

Office of
Water Programs
California State University Sacramento

A n n u a l R e p o r t 200405

Office of Water Programs

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Annual Report

2004₀₅

The **Office of Water Programs (OWP)** is a non-profit organization affiliated with the Department of Civil Engineering at Sacramento State. OWP is a self-supporting unit of University Enterprises, Inc., and consists of the Training Group and the Research Group.

Since 1972, OWP has provided high-quality, low-cost training programs for operators of drinking water treatment and distribution systems and wastewater collection, treatment, and discharge and reuse systems. The revenue generated by these training programs supports our students, keeps our training materials current, promotes our program, and funds development of new training materials and methods. During the 2004-2005 fiscal year, 41,483 manuals, 13,776 enrollments, and 120 sets of videos were purchased. Seventy percent (9,685) of enrolled students successfully completed their courses.



Dr. John Johnston, Technical Advisor,
instructs Civil Engineering students.

Throughout the years, OWP has developed 31 training courses, using correspondence, video, CD-ROM, and internet delivery formats. Our training manuals are now available in 12 languages and are sold in 108 countries. Six hundred and fourteen colleges and universities purchase and use OWP materials as part of their curriculum.

This year marks the first year of sales of three new distance learning courses based on the California Stormwater Quality Association's (CASQA) Stormwater Best Management Practices (BMP) handbooks. Thirty-three enrollments were sold in the first year, with 59 percent of sales to out-of-state students. CASQA BMP on-line courses have been approved as operator training courses by the California Water Environment Association (CWEA), and by certification boards in 10 states to date.

As changing needs and demands call for developing new training methods and materials, OWP will continue to respond by introducing

modern training techniques and by continually updating our content to keep it current and relevant. Our goal is to remain the premier international provider of operator training materials and methods.

T R A I N I N G

The introduction of new treatment processes to treat new types of contaminants and the promulgation of new water quality standards require that operators of wastewater and drinking water treatment plants continually update their training. The Office of Water Programs responds to these training needs by frequently updating training materials, courses, and training methods. Keeping our training materials current remains a top priority for our professional staff as they participate with industry professional organizations and regulatory and certification advisory committees.

NEW COURSES

Manage For Success

This course is designed to help water and wastewater utility managers develop the knowledge, skills, and abilities that will enable them to succeed as managers. Written specifically by and for water and wastewater professionals, the core competencies discussed in this training manual relate directly to the day-to-day experiences of a utility manager. Topics covered include personal and professional skills such as planning and organizing, problem solving, decision making, teaching and training, and communication. The manual also describes key managerial responsibilities and offers many suggestions for effective leadership in areas such as financial management, supervision, personnel management, emergency planning, health and safety programs, community relations, and regulatory compliance. Students completing this new course will earn 4.5 CEUs.



Celia Echauri, Program Representative, takes a phone order.

Water Systems Operation and Maintenance Video Training Series

Water supply systems vary from town to town, city to city, and from region to region. The information presented in this basic course provides students with an introduction to the basic operation and maintenance aspects of small water systems. Passing the operator examinations will require additional study to gain the knowledge and skills needed to operate and maintain water treatment and water distribution systems as efficiently and effectively as possible. Students must identify problems, analyze the causes of problems, and solve operation and maintenance problems. The series consists of seven videos and a learning booklet, and features real operators performing duties at their facilities. Students completing this new course will earn 3.0 CEUs.

CASQA Distance Learning Courses

OWP is now offering tests and study guides based on three California Stormwater Quality Association (CASQA) Stormwater Best Management Practice (BMP) handbooks. The study guides are available on CDs, and the final exams can be taken via the internet. Students can earn two Continuing Education Units (CEUs) for each course. A fourth course, based on CASQA's Stormwater BMP handbook for Industrial and Commercial applications, will be developed in the coming year.

IN DEVELOPMENT

Water Distribution System Operation and Maintenance On-Line Courses

Five new courses are under development to meet the training needs for distribution system operators for the contact hours required to renew their certifications. Each course will focus on one or two major topic areas. These new courses will use the same internet delivery systems that have proven so successful with the Small Water System Operation and Maintenance training series released in 2002. Each course will provide 18 contact hours of training credit.

CONTRACTS

California Water Environment Association

The OWP was awarded a one-year contract with the California Water Environment Association (CWEA) to develop training tools for CWEA trainers to improve the quality and consistency of the training they provide to operators and technicians. OWP staff, in collaboration with the CSUS Center for Teaching and Learning (CTL), are developing a series of seven Moderator Guides for use by CWEA trainers. OWP and CSUS CTL staff will also conduct two workshops for CWEA trainers.

EXPANDING OUR IN-HOUSE CAPABILITIES

In 2004, the Training Group embarked on a large-scale effort to establish procedures for editing their popular training manuals in house. Many of these procedures have now been implemented.

All of the training manuals have been stored electronically on the new WebDAV server. Having all of the electronic files readily available allows the editing staff to control the document creation process and file editing while allowing easy historical archiving. User access has also been controlled, and OWP editorial staff now have secure access to their files.

Future plans for editing include developing the ability to search for graphics on the server and controlling different versions of all documentation files.

R E S E A R C H

For the past seven years, OWP Research engineers and scientists have assisted Caltrans in planning and managing its stormwater management program. This group, along with some Caltrans engineers, are known as the Applied Studies Team (AST). The major elements of this program are characterization monitoring, field testing of best management practices (BMPs), and source control. The Research Group began a new 3-year contract with Caltrans in June 2005. Similar services are being provided to the El Dorado County Department of Transportation (DOT) under a 3-year contract that began in July 2004. The Research Group completed the Used Oil Demonstration Project for the California Integrated Waste Management Board as well as the NPDES Compliance Cost Survey Project for the State Water Resources Control Board. The OWP Research Group is an affiliate member of CASQA.

