lagoons are equipped with an emergency chlorine contact tank, chlorine feed system and outfall weir in the event the storage capacity of the lagoons is exceeded and a discharge is required.

Biographies:

Mike Meyer was the project manager for Strand Associates, Inc. in Columbus Indiana.
Mark Sneve served as the Assistant Project Manger for Strand Associates in Louisville, KY
Keith Reeves is the director of Columbus City Utilities.

CLEANING LARGE DIAMETER INTERCEPTORS: EVERYBODY KNOWS THEY NEED TO DO IT, BUT DOESN'T WANT TO ADMIT IT

Christopher W. Pawlowski, PhD - AECOM
Brandon Vatter, P.E. - Sanitation District 1 of Northern Kentucky
Geoffrey M. Grant, P.E. - AECOM

Corresponding Author Information:
Christopher W. Pawlowski, AECOM
4219 Malsbary Drive
Cincinnati, OH 45242
Email: christopher.pawlowski@aecom.com
Phone: 513-878-6864

ABSTRACT

The maintenance and cleaning of large diameter sewer pipes is challenging and costly. Thus it is often relegated to a lower priority in exchange for more manageable and pressing maintenance activities. Challenges to a successful cleaning program include: understanding the condition of the pipe, knowing the quantity and nature of the sediment or debris present in the sewer, development of a set of appropriate specifications, and quality checking the contractor's work to be sure the sewer is in fact clean.

Recently, the Sanitation District No. 1 of Northern Kentucky (SD1) undertook a large diameter interceptor cleaning program. Before hiring a cleaning contractor, SD1 invested in a comprehensive inspection of their interceptor sewers (74,000 linear feet) using a combination of CCTV and SONAR. The SONAR component enabled calculation of sediment depths below the water surface. These were entered into a hydraulic model to evaluate alternative cleaning strategies. The analysis determined that cleaning all sewer segments resulted in a reduction of 2.4 mgal of CSO volume, whereas targeting cleaning of the highest service grade pipes (27% of the inspected length) resulted in a 1.7 mgal reduction.

SD1 then developed a comprehensive set of specifications and bidding documents. Among their important features are an unambiguous cleaning standard and a qualifications section so that experience and approach to the project are considered in addition to price. Payment is made on the basis of linear length of pipe cleaned, not the intensity of effort or other measures. The bidding process was enhanced by the inclusion of pre-cleaning data, including types and estimated volumes of deposits, videos, and reports.

The cleaning contractor has been on site for two seasons. As called for in the specifications, the contractor performs a full NASSCO PACP post cleaning inspection using CCTV and SONAR. To verify that cleaning is satisfactory, logs and post-cleaning inspection videos are checked. Inspection data are submitted in the form of an SD1

supplied template database, which verifies that all required information is complete and consistent under PACP coding guidelines. This step has helped reduce re-work and re-inspection. In addition, the database converts the PACP coding and scoring to the SCREAM standard on which SD1's asset management program is based. Finally, pre- and post-cleaning condition assessment data are compared to identify trends in sediment buildup and other maintenance issues.

Pre-cleaning inspection and analysis contributed to an effective cleaning project at a significant cost savings. Simulating the impact of different cleaning alternatives allowed SD1 to find an approach that maximized the benefit of cleaning with minimal effort. Minimizing the time a contractor must be on site helps control costs, and is consistent with the regular inspection of infrastructure called for in SD1's continuous sewer assessment program.

KEYWORDS: Operations and Maintenance, Pre-Cleaning inspection, Modeling, Specifications

Rehabilitating the Benefit-Cost Model for Investing in Infrastructure Renewal

S. Wayne Miles, P.E.
CDM, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, 919-787-5620, milessw@cdm.com

Utilities and municipalities have recognized for a number of years that insufficient reinvestment has been occurring in utility infrastructure, especially underground infrastructure. It is widely acknowledged that as this infrastructure ages, the potential for failure and declining levels of service increases. The problem compounds as improvements are deferred and the need for rehabilitation work increases.

Utility managers understand the problems that arise as a result of deferred system rehabilitation. The costs to operate and maintain the system and the risk of a system failure both increase. Ongoing calls for state and federal assistance with funding infrastructure rehabilitation have had limited success in recent years, and most indications are that any significant funding must come from the local level. At the same time, most local utilities have not been able to present the business case to their decision-makers that funding infrastructure rehabilitation is a sound and necessary business decision to continue providing reliable and cost-effective services to their customers.

This paper presents the framework for an economic model that demonstrates the financial argument for funding infrastructure rehabilitation. The model considers traditionally accepted financial considerations for sanitary sewer systems such as savings from infiltration and inflow (I/I) removal in terms of reduced transport and treatment costs and deferred capital expenditures. In addition, consideration is given to the resulting reductions in a variety of other management, operation, and maintenance costs including cleaning, root removal, and crew time spent on emergency responses. Other cost factors considered include the impacts to the community from infrastructure failures such as interruptions in service, reduced service, property damage, reduced traffic flow, and other social costs. The methodology will be presented to tailor cost information to local conditions, and guidance will be provided in selecting appropriate cost factors depending on a range of system-related parameters. Specific examples of developing these factors will be provided along with the results of the financial evaluation.

The methodology presented will show that a business case can be made that funding infrastructure rehabilitation at levels substantially higher than are typically done by utilities today is a financially sound and necessary decision.

