



# A SELECTION OF TRAINING PROGRAMS

FOR WATER AND WASTEWATER OPERATORS



## SORT BY SPONSOR OR MAJOR CONTRIBUTOR

DEPARTMENT OF LABOR/  
WORKFORCE INVESTMENT AGENCY

UTILITY

STATE OR PROVINCE

UNIVERSITY/COMMUNITY COLLEGE

HIGH SCHOOL

UTILITY ASSOCIATIONS AND  
OTHER ORGANIZATIONS

## SORT BY PROGRAM ELEMENTS

INTERNSHIP

APPRENTICESHIP

MENTORING

FOR NEW OPERATORS

FOR EXPERIENCED OPERATORS

FOR MAINTENANCE/OTHER WORKERS

## OVERVIEW

This is a compilation of fact sheets describing training programs, internships and mentoring programs that help new operators enter the water and wastewater industries, as well as enhance the skills and knowledge of experienced operators.

The fact sheets are intended to promote the sharing of unique ideas and best practices for industry professionals seeking to establish similar training programs. The fact sheets represent the experiences of states, utilities, educational institutions and other organizations that sponsored and developed these programs.

Program sponsors found these programs to have many benefits, including:

- ✓ Creation of highly-qualified and highly-trained technical and professional staff;
- ✓ Development of leadership and supervisory skills in new and current staff;
- ✓ Effective way to build a pool of new recruits;
- ✓ Promotion of succession planning and knowledge transfer;
- ✓ Exposing new audiences to water sector careers.

*EPA would like to acknowledge the members of the Workforce / Operator Certification Workgroup for their efforts in developing these fact sheets.*

Office of Water (4606M)

May 2012

[http://water.epa.gov/infrastructure/sustain/ws\\_workforce.cfm](http://water.epa.gov/infrastructure/sustain/ws_workforce.cfm)

# ALASKA JOB CORPS WATER AND WASTEWATER OPERATOR TRAINING

## CONTACT INFORMATION

Malyn Smith  
Center Director  
Alaska Job Corps Center  
907-861-8801  
[smith.malyn@jobcorps.org](mailto:smith.malyn@jobcorps.org)  
<http://alaska.jobcorps.gov/vocations.aspx>

## BENEFITS

- Potential water and wastewater operators receive training at no cost to themselves.
- Participants may receive a taxable living allowance, other benefits, career counseling and job placement assistance.
- A variety of utilities of all sizes, from tertiary to pond treatment systems, are sought to broaden the experiences of the students and expose them to possible future employers.
- The fact that there are no program costs for utilities and students, and the program provides student housing and transportation, makes it an extremely attractive option for training students from rural Alaskan villages.

## TROUBLE SHOOTING / LESSONS LEARNED

- Partnering with Alaska Department of Environmental Conservation (ADEC) is critical to ensuring that the program curriculum will assist students in passing state certification exams.

## PROGRAM DESCRIPTION:

Administered by the U.S. Department of Labor, Job Corps provides year-round vocational, academic and social skills training for women and men in a residential setting free of charge. Participants must be between the ages of 16 and 24, a resident of the United States, without a history of serious health and/or behavioral problems, qualify as low income under national Job Corps guidelines, and be in need of vocational training to get a good job.

The Alaska Job Corps Water and Wastewater Operator Training program provides education and training so students can obtain a level 1 operator certificate in Water Treatment (WT), Waste Water Treatment (WWT), Water Distribution (WD) or Waste Water Collection (WWC). (Alaska Department of Environmental Conservation's (ADEC) operator certification program provides provisional level certification, followed by certification starting with level 1 up to level 4.) Alaska Job Corps also offers Introduction to Wastewater Systems (HAZWOPER Certification) and Introduction to Drinking Water Systems (Small Water System Operator Certification). Finally, to improve employability, students can earn a Class B commercial driver's license (CDL) with tanker endorsement.

The classroom portion of this program takes approximately six to eight months. A student must then complete 1,950 hours (approximately one year) of work-based learning and have their high school diploma or GED to be eligible to sit for the Alaska State Certification exams. Currently, approximately 10 utilities throughout Alaska participate in the program. The host utility does not pay the students' salaries; during the duration of the program the student is compensated through the Job Corps program. The entire program takes about 24 months to complete.

## SPONSORING UTILITY RESPONSIBILITIES:

- Sponsoring utilities must agree to serve as a mentor to the students, spending 6 to 12 months to show and train them on relevant work processes as identified in the Training Achievement Records.\*
- Utilities are not required to invest financially in the student.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required program staff time:** One full-time staff; support staff to assist with other Job Corps services.

**Costs:** Approximately \$44,000 per student per year, this includes Job Corps staff salary, housing, transportation, etc. These costs are incurred by the Job Corps program. The program is free for participants, and no cost is incurred by utilities.

**Funding:** Department of Labor.

**Program start date:** 1994.

**Stakeholder workgroup:** Anchorage Water and Wastewater Utility (AWWU), City of Wasilla, City of Palmer, and Alaska Job Corps, among others.

**Results:** 20 students enrolled in the program yearly, with rolling entrance and exit.

# ALASKA JOB CORPS WATER AND WASTEWATER OPERATOR TRAINING

## MORE ABOUT ALASKA JOB CORPS CURRICULUM:

\*Alaska Job Corps has a comprehensive list of career technical competencies that the students are evaluated on for every discipline taught in the water and wastewater sector, and skills are recorded in a Training Achievement Record (TAR). Every week, instructors rate the student performance from 1 to 3 on various competencies. The students may also be evaluated on supplemental skills or optional 'Employer Specific Skills' that a perspective employer may require before a student is offered employment. The final phase of the TAR requires that a student sit for and pass the State of Alaska operator exam relevant to his or her specific level and area (water, wastewater, etc.).

## EXAMPLES OF COMPETENCIES INCLUDED IN PREVIOUS TARs:

Alaska Job Corps is currently in the process of reviewing and updating the TARs for this program; however, below are examples of competencies included in previous TARs:

### ● EXAMPLES OF COMPETENCIES FOR WATER TREATMENT: (LIST IS NOT COMPREHENSIVE.)

- Demonstrate an understanding of the coagulation and flocculation processes.
- Demonstrate the ability to perform a jar test.
- Identify the various types of sedimentation and clarification equipment used.
- Demonstrate an understanding of backwash procedures and scheduling.
- Describe some of the common problems associated with filter maintenance and their remedy.
- Demonstrate an understanding of disinfection and chlorination processes.
- Identify the lab procedures used to monitor disinfection and chlorination.
- Demonstrate an understanding of waste disposal methods.
- Demonstrate an understanding of the fluoridation process, of potassium permanganate/greensand filtration, ion-exchange system.
- Demonstrate the ability to accurately calculate chemical dosage, flow rate, detention time, feet of head.
- Demonstrate the ability to perform routine turbidity tests, routine fluoride tests, pH tests.
- Qualify for and successfully pass the State of Alaska Provisional Water Treatment exam.

### ● EXAMPLES OF COMPETENCIES FOR WASTEWATER TREATMENT: (LIST IS NOT COMPREHENSIVE.)

- Demonstrate an understanding of the processes and equipment used in Preliminary Treatment.
- Demonstrate an understanding of the processes and equipment used in Primary Treatment.
- Demonstrate an understanding of the processes and equipment used in Secondary Treatment, to include: lagoon systems, activated sludge plants, rotating biological contactors, trickling filter plants.
- Demonstrate an understanding of waste disposal methods.
- Demonstrate an understanding of sludge "stabilization".
- Describe the various processes for conditioning and dewatering sludge, processes involved with aerobic digestion, processes involved with anaerobic digestion.
- Demonstrate the ability to interpret a Wastewater Discharge Permit.
- Demonstrate the ability to perform laboratory tests for: BOD, pH, chlorine residual, alkalinity, settleable and suspended solids.
- Demonstrate the ability to calculate basin volumes, theoretical detention time, chemical dose, flow rates, ratios and determine efficiency of treatment processes.
- Demonstrate an understanding of the purpose for disinfecting wastewater.
- Demonstrate the ability to follow an employer provided safety plan.

## RESOURCES USED FOR CLASSROOM INSTRUCTION INCLUDE:

- California State University Sacramento manuals covering water and wastewater treatment, system operations and maintenance by Kenneth D. Kerri.
- Introduction to Small Water Systems: A Course for Level 1 Operators and Introduction to Small Wastewater Systems: A Course for Level 1 Operators; original development by Skeet Arasmith, Arasmith Consulting Resource, Inc. and Albany, Oregon in cooperation with the Alaska Department of Environmental Conservation and revised by ATTAC (Alaska Training/Technical Assistance Center).

# APPRENTICESHIP CAROLINA™ WATER AND WASTEWATER OPERATORS

## CONTACT INFORMATION

Elizabeth Williams  
Central Carolina Technical College  
803-778-7873  
[williamsel@cctech.edu](mailto:williamsel@cctech.edu)  
<http://www.apprenticeshipcarolina.com/>

## BENEFITS

- Establish a system structured to facilitate the transfer of knowledge from experienced operators to trainees.
- Demonstrate competency by operators in the tasks necessary to their specific job.
- Clearly define career path for employees and a resulting succession plan for the facility.
- Increase pass rates for the state certification examination.
- Possibly expedite operator advancement by the SC Environmental Certification Board.

## TROUBLE SHOOTING / LESSONS LEARNED

- Development of the education component can be challenging for organizations that did not have a foundation to build upon.
- Involve the operators and management in the development of the program.
- Allow incumbent workers to participate in the program with new operators.
- Some operators will advance more quickly through the program.

## PROGRAM DESCRIPTION:

Apprenticeship Carolina™ is a division of the South Carolina Technical College System that works to ensure water and wastewater organizations in the state have access to the information and technical assistance they need to create registered apprenticeship programs through the U.S. Department of Labor (U.S. DOL). Registered programs provide a structured outline for on-the-job (OJT) training, education and a wage progression. Benchmarks are set in the program to help track the apprentice's advancement. Apprenticeship Carolina™ consultants are available to work with utilities to guide them through the registered apprenticeship development process from initial information to full recognition in the National Registered Apprenticeship System. The program's three components - OJT, education and wage progression, are customized to reflect the specific needs of the facilities. Registered programs are typically 1 to 4 years and can be for new or incumbent operators.

The South Carolina Environmental Certification Board (ECB) supports the apprenticeship initiative and has stated that apprenticeship programs incorporating the "ABC Need-to-Know" criteria may be eligible to advance operators to higher levels of licensure more quickly. Their support allows an operator the ability to advance to higher levels of licensure based on his/her competency level, rather than based solely on time spent on the job.

Central Carolina Technical College (CCTC) works with the apprenticeship consultants to help utilities develop the educational component of the programs. CCTC offers certificates, degrees, and continuing education courses that are designed for water and wastewater professionals.

## SPONSORING UTILITY RESPONSIBILITIES:

- Work with an Apprenticeship Carolina™ consultant to customize an apprenticeship program agreement and standards for apprenticeship selection and training.
- Develop an on-the-job training and education plan, and track progress.
- Set wage progression and benchmarks. Apprentices must meet benchmarks half-way through the apprenticeship program and at the end of the program to receive the wage increase. The wage progression is determined by the utility.
- Evaluate apprentice based on the benchmarks established by the utility.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** State-wide: One full-time Apprenticeship Director, four full-time consultants offer free services to apprenticeship programs in any industry state-wide.

**Utility:** 1-5 hours/week. More time spent if education is handled internally.

**Costs:** Utility is responsible for salary, including wage progression, and educational costs. Tax credit of \$1,000/year per apprentice is offered to private organizations, based on state legislation.

**Funding:** State funding through the South Carolina Technical College System.

**Program start date:** 2007.

**Stakeholder workgroup:** Apprenticeship Carolina™, U.S. DOL, SCECB, and Central Carolina Technical College (CCTC).

**Time in development:** Four weeks to over one year (varies by utility).

**Results:** Since 2009, six organizations have developed programs with 21 water/wastewater apprentices registered.

# APPRENTICESHIP CAROLINA™ WATER AND WASTEWATER OPERATORS

## EXAMPLE EDUCATION CURRICULUM FOR WATER OPERATORS:

Course hours total approximately 144 hours per year. Continuing education, online, college credit, in-house or one-on-one courses can be taken. Training can be customized with utility-specific information. Apprentices may enroll in certificate, degree, and continuing education courses at Central Carolina Technical College that are designed for water and wastewater professionals.