CALTRANS—Characterization Monitoring

Although a major portion of the stormwater runoff characterization projects are complete, OWP continues to help Caltrans with special characterization projects to study the effectiveness of drain inlet cleaning, pathogens, herbicides, toxicity, California Toxics Rule (CTR) constituents, and first flush characteristics. Results of these studies have been and will continue to be applied in the design and development of stormwater erosion control and treatment best management practices.

CALTRANS—Treatment Best Management Practices Pilot Studies

The Applied Studies Team is currently conducting various stages of 74 full-scale pilot studies and various small-scale studies. The pilot studies are determining the treatment performance, life cycle costs, and maintenance requirements for the following technologies: detention basins (various operation modes and inlet/outlet structures); sand filters; alternative media (activated alumina, iron modified activated alumina, and limestone); chemically enhanced detention basins; sand traps with filter fabric; vegetated strips; bioretention facilities; and gross solids removal devices.

The Research Group, working closely with the Sacramento State Chemistry Department, is developing and testing drain inlet inserts. The work is being performed at the Used Oil Demonstration Project testing facility located on campus.

The small-scale treatment BMP testing facility in the Lake Tahoe Basin is being used for testing various combinations of sedimentation, filtration (media and filter fabric), and chemical addition. Forty systems were piloted during the past year, and up to 50 systems will be piloted this coming wet season. The coming year will



Tod Granicher, Staff Chemist, manages the OWP lab.

include studies on the toxicity of chemically treated stormwater as well as the stability of floc formed by chemically treated stormwater.

The Research Group is currently writing a guidance manual for the planning, executing, and reporting stages of BMP pilot studies.

Caltrans—Source Control

OWP continues to work closely with staff at the Cal Poly San Luis Obispo Erosion Research Facility. One ongoing project is developing techniques to improve roadside management of erosion control and vegetation establishment. Another project is enhancing a tool that specifies and calculates seed and live plant materials for transportation projects.

In addition, there are several new projects focused on identifying sources of contaminants found in Caltrans stormwater runoff. A goal of one project is to determine which portions of stormwater runoff contaminants come from highway activities versus atmospheric deposition. Other projects are focused on identifying the sources of phosphorus and some metals found in the Caltrans runoff.

Caltrans—Data Management, Tool Development, and Annual Reporting

Services to Caltrans have expanded to include data management, tool development, and preparation of several annual reports. The Research Group is responsible for housing and administering the Caltrans Storm Water Library. They are also responsible for housing and administering the Caltrans Storm Water Information System (SWIS), a continuously updated database that stores all Caltrans monitoring and pilot study data. Data management duties also include oversight, training, and enforcement of Caltrans data collection and analysis protocols. The Caltrans Monitoring Equipment Inventory, Storage, and Maintenance Program is also administered by the Research Group. During the past year, the Research Group also enhanced two on-line tools used by design engineers: the Water Quality Planning Tool and Basin Sizer. Finally, the Research Group prepared the following annual reports: the Treatment BMP Technology Report, the Storm Water Monitoring and BMP Status Report, and early versions of the Strategic Plan.

California Integrated Waste Management Board (CIWMB)

The Used Oil Demonstration Project was completed this past year. Using a testing facility constructed on the Sacramento State campus, the Research Group evaluated the effectiveness of several drain inlet inserts for removing oil and grease from stormwater. Results and conclusions were published in the CIWMB Used Oil Demonstration Grant Laboratory Evaluation of Four Storm Drain Inlet Filters for Oil Removal (July 2005).

State Water Resources Control Board

The Research Group, in coordination with a technical advisory group, surveyed six California communities to estimate the costs to municipalities of complying with their stormwater permits. This project was completed and the results are presented in the National Pollutant Discharge Elimination System (NPDES) Stormwater Cost Survey, published in January of 2005.

El Dorado County

The Research Group was also busy performing a variety of services for the El Dorado County Department of Transportation (DOT). They prepared a draft Storm Water Management Plan as well as the County's stormwater Annual Report. They performed literature reviews and provided recommendations on research and monitoring needs. Analytical and monitoring expertise was provided throughout the year. Four stormwater informational brochures were developed. Three Facility Pollution Prevention Plans were prepared. The County's drainage manual, design standards manual, grading ordinance, and vegetation establishment guidelines were updated.

Sacramento County Regional Sanitation District

OWP continued to provide consulting services under the 3-year contract with the Sacramento County Regional Sanitation District. OWP staff assisted with assessment and selection of appropriate technologies for treating reclaimed wastewater to meet standards for recycled water. Technologies investigated include membrane treatment, cloth filtration, and granular media filtration. The reclaimed water will be used to irrigate median landscaping, golf courses, parks, etc.

OWP also assisted SCRSD by conducting an extensive analysis of methyl mercury contamination of watersheds tributary to the Sacramento River. The work related to treated wastewater discharge permit limitations of methyl mercury into the Sacramento River.

SHARING OUR RESEARCH

The Research Group shares its expertise with transportation and stormwater professionals by publishing and presenting research results at meetings and conferences. Appendix B lists the Research Group's publications and presentations.

Conference abstracts and professional papers can be read and downloaded from the OWP website at owp.csus.edu. Descriptions and links to Caltrans project reports are also available, and users can access specialized software developed for stormwater applications.