ABSTRACT_GREASE (FOG) PROGRAM_ HUGH GARRISON

Title-Grease (FOG) Program Developed by Application of CMOM Requirements

Main Author-Hugh Garrison

Employer of Author-Metro Water Services

Contact Information for Author-Environmental Compliance
(615)862-4590 office. (615)456-3313 cell
Email: hugh.garrison@nashville.gov

Metro Water Services – Grease (FOG) Program
Davidson County Nashville, TN

Paper illustrates the development of an effective grease control program, started in 2002, in Metro Nashville and Davidson County, to anticipate promulgation of EPA CMOM Regulations. (Capacity, Maintenance, Operations and Management). Sewer overflows caused by blockages of grease lead to the development of a functioning FOG Program (Fats, Oils, & Greases). A contractor was selected and communications were established with the groups involved. As a result, a data base was developed of over 2,800 Food Service Establishments (FSEs) that have been permitted, monitored and served enforcement actions. The FSEs now use haulers to deliver FOG directly to the Wastewater Treatment Plant or contractor instead of putting FOG in the sewer system. Over 200,000 gallons of FOG per month is hauled, up from 75,000 gal./mo. in 2002. The corresponding revenue to Metro from the hauled FOG increased to $210k, (from $62k).

Sewer overflows from blockages reduced from 43% in 2002 to 13% in 2009 for blockages caused grease.

Immediate reviews of overflows are conducted to develop corrective actions and issue educational information to customers such as door hangers, letters, and outbound calling.

Additional investigation and reviews helped determine the true cause of an overflow to identify the proper corrective action. Previously, it often appeared that grease was the cause of an overflow.

Sewer maintenance crews with cleaning and televising equipment focused on the list "hot spots" of FOG problems. As the program progressed, the list of hot spots decreased. Daily review of the routine sewer maintenance work logs provided daily information of other grease contributors that were investigated by Environmental Compliance staff.

We learned the lesson that not all grease comes from FSEs.

We discovered residential and Multiple Dwelling Units (MDU) customers contribute substantial amount of grease and cause overflows.

When residential or MDU's were determined to cause grease overflows, Environmental Compliance Staff met with the units and provided door hangers, information sheet, mailings and outbound calls.

To educate the public and influence a change in behaviors, we used Metro Channel 3, Grease Recycling bins at the Convenience Centers, decals on trucks, bill stuffers, public presentations, visits to schools, FSE chains, TN Restaurant Association.

Several case studies of fecal counts in streams are given to illustrate investigation of failing grease control equipment.

On-going monitoring of FSE's has shown improved maintenance from 60% of grease interceptors in 2003 to 95% in 2009. Grease traps maintenance increased from 43% in 2003 to 88% in 2009. Enforcement actions since 2003 included 1,049 notice of noncompliance, 37 notice of violation, and 2 show cause hearings.

TRACTIVE FORCE DESIGN FOR SELF-CLEANSING OF SANITARY SEWERS
Evaluating Design Guidance Based on the Performance of Existing Sewers

Kevin L. Enfinger, P.E. and Paul S. Mitchell, P.E.

ADS Environmental Services
4940 Research Drive • Huntsville, Alabama 35805

The second edition of *Gravity Sanitary Sewer Design and Construction* (ASCE Manuals and Reports on Engineering Practice No. 60 / Water Environment Federation Manual of Practice FD-5) was recently published in 2007 and recommends the use of the tractive force approach for the self-cleansing design of sanitary sewers. (ASCE, 2007) Using this approach, a design slope is determined based on sewer diameter, design particle size, and a design flow rate such that a minimum shear stress on the pipe wall is achieved to maintain self-cleansing conditions. (Merritt, 2007) Although its use is not currently widespread, some communities have begun to incorporate this approach into their sewer design guidelines, and others can be expected to follow.

The authors of this paper have undertaken an effort to extend the use of the tractive force approach from the design of new sewers to the analysis of existing sewers under actual flow conditions. This approach is detailed in this paper. The authors have applied this analysis method to over 100 existing sewers where flow monitor data were available. The results were then compared with historical silt observations to determine the effectiveness of the tractive force approach at predicting locations that were likely to have silt, sedimentation, or debris problems. Based on these results, the general effectiveness of the tractive force approach for the self-cleansing design of sanitary sewers has been validated and supports the use of the tractive force approach for the self-cleansing design of new sewers.

EVALUATING FOUR PARAMETERS FOR ESTIMATING RDI/I

George E. Kurz, P.E., DEE

The Problem:

Engineering measurements of physical conditions should always be made with a level of accuracy or tolerance - either stated or understood. However, there is little indication in the literature that the level of accuracy or confidence is calculated or considered for measurements of sewage flow and rainfall monitoring when used for measuring RDI/I (rainfall dependent inflow & infiltration) or the effectiveness of sewer rehabilitation. It is important for designers to understand the level of confidence that they may have in using various calculated projections for flow and especially for peak levels of RDII. The level of confidence can affect the factor of safety provided in the design – which also may affect the ultimate cost. This paper will evaluate four parameters for RDI/I measurement using standard statistical tests. The four parameters evaluated are: 24-hour I/I, peak-hour I/I, annual I/I, and the R-value (fraction of rainfall entering a collection system as RDI/I).

Goals of the Presentation:

1) Some of the flow monitoring results used for this study, have previously been presented for the purpose of documenting RDI/I reduction. However, the theme of this presentation is new, and is focused on defining and improving accuracy and reliability for predicting RDI/I for large design rainfall events.
2) Apply two objective statistical tests by calculating: r (coefficient of linear correlation for the amount of variation of RDII resulting from changes of rainfall), and the 95% confidence interval for the value estimated for the 24-hour RDII and the peak-hour RDII, respectively. ***(This r value is not to be confused with the R value in the RTK method.)***
3) Provide a tool that may be helpful for developing design safety factors that can compensate for varying levels of performance for different flow monitors and technologies.