Sponsoring utilities are required to include education to enhance on-the-job training, as part of the U.S. DOL agreement. Some sponsors tailor their education to include additional courses to meet the operations and management goals of the organization. This flexibility is one of the benefits of the program. The following is an example of education for drinking water operators, year one.

Year One – Water Treatment Operator Sample Courses	Hours
Basic Level Water Treatment Short School	28
Introduction to Treatment Operations	14
New Employee Orientation	8
Regulatory Review	8
CPR / Bloodborne Pathogen	8
Water Sources & Treatment	12
First Aid Training	8
Confined Space Training	10
Chlorine Application and Safety	8
Pumping Principles and Maintenance	8
Laboratory Sampling and Analysis	4
Safety at Water Facilities	4
Basic Math Skills	16
Basic Computer Skills	8
	<b>144</b>

## EXAMPLE UTILITY PROGRAM:

Spartanburg Water System (SWS) registered an existing, but informal, program and benefited from incorporating ABC's Need-to-Know criteria into their apprenticeship model. SWS has stated the apprenticeship program has helped its employees advance more quickly, and it ensures they have the knowledge to pass certification exams and document their skills.

## EXAMPLE RESPONSIBILITIES OF AN APPRENTICE SUPERVISOR:

The sponsoring utility typically designates an apprenticeship supervisor whose duties include:

- Keeping records of the apprentice's progress.
- Ensuring the apprentice obtains experience outlined in the training plan.
- Performing evaluations based on the competency criteria and the aptitude, skills and progress of the apprentice.
- Ensuring the apprentice is given instructions in safe working methods.
- Making any necessary arrangements to ensure the apprentice is completing the required education courses.
- Acting as the contact person for Apprenticeship Carolina™.
- Ensuring the apprentice is registered with U.S. DOL.

# CITY OF GROTON WATER POLLUTION CONTROL AUTHORITY SUMMER INTERNSHIP PROGRAM

## CONTACT INFORMATION

Kevin Cini  
 City of Groton  
 Water Pollution Control  
 Authority (WPCA)  
 860-446-4085  
[cinik@yurservice.com](mailto:cinik@yurservice.com)

## PROGRAM DESCRIPTION:

This internship program is designed to help young scholars develop an understanding of the skills needed for the wastewater industry. Interns spend the summer before their senior year of high school working a 320-hour internship at the Groton Water Pollution Control Authority (WPCA). Any high school junior in the Groton public school system can apply. All interns, thus far, have been enrolled in the local technical high school. Interns under the age of 18 are insured by the state to work in these safety-sensitive jobs.

In addition to assisting the operator in his/her duties, interns work in the Groton WPCA's lab to help to maintain and monitor equipment. In Groton, interns can take the Sacramento State Operator Training Courses at the local technical high school to supplement their intern experience. Alumni of the summer program are granted the opportunity to participate in a second internship at the plant during their senior year of high school. Interns and managers work together to determine each intern's time commitment for the second internship. All internship hours can count towards earning a Class I wastewater operator certification. (Class I is the lowest certification.)

## BENEFITS

- Young adults are made aware of a previously unknown opportunity, which builds the future of the industry.
- Groton WPCA is a small utility with a staff nearing retirement. This internship program creates a pool of eligible candidates that can be considered to work at the facility when a position opens.

## SPONSORING UTILITY RESPONSIBILITIES:

- Attend yearly mentor training session (conducted by local volunteers).
- Maintain adequate records of the progress of the intern, including: initial interview, safety meetings attended, evaluation and exit interview.
- Work collectively to ensure the intern has a successful experience.
- Perform evaluation to assess intern's growth in technical and mechanical skills.
- Coordinate on-the-job training for the intern, including:
  - Appropriate instructions on safe working methods to ensure the safety of the intern.
  - Procedures of the plant, and methods operators use, to keep the plant in good health.

## TROUBLE SHOOTING / LESSONS LEARNED

- Choose interns who are serious about working, dedicated, have a great school attendance record and adequate grades.
- Conduct outreach to public and technical high schools. Work closely with a technical high school's intern advisor who focuses on job placement.
- Encourage a few employees to serve as mentors. As time progresses, all employees will want to be involved.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** One mentor per intern. The intern becomes a fellow operator and works alongside their mentor to accomplish 2-person tasks.

**Costs:** Approximately \$8,000/year. Costs include: intern salaries (typically \$11/hour) and purchasing safety gear.

**Funding:** City of Groton; Eastern CT Workforce Development Board (mentor training).

**Program start date:** June 2002.

**Initial funding for program development:** Groton Utilities.

**Stakeholder workgroup:** City of Groton WPCA.

**Number of years in development:** One.

**Results:** Two intern alumni are now employed as full-time operators at the WPCA. An internship alumnus assisted in building a wastewater treatment plant when stationed in Afghanistan. Many alumni pursue degrees in environmental studies, wastewater treatment and engineering.

# CITY OF GROTON WATER POLLUTION CONTROL AUTHORITY SUMMER INTERNSHIP PROGRAM

## EXAMPLE PROGRAM OVERVIEW:

### Week 1

- Safety training
- Personal Protection Equipment
- Bookwork
- General overview of treatment process

### Week 2

- Operation & Maintenance explanation
- Station checks
- Wet wells
- Bar screens

### Week 3

- Pump maintenance
- Sacramento course studies

### Week 4

- Department of Agriculture sampling of receiving waters
- Assistance with vessel pump-offs

### Week 5

- City Day Project
- Lab routine overview
- Sampling/performing procedures
- Techniques and precision
- Examining micro-organisms

### Week 6

Learning the basics of:

- Nitrogen cycle
- Removal process
- Digester
- Sludge handling process

### Week 7 & 8

- Labor History Day
- Overview of all aspects of wastewater treatment and its importance to the environment and population
- Work side by side with an operator doing daily duties

# EAST BAY MUNICIPAL UTILITY DISTRICT MENTORSHIP PROGRAM

<p><b>CONTACT INFORMATION</b></p>	<p><b>PROGRAM DESCRIPTION:</b></p>	
<p>Maria I. Marques Senior Human Resources Analyst East Bay Municipal Utility District 510-287-0738 <a href="mailto:marimar@ebmud.com">marimar@ebmud.com</a></p>	<p>The East Bay Municipal Utility District (EBMUD) provides water and wastewater services in Alameda and Contra Costa counties in California. In response to EBMUD's retiring workforce, the utility designed three distinct Leadership Development Academies, each designed to prepare an internal pool of candidates to compete for future vacancies in different levels of supervisory and management positions. The Academies prepare employees for positions as first-line supervisors, mid-level managers (assistant superintendents and superintendents) and upper-level managers. All Academies have a mentoring or coaching component, as well as a core training curriculum, orientation and assessments, and the creation of Individual Development Plans (IDPs). Employees interested in participating in the Academies go through a competitive selection process that includes a written application and panel interviews. The program is not designed for the advancement of operator certification, but rather to provide employees with the leadership and management skills required to compete for vacant supervisory or management positions.</p>	
<p><b>BENEFITS</b></p>	<p>All Academies have a mentoring or coaching component, as well as a core training curriculum, orientation and assessments, and the creation of Individual Development Plans (IDPs). Employees interested in participating in the Academies go through a competitive selection process that includes a written application and panel interviews. The program is not designed for the advancement of operator certification, but rather to provide employees with the leadership and management skills required to compete for vacant supervisory or management positions.</p>	
<ul style="list-style-type: none"> <li>▪ Develops a network of colleagues with established, supportive relationships.</li> <li>▪ Promotes lifelong learning, builds common values and creates organizational loyalty.</li> <li>▪ Both mentors and mentees develop new skills and greater organizational knowledge, while mentees obtain support from an experienced staff member.</li> </ul>	<p>For the mentoring component, Academy participants (i.e., mentees) and mentors are matched based on their skills, areas of expertise and stated preferences. Managers and supervisors identify potential mentors, and make the initial contact with them to encourage involvement. The Mentoring Program Coordinator follows up with the potential mentor to provide additional information about the mentoring program and confirm commitment. Previous mentors also support the recruitment of new mentors by promoting the program to their colleagues.</p>	
<p><b>TROUBLE SHOOTING / LESSONS LEARNED</b></p>	<p><b>MENTOR RESPONSIBILITIES:</b></p>	
<ul style="list-style-type: none"> <li>▪ Link mentoring to organizational priorities.</li> <li>▪ Hold monthly mentor roundtables to facilitate continuous program evaluation and timely improvements.</li> <li>▪ Allow for flexibility and define success broadly.</li> <li>▪ Establish ground rules and clarify roles and responsibilities for all.</li> <li>▪ Provide high quality formal mentor training and support throughout the program.</li> <li>▪ Involve managers and colleagues in the recruitment of mentors to gain maximum commitment.</li> </ul>	<ul style="list-style-type: none"> <li>• Attend 6-hour Kick-off /Mentoring Orientation and 4-hour Mentor Training. Training topics include: developing listening skills, providing feedback, creating IDPs and supporting accountability.</li> <li>• Meet with mentees 2 to 4 hours per month over the course of their 6 to 12 month mentorship commitment.</li> <li>• Structure mentor sessions based around the mentee's IDP. Mentors are given guidelines and ideas for running these sessions.</li> <li>• Monitor their mentee's progress through the Academy and maintain confidentiality.</li> <li>• Attend monthly 2-hour roundtables to share updates, perspectives and approaches.</li> </ul> <p><b>INFORMATION FOR PROGRAM DEVELOPMENT:</b></p> <p><b>Required staff time:</b> Mentor time commitment is approximately 60 hours/6 months. Mentoring Coordinator, from the Human Resources Employee Development staff, devotes about 25 percent of his/her time to the Academies, which includes the mentoring component.</p> <p><b>Costs:</b> Program costs are approximately \$74,000 which includes program development, program administration during the Academy, and salary costs for the mentors' time.</p> <p><b>Funding:</b> Utility-funded.</p> <p><b>Program start date:</b> 2005.</p> <p><b>Initial funding for program development:</b> Utility-funded.</p> <p><b>Stakeholder workgroup:</b> EBMUD staff in the HR, Wastewater, and Water Operations and Maintenance departments.</p> <p><b>Number of years in development:</b> One.</p> <p><b>Results:</b> Over 75 percent of mentors volunteered again. 80 mentor match-ups to date.</p>	

# EAST BAY MUNICIPAL UTILITY DISTRICT MENTORSHIP PROGRAM

## TOPICS COVERED IN MENTOR TRAINING:

- Goals of Mentoring: Provide support, share expertise and promote greater accountability.
- Roles and Respective Responsibilities of the Mentors and the Mentees.
- Mentoring Guidelines / Protocols.
- Partners agree to meet a minimum of 2 to 4 hours per month.
- Partners will work together for 6 to 12 months (depending on the mentee's Academy).
- Partners will maintain confidentiality about what is discussed in the mentoring sessions.
- A "no fault divorce" is available to partners, if after making an effort they still feel they cannot successfully work with their mentees.
- Phases of a Mentoring Relationship: Connect, Create and Close.
- Mentoring Partnership Agreement: Ensures that both partners have articulated their expectations for the mentoring relationship.
- Coaching Skills: Listening, Feedback and Accountability.
- Creating the IDPs: Because participants are required to create an IDP while they are in their Academy, and mentors are asked to provide input, the process for creating an IDP is reviewed.

## ACTIONS MENTORS TAKE TO SUPPORT MENTEES:

- Partner with mentees to support their learning experience during their Academy.
- Provide mentee with support, expertise and encouragement to meet the goals identified in the IDP.
- Participate in collaborative problem solving with their mentee.
- Gather and give direct and non-judgmental feedback about the mentee's performance.
- Support the mentee's accountability for their actions and the progress made on meeting the goals identified in the IDP.
- Provide input on their mentee's IDP, support the action plan identified in the IDP, and offer real-world applications and perspectives to supplement classroom training.

