Gary L. Hunter P.E., BCEE, ENVSP

Wastewater Treatment Process Specialist

As a principal process specialist assigned to Black & Veatch's Wastewater Treatment Technology, Mr. Hunter has developed experience in a variety of areas. He has been involved in pilot plant operations, conceptual design development, system performance evaluations, development of field sampling programs, and equipment testing for both municipal and industrial projects.

Mr. Hunter has been responsible for process designs for various types of annamox treatment, screening, grit, natural treatment, filtration, and disinfection systems at numerous facilities in the US and overseas. He serves as Black & Veatch's regions water reuse specialist in the East US region.

PROJECT EXPERIENCE

RESEARCH

City of St. Joseph, Missouri; Industrial User Support; St. Joseph, Missouri, United States

Project Advisor. Provided oversite of a Annamox DEMON pilot at a tannery to remove nitrogen before discharging to the City's wastewater treatment plant. Assisted vendor related to installation and operation of the pilot. Reviewed data relative to operation of the pilot facility. Prepared presentation regarding results. Identifying a potential inhibition substance that impacted performance of the pilot facility.

City of St. Joseph, Missouri; Industrial user support; St. Joseph, Missouri, United States

Office Location
Kansas City, MO

Education
- AA, Engineering, Ricks College, Idaho 1978
- BS, Civil Engineering, Brigham Young University, Utah, 1984
- MS, Civil Engineering, Brigham Young University, Utah, 1985
- Phd Candidate – Clemson University

Professional Registration
PE – 1991, KS, 12244

Certifications
Board Certified Environmental Engineer (BCEE) – 2009
ENVSP - 2014

Years of Services
34.0

Senior Process Engineer. Supervised pilot demonstration study of an annamox pilot facility for treatment of wastewater from a pork processing plant and tannery. Assisted vendor related to installation and operation of the pilot. Reviewed data relative to operation of the pilot facility. Developed conceptual design of multiple annamox systems including AnitaMox, DEEMON and other to develop CAPEX and OPEX for each alternative. Prepared presentation regarding results.

Metropolitan Sewer District of Greater Cincinnati, Landfill Leachate Treatment; Cincinnati, Ohio, United States

Project Advisor. Provided oversite of an pilot demonstration study using annamox pilot facility to treat landfill leachate. Reviewed data relative to operation of the pilot facility.

Sanitary District of Decatur, Missouri; Nutrient Master Plan; Decatur Illinois United States

Senior Process Engineer. Supervised conceptual study to examine removal of nitrogen from anaerobic digestor decant line. Developed develop CAPEX and OPEX values using DEMON process. Incorporated results in into the Nutrient Master Plan

Confidential Client; Market Survey for New Membrane Product; USA

Research Engineer. Conducted market survey to establish manufacturing properties for a new membrane product. Prepared documentation on the results of the survey and cost impacts related to the new product.

Confidential Client; Economic Model and Testing for New Disinfection Product; USA

Research Engineer. Developed economic model to compare CAPEX and OPEX of ozone, UV, hypochlorite, ferrate, chlorine to new disinfection chemical. Coordinated pilot testing of new chemical to collect data to develop a kinetic model. Prepared summary report of findings.

Wedeco TAK55M HP Validation; ITT Water and Wastewater, Long Creek Wastewater Treatment Plant; Gastonia, South Carolina;

Project Manager. Managed the validation of the Wedeco TAK55 HP open channel UV system for the disinfection of secondary "low-dose" wastewater applications. Testing was conducted in accordance with a modified wastewater validation protocol, based on the concepts and methodologies of the UVDGM. Responsibilities included development of the validation protocol, third-party oversight and management of on-site testing activities, data collection and analysis, development of the performance models and preparation of the validation report.

Electric Power Research Institute; Ultra Violet Scoping Study, Community Environment Center; St. Louis, Missouri;

Process Engineer. Coordinated the development of dose response curves for low pressure, low pressure high intensity, medium pressure, and pulsed pressure UV systems at a 4 mgd peak flow facility. Performed pilot scale studies using for low pressure, low pressure high intensity, medium pressure, and pulsed pressure UV systems. Assisted in the process and economic evaluations.

Electric Power Research Institute; Review of DO Monitoring Equipment, Community Environment Center; St. Louis, Missouri

Process Engineer. Reviewed types of DO probes available on the market. Survey 60 wastewater treatment facilities regarding the use of dissolved oxygen probes. Developed a standardized procedure for the evaluation of DO probes.

Electric Power Research Institute; Co-Disposal of Wastewater Residuals at a Power Generating Facility; St. Louis, Missouri;

Project Consultant. Provide review comments on conceptual design of co-disposal of wastewater residuals at a power generating facility.

US Army Corps of Engineers; Army Industrial Sludge Management Technologies, Construction Engineering Research Laboratory; Champaign, Illinois

Project Engineer. Surveyed treatment facilities at four Army Material Command installations. Evaluated treatment processes for compliance with NPDES permit compliance. Developed pollution prevention and waste minimization alternatives for each military installation.

Electric Power Research Institute | Mechanical Freeze Thaw Application, Community Environment Center; St. Louis, MO

Process Engineer. Coordinated the operation of a Pilot trailer for demonstration of the use of mechanical freeze thaw on water and wastewater residuals. Evaluated the used of mechanical freeze thaw on brine. Prepared test reports for each site and a final study report.

DISINFECTION

Mulchy Gluch Wastewater Plant Improvements Ultra Violet Disinfection; Centennial, CO

Senior Process Engineer. Evaluated two different UV alternatives (Trojan Signa, WEDECO Duron) for installation at a 16.5 mgd pk design flow. Prepared conceptual and economic analysis examining two UV alternatives. Prepared specification for preselection of equipment. Oversaw preselection process of UV equipment. Prepared final specification for final selected vendor.

East Bethel Water Reclamation Plant Metropolitan Council, Ultra Violet Optimization Project; St. Paul, MN

Senior Process Engineer. Evaluated performance of two Aquaponics medium pressure following an 2.5 mgd MBR design flow treatment system. UV System designed to provide effluent capable of meeting NWRI requirements (less than 2.2cfu/100 mL total Coliforms). Advised on sampling to examine performance and optimization of UV system.

Mallard Creek Reclamation Plant, Miscellaneous Improvements Project, Charlotte Water, Charlotte, NC

Senior Process Engineer. Under Task Order 9, developed concepts for a new 32 mgd effluent filter and a new UV system complex to replace existing systems at Mallard Creek WWTP. The preliminary design phase comprisesd wastewater sampling and characterization, evaluation of the existing facilities and operating data, analysis of alternative filtration and UV technologies, and development of preliminary design concepts and criteria. Preliminary computational fluid dynamics (CFD) modeling was performed to evaluate the hydraulics of proposed concepts.

Yakima Water Reclamation Plant Plant improvements, Yakima, WA

Senior Process Engineer. Developed UV concepts for 31.5 mgd Wastewater facility. Prepared designed specification for ENAQUA UV system. Conducted performance testing after installation of equipment.

City of Peoria Reclamation Plant, Water Reclamation Plant Construction, Peoria, AZ

Senior Process Engineer. Conducted conceptual design of UV system downstream of MBR performance with a average design capacity of 5 mgd. UV system required to meet Class A+ disinfection requirements. Prepared specifications for selected enclosed low pressure high output UV system. Evaluated performance testing after installation for compliance with specification

Dunn Water Recalcination Facility, Facilities Improvements; Pinellas County, FL United States

Senior Process Engineer. Evaluated two different UV alternatives (Trojan Signa, WEDECO Duron) for installation at a 16.5 mgd pk design flow. Prepared conceptual and economic analysis examining two UV systems. Conducted Workshop on findings and prepared final report on recommended system.

City of Atlanta Program Manager – UV Improvements, Facilities Improvements; City of Atlanta, GA United States

Senior Process Engineer. Prepped conceptual designs evaluated four different UV alternatives (Trojan Signa, WEDECO Duron, Suez HiCAP, and Calgon C3500) for installation at the South River, RL Sutton, and Utoy Creek water Reclamation facilities. Conducted Educational seminars from all UV vendors. Developed CAPEX and OPEX costs for each alternative.

City of Atlanta Program Manager – UV Improvements, Program Manager of ESECO Facilities Improvements; City of Atlanta, GA United States

Project Consultant. Reviewed detailed Trojan Signa designs for South River, RL Sutton, and Utoy Creek water Reclamation facilities. Confirmed process guarantees provided by vendors for each facility.

Wet Weather Treatment Plant Improvements, Adams Field WWTF, Little Rock, AR

Sr. Process Engineer – Developed plans and specification for expansion of effluent disinfection to 94-mgd with latest generation of UV technology from Trojan (UVSigna).

City of Shreveport, LA, Operation Support, Shreveport, Louisiana, United States;

Senior Process Engineer -
Develop methods for troubleshooting operational upsets due to discharge of industrial waste to the wastewater treatment system. Assisted in troubleshooting SCADA to allow for implementation of automated dissolved oxygen control. Developed methods for improving UV disinfection process. Deployed innovative LED UV sensor for on-line measurements of UV transmittance.

City of Lawrence, Kansas; Wakarusa Water Reclamation Facility; Lawrence, Kansas, United States;

Process Consultant. Assisted in the development of the disinfection strategy for the new Wakarusa Water Reclamation Facility. Evaluated various disinfection alternatives. Options included hypochlorite/bisulfite, UV Disinfection, and ozone. Strategy was design to meet BRN, EBNR, and LOT treatment limits. Assisted in the development of a Technical Memorandum. Prepared and conducted training session on operation of UV system. Conducted performance testing of installed system.

Paso Robles; Design of Ultra Violet Disinfection Systems; Paso Robles CA

Process Consultant. Assisted in the design on 5.5 mgd UV system that was capable of meeting CA DWW Water reuse requirements. Worked with State regulatory officials to establish design criteria for each system. Prepared specifications for three different UV systems. Coordinated shop drawing review for selected system. Coordinated and supervised spot check bioassay testing of installed system.

Johnson County Wastewater New Century Airport Complex, Ultra Violet Disinfection; Johnson County, KS

Senior Process Engineer. Evaluated three different UV alternatives (Trojan 3000+, Aquionics, WEDECO TAK55) for installation at a 4 mgd design flow. Prepared conceptual and economic analysis examining two UV alternatives. Oversaw four week UV demonstration using low pressure-high output UV system. Assisted design team in the preparation of specification for UV system.

City of St. Joseph, Missouri; Facilities Improvements; St. Joseph, Missouri, United States

Senior Process Engineer. Supervised pilot demonstration study of two 0.5 UV demonstration facilities for treatment of trickling filter/activated sludge effluent. Options included bulk hypochlorite/ bisulfite, on-site generation of hypochlorite and bulk bisulfite, and UV Disinfection. Prepared specification for procurement of UV equipment for 108 mgd facility that included both wet and dry weather. Assisted in design of 108 mgd UV facility with ability to disinfect both wet and dry weather.

Greenville Regional Sewer Authority; Pelham Disinfection Alternatives Analysis; Greenville, South Carolina

Process Engineer. Evaluated the use of Chlorine and UV disinfection methods for an 18 mgd wastewater treatment facility.

Developed bench scale testing protocols to evaluate effectiveness of UV disinfection. Coordinated performance of collimated bean testing by Duke University. Evaluated test results for the effectiveness of the UV system. Prepare specification for 18 mgd deep bed denitrifying filter complex.

Disinfection Alternatives Analysis, Unified Government of Kansas City, Ks, Kaw Point Wastewater Treatment Plant, Kansas City, KS

Sr. Process Engineer – Conducted bench scale testing various disinfectants including PAA, UV, ozone, and Hypochlorite for a 20 mgd high purity oxygen activated sludge plant. Developed conceptual level construction and operating costs with non-economic factors to select the most appropriate disinfection alternative. Assisted in the development of plans and specifications for 20 mgd low pressure high output UV system. Conducted performance testing of system for contract acceptance.

City of Henderson, Nevada; Wastewater Treatment Plant Improvements; Henderson, Nevada

Process Engineer. Provided review comments for the specification of a low pressure high intensity UV disinfection for a 20 mgd peak flow facility.

City of Yankton, South Dakota; Wastewater Treatment Plant Expansion; Yankton, South Dakota;

Process Engineer. Developed specifications for a 3.75-mgd low pressure UV system. Evaluated bid proposals from three vendors. Reviewed shop drawings and performance testing data for gravity belt thickening equipment used at the treatment plant.

North Texas Municipal Water District; Ultra Violet System Testing; Dallas, Texas;

Process Engineer. Developed procedures for evaluation of low pressure UV system from a 5-mgd facility for the inactivation of Cryptosporidium from a wastewater facility. Wastewater treatment plant discharges into the local water supply

Escambia County Utilities Agency; Design of UV Disinfection Systems; Pensacola, Florida;

Process Consultant. Assisted in the development of specifications for the selection of two medium pressure systems totaling 80 mgd peak flow. Assisted in the development of specifications for the owner to obtain the equipment.

JEA; Design of UV Disinfection Systems; Jacksonville, Florida;

Process Consultant. Assisted in the design on 5 medium pressure UV disinfection systems totaling 250 mgd peak flow. Evaluated treatment plant data to allow for development of design criteria. Worked with State regulatory officials to establish design criteria for each system.

City of Salem, Oregon; Stormwater Treatment System; Salem, Oregon

Senior Process Engineer. Evaluated eight different UV systems for the disinfection of treated wastewater from a high rate clarification process. Developed conceptual designs and economic analysis for alternatives. Developed non-economic matrix for evaluation of each alternative.

Escambia County Utilities Agency; Design of UV Disinfection Systems; Pensacola, Florida

Process Consultant. Assisted in the development of specifications for the selection of two medium pressure systems totaling 80 mgd peak flow. Assisted in the

development of specifications for the owner to obtain the equipment.

JEA; Design of UV Disinfection Systems; Jacksonville, Florida; In-Progress-In-Progress

Process Consultant. Assisted in the design on 5 medium pressure UV disinfection systems totaling 250 mgd peak flow. Evaluated treatment plant data to allow for development of design criteria. Worked with State regulatory officials to establish design criteria for each system.

City of St. Petersburg, Florida; Wastewater Master Plan; St. Petersburg, Florida

Senior Process Engineer. Evaluated UV, Chlorine gas, and hypochlorite, and onsite generation for three wastewater treatment plant to meet high level disinfection requirements. Alternatives examined the reliability of equipment. Conceptual designs and economic analysis were completed for each disinfection alternatives at of the treatment plants.