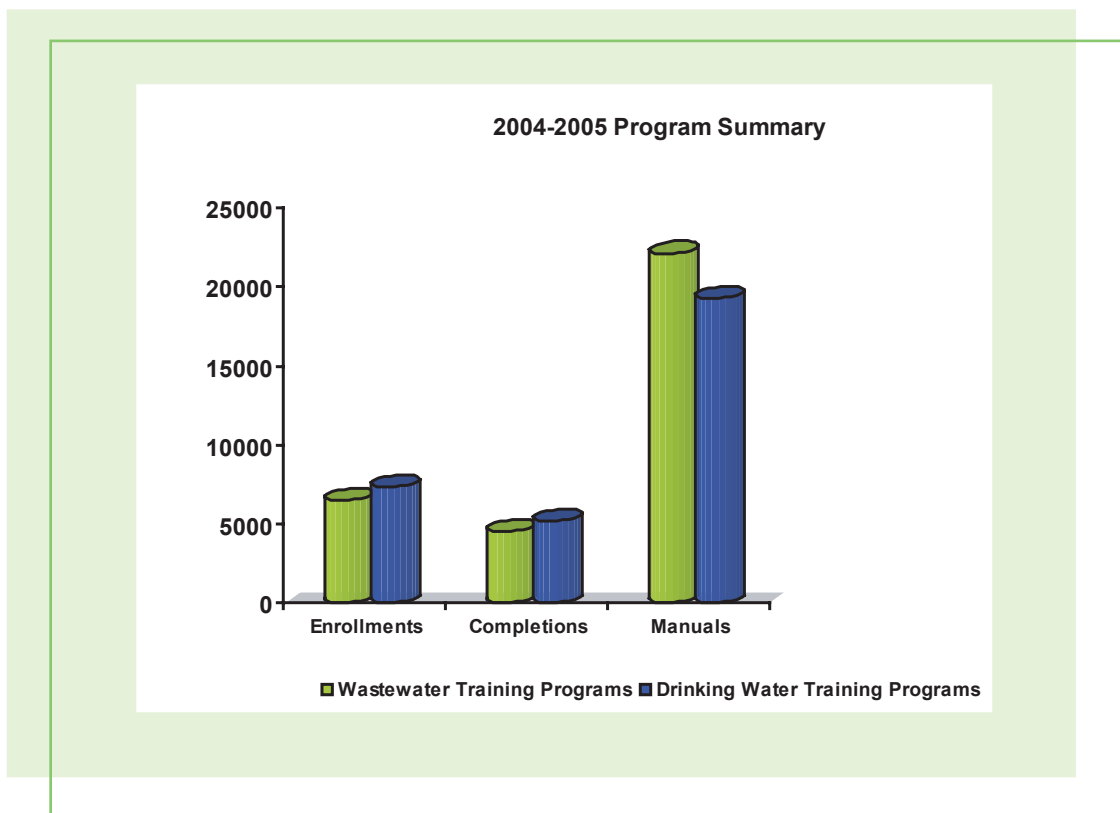
Photo courtesy of International Erosion Control Association (IECA)

Misty Scharff, Soil Scientist, is honored at a conference.

APPENDIX A

SUMMARIES

Totals for activity during the fiscal year 2004-2005 brought overall cumulative totals to 992,301 manuals sold; 252,449 enrollments assigned; and 154,015 successful completions.



WASTEWATER

Small Wastewater System Operation and Maintenance, Volume I
(First Edition, 1997)

2,720 enrollments
1,736 completions
6,240 manuals

More than 63 colleges and universities use this manual as a textbook. The manual and course enrollments have been purchased in the U.S., Canada, and 42 other countries.

Small Wastewater System Operation and Maintenance, Volume II
(First Edition, 2002)

563 enrollments
316 completions
1,369 manuals

More than 24 colleges and universities use this manual as a textbook. The manual and course enrollments have been purchased in the U.S., Canada, and nine other countries.

Operation of Wastewater Treatment Plants, Volume I

(First Edition, 1980; Fifth Edition, 2002)

59,671 enrollments
35,347 completions
195,140 manuals
300 compact disks

More than 462 colleges and universities use this manual as a textbook. The manual and course enrollments have been purchased in the U.S., Canada, and 91 other countries.

Operation of Wastewater Treatment Plants, Volume II

(First Edition, 1980; Sixth Edition, 2003)

30,695 enrollments
18,106 completions
140,546 manuals

More than 411 colleges and universities use this manual as a textbook. The manual and course enrollments have been purchased in the U.S., Canada, and 83 other countries.

Advanced Waste Treatment

(First Edition, 1987; Fourth Edition, 2002)

12,920 enrollments
8,569 completions
54,483 manuals

More than 250 colleges and universities use this manual as a textbook. Companies and individuals in the U.S., Canada, and 68 other countries have purchased manuals and enrollments.

Industrial Waste Treatment, Volume I

(First Edition, 1987; Second Edition, 1994)

5,198 enrollments
3,099 completions
28,906 manuals

More than 180 colleges and universities use this manual as a textbook. The manuals and course enrollments have been purchased in the U.S., Canada, and 61 other countries.

Industrial Waste Treatment, Volume II

(First Edition, 1987; Second Edition, 1995)

2,099 enrollments
1,355 completions
15,517 manuals

More than 145 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 58 other countries have purchased manuals and enrollments.

Treatment of Metal Wastestreams

(First Edition, 1986; Third Edition, 2003)

7,950 enrollments
6,436 completions
28,483 manuals

More than 142 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 51 other countries have purchased manuals and enrollments.