Methods and Results:

A study was conducted of analytical results from 62 flow monitors in Nashville, Chattanooga, Clarksville, Atlanta, and Bowling Green. 37 locations were in separate sanitary sewers and 25 were located in combined sewers. This monitoring was conducted for a total of 13,177 (not consecutive) days and included 1,014 rainfall events. For monitors on separate sanitary sewers the average r value was 0.89 for estimating the 5-year, 24-hour RDII and was 0.90 for estimating the peak-hour flow rate. At the same locations the average % represented by the 95% confidence interval was 32% and 28%. The ideal r value is 1.00 and the ideal 95% confidence value is zero. The most consistent (and high quality results) for the r value and for the confidence level generally occurred for locations that had long-term monitoring greater than 14 months and which captured more than 25 valid wet weather rainfall events (as defined by the standardized method).

Camp Taylor SSES – Challenges and Opportunities

Authors: John Loechle, Louisville MSD; Tom Middeler, Louisville MSD;
Vince Bowlin, Stantec Consulting

The Louisville and Jefferson County Metropolitan Sewer District (MSD) in Louisville, Kentucky is conducting sanitary sewer evaluation surveys (SSESs) throughout its system with the goal of reducing sanitary overflows and improving service to its customers.

The Camp Taylor area is especially challenging for MSD. Built as an army training camp in World War I, sewers were installed to serve the buildings within the camp. After the war ended, many of the buildings were dismantled and the wood used to construct new homes. At first the homes were placed over the existing sewer system to facilitate connecting to the lines, but as more homes went up, the new residences were placed in locations requiring new sewers to be constructed. With few rules in force at the time, the new sewers were constructed to serve properties as efficiently as possible, but with little thought of planning for the future or even for other homes in the area. The result was a sewer system with lines made of various materials in locations that may, or may, be in easements or rights-of-way.

Today, a substantial amount of sewers in Camp Taylor run under houses and may be undersized. It is likely that several thousands of linear feet of sewer are not shown in MSD's Geographic Information System, so it's also likely that a significant portion has received no maintenance. This has contributed to problems associated with back-ups into homes and overflows from the system into area streams.

Compounding these problems are the expectations of the residents, who have been told on several occasions that MSD is going to fix the problems in Camp Taylor.

The Camp Taylor SSES is the first step in correcting problems that have been ongoing for several years in the area. As future repair and rehabilitation projects are constructed along with new sanitary sewers, customers should see improved performance of the system, resulting in fewer back-ups into homes and improved water quality in streams.

Metro Water Services – Private Fire Hydrant Program
Davidson County Nashville, TN

Abstract submitted by Evelyn Fontana,P.E. and Linda Green, Program Administrator
State of TN Certified Grade 4 Water & Wastewater License

Private hydrants are an integral part of Metro Water Services (MWS)-System Service Division (SSD) Water Distribution System. MWS distribution system covers approximately 500 square miles with mixed terrain and elevations variance on all four sides of Davidson County boundary lines.

One of MWS core values is public health and safety; therefore, locating all the private hydrants inside of Davidson County became a joint-effort by the Nashville Fire Department (NFD) and MWS. Such an agreement required a revision to the local charter and ordinances. Enactment of the revised Metropolitan Code of Law Section 15.68.010 mandated that all private water hydrants for fire protection shall be inspected under the supervision of the Metropolitan Department of Water and Sewerage Services was approved on January18, 2006.

The objective of MWS private hydrant program is to observe the testing and operational functionality of all private hydrants inside Davidson County, and to report all testing results to the NFD. Originally the project consisted of updating an older database created by MWS staff in 2002, which identified and linked private hydrants to customer account numbers. This same database was modified by the NFD in 2005, and assigned complex key numbers associated to properties parcels inside Davidson County.

This expanded database was also transferred to MWS in January 2006, which included locating and observing the testing of approximately 2,500 private hydrants semi-annually. In April of 2006, MWS started this program with an administrator, one shared office support person, and 2.0 field people, one type writer and one antiquated electronic print out with an alpha numbering system.

Implementation of MWS Private Hydrant Program began in May 2006, which consisted of locating, tracking, contacting property owners and scheduling appointments to observe testing of over 2,500 private hydrants. Semi-annually routine observation of private hydrant testing is on going by MWS. Utilizing two different computerized software programs, a database was established to record field data and to share information.

Shared information consists mainly of static flows, pressure readings, chlorine residual and operational status of each individual hydrant. The Private Hydrant customer and the Fire Department receive the report of the condition of each Private Hydrant with specific deficiencies noted.

Another software program is used daily to input billing information and charges for services conducted. Typically a charge is $40.00 per hydrant. Additionally, technological development such as mobile dispatching in 2009 and computerized maintenance management systems has enabled the current field personnel to receive work orders by laptops, close and complete work orders while in the field. The accumulation of this data and shared information now covers a three year period with approximately 3,200 private hydrants tested twice per year.

The establishment of the private hydrant program is well-developed, staffed with an administrator, 2 shared office support members and 5.0 field personnel that continues to observe a monthly testing average of over 500 private hydrants every six months. Scheduling appointments within a cyclic time frame initiates the work flow processes. Customers must be contacted and appointments set by their willingness to provide personnel on-site. Private hydrant testing is performed five days a week from 7:00 am - 3:30 pm, (weather permitted) with employees covering a geographical area of 50-100 miles per employee per day. An improvement within the work processes and continuous training allows field personnel to be utilized within other work groups daily. In essence MWS is experiencing greater productivity levels in the completion of daily tasks.

The benefits derived from MWS private hydrant program is serviceability and public safety. Reassuring a community and your customers that the water supply system is adequate as well as, making known the operational status of private hydrants will put the public at ease if ever a fire out break occurs.

MWS and the Nashville Fire Department recognize it is their responsibility to protect public safety. Having the knowledge and information before hand on private hydrants status, allows everyone involved adequate preparation and time for readiness in the event of an emergency situation.