91st Avenue Wastewater Treatment Plant; Ultra Violet Technology Study; Phoenix, Arizona

Senior Process Engineer. Evaluated UV, Ozone, PAA, H2O2 and combination of disinfection alternatives at the pilot scale for high level disinfection and emerging contaminant compound removal. Conducted a literature review of existing, emerging, and future UV technology. Developed a conceptual plan for a demonstration facility that contained filtration, two UV systems, ozone, and chlorine.

City of Phoenix, Arizona; UP05 Facilities Design; Phoenix, Arizona

Senior Process Engineer. Developed mathematical model to examine impacts of chlorine disinfection based on detention time and chlorine residual. Evaluated alternatives for flows up to 400 mgd from two different locations at the facility. Performed pilot testing to determine chlorine demand and residual concentrations.

Metropolitan Water Reclamation District of Greater Chicago; Ultra Violet Disinfection Demonstration Study; Metropolitan Water Reclamation District of Greater Chicago, Illinois

Ultra Violet Disinfection Demonstration Study. Reviewed installation of 34 UV systems facilities at the Hanover Park Wastewater Treatment plant. Provided recommendations on historical data and collimated beam testing conducted by District Staff. Provided support and advice during 18 month pilot study. Prepared spot check test plan.

St. Louis Metropolitan Sewer District; Ultra Violet Disinfection Demonstration Study; St. Louis, Missouri

Senior Process Engineer. Developed monitoring program and selection of UV disinfection study at a 340 mgd (800 mgd) peak activated sludge and 125 mgd average (350 mgd) trickling filter facilities. Demonstration study focused on applying UV disinfection to low transmittance waters. Conducted bench scale testing of UV and chlorine disinfectants. Options included bulk hypochlorite/ bisulfite, on-site generation of hypochlorite and bulk bisulfite, UV Disinfection, ferrate, chlorine dioxide, and ozone.

City of St. Joseph, Missouri; Facilities Improvements; St. Joseph, Missouri

Senior Process Enigneer. Supervised demonstration of two 0.5 UV demonstration facilities for treatment of trickling filter/activated sludge effluent. Options included bulk hypochlorite/ bisulfite, on-site generation of hypochlorite and bulk bisulfite, and UV Disinfection. Prepared specification

for procurement of UV equipment for 108 mgd facility that included both wet and dry weather. Assisted in design of 108 mgd UV facility with ability to disinfect both wet and dry weather.

City of Kansas City, Missouri; Disinfection Strategy for Blue River Wastewater Treatment Plant; Kansas City, Missouri

Senior Process Engineer. Developed monitoring program and selection of disinfection study at a 150 mgd peak/ 75 mgd average trickling filter facilities. Conducted bench scale testing of chlorine disinfectants. Examined implementation of bulk and on-site generation hypochlorite systems. Assisted in design of facilities for use of high-strength delivered on rail.

Melbourne Water Corporation; Western Treatment Plant; Melbourne

Process Engineer. Assisted in the upgrade of an existing wastewater UV facility to comply with revised regulatory and validation requirements to provide a Class A recycled water supply (24 mgd, 4-log Cryptosporidium inactivation). Responsibilities included the evaluation of existing UV disinfection system and identification of potential options to address new requirements; review/approval of the UV reactor validation protocols to expand validation of current UV system; interfacing with the Victoria Department of Health with regards to obtaining approval of UV system validation approach and compliance with local regulatory requirements; observation of validation testing activities; review/approval of the validation report; and UV process assistance throughout the facility design, construction and startup/commissioning.

Melbourne Water Corporation; Eastern Treatment Plant; Melbourne, Australia

Process Engineer. As part of an Advanced Tertiary Treatment Plant upgrade, assisted in the design of a new UV facility (190 mgd, 4-log Cryptosporidium inactivation) for the disinfection of wastewater effluent to reduce impact on the receiving marine environment and creating Class A recycled water resource. Responsibilities included the development of design requirements and specifications, including assessment of the applicability of the UVDGM for the validation and operation of UV reactors for disinfection of non-potable water; review/approval of the UV reactor validation protocols; Reviewed validation testing activities of selected reactor; review/approval of the validation report; and UV process assistance throughout the facility design.

City of Lubbock, Texas; Wastewater Treatment Plant Expansion; Lubbock, Texas

Senior Process Engineer. Developed process design using Integrated Fixed Film Activated Sludge (IFAS for a 31.5 mgd mgd plant which contained total phosphorus removal. Developed design criteria for UV disinfection system. Conducted pilot studies to examine regrowth of bacteria in effluent outfall.

North Texas Municipal Water District; Ultra Violet System Testing; Dallas, Texas

Process Engineer. Developed procedures for evaluation of low pressure UV system from a 5-mgd facility for the inactivation of Cryptosporidium from a wastewater facility. Wastewater treatment plant discharges into the local water supply.

City of Lawrence, Kansas; Wakarusa Water Reclamation Facility; Lawrence, Kansas

Process Consultant. Assisted in the development of the disinfection strategy for the new Wakarusa Water reclamation Facility. Evaluated various disinfection alternatives. Options included hypochlorite/bisulfite, UV Disinfection, and

ozone. Strategy was design to meet BRN, EBNR, and LOT treatment limits. Assisted in the development of a Technical Memorandum.

City of Oak Lodge, Oregon; Disinfection Alternatives Analysis; Oak Lodge, Oregon;

Process Engineer. Evaluated chlorine gas, hypochlorite, and UV disinfection alternatives for a 5 mgd peak flow facility. Developed conceptual and economic analysis for each alternative.

City of Henderson, Nevada; Wastewater Treatment Plant Improvements; Henderson, Nevada;

Process Engineer. Provided review comments for the specification of a low pressure high intensity UV disinfection for a 20 mgd peak flow facility.

Greenville Regional Sewer Authority; Pelham Disinfection Alternatives Analysis; Greenville, South Carolina

Process Engineer. Evaluated the use of Chlorine and UV disinfection methods for an 18 mgd wastewater treatment facility. Developed bench scale testing protocols to evaluate effectiveness of UV disinfection. Coordinated performance of collimated bean testing by Duke University. Evaluated test results for the effectiveness of the UV system. Prepare specification for 18 mgd deep bed denitrifying filter complex.

WASTEWATER TREATMENT

City of Wimberly, Texas; Wastewater Master Plan; Wimberly, Texas;

Process Consultant. Reviewed process evaluation for treatment alternatives to achieve water reuse requirements. Assisted in the development of operation and maintenance cost for each alternative. Reviewed non-economic analysis developed for each alternative.

North Texas Municipal Water District; Wastewater Treatment Plant Evaluation; Dallas, Texas;

Senior Process Engineer. Evaluated capacity of 25-mgd wastewater treatment plant to accept effluent from a paper mill. Evaluation was made of impacts to both liquid and residuals parts of the treatment plant. Developed two alternatives for the pre-treatment of wastewater from the paper mill.

City of St. Joseph| Industrial Temporary Treatment System; St. Joseph, MO

Process Engineer. Responsible for development of conceptual design for a 28 mgd temporary treatment during construction of BNR modification to provide treatment of industrial waste from a tannery. Pilot tested various biological treatment technologies for pretreatment of the industrial wastewater streams. Developed a concept for modification of the aeration system to provide additional air flow to be used during treatment.

City of Lubbock | Wastewater Treatment Plant Expansion; Lubbock, TX

Process Engineer. Responsible for the process design for retrofit of three existing treatment trains for biological nitrogen and phosphorous removal with a peak daily flow of 31.5 mgd. The project included decommissioning of one treatment train and the impact of return streams from anaerobic digestion.

City of Oklahoma, Oklahoma; Pollutant Impact Study; Oklahoma CIty, Oklahoma

Project Engineer. Development a model for the evaluation of TDS impacts on two wastewater treatment plants. Assisted City in the revision of Pretreatment Ordinance for controlling TDS. Developed Industrial pretreatment limits for two industrial users for discharge of TDS. Assisted in permits for TDS control in the City.

Ruston, Louisiana; Wastewater Treatment Plant Improvements; Ruston, LA

Senior Process Engineer. Evaluated existing treatment plant to determine temporary improvements to meet NPDES requirements. Developed process design for 6 mgd ADF facility that included grit removal, equalization, nitrification/denitrification, clarification, filtration, and UV disinfection.

Puerto Rico Aqueduct and Sewer Authority; Operational Assistance; Puerto Rico (U.S.)

Senior Process Engineer. Evaluated performance of 4 mgd grit system upstream of a biological nutrient removal treatment plant. Assessed mechanical performance of grit system, developed operating guide for grit system.

WASTEWATER FILTRATION

Johnson County Wastewater; Wastewater Filtration Study; Johnson County, Kansas;

Senior Process Engineer. Evaluated four types of filtration equipment to remove suspended solids from wastewater effluent. Prepared conceptual designs for 12 mgd and 24 mgd alternatives for selected filtration equipment.

Miscellaneous Treatment Improvements; Asheville, NC, Metropolitan Sewerage District of Buncombe County

Process Engineer. Develop conceptual design for cloth media replacement of 80 mgd of existing microscreens. Evaluated a variety of replacement filtration technology and ultimately repurposed the microscreen facility for disk filtration,

NATURAL TREATMENT

"One-Water" study, Water System Mater plan, Study, and Effluent Cooling Study, City of Ashland, OR

Sr. Process Engineer. The masterplan addressed water availability and quality issues (including copper and lead). The "One-Water" study evaluated lack of drinking water availability and considered reclaimed water reuse. The Effluent Cooling Study evaluated treatment schemes to reduce treatment plant effluent temperature plant and reviewed a "Reasonable Potential Analysis" for effluent copper, based on the State's BLM, and temperature TMDL criteria. This study presented ideas for reducing copper that were considered in the Masterplan, and ideas for reducing temperature (increasing recycled water use), utilized in the "One-Water" study and Masterplan. The recommendations included a combination of constructed wetlands and riparian shading to meet effluent requirements.

Water Quality Impacts Study, City of Las Vegas, Las Vegas, NV

Sr. Process Engineer – Developed model to evaluate water quality impacts from Three Water Reclamation Plants into wetland treatment systems in Las Vegas Wash. Model examined impacts of conventional pollutants, nutrients, and salt on Lake Mead.

Wetland Evaluation of Nitrification, City of Lawrence, Lawrence, KS

Sr. Process Engineer – Developed alternatives using natural wetlands a method for enhancing nitrogen removal from wastewater treatment plant effluent. The range of natural systems ranged from free surface for conventional pollutant removal, nitrification, and denitrification. In addition, an innovative solar

aquatic system, was also evaluated as part of the master planning for the project. The results of the wetlands evaluations were presented as part of public meetings relative to the treatment plant.

Wastewater Treatment Plant Master Plan, Claremont County, OH

Process Engineer - Developed conceptual design for three different types of natural systems at two different treatment plants. Developed capital and operational costs for each alternative

Stormwater Mitigation, Tin Shui Wai, Hong Kong

Project Engineer - Designed wetland treatment system using a reed bed for removal of pollutants from stormwater. Treatment system provided water for a wetland demonstration park. Project recognized internationally for educational benefits.

Wastewater Treatment Facilities Augmentations, United Arab Emirates

Project Engineer – Developed treatment alternatives for new wastewater treatment facilities using wetland treatment concepts.

Wetland Treatment Study, City of St . George, St. George, UT

Project Engineer – Developed conceptual design for a 7 acre wetland which will be used for nutrient polishing from a water reclamation plant.

Wastewater Reuse of Treated Effluent, General Electric, Peoples Creek, OH

Project Engineer – Developed conceptual design for the establishment of 3 wetland ponds systems. Effluent from the wetland ponds is used for cooling water for testing of Jet Engines.

Combined Sewer Overflow Treatment System, City of Portland, Portland, OR

Project Engineer – Prepared conceptual process designs for three combined sewer overflow treatment alternatives that were to be used in conjunction with a wetland treatment system. Assisted in demonstration study that examined the operating characteristics for the wetland. Prepared capital and operating costs for various wetland alternatives.

Wastewater Treatment Facilities – Hurricane Repair, US Army Corps of Engineer, Honduras

Project Consultant– Developed conceptual design for natural systems for four communities. Developed capital and operational costs for each alternative

Indian Creek Mine Reclamations, Kansas Board of Mine Reclamation, Prescott, KS

Process Engineer - Performed surface and groundwater monitoring at a combined 16 locations. Assisted in the design of a 900-acre wetland to treat acid mine drainage.

Peat Treatment System Study, Confidential Client, Tacoma, WA

Process Engineer - Developed conceptual design of a wetland treatment system for removal of pollutants from a truck washing operation.

Wastewater Treatment, Harnett County, NC

Project Engineer - - Developed conceptual design for three different types of natural systems at two different treatment plants. Developed capital and operational costs for each

INDUSTRIAL PRETREATMENT

Industrial Pretreatment Program Evaluation, Columbia, SC

Sr. Process Engineer –Conducted a Gap analysis of the industrial pretreatment program that identified areas within the program that needed to be updated. Surveyed local communities on various surcharge rates and program fees. Advised Utility on key cost areas to cover treatment costs. Revised local sewer use ordinance to reflect current USEPA requirements. Updated technically based local limits to address changes in unit processes at the treatment

plant. Provided consulting on topics such fees and enforcement activities for fats, oils and grease program. Developed an approach for permitting microbreweries.

Industrial Pretreatment Permitting, Metropolitan St. Louis Sewer District, St. Louis

Process Engineer- Developed templates and established industrial pretreatment permit for 250 significant industrial users. Key industrial users included Anheuser Bush, Monsanto, and McDonald Douglas. Directed inspection of all 250 facilities to ensure completeness of permitting approach. Developed special conditions for permits to match site specific conditions.

Technically Based Local Limits Update, City of Maui, HI

Sr. Process Engineer – Developed a model for the evaluation of local limits for the four POTWs. Developed Pollutant of Concerns and monitoring program. Prepared materials for submission to regulatory agency. Provided technical assistance for permitting of industrial users. Evaluated surcharge program as a strategy for controlling organic and solids loading to the treatment plants. Prepared initial program to control fats, oils, and grease from eating establishments.

Surcharge Assessment Study, EPRI, St. Louis, MO

Process Engineer – Developed a treatment alternative for reduction of BOD and TSS from several industrial users including Molson Brewery in the Vancouver, BC area. Various pretreatment alternatives were examined including anaerobic filters, extended aeration, and enhanced clarification. Developed CAPEX and OPEX for each alternative to assist in the reduction of organic and solids surcharge imposed by the local treatment facility.