Pretreatment Facility Inspection

(First Edition, 1988; Third Edition, 1996)

6,157 enrollments
4,035 completions
15,973 manuals

More than 116 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 48 other countries have purchased manuals and enrollments.

Pretreatment Facility Inspection Training Videos

(First Edition Videos, 1998; Course, 2003)

1,236 videos sets
10 enrollments
7 completions

This set of five videos is designed to train inspectors to use safe and efficient procedures when inspecting industrial pretreatment facilities. The videos can be used in conjunction with the manual.

Operation and Maintenance of
Wastewater Collection Systems, Volume I
(First Edition, 1976; Sixth Edition, 2003)

13,017 enrollments
9,149 completions
62,732 manuals

More than 193 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 65 other countries have purchased manuals and enrollments.

Operation and Maintenance of
Wastewater Collection Systems, Volume II
(First Edition, 1976; Fifth Edition, 1995)

6,608 enrollments
4,784 completions
45,540 manuals

More than 177 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 63 other countries have purchased manuals and enrollments.

Collection System Operation and
Maintenance Training Videos
(First Edition, 1997; Course 2004)

29 enrollments
14 completions
1,409 videos

Created for operators of wastewater collection systems, these videos are suitable for training new and experienced collection system operators to safely operate and maintain their systems.

Collection Systems: Methods for Evaluating
and Improving Performance
(First Edition, 1998; Course 2004)

86 enrollments
68 completions
2,258 manuals

This unique resource for operators and managers of wastewater collection systems has been sold throughout the United States and Canada, in 20 other countries, and to 32 colleges and universities.

DRINKING WATER

Water Treatment Plant Operation, Volume I
(First Edition, 1983; Fifth Edition, 2004)

41,308 enrollments
22,308 completions
128,585 manuals

More than 366 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 88 other countries have purchased manuals and enrollments.

Water Treatment Plant Operation, Volume II
(First Edition, 1983; Fourth Edition, 2004)

19,193 enrollments
11,675 completions
82,155 manuals

More than 323 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 82 other countries have purchased manuals and enrollments.

Small Water System Operation and
Maintenance
(First Edition, 1983; Fourth Edition, 1999)

13,630 enrollments
7,690 completions
65,274 manuals

More than 218 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 76 other countries have purchased manuals and enrollments.

Water Distribution System Operation and
Maintenance
(First Edition, 1983; Fifth Edition, 2005)

21,142 enrollments
12,569 completions
97,007 manuals

More than 254 colleges and universities use this manual as a textbook. The manuals and course enrollments have been purchased in the U.S., Canada, and 78 other countries.

Utility Management

(First Edition, 1998; Second Edition, 2004)

5,170 enrollments
4,329 completions
10,878 manuals

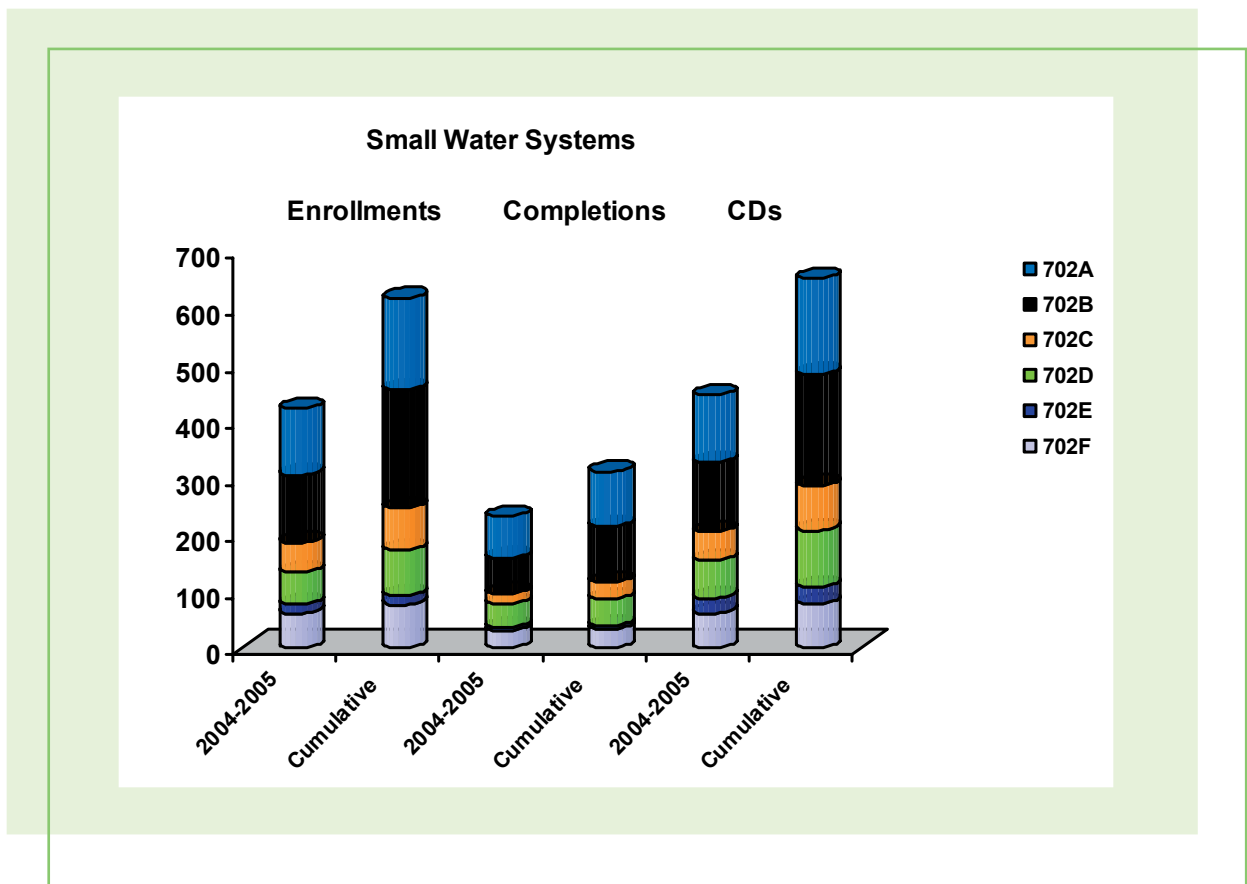
More than 54 colleges and universities use this manual as a textbook. Individuals and companies in the U.S., Canada, and 46 other countries have purchased manuals and enrollments.