# EAST BAY MUNICIPAL UTILITY DISTRICT OPERATOR INTERNSHIP PROGRAM

## CONTACT INFORMATION

Elaine Lew-Smith  
Affirmative Action Officer  
East Bay MUD  
510-287-0710  
[elew@ebmud.com](mailto:elew@ebmud.com)  
<http://www.ebmud.com>

## PROGRAM DESCRIPTION:

The Operator Internship Program (OIP) is part of East Bay Municipal Utility District's (EBMUD) workforce strategy to recruit and train the next generation of water and wastewater operators. Students enrolled in water and wastewater treatment courses at the Tri-Valley Regional Occupational Program (TVROP) or the Solano Community College Occupational Education Program (SCCOEP) who meet the minimum course requirements, as established by the programs\*\*, are eligible for operator internships at EBMUD and other utilities in the San Francisco Bay Area. Students are referred to EBMUD by course instructors at TVROP and SCCOEP. The number of interns placed depends on EBMUD's resources available to provide training and oversight for the intern, and the available intern candidate pool.

## BENEFITS

- Students gain in-plant work hours towards their plant operator certification.
- Increases the potential pool of certified candidates for positions at EBMUD.

The OIP internships last one semester and may not exceed 360 hours. Interns complete their hours through 5 to 20 hour per week shifts. This in-plant experience provides interns with operator experience hours toward their T3 Water or Grade III Wastewater Treatment certificate, but does not provide enough hours to enable interns to complete the required experience hours. Prior to the internship, interns must complete safety training and pass the associated test. During the water internship, interns cover a variety of topics, including: California's Safe Drinking Water Act regulations, supervisory control and data acquisition (SCADA) system operation and distribution system operation. The wastewater internship covers a variety of topics as well, including: safety, odor control and disinfection.

*Note: EBMUD also has a full-time operator training program, separate from OIP, for which full-time operator trainees are hired. The full-time program is not described in this fact sheet; contact EBMUD Recruitment at 510-287-0735 for information about this program.*

## TROUBLE SHOOTING / LESSONS LEARNED

- Get union support for closely supervised unpaid interns.
- EBMUD developed internship guidelines, which include specific definitions of the work interns are not allowed to do, due to safety concerns.
- TVROP and SCCOEP provide EBMUD with evidence of employer's liability insurance during the term of internship with EBMUD.
- The students who have been placed in EBMUD's unpaid internships have only stayed for one semester due to their need to find paid work. This has limited the students' exposure to EBMUD's operator training.

## SPONSORING UTILITY RESPONSIBILITIES:

- Provide intern with exposure to many of the training areas identified in the training plan, which is developed by EBMUD.
- Provide interns with a worksite orientation and safety training.
- Utility staff provide oversight for the interns and conduct a performance evaluation at the conclusion of the internship.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** Interns must be supervised by a senior operator at all times. Additionally, there is one supervisor per treatment plant and an Affirmative Action Office liaison.  
**Costs:** Utility pays for personal protective equipment (safety shoes, goggles, gloves, etc.) and Operator-in-Training certificate fee. Utility does not pay for certification exams.  
**Funding:** Utility-funded.  
**Program start date:** Fall 2010.

**Initial funding for program development:** Utility-funded.  
**Stakeholder workgroup:** EBMUD, TVROP, SCCOEP, BAYWORKS (collaboration of Bay Area water and wastewater utilities).  
**Number of years in development:** One.  
**Results:** Four water treatment interns placed (two fall 2010 and two fall 2011). Two wastewater treatment interns placed fall 2011. No intern hires to date.

# EAST BAY MUNICIPAL UTILITY DISTRICT OPERATOR INTERNSHIP PROGRAM

## WATER TREATMENT OPERATOR INTERN TRAINING PLAN\*:

- California's Safe Drinking Water Act and Other Pertinent Regulations
- Water Treatment Calculations
- SCADA Operation
- Handling and Use of Water Treatment Plant Chemicals and Laboratory Chemicals Used for Drinking Water Analyses
- Laboratory Analyses Conducted by Operators
- Safety Training
- Distribution System Operation
- Treatment Chemical Dosing and Monitoring
- Disinfectant Dosing and Monitoring
- Treatment Processes and Controls

## WASTEWATER OPERATOR INTERN TRAINING PLAN\*:

- Safety Training
- System Overview
- Distributed Control System
- Plant Rounds
- Odor Control System
- Influent Pump Station
- Preliminary Treatment
- Primary Treatment
- Wet Weather Storage Basin
- Scum Concentrators
- Mid-Plant Pump Station
- Secondary Treatment
- Oxygen Production
- Disinfection
- Effluent Pumping
- Sampling
- Dechlorination
- Chemical Storage
- Gravity Belt Thickeners
- Solids/Liquids/Fog Receiving Station
- Digesters
- Dewatering
- Sludge Hoppers

\* The plan is a list of objectives for interns to learn or have the ability to do by the end of the semester. Interns may not be trained in all areas. These training areas are at the discretion of EBMUD and the intern's senior operator and supervisor. Hours spent on the training areas are dependent upon the workflow within EBMUD.

\*\* SCCOEP refers students to the OIP who are enrolled at the community college and in the Occupational Education Class 90. OCED90 allows students to work in the water and wastewater industry and also teaches them other skills such as how to interview and how to write a resume.

TVROP refers any students who are enrolled in the Water Pollution Control Program. For more information on TVROP program see: <http://www.tvrop.org/Water-Pollution-Control/index.html>.

# ENVIRONMENTAL ENGINEERING TECHNOLOGY- WATER AND WASTEWATER DEGREE (EVETW)

## CONTACT INFORMATION

Ann Gunkel, Ph.D.  
Program Chair  
Environmental Engineering  
Technology Program  
513-569-1783  
[ann.gunkel@cincinnatiastate.edu](mailto:ann.gunkel@cincinnatiastate.edu)

Ann Fallon  
Water and Wastewater Advisor  
Environmental Engineering  
Technology Program  
513-569-1750  
[ann.fallon@cincinnatiastate.edu](mailto:ann.fallon@cincinnatiastate.edu)

## BENEFITS

- Develop relationships with students through the co-op program who can then be hired as full-time employees.
- Improve the qualifications of operators already employed by the utility.

## TROUBLE SHOOTING / LESSONS LEARNED

- Input from the Advisory Board is critical to the success of the program. It is important to be flexible and modify the curriculum to meet the industry's changing requirements.
- Partnerships with local utilities is essential for a successful program. Students can attend site visits and perform laboratory exercises at local utilities to eliminate equipment costs, while keeping the training current and relevant. Hands-on training prior to the co-op is necessary for the student's success in the field.

## PROGRAM DESCRIPTION:

Cincinnati State Technical and Community College offers a Water and Wastewater Associates of Applied Science degree through the Environmental Engineering Technology Program. Courses can also be taken to meet the required continuing education units for operator licensure. This program emphasizes water and wastewater treatment, as well as operation and design of treatment facilities. Upon completion of the degree, students have the hours required to take any of the Class I licensure exams - Class I water supply, Class I water distribution, Class I wastewater works, Class I wastewater collection. Courses also meet continuing education requirements for license renewal, and some classes meet Class II and III requirements. Students must apply and register for the exam, however instructors provide guidance.

At the conclusion of this coursework, graduates are prepared to collect and analyze water samples; conduct laboratory tests; conduct plant operations and maintenance activities; ensure compliance with environmental regulations; monitor effluent water quality; and treat and minimize waste.

Students must complete at least two semesters, and are encouraged to complete 12 months, of cooperative (co-op) placement at a utility while pursuing their regular coursework. Students also complete a co-op assignment each co-op semester. To obtain a co-op position students prepare a resume and attend interviews, with help from the co-op coordinator.

## SPONSORING UTILITY RESPONSIBILITIES:

- Develop a learning contract to determine what the student would like to learn as it relates to their degree. Coordinate on-the-job training based on the learning contract. Utility has the flexibility to determine the co-op student's responsibilities and schedule.
- Coordinate a mentoring program with the student and one of the utility's employees (optional). Sometimes "lunch 'n learn" programs are developed, and all co-op students within the utility gather for a small training program or the sharing of a book.
- Complete a feedback form to evaluate the student; no additional records required.
- Utility has complete discretion in the design and administration of the co-op, including student's job tasks, schedule, and how much the student will be paid.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** The college has two full-time staff, a part-time co-op coordinator, an adjunct faculty, and a full-time lab manager spend a total of 6,000 to 8,000 hours/year.

**Costs:** Student tuition is \$5,100/year; faculty salaries & benefits is \$250,000/year; adjunct salaries are \$20,000/year; co-op student salary is \$10-17/hour from employer. Students are responsible for insurance/injury costs.

**Funding:** Metropolitan Sewer District (MSD) Partnership/Training Contract; Ohio Board of Regents (OBR) subsidies;

student tuition (including scholarships and financial aid); co-op employer reimbursement.

**Program start date:** September 1996.

**Initial funding for program development:** Department of Energy grant and OBR Subsidies (capital equipment).

**Stakeholder workgroup:** Advisory Board (industry, utility, state, 4-year college, high school, and EVETW representatives).

**Number of years in development:** Two.

**Results:** 80 EVETW alumni, 75 percent of these are employed by a utility.

# ENVIRONMENTAL ENGINEERING TECHNOLOGY— WATER AND WASTEWATER DEGREE (EVETW)

## CURRICULUM:

The Water and Wastewater major under the Environmental Engineering Technology (EVET) program places an emphasis on water and wastewater treatment, as well as the operation and design of water and wastewater treatment facilities. Courses focus on biological, physical, and chemical treatment processes; collection and distribution systems; calculations for water and wastewater personnel, safety, and statistics; and quality assurance and control.

### Example Curriculum:

#### • 4 CURRICULUM SEMESTERS

##### ■ Semester 1:

- ◆ English Composition 1 (3 Credits)
- ◆ Algebra and Trigonometry (4 Credits)
- ◆ Environmental Science Conservation and Cleanup (4 Credits)
- ◆ Fundamentals of General Chemistry (4 Credits)

##### ■ Semester 2:

- ◆ Physics 1 (4 Credits)
- ◆ Environmental Chemistry (3 Credits)
- ◆ Functions and Introduction to Calculus (4 Credits)
- ◆ Calculations Elective (3 Credits)  
*(Calculations for Water Plant Operators or Calculations for Wastewater Operators)*
- ◆ Water Treatment and Analysis (4 Credits)

##### ■ Semester 3:

- ◆ English Elective (3 Credits)
- ◆ Environmental Regulations and Permits (2 Credits)
- ◆ Supervisory Management (2 Credits)
- ◆ Treatment Technologies (3 Credits)
- ◆ Fluid Mechanics (3 Credits)
- ◆ Utilities Safety and Security (2 Credits)
- ◆ Operations Elective (3 Credits)  
*(Operations of Wastewater Treatment Plants or Water Treatment Plant Operations)*

##### ■ Semester 4:

- ◆ Social Science Elective 1 (3 Credits)
- ◆ Collections and Distribution Systems (3 Credits)
- ◆ Environmental Statistics (2 Credits)
- ◆ Site Mapping and GIS (3 Credits)
- ◆ Public Speaking (3 Credits)
- ◆ Social Science Elective 2 (3 Credits)

*In addition, students are required to complete 2 cooperative education semesters at a utility.*

## ADDITIONAL INFORMATION:

**Website:** [http://www.cincinnati.state.edu/real-world-academics/academic-divisions/center-for-innovative-technologies/programs-certificates-1/chemical-and-environmental-engineering-technologies-department#eet\\_water\\_and\\_wastewater\\_major](http://www.cincinnati.state.edu/real-world-academics/academic-divisions/center-for-innovative-technologies/programs-certificates-1/chemical-and-environmental-engineering-technologies-department#eet_water_and_wastewater_major)

The Environmental Engineering Technology - Water and Wastewater major is a pathway to the Environmental Engineering Technology degree accredited by Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, phone (410) 347-7700.