Abstract submitted by Evelyn Fontana, P.E. and Linda Green, Program Administrator
State of TN Certified Grade 4 Water & Wastewater License
Metro Water Services of Nashville and Davidson County

ABSTRACT

Anatomy of A Chlorine Emergency

Alice Cannella, P.E.; Gary Williams; Chief Randy Parker, CFD; and Jerry W. Stewart, P.E.

On October 2, 2009 the Moccasin Bend WWTP experienced the release of a full 1-ton cylinder liquid chlorine. A major event turned into a minor event because of the plant's emergency response plan. Who, how, what, and why will be explained in the full paper. What would you do if this happened at your plant?

How A Legal Loophole Could Change the Chemical Makeup of Your Utility

David Billings
Frankfort Electric and Water Plant Board
(502) 229-2293
dbillings@fewpb.com
Co-Presenter: David Haas, JJG (david.haas@jjg.com)

In 2007, the Chemical Facility Anti-Terrorism Standards program (CFATS) went into effect. Water/wastewater systems (known as the Water sector) were originally exempted from that program. Because of this, most utilities have paid little attention to the program's far reaching impacts. Since the original CFATS program was part of an appropriations bill, it will "sunset" October 1, 2009. However, CFATS will continue in some form and the Water sector will be drawn into the law. It could mean additional, mandatory security assessments and changes for utilities still using chlorine gas, or a number of other chemical compounds (the list is 5 pages long) in large quantities. It could also mean performing a process review to look for Inherently Safer Technologies (ISTs). One viable option would be switching from chlorine gas to sodium hypochlorite, either delivered in bulk or produced on site.

This paper will present an overview of the new security legislation (the Water sector's inclusion), explore the sodium hypochlorite options, and provide examples of how to evaluate and select the most appropriate IST for water and wastewater treatment plants. It will also highlight a case study for the Frankfort Electric and Water Plant Board (FEWPB) Water Treatment Plant (WTP) that recently completed a similar evaluation to improve safety associated with delivery and storage of chlorine gas cylinders.

Case Study

The FEWPB WTP was originally constructed in 1966 and renovated in 1997. Since 1966, several chemical process changes have occurred, but many of the original chemical feed system facilities were still being used. The WTP is located near the Frankfort, KY population center, which includes the nearby Commonwealth of the Kentucky state capitol building. The FEWPB WTP currently utilizes chlorine gas for disinfection of their water system and routinely maintains up to 12 one-ton cylinders of stored chlorine gas on-site. This study evaluated alternative methods of disinfection (including performing a life cycle cost analysis of bulk delivery of sodium hypochlorite, on-site generation of sodium hypochlorite, tablet chlorination, and addition of chlorine gas leak scrubbers) and also developed other chemical feed system improvements to enable safer handling and application.

The following chemical feed systems were evaluated for safety concerns, application points, regulatory compliance, and chemical efficiency:

- Polyaluminum chloride (PACl) – bulk and day facilities
- Ferric chloride – bulk and day facilities
- Fluorosilicic acid – (fluoride)
- Caustic soda – (50% sodium hydroxide) – bulk and day facilities
- Zinc orthophosphate – bulk and day facilities
- Ammonia
- Chlorine – all facilities
- Chemical mixing and application

The results of this study included recommendations for a new building to house on-site hypochlorite generation equipment and modifications to the existing filter building to improve the storage and feed systems for the other chemicals to meet both existing and future demands. These new facilities are currently being constructed with an anticipated completion date in October 2010.

Title: The Odd Couple: PR & The Media

Main Author: Glen Thomas

Employer of Author: Memphis Light, Gas & Water

Contact Information for Author:

Phone: 901-528-4557

E-Mail: gthomas@mlgw.org

Abstract Selection

It's the business world's ultimate odd couple: the media and public relations (public information). Two very different entities that cross paths every day. Much like the movie made famous by Jack Lemmon and Walter Matthau, this pairing is one that can frequently result in conflict, misunderstandings and even a little comedy. This session takes a light-hearted but practical look at a dysfunctional relationship that rivals anyone's in-laws.

Social media in particular is heavily 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 after a devastating storm knocked out power to about 1/3 of MLGW's customers in June 2009.

Moreover, through case study examples, Thomas looks at media tracking, training, "media fire drills," public records, and a good old fashioned sandwich as ways of maximizing media relationships.

Objectives:

1. Show how a communications crisis can affect media relations and future media coverage. Provide case study examples to illustrate these points.
2. Provide ideas for improving media relations on a limited budget through social media vehicles such as Twitter, Facebook and blogs.
3. Examine blogs as news sources, as well as the pros and cons of posting comments on blogs and media websites.
4. Provide unique takes on media luncheons and media "fire drills" as tools for improving relationships and honing responses.

ABSTRACT_CSO PUBLIC PARTICIPATION PLAN_TROTTER

By: Abby Trotter
Hall Strategies
222 Second Ave. North, Suite 210
Nashville, TN 37201
abby@hallstrategies.com
phone: 615-242-8856

CSO PUBLIC PARTICIPATION PLAN

Metro Water Services (MWS), Hall Strategies (www.hallstrategies.com) and AECOM Water (www.aecom.com) desire to present on public participation, communication and engagement. Presenters will be Sonia Harvat, MWS; Paul Stonecipher, AECOM Water; and Abby Trotter, Hall Strategies.

This educational session will use first-hand experiences garnered through a Public Participation Program (PPP) to gain input on the issues and responsibilities of Nashvillians to appropriately address Nashville's combined sewage overflows (CSOs) into the Cumberland River, one of Tennessee's central waterways. The program is a part of the federally mandated CSO Long Term Control Plan (LTCP) by consent decree between MWS and EPA.