Small Water Systems Video Information Series

(First Edition, 2001)

217 enrollments
153 completions
463 video sets

More than nine colleges and universities use this video series. Individuals and companies in the U.S., Canada, and two other countries have purchase this video series.



SMALL WATER SYSTEMS

WAT 702A Small Water Systems—Water Sources and Treatment
(First Edition, 2003)

162 enrollments
96 completions
168 compact disks

Topics include: the components of a water supply system from source to customer; the diverse responsibilities of a water system operator; the requirements for certification and how to prepare for obtaining and maintaining certification; the hydrologic cycle and its impact on water sources; conducting a sanitary survey as part of selecting a water source; accessing and using the EPA website for the Safe Drinking Water Act; and identifying components of water treatment systems and their purposes. Also included: solution techniques for solving water treatment plant math problems.

WAT 702B Small Water Systems—Wells
(First Edition, 2003)

209 enrollments
99 completions
196 compact disks

Topics include: setting up a wellhead protection program; identifying parts of a well and pump system; maintaining and rehabilitating a well; operating and maintaining a well pump and hydropneumatic pressure tank; inspecting a well and pumping system; disinfecting wells and pumps; keeping accurate records of a well and pumping system; removing sand from water mains; troubleshooting problems in wells and pumping systems; selecting a well site; describing types of wells and drilling methods; testing and evaluating a well and pump; and abandoning and plugging a well no longer productive or needed.

WAT 702C Small Water Systems—Small
Water Treatment Plants
(First Edition, 2003)

74 enrollments
29 completions
80 compact disks

Topics include: treatment requirements and methods for surface waters and groundwaters; operating coagulation, flocculation, sedimentation, filtration, and disinfection treatment processes for a surface water treatment plant; instituting a corrosion control program to protect treatment and distribution infrastructure; operation of solids-contact clarification and slow sand filter systems; operating iron and manganese removal and water softening processes for treatment of groundwater; and setting up effective maintenance and safety programs for a treatment works.

WAT 702D Small Water Systems—Disinfection
(First Edition, 2003)

80 enrollments
41 completions
100 compact disks

Topics include: disinfection and applicable regulations; factors influencing disinfection effectiveness; physical and chemical means of disinfection and the critical factors affecting each; disinfecting wells, pumps, mains, and tanks; operating various types of chlorination equipment; determining and setting chlorination rates; measuring chlorine residual; handling chlorine and chlorine equipment safely; and solving disinfection math problems.

WAT 702E Small Water Systems—Water Rates/
Safety
(First Edition, 2004)

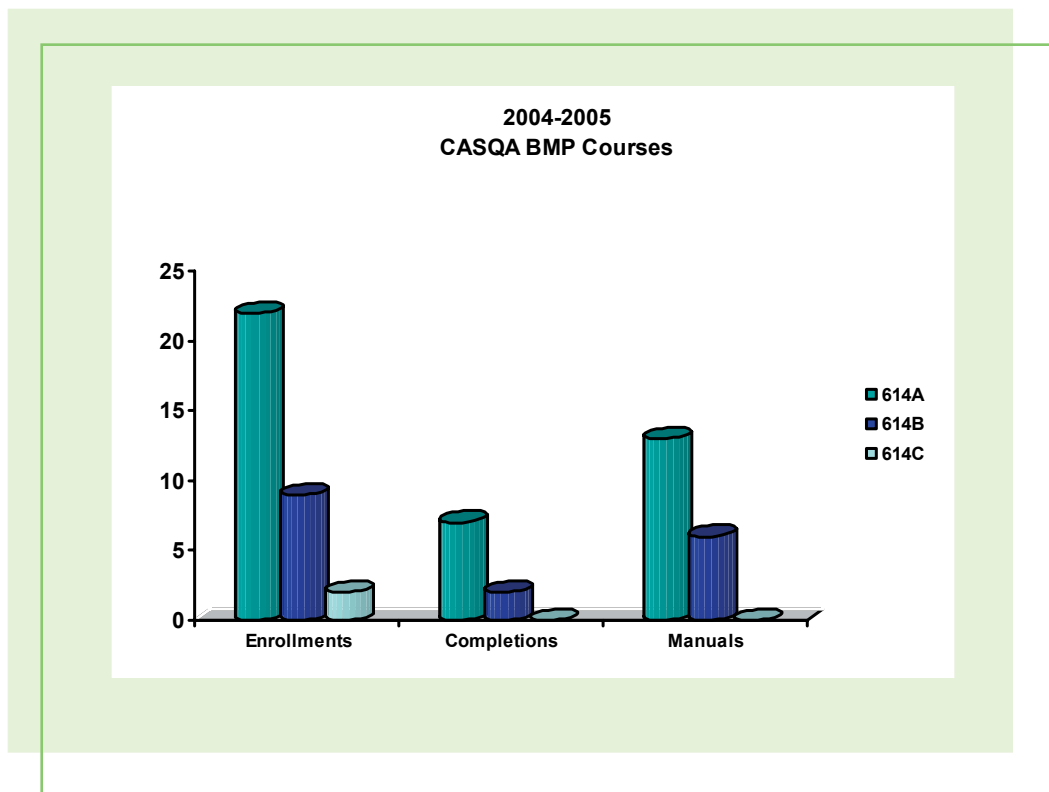
16 enrollments
6 completions
29 compact disks