### Related programs offered by the college:

1. Environmental Engineering Technology (EVET)
2. Environmental Engineering Technology—Stormwater Management Major (EVETS)
3. Environmental Safety and Security Certificate (EVETSC)

## ADDITIONAL OHIO COLLEGE CERTIFICATE PROGRAMS:

- Zane State College (<http://www.zanestate.edu>): Water/Wastewater Laboratory Skills and Public Water Systems Certificates
- Stark State College (<http://www.starkstate.edu>): Water or Wastewater Operations Certificate
- Columbus State Community College (<http://www2.csc.edu>): Water/Wastewater Certificate

# GET INTO WATER! PROGRAM – WATER UTILITY SCIENCE PROGRAM/WATER QUALITY MANAGEMENT

<p><b>CONTACT INFORMATION</b></p>	<p><b>PROGRAM DESCRIPTION:</b></p>	
<p>Melanie Fahrenbruch MJF Consulting, LLC 303-912-3358 <a href="mailto:mel@mjfconsult.com">mel@mjfconsult.com</a> <a href="http://www.getintowaterco.org">http://www.getintowaterco.org</a></p>	<p>The "Get Into Water!" Project is comprised of a series of initiatives that ensure positions in Colorado's water utilities are filled with qualified, trained and technically-skilled employees. It is overseen by an industry advisory council consisting of utilities, workforce centers, educational institutions and related associations.</p> <p>Two of the Project's initiatives include the Water Utility Science Program (WUSP) and Water Quality Management (WQM) Program. These programs offer youth and adult introductory courses in water and wastewater management. WUSP adult courses are held twice per week for 3 hours throughout a semester, and youth courses are offered daily for 1.5 hours. WQM classes are held 4 days per week for 3 hours and take approximately 1 month to complete. All courses are approved by the State of Colorado, and participation in each course is worth a total of 7.5 Training Units (TUs). Courses prepare students for certificates in Level 1 Water Distribution, Level 1 Wastewater Collection, Level D Water Treatment and Level D Wastewater Treatment. At the conclusion of two courses in either program, students can sit for their Level 1 or D certification exam.</p> <p>In Spring 2012, the program looks forward to launching a 100-hour, 3-month on-the-job-training (OJT) program; participation hours can be used towards certification. The participants will be temporary employees of utilities; employers will be reimbursed by local workforce centers for up to 50 percent of the employee's pay. To be eligible for this OJT program, students must complete at least two courses through either WUSP or the WQM Program. Students must be 18 years old to participate. Work activities and weekly hours depend on utility needs. The final number of utility participants, and their complete list of responsibilities, is still being finalized.</p>	
<p><b>BENEFITS</b></p> <ul style="list-style-type: none"> <li>▪ Provides a larger pool of entry-level, certified applicants to utilities in order to meet the needs of utilities whose employees are retiring.</li> <li>▪ Entry-level staff are more broadly educated in the areas of science, math, and utility operations, which facilitates their work at the utility.</li> <li>▪ Incumbent employees are provided with the necessary training for certification.</li> </ul>	<p><b>SPONSORING UTILITY RESPONSIBILITIES:</b></p> <ul style="list-style-type: none"> <li>• Determine job tasks, schedule and wages for temporary employees.</li> <li>• Complete an assessment of the student's performance.</li> <li>• Sign an agreement with the local workforce center to receive salary reimbursement.</li> </ul>	
<p><b>TROUBLE SHOOTING / LESSONS LEARNED</b></p> <ul style="list-style-type: none"> <li>▪ It takes time to develop partnerships with educational institutions.</li> <li>▪ Consultants and teachers developed courses that contain approximately 75 hours of contact time or 7.5 training units. Teachers at the institutions have the flexibility to adapt modules for their classroom.</li> <li>▪ Recruitment of high school students is harder than recruiting adults and requires adequate time for marketing.</li> </ul>	<p><b>INFORMATION FOR PROGRAM DEVELOPMENT:</b></p> <p><b>Required staff time:</b> One part-time Project Manager; stakeholder liaisons (assist with program development); four faculty.</p> <p><b>Costs:</b> 3-year budget for "Get into Water!" is \$600,000, only a portion goes to the training initiative. WUSP and WQM each initially received \$30,000. Adults pay \$695 for each WUSP course, and \$300 for each WQM course. Adults can apply for scholarships. Over \$80,000 is being provided in scholarships through the project.</p> <p><b>Funding:</b> <u>Grant funding:</u> Colorado Department of Labor and Employment (CDLE) via a lump sum grant from the Workforce Investment Act. <u>In-kind:</u> Rocky Mountain Section of the American Water Works Association (RMSAWWA), Rocky Mountain Water Environment Association (RMWEA), Denver Public Schools, City of Boulder, Arapahoe Douglas Works, City and County of Denver, Workforce Boulder County.</p> <p><b>Program start date:</b> 2010.</p> <p><b>Stakeholder workgroup:</b> RMSAWWA, RMWEA, CDLE, Arapahoe/Douglas Works, EGTC, BVSD, City and County of Denver and Workforce Boulder County</p> <p>Number of years in development: One.</p> <p><b>Results:</b> <u>WUSP:</u> 10 youths and 30 adults have completed courses. <u>WQM:</u> 1 youth and 7 adults have completed courses.</p>	

# GET INTO WATER! PROGRAM – WATER UTILITY SCIENCE PROGRAM/WATER QUALITY MANAGEMENT

## PROGRAM SPECIFICS\*:

### • WUSP—BOULDER

- Courses:
  - ◆ Students are first required to take introductory course titled “Water Foundations”
  - ◆ Following “Water Foundations,” students can select from additional courses including:
    - Water Distribution
    - Wastewater Collections
    - Water Treatment
    - Wastewater Treatment
- Courses offered to High School Students\*\* or Adults:
  - ◆ Adult Courses
    - Educational Institution: Boulder Lifelong Learning
    - Credit: TUs
  - ◆ High School Courses\*\*
    - Educational Institution: Boulder High School
    - Credit: Science Elective Credit and TUs

### • WQM PROGRAM—DENVER

- Courses:
  - ◆ Introduction to Water Quality
  - ◆ Introduction to Water Treatment D
  - ◆ Introduction to Water Distribution I
  - ◆ Introduction to Wastewater Collection I
  - ◆ Introduction to Wastewater Treatment D
- Courses offered to High School Students\*\* or Adults:
  - ◆ Educational Institution: Emily Griffith Technical College
  - ◆ Credit: High School or Community College Credit and TUs

\*The two programs offer the same curriculum; however, WUSP does not offer community college credit. Students take all introductory courses in Water Distribution and Treatment, and Wastewater Collection and Treatment. All classes include hands-on laboratory analysis, advanced laboratory procedures for analyzing water and field trips, tours, guest speakers and group activities on projects and related activities.

\*\*Students begin the program in their junior year of high school. Individuals must have a high school diploma or GED and be 18 years of age to be eligible to receive a state certification.

## FUNDING WORKFORCE PROJECTS:

The Workforce Investment Act of 1998 (WIA) provides funding for workforce programs nationwide. In 2009, the American Recovery and Reinvestment Act (ARRA) allocated more than \$3 billion towards workforce programs. Colorado received approximately \$31 million to allocate via the Colorado Department of Labor and Employment (CDLE). Funding was divided into three categories: WIA Adult Services, WIA Youth Services and WIA Dislocated Worker Services. WIA continues to channel funding and to build networks connecting qualified individuals to employment opportunities.

# HAMPTON ROADS SANITATION DISTRICT APPRENTICESHIP PROGRAM

## CONTACT INFORMATION

Debbie Crofford  
 Training Superintendent  
 Hampton Roads Sanitation District  
 757-460-4226  
[dcrofford@hrsd.com](mailto:dcrofford@hrsd.com)  
<http://www.hrsd.com>

## BENEFITS

- Creates a highly qualified and highly-trained technical and professional staff at HRSD.
- Enables new and current staff to further develop their leadership and supervisor skills.
- Current employees are kept abreast of current academic topics in their field.
- Opportunities for partnering with other utilities to meet their need for continuing education credits.
- Apprenticeship programs are an effective way to recruit, train and retain workers for highly skilled positions.

## PLANNED PROGRAM ENHANCEMENTS

- Implementation of a distance learning program with live broadcasting of classroom sessions to remote locations.
- Transitioning from an hour-based OJT tracking system to a skills-based OJT tracking system.

## PROGRAM DESCRIPTION:

The Hampton Roads Sanitation District (HRSD) Apprenticeship Program is a 4-year, entry-level program for adults with a high school diploma or GED credentials. The program is recognized and/or approved by the Virginia Department of Labor and Industry, the US Department of Labor, the Virginia Community College System, the Virginia Department of Education, the Virginia Department of Veterans Services and the Virginia Department of Occupational Regulation. Apprentices are hired through the HRSD employee application process for 1 of 8 trade areas, including plant operator. The program effectively trains new staff and facilitates their licensure advancement. Successful completion of this registered apprenticeship program earns the participants a nationally-recognized state certification as a journeyman.

In general, the program requires a minimum of 8,000 hours of supervised on-the-job training (OJT) over the 4-year apprenticeship, and a minimum of 144 hours of related classroom instruction per year.

Apprentices have the opportunity for job advancement with merit pay increases. Merit increases are based on successful job performance and are part of the evaluation process. Plant operators are required to receive state licensure within 8 years of employment. HRSD pays for one examination sitting at each of the four licensure levels.

## SPONSORING UTILITY RESPONSIBILITIES:

Utility administration is responsible for:

- Providing apprentices with appropriate supervision, facilities, instructors, tutors, textbooks, supplies and program administration.
- Performing reporting and recordkeeping practices to track academic and Virginia DOLI requirements (for apprenticeship recognition).

Mentors are responsible for:

- Communicating with apprentices to review strengths and weaknesses of technical skills.
- Completing progress reports related to completion of required work functions.
- Introducing apprentices to various leadership and supervisory functions.
- Coordinating apprentice OJT activities.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** One full-time Training Superintendent, with aid from an Administrative Coordinator, commit 2,000 hours/year. Apprenticeship Committee assists with policy decisions and program development, and a Training Manager provides general oversight.

**Costs:** \$235,000, including all educational and training expenses, equipment and insurance costs. Apprentice wages

currently range from \$32,118 to \$56,263, depending on length of apprenticeship.

**Funding:** HRSD.

**Program start date:** 1979; first wastewater apprenticeship developed nationwide.

**Stakeholder workgroup:** HRSD.

**Number of years in development:** One.

**Results:** 408 graduates; 98 percent licensure rate.

# HAMPTON ROADS SANITATION DISTRICT APPRENTICESHIP PROGRAM

## EXAMPLE OF PLANT OPERATOR APPRENTICE CURRICULUM:

HRSD apprentices attend night classes twice per week from September through April at HRSD facilities and/or regional vocational/technical schools. In-house courses are taught by qualified professional staff. Tutoring is provided as needed by faculty or other local resources.

### 1st Year

- Math 1, 2, 3, 4
- Computers
- Introduction to Wastewater Treatment / Maintenance 1
- Introduction to Wastewater Treatment / Maintenance 2
- Industrial Waste Regulations

### 2nd Year

- Treatment Plant Math 1, 2, 3
- Preliminary Treatment and Odor Control
- Primary Treatment and Chemical Addition
- Pumping Systems 1
- Valves, Pipe, Pipefitting 1
- Shop Prints and Schematics

### 3rd/4th Year

- Activated Biosolids 1, 2 (21 weeks total)
- BNR and Tertiary Treatment
- Disinfection
- Solids Thickening and Digestion
- Solids Dewatering
- Incineration
- Bearings and Lubrication
- Instrumentation and Controls
- Leadership and Supervision 1, 2
- Stream Ecology
- Sanitary Chemistry 1, 2
- Wastewater Laboratory

## EXAMPLE OF PLANT OPERATOR OJT FUNCTIONS:

On-the-job training (OJT) consists of a 40-hour work week in a variety of work functions reflecting their trade area. Fully qualified operators and supervisors serve as mentors throughout the entire 4-year training period.

Example Functions	Required Hours (Min. - Max.)
Sewage Treatment Shift Operation	100 - 7600
Solids Handling Shift Operation	100 - 7600
Recordkeeping & Data Management	0 - 500
Laboratory, Field Testing, Special Studies & Process Optimization	24 - 1000
Chemical and Fuel	20 - 800
Maintenance	200 - 2000
Housekeeping	0 - 200
Training & Meetings	100 - 800
<b>Total Required Hours</b>	<b>8000</b>

# KENTUCKY WATER TRAINING INSTITUTE

## CONTACT INFORMATION

Jana Fattic  
Western Kentucky University,  
Water Training Institute  
877-984-0999  
[wti@wku.edu](mailto:wti@wku.edu)  
<http://wti.waterky.org/>

## BENEFITS

- Provides a well-rounded education to future and existing operators.
- Works with industry stakeholders to develop course curriculum based on industry-driven needs.
- Prepares students to deal with increases in regulatory requirements and technological upgrades within the water and wastewater industries.
- Allows utilities to determine if an intern would be a good candidate for a future opening at the utility.

## TROUBLE SHOOTING / LESSONS LEARNED

- Classes are available online, which provides students with flexibility and encourages more current operators to participate in the program.
- Utilities are more willing to help if they are informed of a specific need.