Technically Based Local Limit Development, Summit County, CO

Sr. Process Engineer – Assembled Pollutant of Concerns and monitoring program memorandums. Developed a model for the evaluation of local limits from the treatment facility. Model reflected the strict permit limits for discharge into a lake that is used as a water supply. Provided technical support of implementation of the revised limits.

JEA; Local Limits Evaluation; Jacksonville, Florida

Project Engineer. Assisted the City in development of a sampling program for the development of local discharge limits. Evaluated existing local discharge limits. Supervised the surveying of industrial users. Identified local industrial users that are discharging silver. Supervised sampling of 100 silver users that discharge to JEA. Assisted in the development of a local industrial user regulation covering the discharge of industrial waste to JEA.

City of Oklahoma, Oklahoma; Pollutant Impact Study; Oklahoma CIty, Ok

Project Engineer. Development a model for the evaluation of TDS impacts on two wastewater treatment plants. Assisted City in the revision of Pretreatment Ordinance for controlling TDS. Developed Industrial pretreatment limits for two industrial users for discharge of TDS. Assisted in permits for TDS control in the City.

Technically Based Local Limits Update, City of Midwest City, OK

Sr. Process Engineer – Developed a model for the evaluation of local limits for the four POTWs. Developed Pollutant of Concerns and monitoring program. Prepared materials for submission to regulatory agency. Provided technical assistance for permitting of industrial users. Evaluated surcharge program as a strategy for controlling organic and solids loading to the treatment plants.

Coachella Valley Water District; Industrial Pretreatment Training Program; Coachella, California

Project Engineer. Provided training on the National Pretreatment program to Water District on National Pretreatment Issues. Presented information on pollution prevention and treatment of industrial waste. Instructed on basics of environmental chemistry.

City of St. Joseph, Missouri; Local Limits Evaluation; St. Joseph, Missouri

Project Engineer. Performed Audit of City's Industrial Pretreatment Program. Assisted the City in development of a sampling program for the development of local discharge limits. Evaluated existing local discharge limits. Developed discharge site specific limits for local tanning industry

City of Valdez, Alabama; Industrial Pretreatment Program; Valdez, Alaska

Project Engineer. Provided technical assistance in the development of the City's Industrial Pretreatment Program. Performed field inspection of oil refinery and oil storage facility. Evaluated permit application. Evaluated POTW for hydraulic and organic impacts of receiving industrial waste. Developed uniform concentration local limits using a computerized headworks allocation method.

City of Oklahoma City, Oklahoma; Pretreatment Program Assistance; Oklahoma City, Oklahoma;

Project Engineer. Provided technical assistance in the updating of local discharge limits. Reviewed modeling results for determining allowable industrial headworks loading for industrial users. Developed permit limits for military installation. Reviewed permit information for treatment plants. Supervised collection of monitoring data. Performed inspection of industrial users before permitting by the City. Reviewed performance of existing computerized data management system.

Technically Based Local Limits Update, City of Portland, OR

Sr. Process Engineer – Developed a model for the evaluation of local limits for the four POTWs. Developed Pollutant of Concerns and monitoring program. Prepared materials for submission to regulatory agency. Provided technical assistance for permitting of industrial users. Evaluated surcharge program as a strategy for controlling organic and solids loading to the treatment plants.

HEADWORKS AND PRELIMINARY TREATMENT

City of Portland - Bureau of Environmental Services; Tryon Creek Wastewater Treatment Plant Expansion; Portland, Oregon

Project Manager. The project will provide a plant wide upgrade. The work involves providing extensive modifications to several major pumping facilities, as well as design and construction of several large, new pumping systems. New pumping facilities include a 50 mgd Influent Pumping Station, a Residuals Pump Station, and Primary Sludge and Scum pumping system. The following existing systems will be significantly upgraded: Recycled Water Pumping Station, Primary Sludge Pump Station, Primary Effluent Pump Station, Tryon Creek Pump Station, and the Foothills Stormwater Pump Station.

San Antonio Water System; Grit Facilities; San Antonio, TX

Senior Process Engineer. Assisted in the development of two alternatives for the installation of 500 mgd grit facility. Prepared a monitoring plan to quantify and characterize grit from three different treatment facilities. Supervised field crew conducting the collection of field data. Reviewed various alternatives (including grit washing and dewatering) to determine cost effective alternative.

City of Heyward WWTP, Preliminary Facilities Improvements. Heyward, CA

Senior Process Consultant. Assisted design in the evaluation of screening and grit improvements. Examined 4 difference fine (6 mm) and two 3/8 inch opening screen alternatives. Each screen alternatives were examined with its respective washing and compaction equipment. Examined two different grit system in 4 different alternatives including the incorporation of the existing vacculator grit system. Assisted in development of CAPEX and OPEX alternatives.

Orange County Sanitation District; Anaerobic Digester Complex; Orange County, CA

Senior Process Engineer. Developed alternatives for grit removal from a 150 mgd treatment complex. Examined alternatives to determine best treatment approach for grit removal. Assisted in development of capital and operational costs for complex.

Rogers, Arkansas; Wastewater Treatment Plant Improvements; Rogers, AR

Senior Process Engineer. Assisted in the design of a 20 mgd vortex grit removal system. Examined alternatives for washing and dewatering grit removed from the vortex system. Developed specifications for competatively bidding three types of vortex grit removal systems.

Lubbock, Texas; Preliminary Engineering Report; Lubbock, Texas

Senior Process Engineer. Developed alternatives for grit removal from a 32 mgd treatment complex. Examined alternatives to determine best treatment approach for grit removal. Assisted in development of capital and operational costs for the complex.

City of Lawrence, Kansas; Facility Design; Lawrence, Kansas

Project Consultant. Reviewed several alternatives for grit removal at a Greenfield wastewater treatment plant.

Mount Pleasant, South Carolina; Preliminary Engineering Report; Mount Pleasant, SC

Senior Process Engineer. Developed alternatives for grit removal from a 12 mgd treatment plant. Developed monitoring protocols for determining actual grit load to the treatment plant. Supervised collection of grit loading data. Examined alternatives to determine best treatment approach for grit removal. Assisted in development of capital and operational costs for grit system.

New York City Department of Environmental Protection; Bronx and Manhattan Grit Chambers; New York, New York

Senior Process Engineer. Reviewed screening existing 300 mgd system at Bronx Grit Station and 300 mgd at the Manhattan Grit Chambers of mechanical reliability. Provided comments on operational improvements for screens at both locations. Assisted in development of specifications for replacement screens for both locations. Examined potential interim operational modifications that could be implements

during design and construction of new facilities.

North Texas Municipal Water District; Wastewater Treatment Plant Design; Wylie, Texas; In-Progress-In-Progress

Senior Process Engineer. Developed design requirements for 30 mgd grit facility. Reviewed capital and operating costs developed for each alternative.

City of Akron, Headworks Improvements, Akron, OH

Senior Process Engineer. Developed procedures for grit characterization for grit facilities at the Bronx, Manhattan, and Wards Island treatment facilities. Assisted in establishing grit testing locations

Greenville Regional Sewer Authority; Grit Testing; Greenville, SC-

Process Engineer. Assisted in testing of grit testing for a 45 mgd votex grit removal system. Reviewed testing data to determine compliance with specified grit removal requirements. Conducted performance testing of existing grit system.

City of Nashville, Tennessee; Grit Facilities; Nashville, TN

Process Engineer. Evaluated alternatives for removal from an 180 mgd wastewater treatment facility. Developed alternatives from improving grit removal from an aerated grit system.

San Antonio Water System; Grit Facilities; San Antonio, Texas

Senior Process Engineer. Conducted evaluation to assess improvements to Grit system using CFD. Reviewed additional sampling data. Assisted in evaluation of control system to achieve improved grit improvements.

POTABLE WATER TREATMENT

Southern Nevada Water Authority; Development of Shallow Aquifers; Las Vegas, Nevada

Project Engineer. Assisted in the development a full-scale demonstration softening facility for treatment of shallow aquifer before membrane pilot.

City of Mesa, Arizona; Water Treatment Plant Master Plan; Mesa, Arizona; 2000-2000

Project Consultant. Developed conceptual design for two 72-mgd medium pressure UV facilities. Prepared capital and operation and maintenance estimate for both facilities.

City of Leavenworth, Kansas; Water Treatment Plant Master Plan; Leavenworth, Kansas

Project Consultant. Developed a conceptual design for a 6-mgd medium pressure system. Developed capital and operation cost for the system.

City of Worthington, Minnesota; Water Treatment Plant Design; Worthington, Minnesota

Pilot Plant Engineer. Operated a 5 gpm filtration pilot plant for the removal of iron and manganese. Pilot runs were made using manganese greensand and existing composite media.

WATER QUALITY AND WATER RESOURSES

City of St. Joseph, Missouri; Annual Combined Sewer Overflow Report; St. Joseph, Missouri

Project Engineer. Prepared annual CSO report documenting activities related to the EPA nine minimum controls St. Joseph CSO LTCP, Salem, Toledo, and Belle Island

City of St. Joseph, Missouri; Residuals Program Audit; St. Joseph, Missouri

Senior Process Engineer. Assisted in the audit of land application program for a 20-mgd wastewater treatment plant. Characterization and reporting data was reviewed to determine compliance with land disposal requirements.

City of Ennis, Texas; Pollutant Impact Study; Ennis, Texas

Process Engineer. Developed a model for the evaluation of TDS impacts on the POTW. Evaluated TDS impacts based on operating alternatives developed by Industrial User.

JEA; Toxicity Identification Assessment; Jacksonville, Florida

Project Engineer. Assisted the Utility in the identification and assessment of toxic compounds being discharged to the treatment plant. Reviewed flow monitoring and sampling procedures for collection of 4 week long sampling events.

IBM; Treatability Study; Essex Junction, Vermont

Pilot Plant Engineer. Designed test protocols for examining the treatability of wastewater from a complex semiconductor manufacturing process. Test protocols included nitrification and denitrification of complex organic nitrogen compounds. Assisted in start-up and trouble shooting of equipment for demonstration study.

LWD; Design of Centralized Waste Treatment Facilities; Cairo, Illinois

Project Engineer. Reviewed proposed discharge regulations for 45,000 gpd centralized waste treatment facility.

City of Oak Lodge, Oregon; Disinfection Alternatives Analysis; Oak Lodge, Oregon

Process Engineer. Evaluated chlorine gas, hypochlorite, and UV disinfection alternatives for a 5 mgd peak flow facility.

Electric Power Research Institute; Industrial Assessment of BC Hydro; Vancouver, British Columbia, Canada

Project Engineer. Surveyed six industrial dischargers, including two breweries', a chicken production facility, recycle plastics, facility, and a paper mill. Water usage and

conventional pollutant discharge was examined at all facilities. Recommendations for implementation of pollution prevention activities to result in a reduction in local surcharge fees were provided to each industrial facility.

Electric Power Research Institute; Industrial Assessment, Northern States Power; Minneapolis, Minnesota

Project Engineer. Surveyed six industrial dischargers, including two semiconductor facilities for the implementation of pollution prevention activities. Examined improvements to allow for consistent delivery of UPW at one location and total reuse of wastewater at the other location. Also provided pollution prevention assessments for a can making facility, recycled paper mill, a tannery, and an insulation factory.

UNIREC; Industrial Regulation Program; Buenos Aires, Argentina; 1996-1997

Project Engineer. Coordinated the development of regulatory measures for the control of industrial discharges into the Rio Reconquista. Participated in Training Seminar on the control and treatment of industrial waste. Managed the development of a software package to track industrial users. Performed Pollution prevention studies for 2 beef slaughterhouses, a dye factory, and a polymer/resin facility in the basin.

Electric Power Research Institute; Ultra Violet Scoping Study, Community Environment Center; St. Louis, Missouri;

Process Engineer. Evaluated proven and emerging the UV disinfection equipment for water and wastewater industry. Developed economic analysis for identified technologies.

City of St. Joseph, Missouri; Combined Sewer Overflow Study; St. Joseph, Missouri

Water Quality Engineer. Performed field assessment of five CSO monitoring locations that ranged in size from 4 feet to 17 feet in diameter. Developed monitoring program to collect flow and sampling data from each location for one year.

City of Ennis, Texas; Industrial Pretreatment Limits; Ennis, Texas

Process Engineer. Performed computer modeling using PRELIM to determine local limits using uniform concentration method for industrial contributors. Evaluated alternatives for the acceptance of wastewater containing Total Identifiable Petroleum Hydrocarbons (TIPH) at the wastewater treatment. plant.

City of Portland, Oregon; Local Limits Update; Portland, Oregon;

Project Engineer. Developed and coordinated yearlong sampling program in support of local limits studies. Reviewed technical basis for existing local limits. Proposed changes to existing limits. Performed headworks analysis using collected sampling data. Assisted City in the development of innovative control strategy for the control of toxic organic compounds.

City of Modesto, California; Industrial Pretreatment Program; Modesto, California;

Project Engineer. Provided technical assistance in reviewing permit application from a superfund site and water to energy site. Provided technical assistance in the updating of local discharge limits. Reviewed modeling results for determining allowable industrial headworks loading for industrial users. Participated in Public Hearing for presentation of limits to local industrial users.

Metropolitan Sewer District of St. Louis, Missouri; Industrial Pretreatment Permitting; St. Louis, Missouri

Process Engineer. Provided assistance in developing and issuing Industrial Pretreatment permits for 250 industrial users. Performed field inspection of aircraft manufactures, chemical manufactures, hospitals, pharmaceutical manufactures, research laboratories, and breweries. Supervised development of Fact sheets that described industry and evaluated the interrelationship between water usage and wastewater discharged. Provided technical information on development of computerized data management system.

City of St. Peters, Missouri; Industrial Pretreatment Program; St. Peters, Missouri

Project Engineer. Assisted the City in development of a pretreatment program. Performed inspections of six industrial users, and performed computer modeling, using PRELIM 4, to determine local limits using uniform concentration methods for industrial contributors. Evaluated water usage from each facility and developed industrial pretreatment permits for each industrial user. Evaluated discharge from an iron fabrication facility and develop permit limits for the facility.

IEE/USAID; Utility/Industry Environmental Management; Kansas City, Missouri

Project Engineer. Provided training on industrial and municipal treatment processes and pollution prevention techniques.

General Electric; Project; Evendale; Evandale, Ohio

Process Engineer. Evaluated oil/water separators and developed water reuse alternatives for the Evendale jet engine test facility. Evaluated metal finishing operations for regulatory impacts of total reuse of wastewater. Supervised preliminary process designs for point of use-reuse and regional reuse of metal finishing wastewater.