Topics include: developing and implementing a safety program for workers at water treatment and distribution facilities; understanding and properly using safety equipment; instituting safe practices around wells, treatment works, chemical processes, pumps, streets and trenches, confined spaces, and water storage facilities; practicing lockout/tagout procedures; and conducting safety inspections. Topics covered in the second component of the course include: developing water rates for a utility; determining revenue requirements; applying cost allocation methods; calculating distribution of costs to customers; designing rates; administering rates and charges; and planning for financial stability.

WAT 702F Small Water Systems—Laboratory
(First Edition, 2004)

75 enrollments
32 completions
77 compact disks

Topics include: performing basic laboratory procedures; utilizing laboratory equipment and techniques; collecting representative samples using proper sampling techniques and various sampling devices; conducting water laboratory tests including alkalinity, chlorine residual, coliform bacteria counts, hardness, jar tests, pH, temperature, and turbidity; and solving water laboratory math problems.



CASQA BMP COURSES

WAT 614A New Development and Redevelopment (First Edition 2004)

22 enrollments
7 completions
13 manuals

This course provides general guidance for selecting and implementing Best Management Practices (BMPs) to reduce pollutants in runoff in newly developed areas and redeveloped areas to waters of the state. Topics covered include planning for new development and redevelopment, site and facility design for water quality protection, source control BMPs, treatment control BMPs, and long-term maintenance of BMPs.

WAT 614B Construction (First Edition 2004)

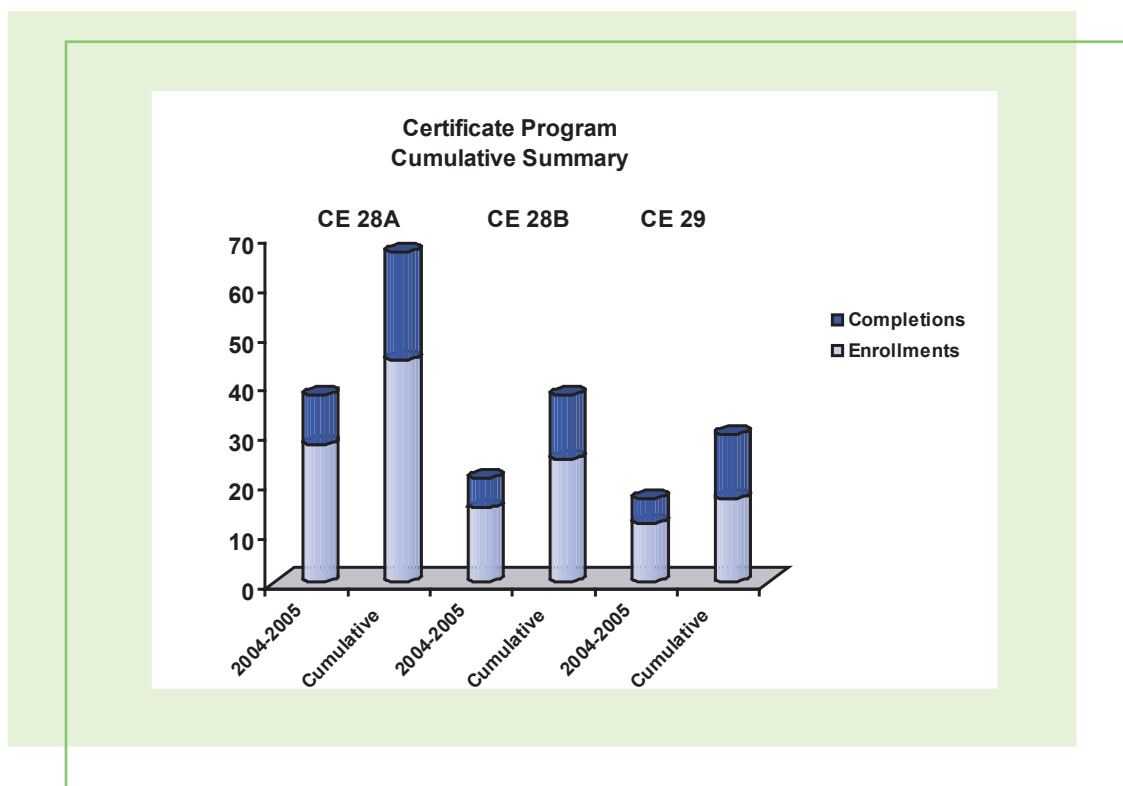
9 enrollments
2 completions
6 manuals

This course provides guidance on developing and implementing Stormwater Pollution Prevention Plans (SWPPPs) that document the selection and implementation of Best Management Practices (BMPs) for particular types of construction projects.

WAT 614C Municipal (First Edition 2004)

2 enrollments
0 completions
0 manuals

This course provides general guidance for selecting and implementing Best Management Practices (BMPs) to reduce pollutants in runoff from municipal operations to waters of the state. Topics covered include regulatory requirements, pollution prevention planning, source control BMPs, treatment control BMPs, and long-term maintenance of BMPs.