## PROGRAM DESCRIPTION:

The Water Training Institute (WTI), developed by the Center for Water Resource Studies at Western Kentucky University (WKU), offers classes to prospective and existing water and wastewater operators across the country. These can be taken as part of an associate's degree or used to meet the required continuing education units. The 2-year Water Resource Management associates degree program may be completed through a series of online courses. At the conclusion, students are prepared for an entry-level operator license. Students must schedule and pay for their licensure exam.

The degree program has three tracks: (1) Water Treatment Operations, (2) Wastewater Treatment Operations, and (3) Water Utility Management. A 120-hour internship, which can count towards experience for licensure, is required for each track to supply students with the necessary hands-on experience. WTI matches interns around the country with utilities in their geographic area. WTI advertises through the Utility Network (UNET) to encourage utilities to volunteer their services to students, including hosting internships, tours, labs, etc.

As part of the program, WTI pairs students with a mentor in the industry through a mentoring network - Encouraging Young Operators with Retired Experience (EYORE). EYORE allows students to make valuable contacts in the industry. The program is volunteer-based and includes seasoned or retired operators that contact WTI to get involved, or that are identified by the WTI Steering Committee. Communication is maintained through an online forum.

## SPONSORING UTILITY RESPONSIBILITIES:

- Provide training in specific treatment and laboratory processes and operations.
- Help the student create a learning plan that outlines specific objectives and tasks associated with the internship. Plan must be approved by WKU's degree program coordinator.
- Determine intern's job tasks and schedule.
- Provide interns feedback, including a closing evaluation.
- Provide compensation to student interns. Utilities are encouraged to pay 50 percent of the student's compensation (\$10 per hour).

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** Program Coordinator, IT staff, and instructors spend more than 2,000 hours/year (e.g., on student advising, course instruction, and program coordination).

**Costs:** \$150,000 covers faculty, staff, supplies, equipment, travel, and overhead. Instructors are paid on a per-course basis.

**Funding:** Student tuition is \$400/semester credit hour. Trade associations offer scholarships (WTI assists with administration).

**Program start date:** Fall 2008.

**Initial funding for program development:** Advanced Technological Education grant (National Science Foundation) and an EPA Technical Assistance Center grant.

**Stakeholder workgroup:** WTI Steering Committee made up of representatives of utilities, state agencies, and trade associations.

**Number of years in development:** Three.

**Results:** The program has two graduates thus far; one graduate was hired at the utility he interned with.

# KENTUCKY WATER TRAINING INSTITUTE

## PROGRAM REQUIREMENTS:

### ● ASSOCIATE DEGREE IN WATER RESOURCE MANAGEMENT

- Housed in WKU's Ogden College of Science & Engineering
- Architectural & Manufacturing Sciences Department
  - ◆ 60 Hours of Academic Credit
    - 15 Hours – General Education\*
    - 21 Hours – Science Core\*

- 24 Hours – Concentration Specific: 3 Tracks\*\*

- Drinking Water Operations
- Wastewater Operations
- Water Utility Management

## COURSES:

### ● WATER RESOURCE MANAGEMENT GENERAL EDUCATION (15 HRS.)

- Intro to College Writing (3 hrs.)
- American National Government (3 hrs.)
- College Algebra (3 hrs.)
- Humanities Elective (3 hrs.)
- Social & Behavioral Science Elective (3 hrs.)

### ● WATER RESOURCE MANAGEMENT SCIENCE CORE (21 HRS.)

- General Biology (3 hrs.)
- General Microbiology (3 hrs.)
- Intro to Chemistry (3 hrs.)
- Intro to Physical Environment (3 hrs.)
- Concepts of Motion (3 hrs.)
- Trigonometry (3 hrs.)
- Intro to Environmental Science (3 hrs.)

### ● CONCENTRATION: DRINKING WATER OPERATIONS (24 HRS.)

- Water Supply & Wastewater Control (3 hrs.)
- Water Distribution & Wastewater Collection (3 hrs.)
- Water & Wastewater Instrumentation & Control (3 hrs.)
- Water Chemistry (3 hrs.)
- Intro to Water Treatment Processes (3 hrs.)

- Calculations & Hydraulics for Water (3 hrs.)
- Advanced Water Treatment Processes (3 hrs.)
- Internship in Utility Operations (3 hrs.)

### ● CONCENTRATION: WASTEWATER OPERATIONS (24 HRS.)

- Water Supply & Wastewater Control (3 hrs.)
- Water Distribution & Wastewater Collection (3 hrs.)
- Water & Wastewater Instrumentation & Control (3 hrs.)
- Water Chemistry (3 hrs.)
- Intro to Wastewater Treatment (3 hrs.)
- Calculations/Hydraulics for Wastewater/Stormwater (3 hrs.)

- Advanced Wastewater Treatment Processes (3 hrs.)
- Internship in Utility Operations (3 hrs.)

### ● CONCENTRATION: WATER UTILITY MANAGEMENT (24 HRS.)

- Water Supply & Wastewater Control (3 hrs.)
- Water Utilities Management (3 hrs.)
- Water Utility Organization, Regulation, & Law (3 hrs.)
- Water Utility Finance and Administration (3 hrs.)
- Human Resource Management for Water Utilities (3 hrs.)
- Water Utility Management and Human Relations (3 hrs.)
- Modern Technology & Water Utility Management (3 hrs.)
- Internship in Utility Management (3 hrs.)

\* General Education and Science Core courses can be taken online, face-to-face on WKU's campus, or credits can be transferred.

\*\* Concentration-specific courses are only offered online, though WTI has worked with some technical assistance providers in Kentucky and Tennessee (due to its proximity to WKU) to provide short courses to cover the same course content.

# MAINE MANAGEMENT CANDIDATE SCHOOL

## CONTACT INFORMATION

Teresa Trott  
Maine Department of Health  
and Human Services (DHHS),  
Drinking Water Program  
207-287-7485  
[Teresa.trott@maine.gov](mailto:Teresa.trott@maine.gov)  
<http://www.jetcc.org/mcs.html>

## BENEFITS

- Participants are better prepared to take on supervisory responsibilities.
- Encourages utility succession planning for water and wastewater managers and upper level operators.

## TROUBLE SHOOTING / LESSONS LEARNED

- Remain flexible and have a back-up plan/ speaker available! A lot of unanticipated time was spent in speaker coordination and adjusting to unexpected changes.
- Budget time to explain the purpose of the training and characteristics of the audience to presenters who come from outside our industry.
- The program has benefited from having a cadre of seasoned industry professionals who have been flexible and willing to respond on short notice to schedule adjustments.
- In year two the California State University Management curriculum was added as an optional independent self-study, which required more coordination.

## PROGRAM DESCRIPTION:

This is a 12-month training program that provides training, networking and skill-development coursework to prepare the next generation of water and wastewater managers and leaders. The training program is aimed at mid-level operators with management potential.

The program includes management courses, technical courses (such as engineering basics and process control) as well as skill training in areas such as media relations, dealing with regulatory agencies, and budget preparation (see example courses on next page). Participants earn more than 60 training contact hours.

The cost of the full-year program is \$500 for each participant. Operators taking part in this program must commit to attend all monthly trainings. Operators are nominated by their utilities to participate. Even operators who will not become managers in the future may participate. Superintendents should either submit candidates for this program or allow staff to self-recommend.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** Agency should expect 450 to 500 hours for coordination of 12-month program (varies if the agency provides instruction). In this case, the program coordinator was not an instructor but attended each program as host and for continuity. Instructors at each session were volunteers but significant time was needed to coordinate with each instructor. If the program coordinator is also able to provide instruction, some personnel time could be combined. Each monthly session takes about 40 hours to organize. This includes communication with presenters and arranging logistics specific to each class, such as catering, preparing handout materials, and communicating with students between classes. Approximately 6 hours per month are spent in the classroom with students.

**Costs:** Total program cost for the first year = \$23,330. This includes staff time (non-instruction), books, meeting space and catering costs.

**Funding:** \$5000 from Maine Waste Water Control Association (MWWCA) and Maine Department of Environmental Protection (DEP) + registration fees. First year of program needed to recover \$9,830 loss from the Joint Environmental Training Coordinating Committee (JETCC) base program. Participant registration fees = \$500/participant.

**Program start date:** 2009.

**Initial funding:** From MWWCA and DEP .  
**Stakeholder workgroup:** JETCC, DEP and DHHS, MWWCA, and Maine Water Utilities Association.

**Number of years in development:** Two.

**Results:** 17 graduates in 2010.

# MAINE MANAGEMENT CANDIDATE SCHOOL

## EXAMPLE COURSES FROM 2010-2011:

- **Housekeeping & Introduction to Personnel Management Book:** California State University at Sacramento Manage for Success: Utility Management. (Charles Conway – New England Interstate Water Pollution Control Commission & Jon Jewett - State of Vermont): 6 hours
- **Basic Aquatic Biology, the State of State Waters, and the Permitting Process** (*WW - Maine DEP Staff*) and **Source Water & Well Head Protection** (*DW - Maine DHHS Staff & others from MWUA*): 6 hours
- **Asset Management/CMOM** (*Wright-Pierce Engineers & RCAP Solutions*): 6 hours
- **Best Management Practice Experiences for Your Management Toolbox** (*DW and WW Utility personnel*): 6 hours
- **Real-World Management and Leadership Skills** (*Dana Peck – Peck Environmental Associates*): 6 hours
- **Labor Relations in a Government; Media Relations & Effective Communication** (*Maine Municipal Association, Maine Department of Labor, other presenters TBA*): 6 hours
- **Long Range Planning for your Overall System Needs** (*Personnel from Water & Wastewater Utilities*): 6 hours
- **Personnel Management and Labor/Regulatory Relations** (*Jon Jewett - State of Vermont*): 6 hours
- **Engineering Basics: Facilities Planning & Design** (*Woodard & Curran Engineers & DEP staff*): 6 hours
- **Overall WWTF Budgeting**, 3 hours; **Blueprint Reading**, 3 hours. Total course: 6 hours
- **Operator exchange** - *participants shadow WWTF & DW managers at a facility other than their own for a day*: 6 hours
- **September TBA: Proposed...At MWWCA Convention Final Recap evaluation, feedback and follow-up. Graduation of 2011 Wastewater MCS Class. Announcement of the 2012 Class.**