Frito-Lay, Inc.; Wastewater Pretreatment Evaluation; Topeka, Kansas; 1994-1994

Process Engineer. Worked with the client to design a sampling study for waste stream characterization. Performed preliminary bench-scale treatment using chemical addition and DAF systems. Evaluated sampling data to determine best pretreatment methods.

National Pollutant Discharge Elimination System Stormwater Permitting; Stormwater Management Utilities; Cincinnati, Ohio

Project Consultant. Provided assistance in installing stormwater-monitoring equipment for NPDES Part 2 municipal permit application.

Douglas Battery; Local Limit Evaluation; Kansas City, Missouri

Process Engineer. Performed sampling study and plant balance for lead discharges. Prepared letter to North Kansas City requesting recalculation of local lead limit.

Lever Brothers; Surfactant Control Project; St. Louis, Missouri

Project Consultant. Developed a sampling program to characterize process water during major facility cleanups. Installed flow metering and sampling equipment to collect field data.

National Starch and Chemical; Wastewater Treatment Plant Evaluation; Kansas City, Missouri

Process Engineer. Evaluated the capacity of the facility to treat 0.74 mgd and 25,000 ppd BOD. Performed preliminary bench-scale treatment using pH adjustment, settling, DAF, and chemical addition. The results of the

study identified the need for pretreatment or equalization to reduce peak day loads, increase aeration capacity, and increase sludge dewatering.

.City of Los Angeles, California; Industrial Pretreatment Program; Los Angeles, California

Project Consultant. Evaluated laboratory and field sampling procedures for industrial pretreatment surcharge program.

City of Norfolk, Virginia; National Pollutant Discharge Elimination System Stormwater; Norfolk, Virginia

Project Consultant. Supervised installation of stormwater monitoring equipment at eight locations for NPDES Part 2 municipal permit application.

East Honolulu Community Services; Wastewater Treatment Plant Master Plan; East Honolulu, Hawaii

Process Engineer. Prepared Master Plan for a 5.8 mgd Average Monthly flow treatment plant. Evaluated both liquid and solids treatment processes to achieve compliance with NPDES permit requirements. Developed conceptual design for expansion of treatment facilities for reuse of treated effluent. Evaluated existing ocean outfall using the UDKHDEN computer model.

Confidential Western Client; Pretreatment Program Audit; United States

Process Engineer. Evaluated pretreatment program to determine compliance with domestic sewage study revisions to federal pretreatment regulations. Audited inspection and sampling procedures used by the Utility. Performed compliance inspection of a metal finishing facility.

McLouth Steel | Wastewater Characterization Study; Detroit, MI

Process Engineer. Performed wastewater characterization of steel mill furnace blowdown wastewater. Developed process design of four alternatives for treatment of wastewater.

City of Norwich, Connecticut; Combined Sewer Overflow Study; Norwich, Connecticut;

Water Quality Staff Engineer. Assisted in the development of a monitoring plan for 18 monitoring stations. Installed equipment for monitoring flow and water quality at nine locations. Collected and analyzed monitoring data in the field with the use of computers.

Procter & Gamble; Waste Characterization Study; Sacramento, California

Process Engineer. Supervised water characterization study of a soap factory. This study included the flow monitoring and sampling from 11 locations for 14 consecutive days. Plant wide mass balance of all pollutants was performed.

City of Izmir, Turkey; Wastewater Treatment Facilities Design; Izmir, Turkey

Water Quality Engineer. Used empirical models to evaluate the impacts of algae growth on discharge from a 100 mgd lagoon facility.

Department of Defense; Wastewater Treatment Facilities, United States Air Force-Nellis Air Force Base; Las Vegas, Nevada

Process Engineer. Performed a process evaluation for the construction of wastewater treatment facilities for wastewater reuse on existing and future , golf courses.

Chesapeake Corporation; Wastewater Reuse; Westpoint, Virginia

Pilot Plant Engineer. Designed and operated a 20 gpm pilot system consisting of primary

clarification, chemical addition, plate settlers, dual media filtration, and continuous upflow moving bed filtration. The purpose of the project was to evaluate treating raw wastewater for reuse within the paper mill. Target water criteria were 50 color units and less than 10 mg/L TSS.

Procter & Gamble; pH Control Study; Kansas City, Kansas;

Process Engineer. Performed pilot study on the removal of fats, oils, and grease using 5 gpm CPI unit; bench- scale study to determine floatable FOG portion of wastewater; conceptual design of pH control and gravity separation facilities; and three waste characterization studies.

US Army Corps of Engineers; Sunflower Army Ammunition Plant;; De Soto, Kansas

Process Design Engineer. Performed conceptual design of three package treatment systems ranging from 10,000 gpd to 1 mgd for the removal of nitroguanidine from wastewater streams.

Santa Ana Watershed Authority; Flood Routing Study; Lake Elsinore, California

Water Quality Engineer. Predicted the effects of flooding for the City of Lake Elsinore by using the HEC 5 computer model.

City of Grand Rapids, Michigan; Combined Sewer Overflow Study; Grand Rapdis, Michigan

Water Quality Engineer. Reviewed combined sewer overflow treatment technologies to design treatment facilities for several locations within the City.

Van Camp Foods; Industrial Pretreatment; Puerto Rico (U.S.)

Process Design Engineer. Performed process evaluation of anaerobic and aerobic (RBC, activated sludge, and trickling filter) and a combination of anaerobic/aerobic treatment processes to treat tuna cannery wastes. Treatment system goals were to surcharge values of 175 mg/L BOD and 125 mg/L settable solids.

City of Asheville, North Carolina; Water Supply Study; Asheville, North Carolina;

Water Quality Engineer. Performed empirical analyses to predict the effect of eutrophication resulting from nitrogen and phosphorus loadings on two public supply reservoirs.

Board of Kansas Mine Reclamation; Indian Creek Mine Reclamation Area; Prescott, Kansas; 1987-1988

Water Quality Specialist. Performed surface and groundwater monitoring at a combined 16 locations. Assisted in the design of a 900 acre wetland to treat acid mine drainage.

County of Dare, North Carolina; Wastewater Treatment Design; Dare, North Carolina

Process Staff Engineer. Performed process design of a 1 mgd package wastewater treatment system to treat landfill leachate.

City of San Diego, California; Aeration System Design; San Diego, California

Process Engineer. Performed a process evaluation for six alternatives for improving oxygen transfer in hyacinth ponds. Developed design criteria for selected aeration system alternative.

City of Olathe, Kansas; Stormwater Sewer Overflow Study, Water Quality; Olathe, Kansas; 1985-1986

Engineer. Performed daily collection of data over a six-month period from 10 locations within the Mill Creek Watershed.

City of Jacksonville, Illinois; Wastewater Characterization Study, Water Quality; Jacksonville, Illinois;

Engineer. Supervised the collection of flow and water quality data from 21 locations within the sanitary collection system.

City of Durham, North Carolina; Wastewater Treatment Design; Durham, North Carolina

Process Staff Engineer. Assisted in the conceptual design of a 10 mgd biological phosphorus removal facility. Evaluated three grit removal systems as part of the conceptual design.

Leavenworth WWTP Expansion, City of Leavenworth, Leavenworth, KS.

Disinfection Process Lead, Supervised collection of UV transmittance data from trickling filter effluent. Conducted pilot testing to improve solids capture from trickling filter effluent. Conducted evaluations for installation of a 12 mgd UV disinfection system. Assisted in preparation of drawings and specifications for installation of UV system. Conducted performance testing to validate installation of equipment.

Metropolitan Water Reclamation District of Greater Chicago | Wastewater Planning; Chicago, IL

Process Consultant. Mr. Hunter has served on the PAC for the UV demonstration project located at the District's Hanover Park facility. In this role he has provided input on the selection of UV equipment, layout of equipment, reviewed operational data, and advised the District on testing requirements. He also assisted the District in the preparation of procedures for "spot check validation" of the UV equipment at the plant.

, Filtration and Disinfection Evaluation, William E Dunn Filtration and Disinfection Evaluation, Pinellas County, FL.

Process Engineer. Conducted evaluation of six different filtration alternatives to improve and replace the existing traveling bridge units. Each alternative was examined relative to reducing the operating and maintenance effort expended by staff. Five different disinfection alternatives were examined to improve the efficiency and optimize the process.

JEA | Design of UV Disinfection Systems; Jacksonville, FL

Process Consultant. Assisted in the design on 5 medium pressure UV disinfection systems totaling 250 mgd peak flow. Evaluated treatment plant data to allow for development of design criteria. Worked with State regulatory officials to establish design criteria for each system

North Texas Municipal Water District | UV System Testing; Dallas, TX

Process Engineer. Developed procedures for evaluation of low pressure UV system from a 5-mgd facility for the inactivation of Cryptosporidium from a wastewater facility. Wastewater treatment plant discharges into the local water supply.

City of St. Joseph| Industrial Temporary Treatment System; St. Joseph, MO

Process Engineer. Responsible for development of conceptual design for a 28 mgd temporary treatment during construction of BNR modification to provide treatment of industrial waste from a tannery. Pilot tested various biological treatment technologies for pretreatment of the industrial wastewater streams. Developed a concept for modification of the aeration system to provide additional air flow to be used during treatment.

City of Lubbock | Wastewater Treatment Plant Expansion; Lubbock, TX

Process Engineer. Responsible for the process design for retrofit of three existing treatment trains for biological nitrogen and phosphorous removal with a peak daily flow of 31.5 mgd. The project included decommissioning of one treatment train and the impact of return streams from anaerobic digestion.

City of Ruston| North WWTP; Ruston, LA

Process Engineer. Evaluated existing treatment surface aeration plant to determine temporary improvements to meet NPDES requirements. Developed process design for 6 mgd ADF facility that included grit removal, equalization, nitrification/denitrification, fine pore diffused aeration clarification, filtration, and UV disinfection.

City of Oklahoma, Oklahoma; Pollutant Impact Study; Oklahoma CIty, Oklahoma

Project Engineer. Development a model for the evaluation of TDS impacts on two wastewater treatment plants. Assisted City in the revision of Pretreatment Ordinance for controlling TDS. Developed Industrial pretreatment limits for two industrial users

for discharge of TDS. Assisted in permits for TDS control in the City.

Treatment Plant Improvements; Des Moines Wastewater Treatment Plant, Des Moines, IA

Sr. Process Engineer – Examined various disinfectants including PAA, UV, and Hypochlorite for replacement of a chlorine gas system to provide peak flow of 150 mgd. Worked with design team to resolve hydraulic bottlenecks in the existing contact basin. Develop model that evaluated conceptual level construction and operating costs with non-economic factors to select the most appropriate disinfection alternative.

Disinfection Evaluation, City of Phoenix, Dos Rios Wastewater Reclamation Plant Improvements, Phoenix, AX

Sr. Process Engineer – Conducted bench scale testing of various combinations of disinfection technologies to achieve Arizona Class A+ (High level disinfection) as well as oxidation of contaminates of emerging concern, pharmaceuticals, and estrogenic compounds for a design flow of 120 mgd. Bench testing included combinations of UV and Ozone with PAA and Peroxide. Developed conceptual capital and operating cost for the various combination of technologies that were tested.

Disinfection Alternatives Analysis, Metropolitan Sewer District of St. Louis, St. Louis, MO

Sr. Process Engineer – Examined various disinfectants including PAA, UV, and Hypochlorite for two different treatment facilities that treat up to 800 mgd from combined sewers. Develop model that evaluated conceptual level construction and operating costs with non-economic factors to select the most appropriate disinfection alternative. Developed innovative approach that would allow for use of chemical storage tanks for either PAA or hypochlorite.

Disinfection Alternatives Analysis, Unified Government of Kansas City, Ks, Kaw Point Wastewater Treatment Plant, Kansas City, KS

Sr. Process Engineer – Conducted bench scale testing various disinfectants including PAA, UV, ozone, and Hypochlorite for a 20 mgd high purity oxygen activated sludge plant. Developed conceptual level construction and operating costs with non-economic factors to select the most appropriate disinfection alternative.

Electric Power Research Institute; Co-Disposal of Wastewater Residuals at a Power Generating Facility; St. Louis, Missouri

Project Consultant. Provide review comments on conceptual design of co-disposal of wastewater residuals at a power generating facility.

Ruston, Louisiana; Wastewater Treatment Plant Improvements; Ruston, Louisiana

Senior Process Engineer. Evaluated existing treatment plant to determine temporary improvements to meet NPDES requirements. Developed process design for 6 mgd ADF facility that included grit removal, equalization, nitrification/denitrification, clarification, filtration, and UV disinfection.

San Antonio Water System; Grit Facilities; San Antonio, Texas

Senior Process Engineer. Assisted in the development of two alternatives for the installation of 500 mgd grit facility. Prepared a monitoring plan to quantify and characterize grit from three different treatment facilities. Supervised field crew conducting the collection of field data. Reviewed various alternatives (including grit washing and dewatering) to determine cost effective alternative.

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Johnson County Wastewater; Wastewater Filtration Study; Johnson County, KS

Senior Process Engineer. Evaluated four types of filtration equipment to remove suspended solids from wastewater effluent. Prepared conceptual designs for 12 mgd and 24 mgd alternatives for selected filtration equipment.

City of Wimberly, Wastewater Master Plan; Wimberly, TX

Process Consultant. Reviewed process evaluation for treatment alternatives to achieve water reuse requirements. Assisted in the development of operation and maintenance cost for each alternative. Reviewed non-economic analysis developed for each alternative.

North Texas Municipal Water District; Wastewater Treatment Plant Evaluation; Dallas, TX

Senior Process Engineer. Evaluated capacity of 25-mgd wastewater treatment plant to accept effluent from a paper mill. Evaluation was made of impacts to both liquid and residuals parts of the treatment plant. Developed two alternatives for the pre-treatment of wastewater from the paper mill.

City of Portland; Ramsey Lake Wetland Treatment; Portland, OR

Process Engineer. Prepared conceptual process designs for three-combined sewer overflow treatment alternatives.

City of Nashville; Grit Facilities; Nashville, TN

Process Engineer. Evaluated alternatives for removal from a 180 mgd wastewater treatment facility. Developed alternatives from improving grit removal from an aerated grit system.

City of Ruston; Wastewater Treatment Plant Improvements; Ruston, LA

Senior Process Engineer. Evaluated existing treatment plant to determine temporary improvements to meet NPDES requirements. Developed process design for 6 mgd ADF facility that included grit removal, equalization, nitrification/denitrification, clarification, filtration, and UV disinfection.