WATER TREATMENT PLANT OPERATIONS SPECIALIST CERTIFICATE

CE 28A Water Treatment Plant Operation I (First Edition, 2002)

45 enrollments
22 completions

This introductory course provides an overview of the need for water treatment, the importance of providing safe water for the public, and the theory and operation of conventional water treatment plant processes. Emphasis is placed on developing knowledge and skills needed by an operator working in a conventional water treatment plant treating surface water.

CE 28B Water Treatment Plant Operation II (First Edition, 2002)

25 enrollments
13 completions

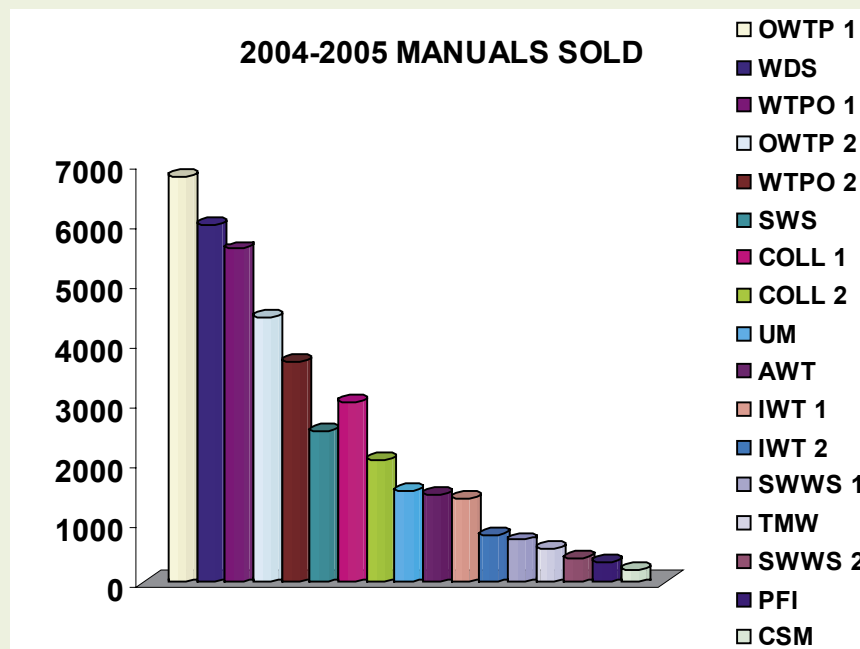
Building on the knowledge obtained in I, this second course introduces advanced information on the theory and operation of conventional water treatment plant processes. In addition, the more advanced processes including iron and manganese control, fluoridation, softening, trihalomethane prevention, demineralization, and handling and disposal of process wastes are presented. Emphasis is placed on developing advanced knowledge and skills needed by an

operator working in a conventional water treatment plant treating surface water: instrumentation, safety, advanced laboratory procedures, water quality regulation, and administration.

CE 29 Small Water System Operation and Maintenance (First Edition, 2002)

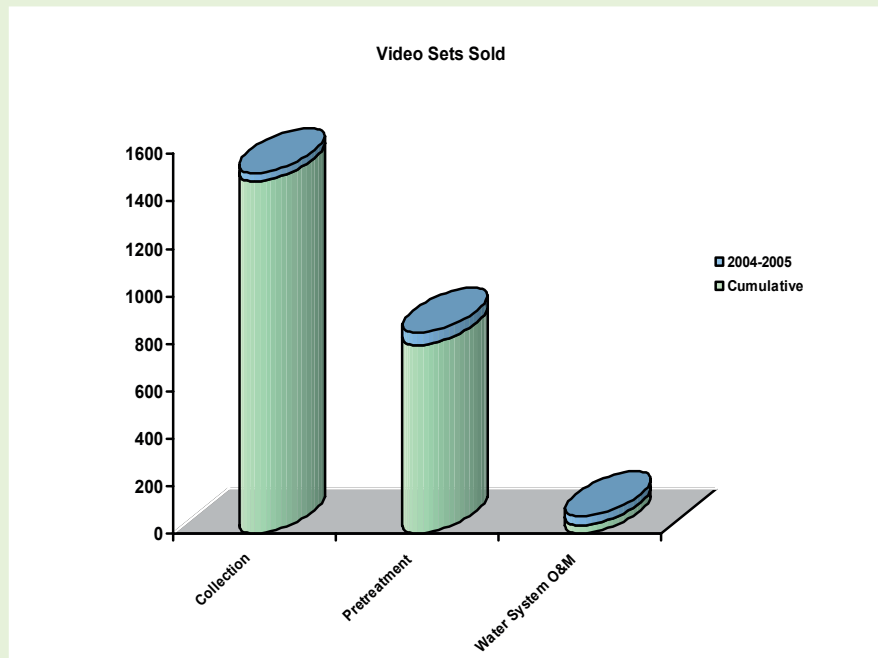
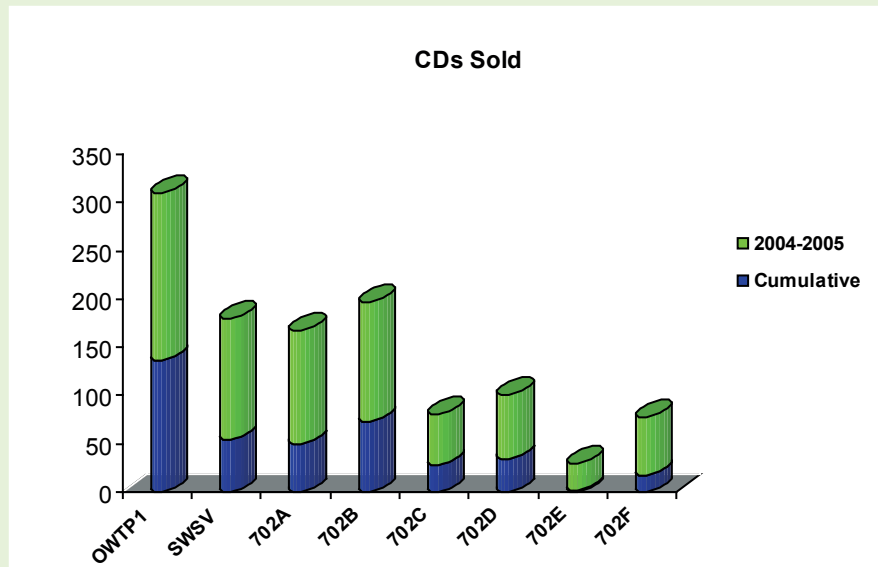
17 enrollments
13 completions