The PPP demonstrates the existing impact of CSO's on the Cumberland River; educating the general public about potential improvements to the river's quality that will positively effect future city development and water recreation activities, but will come at a cost to ratepayers.

PPP Goals

- Engage the public, collecting meaningful input from citizens, businesses and civic organizations to influence the decision-making process of the CSO plan.
- Achieve broad public education and awareness on the need for significant improvements to MWS's CSS and attain a high level of support for the necessary investment.
- Garner public support for the investment needed to implement the LTCP, balancing cost vs. water quality improvements.

PPP Activities

- To begin the program, a Citizen Advisory Committee comprised of stakeholders and community leaders have participated in education and have embarked on a public engagement campaign that will be centered around community meetings.
- Through the forthcoming series of public meetings the CAC will continue to expand the stakeholder group to generate wide public input and support.

- In the coming months the program will educate and engage local media on CSO plan process through stories, editorials, and social media.
- Development of overall campaign plan and theme that drives public engagement, and will be used for material development, including collaterals, website, electronic communications tools, and public presentations.

The 15 month-campaign began in August of 2009 and is set to conclude in October 2010.

Program Components	Program Activities
Citizen Advisory Committee	Identify key stakeholders
	Gain support for public input plans
	Train to lead public input process
Public Education	Survey attitudes
	Develop public message and project theme
	Develop website and social media plan
	Inform local press
	Create speakers bureau
	Billing inserts
	Paid media (limited, if needed)
Public Involvement	Public meetings
	Develop task force
	Survey attitudes
	Focus groups
	Community leader/official interviews

Protecting Our Future:

Partnering with Schools to Implement Critical Water Quality Programs

Emily Fritz, John Ralston, Vince Monks, and Rengao Song, Ph.D.
Louisville Water Company
550 South 3rd Street
Louisville, KY 40202

Protecting public health is the primary goal of water utilities in the United States. When a water utility develops and implements a cross-connection control program (CCCP), it must look at what type of customers utilize the distribution system water supply. The utility must look at the degree of hazard the customer may impose on the potable water and define "high hazard" facilities.

Schools are one of the vitally important customers. As a customer base, our school systems have a large sensitive population. The Louisville Water Company serves the Jefferson County Public School System (JCPS), which is the 17th largest school system in the U.S. with a student population of over 92,000. JCPS has ~18,000 teachers and support staff distributed within156 schools and 15 supporting facilities.

This presentation will cover issues such as: School Board buy-in for a cross-connection program, educating the JCPS members involved on water quality and cross-connection control, and the logistics of inspecting 171 schools and support buildings.

In addition to the CCCP, a joint program has also been established to monitor for lead in drinking water in both public and private school facilities. The program was modeled off of EPA's "3T's for Reducing Lead in Drinking Water in Schools". The program focuses on educating schools on potential sources of lead in drinking water, sample plan development, sample collection training, available laboratory services, data analysis, and remedial action plans.

Many benefits of having an established monitoring program include the opportunity for education, as well as being represented as a standard-setting utility, but most importantly would be the health advantages of such programs. The benefits of sharing these programs will hopefully serve as a road map for other water utilities to enhance awareness and prevention of critical water quality issues.

Title: Ceramic or Polymeric Membranes: What is your application?
Main Authors: Brent Fulghum/Frank Rombardo
Employer: Jordan, Jones & Goulding
Contact Information: One Vantage Way, Ste B-400
Nashville, TN 37228
615.254.6002
Brent.fulghum@jjg.com

The use of ceramic membranes is common in the industrial market where high product recovery, energy savings, equipment robustness, and unique applications (e.g. cold filtration) are the driving forces. In recent years, ceramic membranes have been successfully applied to the municipal drinking water market under similar philosophies.

The City of Clarksville, TN (City) conducted a 4-month pilot study using ceramic membranes by Kruger, Inc. and polymeric membranes by Pall Corporation in preparing for the design of a 28-mgd granular media filter retrofit with microfiltration membranes. The purpose of this study was to demonstrate successful performance and to determine physical design parameters that could provide a basis on which a full-scale operation may be designed. Testing was conducted on surface water from the Cumberland River with an average turbidity of 10 NTU and average TOC of 2.3 mg/L. The protocol for the pilot study gave the Manufacturers the option to test flocculated raw water and/or settled water..

This paper presents the results of the study and shows the differences and similarities in operation and performance between the two types of membranes. The results of the study revealed that ceramic membranes are capable of successfully operating at a flux of 175 gfd using flocculated raw water provided that coagulant doses and cleaning regimes were aggressive enough to prevent membrane fouling. In comparison, polymeric membranes achieved a flux of 100 gfd using a settled water with less aggressive cleaning schedules and lower coagulant doses. The operational and performance-based differences between ceramic and polymeric membranes found from the study provided information that enabled the City to select the manufacturer which was best suited for the application.

Kentucky / Tennessee AWWA/ WEA
2010 Water Professionals Conference
July 18-21, 2010
Nashville, TN

Protecting Your Water Supply and Your Bottom-Line: Shifting Treatment Costs From Ratepayers to Polluters

Victor M. Sher

Abstract

Traditional legal remedies for drinking water contamination focus on the "potentially responsible party" who actually released the pollution, for example, the operators of retail gas stations, local dry cleaning operations or fertilizer or pesticide applicators. When contamination affects public water supply wells, however, these remedies frequently fail. First, there is an enormous disparity in knowledge and culpability between the large corporations that developed and distributed their ubiquitous products, and the small businesses that unknowingly stored, sold, and accidentally released them to the environment. Second, the costs of treating even modestly sized public water supply wells are quite large. The financial resources needed to pay such costs are beyond the scope of many local businesses. Public water suppliers may have an overwhelming liability case in these situations but run the risk of having the "responsible" party unable to pay even a small portion of the damages awarded.