Johnson County Wastewater; Wastewater Filtration Study; Johnson County, KS

Senior Process Engineer. Evaluated four types of filtration equipment to remove suspended solids from wastewater effluent. Prepared conceptual designs for 12 mgd and 24 mgd alternatives for selected filtration equipment.

Johnson County Wastewater; New Century Airport Complex Ultra Violet Disinfection; Johnson County, KS

Senior Process Engineer. Evaluated three different UV alternatives for installation at a 4 mgd design flow. Prepared conceptual and economic analysis examining two UV alternatives. Oversaw four week UV demonstration using low pressure-high output UV system. Assisted design team in the preparation of specification for UV system.

City of Lubbock; Wastewater Treatment Plant Expansion; Lubbock, TX

Senior Process Engineer. Developed process design using Integrated Fixed Film Activated Sludge (IFAS for a 31.5 mgd mgd plant which contained total phosphorus removal. Conducted pilot studies to examine regrowth of bacteria in effluent outfall.

Southern Nevada Water Authority; Development of Shallow Aquifers; Las Vegas, NV

Project Engineer. Assisted in the development a full-scale demonstration softening facility for treatment of shallow aquifer before membrane pilot

City of Lawrence; Wakarusa Water Reclamation Facility; Lawrence, KS

Process Consultant. Assisted in the development of the disinfection strategy for the new Wakarusa Water Reclamation Facility. Strategy was designed to meet BRN, EBNR, and LOT treatment limits. Assisted in the development of a Technical Memorandum.

City of St. Joseph; Annual Combined Sewer Overflow Report; St. Joseph, MO

Project Engineer. Prepared annual CSO report documenting activities related to the EPA nine minimum controls St. Joseph CSO LTCP, Salem, Toledo, and Belle Island

City of St. Joseph; Residuals Program Audit; St. Joseph, MO

Senior Process Engineer. Assisted in the audit of land application program for a 20-mgd wastewater treatment plant. Characterization and reporting data was reviewed to determine compliance with land disposal requirements.

IBM; Treatability Study; Essex Junction, VT

Pilot Plant Engineer. Designed test protocols for examining the treatability of wastewater from a complex semiconductor manufacturing process. Test protocols included nitrification and denitrification of complex organic nitrogen compounds. Assisted in start-up and trouble shooting of equipment for demonstration study.

City of Izmir; Wastewater Treatment Facilities Design; Izmir, Turkey

Water Quality Engineer. Used empirical models to evaluate the impacts of algae growth on discharge from a 100 mgd lagoon facility.

Department of Defense; Wastewater Treatment Facilities, United States Air Force-Nellis Air Force Base; Las Vegas, NV

Process Engineer. Performed a process evaluation for the construction of wastewater treatment facilities for wastewater reuse on existing and future , golf courses.

Chesapeake Corporation; Wastewater Reuse; Westpoint, VA

Pilot Plant Engineer. Designed and operated a 20 gpm pilot system consisting of primary clarification, chemical addition, plate settlers, dual media filtration, and continuous upflow moving bed filtration. The purpose of the project was to evaluate treating raw wastewater for reuse within the paper mill. Target water criteria were 50 color units and less than 10 mg/L TSS.

City of Asheville; Water Supply Study; Asheville, NC

Water Quality Engineer. Performed empirical analyses to predict the effect of eutrophication resulting from nitrogen and phosphorus loadings on two public supply reservoirs.

City of San Diego; Aeration System Design; San Diego, CA

Process Engineer. Performed a process evaluation for six alternatives for improving oxygen transfer in hyacinth ponds. Developed design criteria for selected aeration system alternative.

Brigham Young University, Environmental Analysis; United States

Supervisor - . Collected and analyzed data from monitoring programs, ranging from cooling water discharge to landfill leachate. Was responsible for Quality Control/Quality Assurance program.

SENIOR ENVIRONMENTAL ENGINEER

Gayathri Ram Mohan, Ph.D., P.E.

Greater Atlanta Area

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my Linked in profile

SUMMARY

Resourceful and solutions-driven operations-focused Environmental Engineer encompassing 10+ years of notable research, process engineering, master planning, and project management experience in water/wastewater treatment.

Impeccable background in evaluating and troubleshooting full-scale systems and developing innovative ways to improve or optimize existing processes in advanced wastewater treatment and reuse applications.

CORE COMPETENCIES

- Wastewater Process Engineering
- Biosolids & Biogas Management
- Applied Research
- Bio-P Optimization
- Nutrient Removal & Recovery
- Ozone-BAC
- Engineering & Construction Design Review
- Project Scoping, Budgeting & Resource Management
- Facility Operations Management

EDUCATION

Doctor of Philosophy (2012)
Bio-Environmental Engineering
University of Florida, Gainesville, FL

Bachelor of Technology (2008)
Biotechnology
SRM University, Chennai, India

LICENSES

Professional Engineer: MI
Class III Wastewater: GA

SELECT ENGINEERING PROJECTS

F. Wayne Hill WRC, Gwinnett County, GA (60 MGD Advanced WRRF)

Two-Phase Anaerobic Digestion Feasibility Evaluation, 2021 – 2022. Dr. Ram Mohan served as the Technical Lead for the collaborative research project with Clemson University. This study was a first of its kind conducted on co-digesting reactors. First, BMP tests were conducted to determine the effect of FOG loading on co-digestion, and second, single vs. two-phase co-digestion was investigated in semi-continuous reactors to evaluate the potential increase in solids handling capacity. The results allowed the full-scale plant to re-rate the design basis for biosolids handling without building additional digesters, resulting in savings of more than $2MM in capital costs.

Supplemental Alkalinity Chemical Feed System, 2020 – 2022. Dr. Ram Mohan led a full-scale pilot trial that determined an innovative solution to address frequent clogs in the Magnesium hydroxide feed system. This important project saved the County over $500K and reduced the payback period in building a permanent chemical feed system to less than 5 years.

Industrial Pretreatment Surcharge Model Update. 2020 – 2021. Dr. Ram Mohan worked closely with a team of 3 consulting engineers to decipher the original model developed in 2009 and subsequently, successfully revised the industrial surcharge model to reflect present-day expenditures incurred by the County for capital upgrades and treatment facility operations.

Ozone Rehabilitation, 2019 – 2021. This capital project identified and addressed performance limiting factors that impacted the ability of the ozone system to meet treatment requirements in a reliable, efficient, safe, and cost-effective manner. Dr. Ram Mohan developed a detailed project scoping document and collaborated with the engineering and construction team to complete a $4MM capital improvement project to rehabilitate both pre-and post-ozone systems.

Nutrient Recovery Optimization, 2017 – 2018. Dr. Ram Mohan served as the Lead Process Engineer, working closely with plant operations to fine-tune nutrient recovery using Ostara pearl reactors. She developed detailed SOPs and led the full-scale implementation of modified seeding schedules to achieve desired effluent quality and prevent recycling struvite fines to the head of the plant. These modifications helped increase product yield by 30- 50%, resulting in annual savings of over $100K.

Biological Phosphorous Removal Optimization, 2016 - 2018. Dr. Ram Mohan oversaw the efforts to identify root cause for elevated phosphorous in bioreactor effluent at a 60-MGD advanced wastewater treatment facility. She managed a team of 10 consultants and supervised field efforts to implement modified zonal bioreactor configuration to circumvent seasonal impacts and reduce reliance on metal salts and consistently meet a stringent effluent TP permit limit of 0.08 mg/L.

Crook Creek WRF, Gwinnett County, GA (16 MGD WRF)

Treatment Capacity Expansion, 2021 – 2022. Dr. Ram Mohan managed a team of 13 consultants, comprising of several Design Engineers and SMEs from across two major engineering firms, to review options to re-rate the treatment capacity of an existing 16 MGD water reclamation facility. She played a key role in developing a creative solution that saved the County more than $10MM in achieving the desired expanded plant flows by maximizing the utility of existing infrastructure.

Aerobic Granular Sludge Evaluation, 2021. Dr. Ram Mohan served as the Technical Project Manager overseeing field efforts to evaluate the performance of densified aerobic sludge treatment for biological nutrient removal at a newly upgraded 16 MGD water reclamation facility.

Yellow River WRF, Gwinnett County, GA (22 MGD MBR-Plant)

Plant-Wide Process Metrics, 2021. Dr. Ram Mohan played a key role as an SME on an industry-transforming project focused on the development of lead metrics by each unit process at Gwinnett County's Yellow River WRF, a 22-MGD MBR plant. Metrics were chosen after a detailed analysis of historical plant performance, with the end goal to predict changes in water quality and identify process performance issues.

PROFESSIONAL EXPERIENCE

Gwinnett County Department of Water Resources, Atlanta, GA
Senior Scientist V, Water & Sewer Technical Services Division 03/2020 – Present
Senior Scientist IV, Operations Technical Services Division 03/2019 – 03/2020
Engineer III, Operations Technical Services Division 03/2016 – 03/2019

Dr. Ram Mohan leads process engineering activities for all three water reclamation facilities owned and operated by Gwinnett County. She acts as an SME in evaluating process upsets and implementing full-scale measures to address process performance issues. She plays an important role in identifying high-impact capital improvement projects focused on rehabilitation and repair of vertical assets from scoping through engineering design. She has been a key stakeholder and represented the County's interests on master planning projects focused on wastewater and biosolids treatment capacity needs. In addition to national research studies, she has represented the County in both phases of COVID19 tracking funded by the Department of Health and Human Services. Her latest efforts are focused on energy optimization across all GCDWR operated facilities.

Nclear Inc., Atlanta, GA 01/2015 – 03/2016
Process Engineer

Dr. Ram Mohan led the R&D efforts related to improving product quality and onsite field trials at municipal and industrial (poultry and agriculture) client locations to test the effectiveness of NClear media for P removal from wastewater. In this role, she supervised a team of engineers and scientists, defined project scope, and deliverables to support business objectives in collaboration with senior management and stakeholders, and presented scientific data by communicating accurate summaries of results at industry conferences and regulatory business meetings.

RESEARCH HIGHLIGHTS

WRF Project Highlights

Dr. Ram Mohan leads advanced wastewater-related research for Gwinnett County Department of Water Resources. She has represented Gwinnett County DWR in several WRF projects in various roles including leading research activities as a Principal or Co-Principal Investigator, participating on the project advisory council (PAC) and utility advisory board.

- **Principal Investigator – Tailored Collaboration Project 5092,** 2020 – 2023, "Understanding and Improving Reuse Biofilter Performance during Transformation from GAC to BAC."
- **Co-Principal Investigator – WRF 5031**, 2020 – 2023, "Occurrence of **PFAS** Compounds in US Wastewater Treatment Plants."
- **Played a key role as project team member in commissioning and operating an award-winning Direct Potable Reuse** (DPR) pilot plant (WRF 15-11) that treated a blend of highly treated effluent from F. Wayne Hill Water Resources Center and raw water from Lake Lanier, at the Shoal Creek Filter Plant, (98 MGD) 2016 – 2018.
- Hands-on experience with start-up and operation of **Advanced Ozone-BAF pilot (WRF 4555)** at the Shoal Creek Filter Plant, Gwinnett County, GA, 2016 – 2018.

US Environmental Protection Agency, Cincinnati

ORISE Postdoctoral Researcher, 2013 – 2014.

Dr. Ram Mohan was a Task Lead for the US EPA-funded contract "Treatment, control, and monitoring of remediation technologies, contaminated sites and facilities, and ecosystems". During her tenure as an ORISE Post-doctorate fellow, she designed and operated pilot scale MABRs for non-potable reuse of greywater, built-in collaboration with NASA, and led the development of detailed experimental plans, routine sampling, monitoring, and data analysis. She collaborated with researchers from the Department of Homeland Security to conduct a thorough investigation of advanced early detection warning systems for wastewater treatment applications. Dr. Ram Mohan also assisted with preparing detailed project plans and reports including technical reports to members of the Congress.

University of Florida, Gainesville, FL

Industry Project: IMDC, INC., GAINESVILLE, FL, 2011 – 2012

Photocatalytic Degradation of Dye Containing Wastewaters
Dr. Ram Mohan spearheaded the development and use of novel immobilized photoreactors using nonwoven, reusable Titanium dioxide coated filters for degradation of complex, recalcitrant, color-causing compounds in wastewater.

Industry Project: HARVEST POWER INC., WALTHAM, MA, 2010 – 2011

Anaerobic Digestion of Municipal Solid Waste (MSW)

Dr. Ram Mohan conducted a feasibility study to evaluate biogassification potential of organic fraction of MSW in mesophilic anaerobic digesters. She characterized various sludge streams for solids and nutrient content, biochemical methane potential and investigated the effect of enzymatic and thermal pre-treatment to improve methane yield. Following the success of the project, a collaborative effort between Reedy Creek Improvement District and Harvest Power Inc. led to the construction of a large-scale anaerobic digester to treat 162-301 kilo tons MSW/year.

Ph. D Research, Dissertation Title**: "An Integrated Biorefinery for Recovery of Energy, Nutrients and Clean Water from Cellulosic Ethanol Stillage,"** 2009 – 2012.

Dr. Ram Mohan developed a closed-loop Cellulosic Bioethanol wastewater treatment model comprised of high-rate thermophilic anaerobic digestion, nutrient recovery as struvite (patent pending), and advanced oxidation process using UV/TiO2 photocatalysis. Her work helped recover resources and offset treatment costs of an otherwise expensive process by reducing reliance on groundwater by 30% by recycling highly treated effluent and providing a means to generate energy using biogas produced from the treatment of high strength stillage produced during fermentation.

SELECT PUBLICATIONS & CONFERENCE PROCEEDINGS

Mohan, G.R., Ozone-BAC in Potable Reuse Applications at Gwinnett County, GA, WateReuse Florida, 2022.
Mohan, G.R., Garmon, J., Latimer, R., Pitt, P., Yi, C., Stabilizing Nutrient Recovery, WE&T, 2021.
Hooper, J.S, **Mohan, G.R.,** Chiang, D., and Funk, D., Breaking Down and Communicating PFAS, AWWA -Potable Reuse, 2020.
Funk, D., Hooper, J., Bell, K., Machek, E., Huang, C.H., and **Mohan, G.R**., Removal of Emerging Contaminants through Multi-Stage Ozone-Biofiltration, AWWA International Symposium-Potable Reuse, 2020.
Atieh.B, Khunjar. W, Latimer. R, **Mohan. G.R**, Wisdom, B., Nutrient Recovery: Mature and Ready for the Big Stage, Horizons, 2019.
Mohan, G.R., Lan, J.C., Kilpatrick, S., and Flippin, T.H., Magnesium Hydroxide Addition for Odor and Corrosion Control in Conveyance Systems: Product Selection and Dose Optimization, WEFTEC, 2018.