This course is designed to train operators in the practical aspects of operating and maintaining small drinking water supply and treatment systems, with emphasis on the use of safe practices and procedures. Topics include the role and duties of small system operators, water sources and treatment processes; operation and maintenance procedures for small water treatment plants; disinfection; safety; laboratory procedures; setting water rates; and how to solve water treatment plant math problems. Detailed descriptions of the components of a drinking water well are presented, and operators will learn how to set up a wellhead protection program; operate, maintain and rehabilitate wells; disinfect wells and pumps; and troubleshoot operating problems.



Key to Abbreviations

| | |
|----------|--|
| OWTP I: | Operation of Wastewater Treatment Plants, Vol. I |
| WDS: | Water Distribution System Operation and Maintenance |
| WTPO I: | Water Treatment Plant Operation, Vol. I |
| OWTP II: | Operation of Wastewater Treatment Plants, Vol. II |
| WTPO II: | Water Treatment Plant Operation, Vol. II |
| SWS: | Small Water System Operation and Maintenance |
| COLL I: | Operation and Maintenance of Wastewater Collection Systems, Vol. I |
| COLL II: | Operation and Maintenance of Wastewater Collection Systems, Vol. II |
| UM: | Utility Management |
| AWT: | Advanced Waste Treatment |
| IWT I | Industrial Waste Treatment, Vol. I |
| IWT II: | Industrial Waste Treatment, Vol. II |
| SWWS I: | Small Wastewater System Operation and Maintenance, Vol. I |
| TMW: | Treatment of Metal Wastestreams |
| SWWS II: | Small Wastewater System Operation and Maintenance, Vol. II |
| TMW: | Treatment of Metal Wastestreams |
| PFI: | Pretreatment Facility Inspection |
| CSM: | Collection Systems: Methods for Evaluating and Improving Performance |



APPENDIX B

PRESENTATIONS

Conference Presentations

Currier, Brian, "NPDES Stormwater Cost Survey," *California Stormwater Quality Association (CASQA) Quarterly Meeting*, Oakland, CA, January 14-15, 2005.

Currier, Brian, "NPDES Stormwater Cost Survey," *Clean Water Institute*, Irvine, CA, April 7-8, 2005.

Currier, Brian, "NPDES Stormwater Cost Survey," *Southern California Association of Governments (SCAG), Water Quality Committee*, Los Angeles, CA, April 14, 2005.

Murphy, Kevin, "Tahoe Small-Scale Facility Pilot Studies," *Tahoe Fine Sediment Workshop*, Kings Beach, CA, April 28, 2005.

Ohlinger, Kurt, "Math for Operators of Wastewater Treatment Facilities," Northern Regional Training Conference, California Water Environment Association, Reno, NV, September 2004.

Ohlinger, Kurt, and Ramzi Mahmood, "Struvite Scale Potential Determination Using a Computer Model," California Water Environment Association Annual Conference, Palm Springs, CA, April 2005.

Scharff, Misty, "Effectiveness of Vegetated Biostrips in the Treatment of Highway Storm Water Runoff: A Comparison of RUSLE and RUSLE2 Methods," *Soil Science Society of America Conference*, Seattle, WA, Oct. 31-Nov. 4, 2004.

Scharff, Misty, and David Alderete, "Lesson Learned From the Design of a Bioretention Area to Treat Storm Water Runoff," *3rd Annual North American Surface Water Quality Conference (StormCon)*, Palm Desert, CA, July 26-29, 2004.

Publications

Currier, Brian, "Laboratory Evaluation of Four Storm Drain Inlet Filters for Oil Removal," *ASCE/EWRI World Water and Environment Conference*, Anchorage AK, May 15-19, 2005.

Hallock, B., Power, A., Rein, S., and Scharff, M., "Performance of Erosion Control Treatments and Native Vegetation on Reapplied Topsoil," *International Erosion Control Association (IECA), Conference 36*, Dallas, TX, February 20-24, 2005.

Scharff, Misty, "Comparison of RUSLE and RUSLE2 to Determine Water Quality Treatment of Vegetated Strips," *International Erosion Control Association (IECA), Conference 36*, Dallas, TX, February 20-24, 2005.

Scharff, Misty, and David Alderete, "Case Study: The Design of a Bioretention Area to Treat Highway Runoff and Control Sediment," *International Erosion Control Association (IECA), Conference 36*, Dallas, TX, February 20-24, 2005.