# MASSDEP'S GREEN JOBS TRAINING AND PLACEMENT PARTNERSHIP

<p><b>CONTACT INFORMATION</b></p>	<p><b>PROGRAM DESCRIPTION:</b></p>	
<p>Yvette DePeiza Drinking Water Program, MassDEP 617-292-5857 <a href="mailto:Yvette.DePeiza@state.ma.us">Yvette.DePeiza@state.ma.us</a> <a href="http://www.mass.gov/dep/water/drinking/greenjob.htm">http://www.mass.gov/dep/water/drinking/greenjob.htm</a></p>	<p>Massachusetts Department of Environmental Protection (MassDEP) created the Green Jobs Training and Placement Partnership (GJPP) to attract, identify, and train future water system operators and drinking water professionals by providing classroom and field (i.e., internship) training. The program focuses on, but is not limited to, EPA-designated environmental justice areas. Upon completing the training, students are prepared for Very Small System or Distribution I operator certification. MassDEP (via an outside contractor) reimburses students that take the licensure exam. Training opportunities include:</p> <ul style="list-style-type: none"> <li>• <b>Training for students at vocational and technical high schools.</b> MassDEP partners with the Massachusetts Coalition of Small Systems Assistance (MCSSA) to provide classroom instruction using guest lecturers, reference materials and student field trips. Instruction lasts approximately 1 semester. High school juniors and seniors can participate in this program, but there may be restrictions on the associated internship depending on a student's age.</li> <li>• <b>Training for adult students through evening adult education classes.</b> MassDEP runs a 15-hour evening course for individuals looking for new and different work, such as veterans or re-careering individuals. Classes focus on very small system operations.</li> <li>• <b>Training for students at state and community colleges.</b> Through a 18-hour course, students can develop an understanding of the professional opportunities in the drinking water field, receive college credit, and obtain access to educational resources.</li> </ul>	
<p><b>BENEFITS</b></p> <ul style="list-style-type: none"> <li>▪ GJPP keeps valued members of the drinking water community "in the game" and validates them and the work they have been doing for the last 30 to 40 years.</li> <li>▪ GJPP builds a drinking water operator training curriculum into vocational high schools and community colleges.</li> <li>▪ GJPP trains the next generation of water operators.</li> </ul>	<p>MassDEP offers a 300-hour internship, that counts towards licensure, for any student who completed GJPP training. The Massachusetts Water Works Association (MWWA) coordinates the internship, including approving intern work plans and conducting an exit interview. Students are required to complete a project upon conclusion of the internship.</p>	
<p><b>TROUBLE SHOOTING / LESSONS LEARNED</b></p>	<p><b>SPONSORING UTILITY RESPONSIBILITIES:</b></p>	
<ul style="list-style-type: none"> <li>▪ The vocational technical high school program was effective because the high school administrators were responsive.</li> <li>▪ Training courses can be built into existing environmental science classes. All GJPP programs must have core curricula.</li> <li>▪ The creation of internship opportunities has been key to making the program a success.</li> <li>▪ GJPP was able to build off of an existing internship program, including recruiting utilities, with the help of industry associations and other regional partners.</li> </ul>	<ul style="list-style-type: none"> <li>• Train and oversee the work of the intern for the duration of the internship.</li> <li>• Develop a work plan for each intern, including weekly duties and performance criteria.</li> <li>• Provide a mentor for program graduates (with MWWA assistance). Mentors offer meaningful work that exposes the student to facets of public water system (PWS) operations.</li> <li>• Perform a summary report at the end of the internship to assess intern's performance.</li> </ul> <p><b>INFORMATION FOR PROGRAM DEVELOPMENT:</b></p> <p><b>Required staff time:</b> 200-400 hours/year  <b>Costs:</b> Program costs include compensation for: instructors, water works associations (provide program support), MassDEP staff, and interns (paid \$10/hour for 300 hours). PWSs are often responsible for insurance costs (not required).  <b>Funding:</b> MassDEP and EPA operator training funds, Drinking Water State Revolving Fund set-asides, and an Operator Expense Reimbursement Grant.  <b>Program start date:</b> 2009.</p> <p><b>Initial funding for program development:</b> DWSRF Set-asides  <b>Stakeholder workgroup:</b> MCSSA, MWWA, PWSs, vocational technical high schools, adult education programs, and community and state colleges.  <b>Time in development:</b> Ongoing. Built off past experiences.  <b>Results:</b> 349 participants during the first two years of GJPP. Of these students: 40 participated in internships, 22 received certification, and 4 were hired by PWSs.</p>	

# MASSDEP'S GREEN JOBS TRAINING AND PLACEMENT PARTNERSHIP

## VOCATIONAL TECHNICAL SCHOOL AND COLLEGE CURRICULUM:

- **THE FOLLOWING CURRICULUM FOCUSES ON WATER TREATMENT:**
  - Drinking Water Sources and Watershed Protection
  - Water Treatment Plant Operation Overview
  - Preliminary Treatment Processes
  - Coagulation and Flocculation
  - Clarification, Filtration and Adsorption Processes
  - Disinfection Treatment Processes
  - Corrosion Control
  - Taste and Odor Control
  - Other Treatment Technologies:
    - ◆ Iron and Manganese Control
    - ◆ Softening and Fluoridation
  - Drinking Water Treatment Plant Testing, Sampling, and Reporting Processes
  - Drinking Water Treatment Applied Math
  - Drinking Water Treatment Maintenance and Troubleshooting Skills
  - Drinking Water Treatment Operations Safety Practices

## EXAMPLE OF INTERNSHIP WORK PLAN\*:

- **WEEK ONE—WATER RESOURCES:**
  - Land acquisitions, forestry management, and water quality sampling
- **WEEK TWO—WATER TREATMENT:**
  - Filters – Slow and rapid sand filtration and treatment of water
- **WEEK THREE—WATER STORAGE:**
  - Water storage tank maintenance and transmission
- **WEEK FOUR—WATER QUALITY:**
  - Hydrant rebuilds, exercising gates, unidirectional flow, contractor assistance
- **WEEK FIVE—ENGINEERING AND FIELD INSPECTION:**
  - Project management, dig safe, new main supervision, and safety
- **WEEK SIX—RESERVOIR:**
  - Valve replacement, new services

\* This work plan is at the discretion of the PWS. Hours spent on the tasks are subject to the work flow within the system. Interns are also required to complete a 3-5 page paper and poster board on a topic chosen by student or produce a product to be used by the system.

## SUMMER WATER CAMP:

In addition to the programs listed above, MassDEP also supports a week-long Summer Water Camp for elementary and high school students. The camp exposes students to all aspects of drinking water protection, supply and treatment and encourages their interest in the drinking water field.

# NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION – LICENSED OPERATOR INTERNSHIP PROGRAM

## CONTACT INFORMATION

Joe duRocher  
New Jersey Department of Environmental Protection,  
Bureau of Safe Drinking Water  
609-292-5550  
[joseph.durocher@dep.state.nj.us](mailto:joseph.durocher@dep.state.nj.us)  
<http://www.state.nj.us/dep/>

## BENEFITS

- Encourages utilities to hire and train interns and promote the entry of individuals into the drinking water profession.
- Creates jobs and provides funding necessary to address a critical workforce need.
- Promotes succession planning measures and long-term water system sustainability, thereby protecting the public health of the citizens of New Jersey.

## TROUBLE SHOOTING / LESSONS LEARNED

- The program experienced significant delays in obtaining approval to utilize Federal ERG funds. Due to these delays, the application period was only open for about six weeks. NJDEP received fewer applications than positions available. In addition, some utilities were forced to withdraw from the program due to the truncated timeline.

## PROGRAM DESCRIPTION:

The New Jersey Department of Environmental Protection's (NJDEP) Licensed Operator Internship Program is a one-year program to reimburse participating utilities for costs associated with hiring interns for the purpose of obtaining the one year of operating experience to qualify for Water Treatment (T) and/or Water Distribution (W) licensure. The program runs from September 1, 2011, to August 31, 2012, and may be extended through December 31, 2012.

This funding opportunity was made available to all 547 public community water systems in New Jersey requiring a public water distribution or treatment license to operate. Funding was available through the Federal Operator Certification Expense Reimbursement Grant (ERG) for sixty positions at a maximum of \$35,000 per intern position. NJDEP notified potential grantees of the funding opportunity by mail, through their website, and through outreach with related associations. Although NJDEP delineated preference criteria to select systems for funding, NJDEP received fewer than 60 applications and thus all eligible systems that applied were approved for funding.

## SPONSORING UTILITY RESPONSIBILITIES:

- Submit a standard grant agreement; reimbursement requests cannot be processed until these agreements are executed by NJDEP.
- Submit appropriate documentation of intern's hours worked and the appropriate state forms; documentation includes timesheet records, description of work duties performed, documentation of intern's high school diploma, and proof of completion of the 180-hour training course.
- Conduct a minimum of two job performance evaluations for each intern and submit a final financial status report and a final performance report within 60 days of the end of the program.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** Approximately one full-time equivalent (FTE) for six months for program development.

Approximately half an FTE for one year to process payment requests.

**Costs:** \$2,100,000 was available for 60 intern positions. 31 positions were approved for funding for a total of \$1,016,000.

**Funding:** The Federal Operator Certification Expense Reimbursement Grant (ERG) is a one-time grant.

**Program start date:** 2011.

**Initial funding for program development:** Federal ERG.

**Stakeholder workgroup:** Program developed in-house by NJDEP staff. Sought input from NJAWWA Board of Trustees.

**Number of years in development:** Approximately 2 years; the program was first proposed in June 2009. Most significant delays were associated with utilizing ERG funds for the program.

**Results:** 31 positions were approved in 2011. Results not yet available.

# NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION – LICENSED OPERATOR INTERNSHIP PROGRAM

## PROGRAM DESCRIPTION CONTINUED:

The primary goal of this program is to provide individuals with the education and experience needed to become certified as New Jersey Water Treatment (T) and/or Water Distribution (W) operators. The minimum qualifications to take a T-1 or W-1 state exam are: 1) possession of a high school diploma or equivalent, 2) satisfactory completion of a 180-hour introductory course, and 3) one year of operating experience. Therefore, interns are required to possess a high school diploma or equivalent and enroll in and successfully complete the 180-hour training course. The training course is conducted by accredited educational institutions. County colleges, vocational schools and state universities offer the course. The courses must be approved by DEP with the recommendation of DEP's Advisory Committee on Water Supply and Wastewater Licensed Operator Training. The agenda for the 180-hour Introduction to Water and Wastewater training course is provided here.

Work performed as part of the internship program must be relevant to water system operation. Individuals who successfully complete the one-year internship will qualify to take a state T-1 and/or W-1 examination.

The program reimburses participating systems for interns' hourly pay and for indirect costs. NJDEP notified potential grantees of the funding opportunity by sending notices in the mail, posting the application on the NJDEP Water Supply website, and with outreach to the New Jersey Section AWWA, the New Jersey Water Association, the North Jersey Water Conference and the South Jersey Water Professionals Association.

Criteria for systems that applied for funding showed preference for 1) systems requiring a full-time operator; 2) systems that can demonstrate need for an intern in order to achieve adequate succession planning; 3) more complex treatment systems with a higher level of sophistication, as indicated by their license classification; 4) publicly owned water systems; and 5) systems with a training program in place for operators.

The program does not cover hourly pay that exceeds \$17.86 per hour or a total of \$32,500 per position per year. The program does not cover hours worked in excess of 35 hours per week, or the number of hours worked in a week that exceeds the number of hours regularly worked by the licensed operator of the system. Indirect costs are reimbursed at the rate of 7.69 percent of interns' hourly pay, and may not exceed \$1.37 per hour or a total of \$2,500 per year.

PART I (90 hours)*	
MATHEMATICS: Basic Math	12 hrs.
Basic Algebra	15 hrs.
Geometric Figures	9 hrs.
PHYSICS: Hydraulics	12 hrs.
Electricity	12 hrs.
Simple Machines	2 hrs.
BASIC CHEMISTRY	11 hrs.
MICROBIOLOGY	11 hrs.
MISCELLANEOUS	6 hrs.
PART II – WATER SECTION (45 hours)*	
ADMINISTRATIVE	6 hrs.
WATER SOURCES AND CHARACTERISTICS	3 hrs.
WELLS	3 hrs.
WATER TREATMENT	12 hrs.
DISINFECTION	3 hrs.
WATER ANALYSIS AND INTERPRETATION	3 hrs.
DISTRIBUTION SYSTEM	9 hrs.
SAFETY	3 hrs.
FIELD TRIP	3 hrs.
PART II – WASTEWATER SECTION (45 hours)*	
ADMINISTRATIVE	4 hrs.
WASTEWATER SOURCES AND CHARACTERISTICS	2 hrs.
TREATMENT METHODS: Preliminary	3 hrs.
Primary	3 hrs.
Secondary	10 hrs.
Sludge Handling	6 hrs.
Advanced Treatment	3 hrs.
DISINFECTION	2 hrs.
WASTEWATER ANALYSIS AND INTERPRETATION	3 hrs.
COLLECTION SYSTEM	6 hrs.
FIELD TRIP	3 hrs.
* Each section shall have a minimum of two (2) tests with a minimum average of 70 for passing.	

# THE OPERATOR TRAINING COMMITTEE OF OHIO WATER ENVIRONMENT TECHNICIAN PROGRAM

## CONTACT INFORMATION

Jean Diamond, Environmental Career Counselor  
Operator Training Committee of Ohio, Inc.  
614-440-4141  
[jean@ohiowater.org](mailto:jean@ohiowater.org)  
<http://www.ohiowater.org/otco/New%20Site/NewOTCO.html>

## BENEFITS

- The internship benefits both interns and utilities - interns can learn new skills and water and wastewater utilities gain assistance, without incurring the cost of an intern's salary.
- The program is flexible. Depending on the amount of funding available, OTCO can conduct trainings at the utility site, benefiting other utility employees.

## TROUBLE SHOOTING / LESSONS LEARNED

- Selected interns must be: self-sufficient during training; prepared for the academic challenge; understand the occupation, including the physical demands and necessary skills; realistic regarding expectations of entry-level employment.
- Interns must be committed and flexible. Based on the type of funding received, interns will be required to fill out the necessary JFS paperwork. In addition, the status of the internship is based on the availability of funding.