Mohan, G.R., Harris, R.H., Lan, J.C., Jalla, S., and Lozier, J.L., Restoring Submerged UF Membrane Performance Using an Innovative Patented Chemical Cleaning Procedure, WEFTEC, 2018.

Mohan. G.R., Lan, J.C., Latimer, R., Lynch, M., and Pitt, P., Nutrient Recovery Performance, and the Optimization of Biological Phosphorus Removal at the F. Wayne Hill WRC, WEF Nutrient Removal and Recovery Conference Proceedings, 2018.

Mohan G.R., Li, X., Lalley, J., Speth, T.F., Garland, J., and Nadagouda, M., Greywater treatment using membrane- aerated bioreactors (MABRs), AWWA ACE14 Conference Proceedings, 2014.

Lalley, J., Han, K., **Mohan, G.R.,** Nadagouda, M.N., Speth, T.F., and Garland, J.L., Phosphate removal using modified Bayoxide®E33 adsorption media, Environmental Science: Water Research and Technology, 2014.

Mohan, G.R., S. Gadekar, and P. Pullammanappallil, Development of a process model for recovery of nutrients from wastewater by precipitation as struvite. Florida Water Resources Journal, 2011.

PROFESSIONAL ACTIVITIES

- American Water Works Association
- Georgia Association for Water Professionals
    - Secretary, Wastewater Treatment Committee (July 2021-June 2022)
    - Elected Vice Chair, Wastewater Treatment Committee (July 2022- June 2023)
- Water Environmental Federation
- WateReuse Association
    - Technical Program Committee Member (WRF Symposium 2023)

Mark W. Miller, PhD, PE

Experience Summary

Mark Miller is a Process Engineer, with 12 years of experience and a collaborative, listen-first approach. He has worked on numerous process designs of water resource recovery facilities across the Eastern US. His technical expertise includes enhanced biological nitrogen and phosphorus removal, high-rate activated sludge processes, whole-plant modeling, process automation, and treatment optimization. Mark also specializes in field work to characterize waste streams, diagnose treatment issues, and support designs to improve treatment processes like activated sludge and clarifiers.

Assignment

Wastewater Process Engineer

Education

Ph.D., Civil Engineering, Virginia Polytechnic Institute and State University, 2015

M.S., Civil Engineering, Virginia Polytechnic Institute and State University, 2011

B.S., Civil Engineering, Virginia Military Institute, 2009

Registration

Professional Engineer, No. 045265, North Carolina

Experience

12 years

Joined Firm

2015

Relevant Expertise

- *Biological nitrogen removal*
- *Biological phosphorus removal*
- *Biological process modeling*
- *High rate activated sludge processes*
- *Mainstream shortcut nitrogen removal processes*
- *Innovative wastewater treatment technologies*
- *Carbon management and energy neutrality*
- *Advanced aeration controls*

Rocky River Regional WWTP Expansion Study, Water and Sewer Authority of Cabarrus County, Concord, NC

Lead Process Engineer. Mark led the process engineering effort to determine the existing capacity of the RRRWWTP and develop expansion alternatives for increasing the capacity of this two-stage, high-purity oxygen (HPO) plant from 26.5 to 34 MGD. This included development of flows and loads design criteria, off-gas sampling to support HPO modeling, biological process modeling of the HPO activated sludge processes, and clarifier stress testing to determine existing clarification capacity. A conceptual design was then developed for the selected alternative, which included constructing influent equalization, sidestream treatment of incinerator scrubber blowdown water, and conversion of the HPO reactors to diffused aeration.

McAlpine Wastewater Management Facility Reliability and Process Improvements, CLT Water, Charlotte, NC

Lead Process Engineer. Mark was involved in several design aspects of this progressive design-build project to include field testing of secondary clarifiers, aeration basins, and a demonstration scale return activated sludge fermentation study to enhance biological phosphorus removal. The demonstration study also included an evaluation of advanced aeration controls within several existing aeration basins. His duties included laboratory testing, data collection and evaluation, and collaboration with the design-build team, client, and owner's advisor to ensure critical success factors were met for the study. Mark also led the process modeling of the demonstration study and the aeration system upgrades that included aeration controls and instrumentation, diffused air system replacement, and new blowers.

Program Management: Mallard Creek Basin and WRF Improvements, Charlotte Water, Charlotte, NC

Lead Process Engineer. Mark is leading the process engineering to support design improvements of the Mallard Creek WRF, including special sampling to update biological process models, evaluation of process improvements to expand the plant to 16 MGD, and an alternatives analysis for expansions beyond 16 MGD. Process improvements will consist of preliminary treatment expansion, EQ basin evaluation, primary clarifier expansion, and advanced aeration controls strategies to save chemicals and energy.

Regional Rocky River WWTP Operations Assistance, Water and Sewer Authority of Cabarrus County, Concord, NC

Lead Process Engineer. Mark led the investigation to identify the cause and source of nitrification inhibition at the RRRWWTP. This included reviewing plant performance data and conducting multiple site visits to assist plant staff with field testing and troubleshooting treatment issues. Mark performed process modeling of the high-purity oxygen activated sludge processes to aid with

transitioning the plant from parallel to series operation, which led to a full recovery of nitrification.

Central Water Reclamation Facility Upgrades, Metro Water Services, Nashville, TN

Process Engineer. Mark conducted the process modeling and evaluation for the upgrades of a 125 MGD CSO facility. This CMAR project includes a new headworks, modifications to the existing primary and secondary clarifiers, and converting draft tube aeration to fine-pore diffused aeration in deep tanks. Mark utilized biological process modeling and 2D and 3D computation fluid dynamics (CFD) modeling to optimize the secondary process design that includes the addition of an anaerobic selector, ammonia-based aeration control, degassing zone for supersaturated gases, and a classifying selector for foaming and settling control.

Big Creek Expansion, Fulton County, GA

Process Engineer. As part of this progressive design-build project, Mark conducted the evaluation of process alternatives to convert the existing conventional activated sludge plant to a 38 MGD membrane bioreactor (MBR) facility with enhanced biological nutrient removal. Upgrades will include converting the existing secondary clarifiers to equalization basins, constructing a new ENR/MBR facility, aerobic digesters, and post aeration. Mark utilized biological process modeling to develop the process configuration and to evaluate ammonia-based aeration control that will be utilized.

Mallard Creek and Back Creek Basin Study, Charlotte Water, Charlotte, NC

Process Engineer. Mark was responsible for performing the evaluation of treatment process capacity requirements and the development of process alternatives for upgrade planning. This project involved developing a plan for ensuring adequate conveyance and treatment capacity for the growing service area. The study included population and flow projections, assessment of potential regulatory changes, evaluation of conveyance capacity, assessment of reuse potential, evaluation of treatment capacity, and the development of a capital improvement plan. This study was followed by a condition assessment of the preliminary and primary treatment processes and an engineering assessment to upgrade the facility from 12 to 16 MGD.

Big Coppitt WWTP Expansion Pre-design, Florida Keys Aqueduct Authority, Big Coppitt, FL

Process Engineer. Developed influent flow and load projections and assisted with major equipment selection and preliminary sizing for the planned expansion of the Big Coppitt WWTP.

Sawgrass WWTP Improvements, City of Sunrise, FL

Process Engineer. Conducted process simulation modeling of the 20 MGD activated sludge plant to develop alternative options to convert existing surge tanks into activated sludge capacity and replace the aging fine-pore diffused aeration system. The project included a preliminary investigation and facility assessment to establish the capacity and efficiency of the proposed plant improvements. The assessment also defined the nature of the facility operating and design criteria to govern the subsequent design of the proposed improvements. The design included detailed wastewater characterization to develop a calibrated process model and process design to upgrade the facility. Upgrades include converting the existing process from nitrifying activated sludge to biological phosphorus removal with ammonia-based aeration control.

Regional Wet Weather Management Plan, Hampton Roads Sanitation District, Virginia Beach, VA

Process Engineer. Conducted process evaluation to determine the wet-weather capacity of the District's Williamsburg WWTP.

Salisbury WWTP BNR/ENR Upgrades, Salisbury, MD

Process Engineer. Developed the seeding and startup plan for the 4-stage Bardenpho enhanced nitrogen removal process. Also developed several process control plans for the new facilities including the primary clarifiers, biological process, filtration, disinfection, and other ancillary processes. He continues to provide process support to assist with optimization of current operations and maintain permit compliance during construction.

Automation and Energy Master Plan Phase II, Orange County Utilities Department, Orlando, FL

Process Engineer. Assisted in the development of an Automation and Energy Savings Master Plan for OCU's Water Reclamation Facilities. The objective was to identify opportunities to reduce operating costs with a focus on labor and energy. This included energy and process data analysis, process modeling, and providing automation and control recommendations.

WERF Source Separation, Hampton Roads Sanitation District, Virginia Beach, VA

Process Engineer. The Water Environment and Research Foundation (WERF), as part of the EPA's National Center for Resource Recovery and Nutrient Management (EPA-G2012-STAR-H1) grant, awarded a research project (STAR_N1R14) to complete the following activities: (i) provide design and permitting guidelines to address practical issues related to the implementation of urine separation and collection systems in a high occupancy building; (ii) understand how urine pretreatments (e.g., storage, precipitation) impact pharmaceutical and biological contaminant concentrations; (iii) compare the efficacy of using natural urine and urine derived product (e.g., struvite) as agricultural fertilizers; and (iv) evaluate the fate of nutrients, pharmaceuticals and biological contaminants once urine products are land applied. Dr. Miller provided a review of resource recovery technologies to address nitrogen removal from source separated urine.

Special Projects, Hampton Roads Sanitation District, Virginia Beach, VA

Lead Graduate Researcher (Ph.D.): Dr. Miller led the pilot-scale investigation of mainstream deammonification where he developed innovative process control strategies aimed at managing carbon capture and removal from high-rate activated sludge processes. In addition, he mentored several graduate students from the Old Dominion University and Virginia Tech on their thesis research.

WERF/WEF Study Quantifying Nutrient Removal Technology Performance

Graduate Researcher (M.S.): This unique joint effort of the Water Research Foundation and the Water Environment Federation surveyed the best performing nutrient removal plants in the US (22 plants), using both the plant data, design data and operating schemes to identify the LOT (Limit of Technology) for conventional nutrient removal technologies. LOT has previously loosely been described as meeting a TN of 3.0 mg/L or a TP of 0.1 mg/L without specifying any averaging period. Results from the investigation impacted the wastewater industry broadly, in terms of establishing technology rankings, guidance for features or operating schemes that enhance reliability, and the appropriate use of performance statistics in permit writing.

Memberships

Water Environment Federation, Member

International Water Association, Member

WWRmod Scientific Committee

WEF Nutrient Removal and Recovery 2018 Steering Committee

WEF MEGA Sub-committee

WEF MRRDC Committee

WEF Plant Operations and Maintenance Program Committee

LIFT Technology Reviewer

Water Science & Technology Reviewer

International Journal of Water and Wastewater Treatment Reviewer

Publications / Presentations

1. **Miller, M.W.,** Elliott, M., DeArmond, J., Kinyua, M., Wett, B., Sudhir, M., and Bott, C.B. (2017) Controlling the COD removal of an A-stage pilot study with instrumentation and automatic process control. *Water Science & Technology*, 75(10).
2. Kinyua, M., **Miller, M.W.**, Wett, B., Murthy, S., Chandran, K., and Bott, C.B. (2017) Polyhydroxyalkanoates, triacylglycerides and glycogen in a high rate activated sludge A-stage system. *Chemical Engineering Journal,* 316, 350-360.
3. **Miller, M.W.**, Jimenez, J., Murthy, S., Wett, B., and Bott, C.B. (2016) Controlling organic carbon removal of a highly-loaded activated sludge process. *Proceedings of the 89th Annual Water Environment Federation Technical Exposition and Conference*, New Orleans, Louisiana, September 24-28, 2016.
4. **Miller, M.W.**, DeArmond, J., Elliott, M., Kinyua, M., Kinnear, D., Wett, B., Murthy, S., and Bott, C.B. (2016) Settling and dewatering characteristics of an A-stage activated sludge process proceeded by shortcut biological nitrogen removal. *International Journal of Water and Wastewater Treatment,* 2(5).
5. Nogaj, T., Randall, A., Jimenez, J., Takács, I., Bott, C.B., **Miller, M.W.**, Murthy, S., and Wett, B. (2015) Modeling of organic substrate transformation in the high-rate activated sludge process. *Water Science & Technology*, 71(7), 971-979.
6. Regmi, P., Holgate, B. Fredericks, **Miller, M.W.**, Wett, B., Murthy, S., and Bott, C.B. (2015) Optimization of a mainstream nitritation-denitritation process and anammox polishing. *Water Science & Technology,* 72(4), 632-642.