Recent lawsuits by cities and other public water agencies have focused on pursuing parties higher up the chain of commerce. Instead of suing the traditional "potentially responsible party," these cases focus on the defect in the "product" released and place responsibility on its manufacturer. The courts have seen lawsuits against the refiners of gasoline containing MTBE, as well as the manufacturers of PCE associated with dry cleaners, TCE from industrial degreasers, DBCP and TCP from soil fumigants, and others.

This new approach to contamination litigation has important implications for public water suppliers lawyers, regulators, and environmental consultants. This presentation will discuss the legal theories underlying these landmark cases and the status of lawsuits currently pending in jurisdictions around the country. The presentation will also discuss emerging contaminants of concern to rural water providers and the legal and political responsibilities and pitfalls involved in addressing actual or threatened contamination of a public water supply.

About Sher Leff, LLP: Sher Leff is a San Francisco based environmental law firm dedicated exclusively to representing public water suppliers and other public agencies in cases involving contamination of groundwater and drinking water supplies by toxic chemicals. Sher Leff has a unique understanding of the complex legal, scientific, and political issues that arise when a drinking water supply is threatened by contamination.

The use of UV / Peroxide for Taste and Odor Treatment

By: Rob Haas, Terry Keep, Adam Festger, and Alan Royce

Deteriorating drinking water quality, including the presence of algae-bloom-derived taste and odor-causing compounds and algal toxins, continues to be a major concern for municipal drinking water suppliers. Off-tastes and odors can significantly erode public confidence in the safety of delivered water, despite assurances of safety from suppliers and governments

UV technologies continue to experience rapid growth in municipal drinking water disinfection applications. In addition, there is a growing awareness of UV-based advanced oxidation processes for treating micropollutants in water, including treatment of taste and odor-causing compounds and associated algal toxins.

Several municipalities have installed full-scale UV-oxidation systems for simultaneous disinfection and treatment of taste and odor and algal toxins. These include the cities of West Elgin, Ontario (2 million gallons per day [MGD] peak flow) and Cornwall, Ontario (26 MGD), Waxahachie, Texas (15 million gallons per day [MGD] peak flow) and Groesbeck, TX (2 MGD peak flow). The combination of UV and hydrogen peroxide initiates an oxidation reaction that destroys T&O-causing chemicals and increases the level of disinfection.

Performance testing was performed on the installations between December 2006 and November 2009. Data from each performance validation study will be presented showing the effectiveness of T&O-compound reduction. Actual T&O reduction data collected are compared to results of predictive models. In addition, data will be presented on the treatment of fishy, swampy, and grassy odors and algal toxins with UV-oxidation.

2010 KY/TN
WATER PROFESSIONALS CONFERENCE
CALL FOR PAPERS- Due December 17, 2009
July 18-21, 2010
Nashville Convention Center
Nashville, TN

Abstract:

Innovative Microwave UV System Design Used to Meet Disinfection Needs
By: Joel Neulight, Severn Trent Services

The Kent County Regional Wastewater Treatment Facility (KCRWTF) is an award winning 16 million gallon per day (MGD) wastewater treatment plant located in Kent County, Delaware. An objective of the Environmental Health and Safety Management System (EHS-MS) was to remove chlorine gas as its disinfection process. This offered significant environmental and health and safety benefits.

Ultraviolet (UV) disinfection produces no residual byproducts, does not require dechlorination before discharge to the nearby receiving stream, does not require additional regulatory requirements such as OSHA's PSM or the EPA's RMP, and does not need special handling and emergency response training. A Capstone project conducted by students of the University of Maryland Graduate School suggested UV as a cost effective treatment alternative.

An innovative UV solution, the Severn Trent Services MicroDynamics® microwave UV disinfection system was presented to the KCRWTF for consideration. The microwave UV disinfection system offered a number of advantages over traditional UV systems.

- The UV lamps did not heat up and would not build up deposits on the lamp sleeves;
- The UV lamps use no electrodes and therefore do not cloud up on the interior;
- The system can operate at ambient water temperatures;
- The lamps are fully guaranteed for 3 years or 27,000 hours of 24/7 operation;
- The system features no electrical connections in the water;
- The lamps take seconds to reach full power; and
- The system does not require the lamps to be submerged in the channel, lamps can operate in air

Before the KCRWTF committed to purchasing the MicroDynamics system, a 1 MGD pilot plant was tested during May 2008 and found to meet the permit limits of 33 colonies/100 ml of Enteroccocus. The unit was operated at 150% of its 1 MGD flow and performed as well as chlorine gas.

The full scale UV system will be capable of handling a normal flow of 12 MGD and peak of 18 MGD a floating weir is also being installed as part of the site work to balance the flow to a maximum 18 MGD instead of the current 24 MGD maximum design flow and will be fully commissioned and operational by May/June 2010. Currently Kent County Department of Public Works is seeking low interest State Revolving Fund (SRF) stimulus funding to cover the costs of the upgrades. It is expected that the funds will be available in the early fall 2009 and the project will be bid and under construction by late fall.