## PROGRAM DESCRIPTION:

The Water Environment Technician Program is an internship program managed by the Operator Training Committee of Ohio (OTCO), a nonprofit organization that develops and delivers training to meet the needs of water and wastewater operators. The program is funded by the Ohio Department of Jobs and Family Services (JFS) Bureau of Workforce Services. The Water Environment Technician Program prepares interns to become certified as Class I water supply operators or Class I wastewater works operators by providing valuable training and helping individuals to fulfill the 2,080 contact hours needed for certification.

Many program candidates learn about the program through their local JFS. All candidates are screened by JFS and OTCO before acceptance to the program. OTCO works with the utilities in the candidate's community to set up an internship. Interns typically commit 40 hours per week for 1 year at their sponsoring utility; however, interns have the flexibility to commit as little as 20 hours per week. OTCO works with JFS, the sponsoring utility, and intern to set up a customized training agreement (based on available funding), the timeline for operator certification testing, and the intern's goals and needs. This is generally an unpaid internship. OTCO also ensures that students complete the certification exam application properly, on time, and include any associated fees.

The intern's customized curriculum can include a variety of courses, including GIS Field Applications. During this course, students map the assets of a municipality to gain hands-on experience, while providing a utility with useful data.

## SPONSORING UTILITY RESPONSIBILITIES:

- Interview prospective interns to ensure a "good fit" regarding learning interests and work ethic. (Utilities are not obligated to hire the intern after the internship.)
- Provide OTCO with feedback on the intern's performance related to: understanding of basic instructions; initiative to ask questions; professionalism; communication with staff members; and traits beneficial to their work at the utility.
- Utilities can determine the intern's job tasks, schedule, and if a mentor is assigned.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** Full-time Career Counselor, part-time Administrative Assistant, and instructors.  
**Costs:** Based on available funding from JFS. Funding covers program coordination, instructors, training materials, safety equipment, and liability insurance.  
**Funding:** JFS administers the Workforce Investment Act (grant from Ohio's Workforce Investment Boards for re-careering or dislocated workers) and the Trade Adjustment Act (grant from the U.S. Department of Labor for workers unemployed or working with reduced hours due to outsourcing).

**Program start date:** 2008.  
**Initial funding for program development:** OTCO Workshops (held for continuing education unit credits); JFS funding.  
**Stakeholder workgroup:** OTCO Board of Trustees including representatives from utility organizations, regulatory agency, and industry professionals.  
**Results:** 87 percent program completion rate with 65 percent having operator-in-training status (passed certification exam, but not yet fulfilled experience requirements) or holding a higher certificate.

# THE OPERATOR TRAINING COMMITTEE OF OHIO WATER ENVIRONMENT TECHNICIAN PROGRAM

## EXAMPLE TRAINING PROGRAM CURRICULA:

- **WATER TREATMENT: 320 HRS**
    - Basic Water Treatment
      - ◆ Introduction to Water Distribution Systems
    - Water Treatment Internship
      - ◆ Plant Operation Laboratory
      - ◆ Distribution Systems
      - ◆ Independent Research Project
    - Water Treatment Workshop
    - Water Distribution Systems Workshop
    - Introduction to Backflow Prevention
    - Basic Laboratory Techniques
    - Ohio Administrative Code
      - ◆ Ohio EPA Water Regulations
  - **WASTEWATER TREATMENT: 320 HRS**
    - Basic Wastewater Treatment
      - ◆ Introduction to Wastewater Collections Systems
    - Wastewater Treatment Internship
      - ◆ Plant Operation Laboratory
      - ◆ Wastewater Collection Systems
      - ◆ Independent Research Project
    - Wastewater Treatment Workshop
  - Wastewater Collection Systems Workshop
  - Introduction to Backflow Prevention
  - Basic Laboratory Techniques
  - Ohio Administrative Code
    - ◆ Ohio EPA Wastewater Regulations
- **ADDITIONAL COURSEWORK**
  - Basic Computer Literacy (24 hrs each)
    - ◆ Introduction to MS Operating System (XP, VISA, 7)
    - ◆ Introduction to MS Word
    - ◆ Introduction to MS Excel
    - ◆ Introduction to PowerPoint
    - ◆ Introduction to GIS for Water/Wastewater
  - Standard Operation Procedures
  - Geographical Information Systems Field Applications for:
    - ◆ Water Distribution Systems
    - ◆ Wastewater Collection Systems
  - Additional electives based on location facility requirements
  - Basic Electrical Troubleshooting
  - Cross Connection Control

## EXAMPLE INTERN DUTIES:

In general, intern job duties are based on job analyses developed by Ohio EPA. Examples are below.

- **CLASS I WATER OPERATOR (EXAMPLE DUTIES)**

[http://www.epa.ohio.gov/portals/28/documents/opcert/Class\\_I\\_Water\\_Operator\\_chart\\_final.pdf](http://www.epa.ohio.gov/portals/28/documents/opcert/Class_I_Water_Operator_chart_final.pdf)

- Manage source water
- Operate water treatment facility
- Perform EPA sampling requirements
- Operate distribution system
- Maintain water treatment facility
- Administer water treatment programs (ex. backflow prevention program)
- Perform administrative activities

- **CLASS I WASTEWATER OPERATOR (EXAMPLE DUTIES)**

[http://www.epa.ohio.gov/portals/28/documents/opcert/WWI\\_job\\_analysis.pdf](http://www.epa.ohio.gov/portals/28/documents/opcert/WWI_job_analysis.pdf)

- Conduct routine sampling and monitoring
- Manage process control
- Perform plant maintenance
- Perform collection system maintenance
- Maintain safe work environment
- Manage recordkeeping
- Manage biosolids disposal
- Perform administrative functions

# SAN JOSE WATER COMPANY SUMMER LABORER PROGRAM

## CONTACT INFORMATION

Stephanie Orosco  
 Manager of Human Resources  
 San Jose Water Company  
 (408) 279-7854  
[Stephnie\\_Orosco@sjwater.com](mailto:Stephnie_Orosco@sjwater.com)  
<http://www.sjwater.com>

## BENEFITS

- Assists SJWC in managing the summer workload, including covering shifts for employees taking vacation.
- Develops participant interest in a future career in the water utility industry.
- Provides work experience and pay for college students and at-risk young adults in the surrounding communities.

## TROUBLE SHOOTING / LESSONS LEARNED

- SJWC is responsible for all insurance and liability. The SJWC has successfully dealt with few workers' compensation claims, but no significant claims.
- Through effective partnerships, such as with SJCC, the program is well-established and has not had difficulty recruiting qualified candidates. Recruitment is referral-based and the program has had success with this format.

## PROGRAM DESCRIPTION:

The San Jose Water Company (SJWC) Summer Laborer Program was created to provide college students and at-risk young adults in the local community with the opportunity to obtain professional work experience through a 3-month summer program. The program has had success in placing program participants on distribution system maintenance crews. This program is not designed to help individuals obtain or advance their operator certification.

Participants have the opportunity to gain experience in the water utility industry, while fulfilling the utility's need to maintain a required staffing level during the busy summer months. This program is open to students enrolled in an accredited college or university, or a member of San Jose's Conservation Corps; there are no specific educational prerequisites. To recruit potential candidates SJWC partners with the vocational training programs at the Workforce Institute at San Jose City College and San Jose Conservation Corps (SJCC), a youth job training and education program.

Participants have the opportunity to support the field or administrative efforts of the utility. SJWC also provides occupational and safety training for participants. Training includes classroom safety training, such as driving, protective gear and public interaction, as well as training specific to their job function (e.g., painting hydrants, which includes training on working with spray paint, assembling/disassembling hydrants, and protecting private property from overspray). Any summer laborer program participant working on water distribution crew trucks receives the same training as full-time employees, including 1 hour of one-on-one safety training with a safety program specialist and weekly safety training sessions with the entire distribution work crew. All participants are placed in laborer positions, with a limited opportunity to observe more highly skilled positions. Office work is occasionally performed by 1-2 students who are proficient with MS Office, or possess IT and/or web design skills.

## SPONSORING UTILITY RESPONSIBILITIES:

- Supervisory employees manage and oversee the program.
- Supervisory employees do not receive formal training on the program because it is well-established.
- Managers are required to complete an evaluation form for each participant that covers job performance, safety, attendance, dress and attitude.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** 40-65 hours per year for program administration by the SJWC Human Resources Department.  
**Costs:** Estimated 2011 cost for payroll and taxes is \$197,165 for the salary for 24 participants. Additional costs include safety training and daily oversight by supervisors and crew leaders. In 2011 the participant's pay was \$16.30/hr., the 2012 rate is TBD.  
**Funding:** Utility funded.  
**Program start date:** 2001.

**Initial funding for program development:** Utility funded.  
**Stakeholder workgroup:** SJWC, San Jose City College, SJCC.  
**Time in development:** Six to nine months.  
**Results:** Some of the participants were subsequently hired for regular full-time positions with the company, including positions on distribution system maintenance crews.

# SAN JOSE WATER COMPANY SUMMER LABORER PROGRAM

## ELIGIBILITY REQUIREMENTS:

- Currently enrolled in an accredited college or university as an undergraduate student or an active member of the SJCC.
- Is between the ages of 18 and 25.
- Holds a valid drivers license.
- Has a clean driving record.
- Plans to return to an accredited college or university in the fall or participate in the SJCC.
- Is able to commit 3 consecutive months to full-time work at SJWC.

## EXAMPLE JOB TASKS\*:

- Painting hydrants
- Digging ditches
- Clearing brush
- Creating or updating documents in Microsoft Word or Excel
- Filing papers
- Stocking crew trucks
- Cleaning and organizing crew truck tools
- Basic hydrant assembly
- Photographing global positioning system service points within the SJWC service area

\* These job tasks are at the discretion of SJWC and the participant's manager. Hours spent on the task are dependent upon the workflow within the SJWC.

# SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE ONE-YEAR WATER QUALITY CONTROL OPERATIONS CERTIFICATE PROGRAM

## CONTACT INFORMATION

Paul Shetley  
Director  
Environmental Resources  
Training Center, SIUE  
(618) 650-2030  
[pshetle@siue.edu](mailto:pshetle@siue.edu)  
[http://www.siue.edu/ertc/  
one\\_year\\_program.shtml](http://www.siue.edu/ertc/one_year_program.shtml)

## BENEFITS

- Utilities consider participation in the program as a recruiting opportunity. It gives utilities the opportunity to conduct the equivalent of a "long-term interview" with potential future employees.

## TROUBLE SHOOTING / LESSONS LEARNED

- Utilities are often concerned about their liability when accepting interns. SIUE signs a field practice agreement with all participating utilities. The university is willing to negotiate these agreements to a certain extent. This can be a 2-month negotiation process if the utility is new to SIUE's program.
- Though utilities administer the internships independently of SIUE, the university works to ensure that the students have meaningful internship experiences. As the program has developed, SIUE has ceased working with utilities that did not provide these experiences.

## PROGRAM DESCRIPTION:

The Southern Illinois University Edwardsville (SIUE) Water Quality Control Operations Program is a one-year, full-time program of study leading to a Certificate of Completion. The program includes a 10-week internship program, where students work 40 hours per week for five weeks at a drinking water treatment plant and five weeks at a wastewater treatment plant. Upon completion of the full-year program, Illinois Environmental Protection Agency (IL EPA) and Missouri Department of Natural Resources (MO DNR) administer the certification exams at the university for entry-level public water supply operators and/or wastewater treatment system operators.

Enrollment is limited to 35 students per academic year. Formal entry into SIUE is not required for admission. The program prefers to admit only high school graduates or persons with a GED certificate, though some students 18 or older who are not high school graduates may also be admitted. The program requires that students remain in good academic standing by maintaining a cumulative 2.00 GPA (on a 4.00 scale) in order to be eligible to complete an internship.

Students can choose to continue their education at Lewis and Clark Community College in Godfrey and earn an AAS in Applied Science. The course of study at Lewis and Clark Community College focuses on building skills required to manage a utility.

## SPONSORING UTILITY RESPONSIBILITIES:

- Depending on the size of the utility, SIUE will place 1-2 students per utility. The university works to match students with utilities near the students' homes for the internship.
- SIUE signs a field practice agreement with all participating utilities.
- The students must be supervised during their internships, but participating utilities have complete discretion in the design and administration of the internships. This includes intern job tasks, schedule, and whether and how much the intern will be paid.
- The utility is not required to keep records for the university. However, the university does receive evaluations from the students.