7. Regmi, P., Bunce, R., **Miller, M.W.**, Park, H., Chandran, K., Wett, B., Murthy, S., and Bott, C.B. (2015) Ammonia-based intermittent aeration control optimized for efficient nitrogen removal. *Biotechnology and Bioengineering,* doi: 10.1002/bit.25611.
8. Regmi, P., Holgate, B., **Miller, M.W.**, Park, H., Chandran, K., Wett, B., Murthy, S., and Bott, C.B. (2015) Nitrogen polishing in a fully anoxic anammox MBBR treating mainstream nitritation-denitritation effluent. *Biotechnology and Bioengineering,* doi: 10.1002/bit.25826.
9. **Miller, M.W.**, Elliott, M., Jimenez, J., Wett, B., Murthy, S., and Bott, C.B. (2015) Adsorption-style high-rate activated sludge for carbon management and diversion. *Proceedings of the 88th Annual Water Environment Federation Technical Exposition and Conference*, Chicago, Illinois, September 26-30, 2015.
10. **Miller, M.W.**, Regmi, P., Wett, B., Murthy, S., and Bott, C.B. (2015) Combining high-rate activated sludge and shortcut nitrogen removal for efficient carbon and energy utilization. *Proceedings of the WEF Water and Energy Conference,* Washington DC, June 7-10, 2015.
11. Regmi, P., **Miller, M.W.**, Holgate, B., Bunce, R., Park, H., Chandran, K., Wett, B., Murthy, S., and Bott, C.B. (2014) Control of aeration, aerobic SRT and COD input for mainstream nitritation/denitritation, *Water Research*, doi: 10.1016/j.watres.2014.03.035.
12. Miller, M.W., Regmi, P., Jimenez, J., Murthy, S., Wett, B., and Bott, C.B. (2014) Optimizing adsorption-style high rate activated sludge for BNR and energy recovery. *Proceedings of the IWA Specialist Conference Global Challenges: Sustainable Wastewater Treatment and Resource Recovery,* Kathmandu, Nepal, October 26-30, 2014.
13. **Miller, M.W**., Regmi, P., Wett, B., Murthy, S., and Bott, C.B. (2014) On-line sensors for the control and optimization of an adsorption-style HRAS pilot study. *Proceedings of the IWA World Water Congress & Exhibition,* Lisbon, Portugal, September 21-26, 2014.
14. **Miller, M.W.**, Jimenez, J., Murthy, S., Kinnear, D., Wett, B., and Bott, C.B. (2013) Mechanisms of COD removal in the adsorption stage of the A/B process. *Proceedings of the 86th Annual Water Environment Federation Technical Exposition and Conference*, Chicago, Illinois, October 5-9, 2013.
15. **Miller, M.W.**, Bunce, R., Regmi, P., Hingley, D.M., Kinnear, D., Murthy, S., Wett, B., and Bott, C.B. (2012) A/B process pilot optimized for nitrite shunt: high rate carbon removal followed by BNR with ammonia-based cyclic aeration control. *Proceedings of the 85th Annual Water Environment Federation Technical Exposition and Conference*, New Orleans, Louisiana, September 29-October 3, 2012.
16. Bott, C.B., Parker, D.S., Jimenez, J., **Miller, M.W.**, and Neethling, J.B. (2012) WEF/WERF study of BNR plants achieving very low N and P limits: evaluation of technology performance and process reliability, *Water Science & Technology*, doi: 10.2166/wst.2012.949.
17. Bott, C.B., Parker, D.S., Jimenez, J., and **Miller, M.W.** (2010) WEF/WERF study quantifying nutrient removal technology performance, *Water Environment Research Foundation*, WERF Report NUTRIR06h.
18. Rahman, A., Hasan, M., Meerburg, F., Jimenez, J.A., **Miller, M.W.**, Bott, C.B., Al-Omari, A., Murthy, S., Shaw, A., De Clippeleir, H., and Riffat, R. (2020) Moving forward with A-stage and high-rate contact-stabilization for energy efficient water resource recovery facility: mechanisms, factors, practical approach and guidelines, *Journal of Water Process Engineering,* doi: 10.2016/j.jwpe.2020101329.

ALISON LING, PhD, PE
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Address: 12110 Westridge Ln. Minnetonka, MN 55305

EDUCATION

UNIVERSITY OF COLORADO — Boulder, CO
Master of Science in Civil Engineering — *Fall 2009-Fall 2013*
Graduation Date: May 2012, GPA: 3.86/4.0
Ph.D. in Civil Engineering
Graduation Date: December 2013, GPA: 3.94/4.0
Water Engineering and Management Graduate Certificate

UNIVERSITY OF MINNESOTA — Minneapolis, MN
Bachelor of Civil Engineering, — *Fall 2004-May 2008*
Summa Cum Laude with High Distinction
Graduation Date: May 2008, GPA: 3.95/4.0

EXPERIENCE

BARR ENGINEERING — Minneapolis, MN
Environmental Engineer, Technical Leader — *Jan. 2014-Present*
- Develop and oversee bench testing for industrial water and wastewater treatment
- Design testing and sampling plan and select equipment for pilot tests
- Build, troubleshoot, and execute industrial wastewater treatment process models
- Perform feasibility analyses and preliminary cost estimates for industrial treatment systems
- Evaluate and select water treatment and reclamation equipment for industrial treatment systems
- Lead company initiative to further apply in data science, statistics, and machine learning
- Lead water and wastewater group initiatives to track emerging trends and conduct applied research

UNIVERSITY OF COLORADO — Boulder, CO
Graduate Research Assistant, Environmental Engineering — *Aug. 2009-Dec. 2013*
- Coordinate with ten wastewater utilities to collect corroded concrete samples
- Design and conduct laboratory and field tests of a new corrosion inhibition treatment
- Perform DNA extractions, quantification, and 16S rDNA amplicon sequencing
- Mentor and manage two graduate student researchers
- Write and facilitate submission of technical papers to peer-reviewed journals

EAWAG: SWISS INSTITUTE OF AQUATIC SCIENCES — Dübendorf, Switzerland
Research Assistant, Aquatic Ecology — *May 2009-July 2009*
- Performed DNA extraction, PCR, DGGE, and fungal biomass assays
- Assisted in alpine stream sample collection

TSINGHUA UNIVERSITY — Beijing, China
Research Assistant, Environmental Engineering — *Sept. 2008-Dec. 2008*
- Build and operate bench-scale microbial fuel cells to extract energy from fish farm wastewater
- Assist lab mates in preparing English language papers

BARR ENGINEERING COMPANY — Minneapolis, MN
Assessment and Remediation Intern — *May 2008-Aug. 2008*
- Drafted reports and permits for site remediation projects
- Performed simulations and modeling for wastewater treatment design
- Collected samples and performed field screening for soil contamination

UNIVERSITY OF MINNESOTA — Minneapolis, MN
Research Assistant, Civil Engineering — *May 2007-June 2008*

- Collected water samples from lakes and performed molecular biological analyses
- Analyzed microbial community data and performed statistical calculations

CITY OF BLOOMINGTON — Bloomington, MN
Civil Engineering Intern — *May 2005-Aug. 2005*

- Performed pond inspections to gauge adequacy of vegetative buffer zones
- Maintain and update city stormwater GIS database

ACTIVITIES & LEADERSHIP

- U of M Department of Civil, Environmental, and Geological Engineering Professional Advisory Board Member (2019-present)
- Peer reviewer for *Water Research* and *Environmental Science and Technology*
- WEF Industrial Wastewater Committee and Refining Subcommittee
- Tau Beta Pi MN-A Chapter President (’07 – ’08)
- Student Government Representative (‘05 – ’06)

TEACHING EXPERIENCE

- Developed and led deployment of internal course on Technical Communications (Barr, 2019)
- Developed and led deployment of internal course on Client Service (Barr, 2018)
- Water and Wastewater Treatment University Course Instructor (U of M, Fall 2016)
- Fundamentals of Environmental Engineering University Course Instructor (CU, Fall 2013)
- Microbiology/Microbial Ecology TA (CU, Four Semesters)
- Engineering and Math Tutor (CU, Two Sumusters)
- English Conversation University Instructor (Beijing City University, Fall 2008)

TECHNICAL COURSES

- Water Environment Federation (WEF) Water Leadership Institute (2022)
- Machine Learning - Coursera/Stanford Online (Spring 2020, Online)
- Industrial Anaerobic Treatment Short Course - Marquette University (September 2017, Milwaukee, WI)
- Data Analysis – Coursera/Johns Hopkins University (Spring 2013, Online)
- Microbial Diversity Summer Course - Marine Biological Laboratory (Summer 2010, Woods Hole, MA)

AWARDS

- Department of Energy Office of Science Graduate Fellow (2010-2013)
- Environmental Protection Agency STAR Fellowship, awarded but declined (2009)
- National Science Foundation Graduate Fellowship, awarded but declined (2009)
- Tau Beta Pi Engineering Honor Society (2005-2008)
- Chi Epsilon Civil Engineering Honor Society (2007)
- University of Minnesota Institute of Technology Dean’s List, 7 Semesters
- Central States Water Environment Association Academic Excellence Award (2008)
- U of M Department of Civil Engineering Goldberg Award for Excellence (2008)
- Minnesota Society of Professional Engineers Merit Scholarship (2007-2008)
- American Council of Engineering Companies of Minnesota Merit Scholarship (2006-2008)
- University of Minnesota Presidential Merit Scholarship (2004-2008)
- U of M Department of Civil Engineering Merit Scholarship (2005-2008)
- Minnesota Public Works Association Merit Scholarship (2005-2006)

TECHNICAL SKILLS & CERTIFICATIONS

- Professional Engineer, MN #54858
- Adobe Dreamweaver, Illustrator
- Coding: Python, R
- Modeling: BioWin, GoldSim, PHREEQC
- Mandarin Chinese: Working Proficiency
- HAZWOPER 40-Hour, MSHA 24-Hour

PUBLICATIONS

Alison Ling and John Tillotson. 2021. How DNA sequencing can aid integrated microbiome management in water systems. *The Analyst Technology Supplement.* Association of Water Technologies. Fall 2021. 42-50.

Alison Ling, Julie Korak, and Anna Schleip. 2018. Lead and Copper Corrosion in Distribution Systems: Current Understanding and Outlook. *Breeze Magazine.* Minnesota Chapter of the American Water Works Association. Summer 2018 174:22-23.

Alejandro Caicedo-Ramirez, Alison L. Ling, and Mark T. Hernandez. 2016. Diffusion susceptibility demonstrates relative inhibition potential of sorbent-immobilized heavy metals against sulfur oxidizing acidophiles. *J Microbiol Methods.*131:42-44. doi: 10.1016/j.mimet.2016.09.024.

Alison L. Ling, Charles E. Robertson, J. Kirk Harris, Daniel N. Frank, Cassandra V. Kotter, Mark J. Stevens, Norman R. Pace and Mark T. Hernandez. 2015. High-resolution bacterial community succession in microbially induced concrete corrosion in a working sanitary manhole. *PLoS One.* 10(3):e0116400. doi: 10.1371/journal.pone.0116400.

Alison L. Ling, Charles E. Robertson, J. Kirk Harris, Daniel N. Frank, Cassandra V. Kotter, Mark J. Stevens, Norman R. Pace and Mark T. Hernandez. 2014. Carbon Dioxide and Hydrogen Sulfide Associations with Regional Bacterial Diversity Patterns in Microbially Induced Concrete Corrosion. *Environ Sci Technol.* 2014 Jul 1;48(13):7357-64. doi: 10.1021/es500763e.

Alison L. Ling, Mark T. Hernandez, Norman R. Pace, and Timothy M. LaPara. 2013. Tetracycline Resistance and Class 1 Integron Genes Associated with Indoor and Outdoor Aerosols. *Env. Sci. Technol.* 79(9): 4046-4052.

Deng, Qian, Xinyang Li, Jian-E Zuo, Alison Ling, and Bruce E. Logan. 2010. Power generation using an activated carbon fiber felt (ACFF) cathode in an upflow microbial fuel cell. *J. Power Sources.* 195(4): 1130-1135.

BOOK CHAPTERS

A. Ling, S. Arabi., C. Claros, T, Ebihara, T. Schlect. Chapter 1: Industrial Wastewater Treatment and Pretreatment, in *Wastewater Treatment Fundamentals III*. Water Environment Federation. In progress.

S. Arabi, **A. Ling,** E. Dumas, A. Benedict. Chapter 1: Introduction, in *Industrial Water Reuse and Zero Liquid Discharge*. Water Environment Federation. 2021.

PRESENTATIONS

"Microbial Ecology of Concrete Corrosion" – *American Society for Microbiology* National Conference, May 2013.

"New Brighton: Advanced Oxidation Pilot and Design for 1,4-Dioxane Removal" – *American Society of Civil Engineers* Water World Congress, June 2018.

"Modeling Mine Water Treatment Processes and Recycle Loops using GoldPHREEQC" – *Society of Metallurgical and Mining Engineers* National Conference, February 2018.

"Hydrogen Sulfide Corrosion – How it works and what you can do about it" – *Water Environment Foundation* Collection Systems Webinar, May 2018.

"Anaerobic Digester Microbial Community, Metadata, and Outcomes" – *Central States Water Environment Foundation* Wisconsin Wastewater Operations Seminar, November 2018.

"Microbial Ecology of Activated Sludge System to Inform System Operation and Design" – *Central States Water Environment Foundation* Conference on the Environment, November 2019.

"Challenges and Lessons Learned – UV/H_2O_2" *American Water Works Association* Virtual Summit on Water Quality and Infrastructure. December 2020

"Biological Removal of Sulfate from Water: Current Status and Outlook for Mine Water Treatment." – *Society of Metallurgical and Mining Engineers* Minnesota Section Annual Meeting, April 2021

"Installing a 1,4-dioxane removal system: pilot to operations" – *Michigan Society of Professional Engineers Annual Meeting*, May 2021.

"Pretreatment Perspectives for PFAS." American Groundwater Trust Webinar, October 2021.

"Greenhouse Gas Impacts of Environmental Remedies." Central States Water Environment Foundation Wisconsin Conference on the Environment, November 2021.

INVITED TALKS AND MEDIA

"The Urban Water Cycle" – Ignite Minneapolis, November 2016

Interview with America Public Media for "In Deep" podcast – December 12, 2019

Alumni Feature in University of Minnesota, Civil Engineering Magazine – Fall 2019

Distinguished Guest Speaker Commencement Address – University of Minnesota, Department of Civil, Environmental, and Geo-Engineering Commencement Ceremony, May 2021

"Technical Communications" – Lecture for University of St. Thomas Engineering Capstone Course (Fall 2021), University of Minnesota Civil Engineering Capstone Source (Spring 2021, Spring 2022)

PATENTS

Alison Ling and Mark Hernandez. Delivery of Heavy Metals for the Inhibition of Microbially Induced Concrete Corrosion. United States Provisional Patent. Filed 11/11/2013. Serial Number 61/902,673.