This paper will look at the experience of the pilot plant, and designing and commissioning the full-scale system. Highlighting benefits such as:

- Solar panel power provided purchased to meet additional power requirements
- Replacement of chlorine gas is a sustainable solution- eliminates use of a man made chemical
- Reduced regulatory issues (EPCRA)
- Increased employee and neighborhood health and safety

- Longer lamp life of microwave UV technology reduced dependence on nonrenewable resources
- Less solid waste produced from the UV disinfection process

Comparison of On-line Chlorine Analysis Methods and Reagent Discharge Implications

Terry L. Engelhardt
Application Sales Engineer
Hach Company
P.O. Box 389
Loveland, CO
tengelha@hach.com
970-461-3910
970-461-3916 Fax

Historically, both amperometric and colorimetric technologies have been widely used for monitoring free and total chlorine residual concentrations within water treatment processes and distribution systems. However, the accuracy of the amperometric sensors and the necessity to routinely calibrate them against accepted methods brings into question their suitability for regulatory reporting, which has been debated within the industry. Enactment and implementation of the Ground Water Rule has renewed debate and interest in comparison of colorimetric and amperometric on-line analyzers. Another ruling on acceptability of amperometric measurements issued by EPA in November 2009 has further fueled debate. Since many monitoring sites for ground water systems may not be equipped with a sanitary sewer for analyzer waste, composition of analyzer waste also is of interest.

Selection of an amperometric probe or an instrument utilizing the DPD colorimetric method for monitoring chlorine residual is not as simple as it may appear. Technical considerations of water temperature, pH, mineral content, and whether free or total chlorine residuals are to be measured will all impact the instrument selection. Chemical discharge from both amperometric and colorimetric systems may also have an impact on the selection process. Finally, frequency of maintenance, including calibration, and costs associated with maintenance and calibration procedures should be considered.

This paper will explore the technical aspects of the measurements as well as maintenance and discharge considerations for both measurement technologies.

Selecting a Sustainable and Beneficial Reuse Biosolids Processing System – The DeKalb Experience

Robert C. Borneman, PE, DEE, Wynne Grubbs, P.E. and Paul Thomas, F.E.
ARCADIS, Inc., Chattanooga, Tennessee

The rapid and expansive growth of DeKalb County (East Atlanta GA) had resulted in the need to expand the existing wastewater treatment works within the County to meet the growing flows and more stringent Metro Atlanta discharge limits. The county embarked on a planning and follow-on design for the expansion of its existing Pole Bridge Creek (xxx cm/d, XXX MGD) and Snapfinger (xxx cm/d, XXX MGD) WWTF's. The expected Biosolids generation from both facilities when at design flows was expected to be approximately 1,167,500 dry kg/y (1,287 dry tons/y).

The existing land disposal sites for the biosolids were reaching their maximum metals saturation rates and the county's land fill was facing increasing financial charges and external pressures to reduce receipt of biosolids. As part of the County's expansion planning, the biosolids became a key feature of the desire to develop a plan that would be sustainable, reduce overall energy consumption, and produce a product of beneficial use.

The initial study evaluated the use of conventional digestion methods. Both anaerobic and aerobic digestion methods were considered through the use of conventional digesters and egg shaped digesters. Biosolids dewatering equipment, drying systems, gas reuse equipment, endogenous incineration, ultimate reuse methods, alternative disposal methods, and finally the handling and treatment of recycle streams were all evaluated. The initial study findings were incorporated into a design development report that gave the County many directions to advance their agenda of a sustainable, efficient and ultimately beneficial use of resources.

The recommendations of the initial study were presented to the County, which after considerable deliberation, resulted in the combination of biosolids handling from both facilities into a single treatment and handling facility. The design of the combined solids handling facility became a phased and continuous decision making exercise that has resulted in a multi-year phased program that is expected to result in both short term efficiencies, allowances for mid-term adjustments, and long term high beneficial reuse of biosolids. The final design minimizes waste streams and utilizes gas production with minimal disruption to the existing wastewater treatment operations.

The overall process consisted of evaluating the existing facilities, considering various key design concepts, and eventually selecting a final treatment and handling process. The final design incorporates both aerobic and anaerobic digestion, which utilizes new egg shaped anaerobic digesters, followed by dewatering with centrifuges, automatic vehicle loading and conveying system, gas reuse/handling, and recycle stream treatment/reuse. The phased design also incorporates biosolids drying and recycling of sludge at Class "A" levels. The sustainable features of the concept were incorporated and developed to allow the County to exceed effluent standards and ultimately protect the environment.

Can an Egg-shaped Digester Stand on Its End?

Tom Wynn, P.E.
Karen Harrison, P.E.
Jordan, Jones & Goulding, Inc

The current emphasis on energy efficiency and reducing carbon footprints has increased interest in anaerobic digestion and recovery of digester gas for power generation. Increasingly, thermophilic digestion is being considered because of the increased gas production realized as well as the resulting Class A biosolids. Conventional pancake type anaerobic digesters can have inadequate mixing, resulting in grit accumulation and loss of treatment volume. Loss of treatment volume and poor mixing degrade process performance. Egg-shaped digesters have gained in popularity over the last 10 to 15 years because their design and tank geometry facilitates mixing, reduces grit accumulation and improves process performance. Other benefits of egg-shaped digesters include smaller footprint and better scum control. However, this type of digester offers no room for gas storage and requires separate gas storage facilities. As with other fixed-cover digesters, egg-shaped digesters do not have solids storage capability, so separate solids storage facilities are also required. In addition, the cost of field erected egg-shaped digesters is high due to lack of competition in the industry. This paper will present an overview of the process and the advantages and disadvantages of egg-shaped digesters over conventional digester design. The paper will also present potential alternative design concepts to egg-shaped digesters which provide the same benefits at lower cost. Case studies will also be presented.

DEWATERING TECHNOLOGY: TRADITIONAL VERSUS NEW

Steven C. Reese, P.E. and W. James Gellner, P.E, Hazen and Sawyer PC.