## INFORMATION FOR PROGRAM DEVELOPMENT:

**Required staff time:** Four full-time instructors, plus part-time instructors, and one full-time administrator.

**Costs:** Approximately \$500K/year.

**Funding:** Annual grant from IL EPA \$120K.

**Program start date:** 1981.

**Initial funding for program**

**development:** Clean Water Act 104(g)(1) funding.

**Stakeholder workgroup:** IL EPA, and an Advisory Committee made up of school representatives, Lewis and Clark Community College, and water and wastewater operators.

**Number of years in development:**

Approximately two to three years.

**Results:** Average graduation rate: 70 to 80 percent; Average exam pass rate: 80 percent; Job placement rate varies by year. Recently, it ranged from 50 to 80 percent.

# SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE ONE-YEAR WATER QUALITY CONTROL OPERATIONS CERTIFICATE PROGRAM

## PROGRAM DESCRIPTION CONTINUED:

The program emphasizes practical training during 35 contact hours per week. The university's Environmental Resources Training Center has fully equipped wet chemistry teaching labs, an instrumental analysis teaching lab, a 30,000 gallon/day training scale water and wastewater treatment plants along with the 0.3 million-gallon-per-day SIUE wastewater treatment plant. A 10-week supervised work-study internship is an integral part of the program. All students enroll in an internship at a public water supply and/or wastewater treatment system.

Example schedule			
Fall	Hours per week		
	Lecture	Lab	Total
Wastewater Operations I	4	4	8
Water Supply Operations	4	4	8
Water Quality Laboratory I	2	6	8
Mechanical Maintenance	3	4	7
Water Quality Math and Science	4	0	4
Spring	Hours per week		
	Lecture	Lab	Total
Wastewater Operations II	4	4	8
Water Supply Operations II	4	4	8
Water Quality Laboratory II	2	4	6
Electrical/Instrumentation Maintenance	2	4	6
Water Quality Communications	1	1	2
System Maintenance	2	3	5
Summer			
Supervised Work Study	40 hours/ week for 10 weeks		

# TECHNICAL HIGH SCHOOL PROGRAMS IN TEXAS

CONTACT INFORMATION	PROGRAM DESCRIPTION:	
<p>Teresa Bryant; City of Waco 254-750-8007 <a href="mailto:teresab@ci.waco.tx.us">teresab@ci.waco.tx.us</a></p> <p>Barry Allen; City of Irving 972-721-2249 <a href="mailto:ballen@cityofirving.org">ballen@cityofirving.org</a></p>	<p>The Barbara Cardwell Career Preparatory Center, part of the Irving Independent School District (Irving ISD), has a HydroTechnology program that prepares high school students to take the Class D Water or Class I Wastewater Collections licensing exam and helps students earn hours needed for licensure. Students typically enter this 3-year program in 10th grade. It includes 2 courses and a practicum. The first class, Basic Water, includes topics such as types of public water systems, public relations, water quality, ground water production, surface water production, disinfection, storage, distribution, pumping, safety, and operator math calculations. The second class, Waste Water Collection, focuses on state requirements, collection system and design, construction, lift stations, maintenance and operations, industrial waste monitoring, collection system management, and operator math calculations. The program involves hands-on training, weekly guest speakers from local utilities, and field trips to water and wastewater utilities. All students can earn 20 hours towards licensure. Irving ISD pays for students to take the licensure exam.</p> <p>During their Senior Year, some students have the opportunity to complete a practicum course. Practicum courses are given for one hour daily, and cover subjects such as occupational safety and health training, customer service, planning and time management, problem solving and employment skills. After class time, students registered in the practicum spend 2 hours per day at Water Utilities for a hands-on internship.</p> <p>The Partnership for Water Education in Waco, Texas, is an initiative between the City of Waco and the Waco Independent School District (Waco ISD). Inspired by Irving's program, Waco started their own year-long program at the A.J. Moore Academy to train students for the Class D Water Operator License. Courses cover a wide range of topics including: duties and responsibilities of operators, state and federal regulations, water quality standards, water treatment processes, microbial disinfection, storage and distribution, occupational safety, water operations math, and utility public relations. The class meets every other week for 2 days. Once a month, students go on a field trip to the water utility to gain hands-on experience in water testing, water treatment processes, lab sampling, meter maintenance, line repair and valve operations.</p>	
BENEFITS		
<ul style="list-style-type: none"> <li>▪ Creates positive press opportunities for the utility and the schools in the community.</li> <li>▪ Opportunity for increased civic engagement, innovative educational programming, enhanced community partnerships and support for an at-risk portion of the population.</li> <li>▪ Interaction with students allows a broader learning experience and gives the utility opportunity to assess job potential.</li> <li>▪ Field trips increase students' interest, awareness, and knowledge of key elements in the water industry.</li> </ul>		
TROUBLE SHOOTING / LESSONS LEARNED	INFORMATION FOR PROGRAM DEVELOPMENT:	
<ul style="list-style-type: none"> <li>▪ Cities may require a drivers license and clean driving records, making it difficult for some students to get an internship. The City of Irving is working on funding for students to address this issue.</li> <li>▪ Students who self-elect to take the course retain interest over those who are placed in the course.</li> <li>▪ Additional funding can come from area water organizations.</li> </ul>	<p><b>Required staff time:</b> One full-time teacher and participating utility staff, including a part-time project manager.</p> <p><b>Costs:</b> <u>Irving:</u> \$12,500 (soft costs) /year. <u>Waco:</u> \$7,790/year. These are costs incurred by the utilities to cover the approximate portion of utility staff time devoted to the program. Extra costs include teacher time, testing fees, books and transportation.</p> <p><b>Funding:</b> School districts (Irving ISD and Waco ISD) pay for teachers and testing supplies; utility pays staff time and project supplies. Waco received additional funding from American Water</p>	<p>Works Association and other water associations.</p> <p><b>Program start date:</b> <u>Irving:</u> 2008. <u>Waco:</u> 2010.</p> <p><b>Stakeholder workgroup:</b> City of Irving, Irving ISD, City of Waco, Waco ISD</p> <p><b>Time in development:</b> <u>Irving:</u> concurrently with program start. <u>Waco:</u> Four months.</p> <p><b>Results:</b> <u>Irving:</u> 50 alumni, 9 licensures; Irving Water Utility Department currently employs 2 alumni. <u>Waco:</u> 12 alumni, four took the Class D licensure test (including the teacher) and three passed.</p>

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## EXAMPLES OF FIELD TRIPS AND HANDS-ON ACTIVITIES:

### Irving, TX—Cardwell Career Prep Activities and Field Trips

- **Leak Detection** - Students are taught how to use leak detection equipment at a known leak in the city.
- **Elm Fork Water Treatment Plant** - Students learn treatment processes.
- **Trinity River Authority of Texas Central Regional Wastewater System Plant** - Students learn wastewater treatment processes and learn about water quality testing.
- **Water Utility Department** - Students visit water department and observe environmental compliance, warehouse, pumps and motors shop, SCADA system; operators show students how to operate equipment.
- **Small Water Tap Activity** - Each student makes a  $\frac{3}{4}$  inch tap on 8 inch pipe and is shown how to properly cut copper piping and attach from the main to the meter.
- **2" Meter Change Out** - Students participate in replacing gaskets on a 2" meter and are taught how to disinfect gaskets.
- **Self-contained Breathing Apparatus Equipment Use Tarrant Regional Water Authority Field Trip** - Students observe a raw water storage facility and observe raw water intake.
- **City of Irving Tour** - Students observe city infrastructure including water tower, pump station, and lift station.
- **Confined Space** - Students are taught how to prepare a permit, monitor a vault, and how to descend into a confined space.
- **Fire Hydrant Investigation, Repair and Flushing** - Students participate in troubleshooting, breaking down and reassembling a hydrant; students are taught the importance of flushing.
- **Testing for Chlorine** - Students are taught how to test for chlorine residual.
- **Bacti Sampling Procedures** - Students are taught proper techniques for sampling, storage and transport.

- **Trenching and Shoring** - Students are taught proper techniques for trenching and shoring.
- **Valve Operation** - Students shown how to properly operate a 6" gate valve and how to distinguish valve size by operation.
- **Employment Issues** - Students receive instruction on how to prepare a resume, how to apply and interview for jobs, and coaching on good work habits.

### Waco, TX — A.J. Moore Academy Field Trips

- **Public Relations - City Water Office** - Students learn about billing and payment acceptance procedures and activities involved in the "Call-Center." Students receive a presentation on meter shop operations, including turn-on, turn-offs, and automated meter reading.
- **Water Quality - Wetlands/Dissolved Air Flotation** - Students tour the new facility and learn how the process improves water quality.
- **Surface Water Production - Mount Carmel/Riverside Water Treatment Plants** - Students participate in several hands-on activities including filter backwash, water sampling, residual testing, bacteriological testing, and chemical feed processes.
- **Distribution - Riverside Water Treatment Plant** - Students are introduced to and participate in distribution activities such as line repair, valve operation, camera operation, and vactor operations.
- **Mathematics/Water Calculations Tutoring** - Students review basic algebra needed for day-to-day water utility functions, including chlorine dosages, estimation of leak size, disinfecting, motor horsepower, pumping, electrical and storage calculations.
- **Field safety** - Students review the major safety hazards associated with water utilities work through a presentation and lecture.
- **Water Utilities Careers** - City of Waco employees from different divisions discuss their jobs and their career plans in the water industry with students.

## SPONSORING UTILITY RESPONSIBILITIES:

- Waco ISD and Irving ISD work with utility staff to plan field trips and hands-on classroom work.
- Water Utility employees in Irving may supervise summer and practicum interns; determine intern's job tasks.

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- **ALASKA JOB CORPS WATER AND WASTEWATER OPERATOR TRAINING**
  - US Department of Labor Job Corps entry-level water and wastewater operator training
- **APPRENTICESHIP CAROLINA™ WATER AND WASTEWATER OPERATORS**
  - South Carolina Apprenticeship Program certified by the Department of Labor for new and incumbent wastewater and water operators
- **CITY OF GROTON WATER POLLUTION CONTROL AUTHORITY SUMMER INTERNSHIP PROGRAM**
  - Utility-based program to train entry-level wastewater operators
- **EAST BAY MUNICIPAL UTILITY DISTRICT MENTORSHIP PROGRAM**
  - Utility-led mentoring program to develop utility supervisors
- **EAST BAY MUNICIPAL UTILITY DISTRICT OPERATOR INTERNSHIP PROGRAM**
  - Utility-based internship for students working towards water or wastewater treatment certificate
- **ENVIRONMENTAL ENGINEERING TECHNOLOGY — WATER AND WASTEWATER DEGREE (EVETW)**
  - Associates degree program for entry-level operators
- **GET INTO WATER! PROGRAM — WATER UTILITY SCIENCE PROGRAM/WATER QUALITY MANAGEMENT PROGRAM**
  - Partnership program between utilities, utility associations and educational institutions to train high school students and adults to become entry-level operators
- **HAMPTON ROADS SANITATION DISTRICT APPRENTICESHIP PROGRAM**
  - Utility-based apprenticeship program with academic and on-the-job training for wastewater operators
- **KENTUCKY WATER TRAINING INSTITUTE**
  - Training program for entry-level and experienced water and wastewater operators based at Western Kentucky University
- **MAINE MANAGEMENT CANDIDATE SCHOOL**
  - Statewide training program to develop utility managers
- **MASSDEP'S GREEN JOBS TRAINING AND PLACEMENT PARTNERSHIP**
  - Statewide internship and training program for small system and entry-level distribution operators
- **NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION — LICENSED OPERATOR INTERNSHIP PROGRAM**
  - Statewide grant program to fund operator internships
- **THE OPERATOR TRAINING COMMITTEE OF OHIO WATER ENVIRONMENT TECHNICIAN PROGRAM**
  - Statewide training program for entry-level operators developed in conjunction with Ohio Department of Jobs and Family Services
- **SAN JOSE WATER COMPANY SUMMER LABORER PROGRAM**
  - Utility-led summer laborer program for young adults
- **SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE ONE-YEAR WATER QUALITY CONTROL OPERATIONS CERTIFICATE PROGRAM**
  - University-based entry-level water and wastewater operator program
- **TECHNICAL HIGH SCHOOL PROGRAMS IN TEXAS**
  - Technical high school entry-level water and wastewater operator training programs in the cities of Irving and Waco, Texas