KEY PROJECT CONTRIBUTIONS AT BARR ENGINEERING

- Developing and evaluating treatment alternatives for PFAS treatment at 3M's Cottage Grove facility, including contributions to the treatability study and treatability testing report submitted to the MPCA. This work involved detailed cost estimating and alternatives evaluation as well as review and presentation of pilot-testing results.
- Coordinating technical alternatives analysis, conceptual design, and cost estimates for evaluating technologies to control greenhouse gas emissions from oil sands tailings ponds for the Canadian Oil Sands Innovation Alliance

- Managing and serving as technical expert for a project evaluating biological filtration for groundwater remediation at an industrial site, including technology evaluation, feasibility studies, pilot equipment design, oversight of four-month pilot test, reporting, and preliminary full-scale design.
- Process modeling, cost estimating, and reporting for municipal wastewater treatment upgrades to meet current and future water quality standards for the Minnesota Office of Management and Budget.
- Contributing to an MPCA report analyzing alternatives for sulfate treatment for municipal wastewater treatment plants. This work included research and a detailed technology evaluation of physical, chemical, and biological treatment processes.
- Serving as technical process lead for design and piloting of PFAS treatment at a Superfund site with PFAS-laden groundwater. This included process design, treatability testing, and start-up troubleshooting as well as sampling design and data analysis for coagulation and settling, greensand filtration, GAC adsorption, and ion exchange processes.
- Serving as primary task manager for technology evaluation and six-month pilot test of 1,4-dioxane remediation of a groundwater drinking-water source for public distribution, including planning and coordination of extensive sampling program, data evaluation, and reporting to client and state agency.
- Serving in a technical advisory role for troubleshooting of installed 1,4-dioxane remediation system using UV/peroxide advanced oxidation, including coordination with operators, oversight of chemical kinetic modeling, and communication with client and vendor staff.
- Developing corrosion control plan for the state health department and coordinating associated chemical dosing and hydrant flushing during drinking water source changeover for the City of New Brighton
- Modeling wastewater treatment systems for PolyMet Mining, including preliminary design of membrane systems to meet a 10 mg/L sulfate target and conversations with membrane vendors regarding operational considerations and fouling. This work includes development of comprehensive and adaptable process model, estimating water quality and costs associated with various operating scenarios, and writing regulatory permit-support reports.
- Developing flow and sulfate balance, including data collection, conceptual model development, and Monte Carlo simulation of probabilistic scenarios for evaluating water management alternatives at Minntac's tailings basin and their effect on sulfate treatment capacity needed to meet MPCA permit conditions
- Serving as project manager and technical lead of three-year bench-testing program for regulatory compliance at a sugar beet facility, including design of bench-test protocols and sampling program, coordination of Barr and client staff, oversight of bench testing, data evaluation, and reporting to state agency.
- Developing conceptual and detailed design of a novel ion-exchange process for reuse of industrial process stream, including equipment vetting and selection, control interface planning, plan development, and startup assistance.
- Modeling vapor intrusion at multiple industrial sites using EPA Johnson and Ettinger model software, including the effect of building connectivity and ventilation.
- Evaluating and modeling nitrogen removal technologies for SMBSC's wastewater treatment plant, including sensitivity analysis of response to changing conditions and presenting results to the client. Also mentored a student capstone group on this project.
- Evaluating treatment capacity of anaerobic digester at American Crystal Sugar's wastewater treatment plant by building biological kinetic model for the wastewater treatment system. Also analyzed toxicity identification and reduction data for wastewater effluent and making regulatory recommendations.

PATRICK J. BRADLEY

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Richmond, Virginia 23230
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Objective: Senior level management position in government affairs and business development

RELEVANT EXPERIENCE

Deputy Director, Senior - City of Richmond, VA, Department of Public Utilities. 2020-present.

I serve as the Deputy Director of the Collection Systems and Regulatory Affairs Division. The Division is responsible for operation and maintenance of the city's sanitary, combined and storm sewer systems; city floodwall system; the Water Resources Program; Pretreatment Program; the water and wastewater laboratories; and regulatory affairs for water-based utilities.

National Stormwater Practice Lead – RES, LLC, Richmond, VA. 2019-2020

I provide regulatory and policy support for projects related to stormwater compliance for a range of clients in the public and private sector. I also support business development by providing analysis of regulatory requirements.

Senior Policy Advisor - City of Richmond, VA, Office of the Deputy Chief Administrative Officer for Operations. 2015-2019.

My primary area of focus was managing compliance and providing regulatory support to the water related utilities (stormwater, drinking water, and wastewater, including pretreatment program) and Department of Public Works. My most significant projects were managing pretreatment program and lab, and also development of an integrated plan and permit to more efficiently manage Clean Water Act and Safe Drinking Water Act compliance requirements for the City on a watershed basis.

Senior Scientist - LimnoTech, Inc., Washington, DC. 2008-2015.

I led the company's regulatory compliance services. My work generally included review and assessment of state and federal policy and regulations to develop strategies to help clients maintain a high level of compliance. Much of my work focused on watershed-based solutions for municipal and industrial clients.

Assistant Branch Chief - United States Environmental Protection Agency, Dallas, TX, and Washington, DC. 1988-1992; 1995-2008.

Prior to leaving EPA in 2008, I served as the Assistant Chief of the State and Regional Branch. Other positions I held at EPA included, Municipal Permits Program Coordinator, Acting Chief of the Municipal Branch, Acting Chief of the Industrial Branch, the National Pretreatment Program Coordinator, National Expert for NPDES Permit Program, senior staff member of the water quality criteria development team, NPDES permit writer, and regional pretreatment program manager. This experience provided me extensive insight of all aspects of NPDES permit development, negotiation, and issuance; with water quality criteria and standards; with industrial and municipal wastewater facility inspections; and contract management.

Environmental Protection Specialist - Department of Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA, 1992-1995.

Managed the Command's water quality assessment program, NPDES permits program, and pretreatment permit program. Notable projects included: development of a coalition of Naval facilities to present a unified position on specific regulations in the southeastern Virginia area; management of a water effect ratio and water quality modeling study of the Elizabeth River; development of an industrial wastewater management program (modelled after Pretreatment Program) for Naval Base Norfolk, Naval Amphibious Base Little Creek and Marine Corps Base Camp Lejeune; management of a study to determine the toxicity and treatability of various fire fighting foams; and conducted numerous multi-media self-audits at Naval and Marine Corps facilities.

Environmental Researcher - Environmental Health Associates, P.A., Edison, NJ, 1987-1988.

Developed Health Risk Assessments and Environmental Impact Statements for a variety of clients.

Research Ecologist - The University of Texas at Arlington, 1984-1987.

Through a research grant and fellowship from Texas Utilities, studied the effect of strip mining and reclamation processes on herpetofaunal communities.

EDUCATION

M.S. BIOLOGY. The University of Texas at Arlington (1987).
B.S. BIOLOGY. State University College at Plattsburgh, NY (1984). Minors: Chemistry & Psychology.
Virginia Tech Wastewater Operators Short School. Blacksburg, VA (2017)
Office of Personnel Management, Growing Leaders for the 21st Century. Washington, DC. (2001)
Office of Personnel Management, Management Development Seminar. Shepherdstown, WV (2000).
US EPA Water Quality Standards Academy. Atlanta, GA (1994).
Water Quality Modeling and Modeling with WASP 5.0. University of Texas at Austin (1993).
A/E Contract Management Course. Naval Facilities Engineering Command. Norfolk, VA (1993).
US EPA Regulation Development Course. US EPA Headquarters, Washington, DC (1991).
Treatment of Metal Wastestreams, Self Study Course. California State University, Sacramento (1989).
Municipal Wastewater Treatment Training Workshop. University of Texas at Arlington (1989).
Pretreatment Facility Inspection, Self Study Course. California State University, Sacramento (1989).
Water Pollution Control: Biological Wastewater Treatment. University of Texas at Austin (1988).

AWARDS, RESEARCH GRANTS & FELLOWSHIPS

Award from the National Partnership for Reinventing Government from the Office of the Vice-President (Hammer Award), June 2000 and October 1998.
U.S. EPA Office of Policy Special Award for "Excellence in Leadership" for Project XL. September 1998
Letter of Appreciation, Major General Bowdon, Commanding General, Camp Pendleton. February 2003.
U.S. EPA Office of Enforcement and Compliance Assurance Bronze Medal. Environmental Justice Programmatic Reviews. September 2008
U.S. EPA Office of Water Bronze Medal. Environmental Justice. June 2008
U.S. EPA Office of Water Bronze Medal. Priority Permits Initiative. May 2006
U.S. EPA Office of Water Bronze Medal. Watershed-based Permitting. June 2003
U.S. EPA Office of Water Bronze Medal. 303(d) Regulations. July 2001
U.S. EPA Office of Water Bronze Medal. Permit Application Regulation. June 2000
U.S. EPA Office of Water Bronze Medal. Stormwater Report to Congress. June 2000
U.S. EPA Office of Water Bronze Medal. Pretreatment Program Training. June 1999
U.S. EPA Office of Water Bronze Medal. NPDES Permit Writers Training. June 1999
U.S. EPA Office of Policy Bronze Medal. Metal Finishing Strategic Goals Program. May 1998
U.S. EPA Office of Water Bronze Medal. Framework for Watershed-Based Trading. May 1997
U.S. EPA Office of Water Bronze Medal. Common Sense Initiative. May 1997
Letter of Appreciation, Admiral Schriefer, Office of Chief of Naval Operations. November 1996.
Letter of Appreciation, Admiral Moses, Commander Naval Base Norfolk. May 1995.
Letter of Appreciation, Captain Walsh, Engineering Field Activity Northwest. April 1995.
Letter of Appreciation, Admiral Schriefer, Office of Chief of Naval Operations. December 1994.
Graduate Research Fellowship and Grant. Texas Utilities Electric Services. Research the effects of strip mining and reclamation processes in Fairfield, Texas. 1985-1987.
Grant-in-Aid of Research. Sigma Xi, The Scientific Research Society. 1985-1988.

PROFESSIONAL MEMBERSHIPS

Water Environment Federation - Virginia Water Environment Association

RECENT PUBLICATIONS (Partial List)

Bradley, P and P. Fanning. 2018. Wet Weather and Water Quality - 30 Years Later and All the Same Questions Remain. Proceedings of the Water Environment Federation, WEFTEC 2018

LeRose, G.; J. Hatchett, H. Bourne and P. Bradley. 2018. Richmond's RVA Clean Water Plan: How to Transition from Integrated Planning to Implementation. Proceedings of the Water Environment Federation, WEFTEC 2018.

Bradley, P.; A. Wortzel and B. Smith. 2015. What is it about November and EPA Memos: A Look at EPA's 2002, 2010 and 2014 Memos on Stormwater, TMDLs and NPDES Limits. Proceedings of the Water Environment Federation, WEFTEC 2015; pg 627-639.

LeRose, G.; R. Steidel, P. Bradley, H. Bourne, C. Blanchard and S. Mitchell. 2015. The Crucial Importance of Stakeholder Communication in Integrated Planning: Lessons from Richmond. Proceedings of the Water Environment Federation, WEFTEC 2015; pg 3325-3335.

Steidel, R.; G. LeRose, H. Bourne and P. Bradley. 2014. Watershed-Based Permitting and Integrated Planning: Bringing It All Together in Richmond. Proceedings of the Water Environment Federation, WEFTEC 2014: Session 321.

Baumgartner, R. and P.J. Bradley. 2014. Watershed Health, Ecosystem Services, and Integrated Permitting: Making It All Work Together. Water Environment & Technology. January 2014, Vol. 26, No.1. pp. 29-30

Bradley, P and D. Kocarek. 2014. Overall Design Considerations. Chapter 2 of Wet Weather Design and Operation in Water Resource Recovery Facilities. MOP 8. Water Environment Federation.

Baumgartner, R and P. Bradley. 2013. Watershed Health, Ecosystem Services and Integrated Planning/Permitting: Making It All Work Together. Proceedings of the Water Environment Federation, WEFTEC 2013: Session 318.

Bradley, P; Ott, D; Sandino, J; Fitzpatrick, J; Gellner, J and Tabor, C. 2012. Urban Wet Weather and Integrated Planning/Permitting: Past, Present And Future. Proceedings of the Water Environment Federation, WEFTEC 2012: Session 106.

Sandino, J; Bradley, P; Ott, D; Fitzpatrick, J; Gellner, J and Tabor, C. 2012. It Isn't Cut and Dry: General Considerations in the Development of Wet Weather Flow Improvement Scenarios for Wastewater Treatment Facilities. Proceedings of the Water Environment Federation, WEFTEC 2012: Session 106.

Ott, D; Sandino, J; Fitzpatrick, J; Bradley, P; Gellner, J and Tabor, C. 2012. Water, Water Everywhere! -- Overview of Sustainable Collection System Strategies For Effective Wet Weather Flow Management. Proceedings of the Water Environment Federation, WEFTEC 2012: Session 106.

Fitzpatrick, J; Gellner, J; Bradley, P; Ott, D; Sandino, J and Tabor, C. 2012. Preparing for a Rainy Day: Overview of Treatment Technology Options for Wet-Weather Flow Management. Proceedings of the Water Environment Federation, WEFTEC 2012: Session 106.

Gellner, J; Sandino, J; Fitzpatrick, J; Bradley, P; Ott, D; and Tabor, C. 2012. What Happens When Everyone "Flushes" at the Same Time? Case Studies on Management of Wet Weather Flow Events. Proceedings of the Water Environment Federation, WEFTEC 2012: Session 106.

Presentations (partial list):

Chesapeake AWWA. 2021. Mid-Atlantic Utility Conference. Integrated Planning, Integrated Permitting and CSO Compliance

WEFTEC Annual Conference. 2021. Using RT-DSS to Optimize Existing Infrastructure, Better Understand our Collection System and Reduce Combined Sewer Overflows

National Association of Clean Water Agencies. 2016-2019. Annual Pretreatment Conference. Pretreatment Training Course.

WEFTEC Annual Conference. 2018. Wet Weather and Water Quality - 30 Years Later and All the Same Questions Remain

National Association of Clean Water Agencies. 2017. Annual Enforcement Conference. How to Review and Negotiate Permits.

WEFTEC Annual Conference. 2017. Pre-Conference Workshop: Case Study, City of Richmond Integrated Plan.

National Association of Clean Water Agencies. 2016. Landfill Leachate and Interference with UV Disinfection – A Case Study.

WEFTEC Annual Conference. 2015. What is it about November and EPA Memos: A Look at EPA's 2002, 2010 and 2014 Memos on Stormwater, TMDLs and NPDES Limits.

WEFTEC Annual Conference. 2015. The Crucial Importance of Stakeholder Communication in Integrated Planning: Lessons from Richmond

WEFTEC Annual Conference. 2014. Watershed-Based Permitting and Integrated Planning: Bringing It All Together In Richmond.

EPA/Region VI Pretreatment Association Annual Workshop. 2014. 30 Years Later – The NPDES Pretreatment Program Still Leads the Way

Virginia Water Environment Association and Waterworks Association Joint Annual Meeting. 2013. Integrated Watershed Management in Richmond

WEFTEC Annual Conference. 2013. Watershed Health, Ecosystem Services and Integrated Planning/Permitting: Making It All Work Together.

Virginia Water Environment Association and Waterworks Association Joint Annual Meeting. 2013. Integrated Planning and Permitting: A Water Quality-Based Cost- Benefit Approach for Utilities

Water Environment Federation/Ohio Water Environment Association Training Workshop. 2013. Pretreatment Program Training Course.

Metropolitan Washington Council of Governments, Water Resources Technical Committee (WRTC) Meeting. 2013. EPA's Integrated Planning/Permitting: Past, Present and Future

Indiana Water Environment Association Annual Conference. 2012. Antidegradation – A Great Concept, But What About Implementation

Chesapeake Water Environment Association, Stormwater Workshop. 2012. Integrated Planning/Permitting: Past, Present and Future