Contact Information for Main Author:
11311 Cornell Park Drive, Suite 135, Cincinnati, Ohio 45242, 513-469-2750
sreese@hazenandsawyer.com

ABSTRACT

Dewatering focuses on liquid reduction while providing safe residual handling and disposal along with the potential for reduced carbon footprint. Selection of a dewatering technology requires systematic analysis of a wide array of options including treatment processes, residual characteristics, and other site-specific variables. In addition, dewatering systems typically require a relatively large initial capital investment and a substantial share of a municipality's annual budget for operation and maintenance. Under the constraints of rising costs and decreases in available budgets, municipalities are looking at new and different dewatering technologies.

Municipalities can utilize a financial analysis and non-cost impacts to evaluate dewatering technologies and make sustainable decisions. A net present worth financial analysis provides a cradle to grave cost summary for comparison of the upfront capital costs to annual operation and maintenance costs. Dewatering technologies can also be compared on a non-cost basis including difficulty of operation, operator training, permitting, etc. In addition, dewatering technologies can be compared based on several environmental impacts such as global warming, greenhouse gas emissions, acidification, etc. This helps to quantify and understand the environmental burden for each alternative.

This paper focuses on several methodologies for comparing different dewatering technologies, traditional and new. The technologies are compared based on net present worth costs as well as non-cost factors including environmental impacts. A municipality can better comprehend dewatering technologies when compared on a long-term cost analysis and by factoring in several non-cost aspects. These unique tools provide a means to quantify the cost, non-cost and environmental impacts to assist a facility in selecting the appropriate technology to dewater their residuals.

Abstract- 2010 WPC Knoxville

Title- Water For People Overview

Author- Stephen H. King – Water For People Co-Chair KY/TN AWWA

CDM
800 Oak Ridge Turnpike
Suite B200
Oak Ridge, TN 37830
Direct Phone/Fax: (865) 425-5405
Office Phone: (865) 482-1065
Mobile: (615) 828-9480

This presentation will provide and overview of the Water For People program.

Water For People's **mission** is to help people in developing countries improve their quality of life by supporting the development of locally sustainable drinking water resources, sanitation facilities, and health and hygiene education programs.

Water For People's **vision** is a world where all people have access to safe drinking water and sanitation; a world where no one suffers or dies from a water- or sanitation-related disease.

Water For People's **Guiding Principles**:

> *We believe in people.* We believe in the dignity of all people and that access to safe drinking water and effective sanitation are basic human rights.
>
> *We keep it local.* We believe that drinking water, sanitation, and hygiene problems are most effectively solved using local resources. Local communities must be the driving force in all of our programs to make sure solutions are sustainable.
>
> *We keep good company.* We believe in the power of partnerships. We search out trusted partners who share our vision and work together to build long-term relationships based on trust.
>
> *We keep our promises.* We believe we owe it to the communities we serve, our volunteers, staff and donors to keep our promises and manage our resources effectively and efficiently.

Water For People is an international nonprofit development organization committed to the long-term impact of increased access to safe drinking water and improved sanitation and health. Time after time, Water For People finds that providing safe drinking water serves as a catalyst for greater community development. That's because Water For People coaches and facilitates. Our local partners implement.

By North American standards, the work of Water For People is simple, yet life-saving. Our projects, many ranging in cost from $500 - 10,000, include: community hand pumps; school hand-washing stations; gravity-fed water systems; household latrines; and health and hygiene education.

Engineers Without Borders – Nashville: From Chapter Creation to Project Design

Kimberly M. Martin, P.E.
Engineers Without Borders
President, Nashville Professionals Chapter
210 25th Avenue North, Suite 1102, Nashville, TN 37203
martinkm@cdm.com

The community of Chapelton, Jamaica is approximately 50 miles from Kingston, in the Clarendon Parish of Jamaica. The rural community, with a population of approximately 4,000, consists primarily of subsistence farmers, with no significant industry. Limitations of the community's existing water supply and distribution system, among other infrastructure concerns, were brought to the attention of the Nashville Professionals Chapter of Engineers Without Borders (EWB) by a local, non-governmental organization working in the community in late 2008.

After learning additional details about the community, members of EWB's Nashville Professional Chapter begin working with the national EWB organization to develop a program to assist the Chapelton community address their infrastructure needs. From November 30, 2009 through December 6, 2009, members of the Chapter traveled to Jamaica on their first assessment trip for the Chapelton program. The primary goals of the trip were to obtain knowledge of the existing water distribution system, potential sources of supplemental water, and the community's uses of those water sources. Additionally, the assessment team conducted community health assessments and held a community meeting in order to better understand the community's needs.

Using the information gathered on the trip, the project team is currently setting goals for the first project to be evaluated, designed, and implemented. It is likely that the first project will improve upon the existing storage system at a local school. Implementation of these improvements is expected to be completed in 2010.

As is the case with EWB programs, long-term relationships with sustainable solutions is the goal of this program. Subsequent projects in Chapelton will continue evaluation of the regional water supply and distribution system based on the information gathered during previous and upcoming trips and information provided by our local contacts. Additionally, future projects will assess the water supply to the health clinic, the need for additional structures at the local school, and improvements to existing unpaved roads.

This presentation will provide information on the EWB organization, the Nashville Professionals Chapter, and the work being done in Chapelton, Jamaica.

The Pretreatment Certification Committee requests one room for one day to fill with pretreatment technical sessions. The committee will fill the technical sessions with speakers from Kentucky and Tennessee municipalities, consulting firms, state pretreatment representatives, and potentially EPA representatives. Topics may include:

1. Case-studies of POTW problems caused by industrial discharges, finding the source of pollutant, and subsequent enforcement.

2. Federal and state pretreatment updates

3. Oil and grease program implementation (may include case-studies)

4. General pretreatment topics, such as industrial user permits, oversight, sampling, and inspections.

5. Applications of specific categorical standards.

The Committee could provide a detailed list of topics and presenters by the beginning of May.