

OFFICE OF WATER PROGRAMS



ANNUAL REPORT
2003-2004

OFFICE OF WATER PROGRAMS

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GAY KORNWEIBEL, ASSISTANT DIRECTOR

TRAINING

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THE OFFICE OF WATER PROGRAMS

THE OFFICE OF WATER PROGRAMS (OWP) IS A NON-PROFIT ORGANIZATION AFFILIATED WITH THE DEPARTMENT OF CIVIL ENGINEERING AT CALIFORNIA STATE UNIVERSITY SACRAMENTO (CSUS). OWP IS A SELF-SUPPORTING UNIT OF CALIFORNIA STATE UNIVERSITY, SACRAMENTO FOUNDATION, AND HAS TWO DEPARTMENTS: TRAINING AND RESEARCH.

WHERE WE ARE NOW

DIRECTOR'S MESSAGE

BY DR. RAMZI MAHMOOD, P.E., DIRECTOR



THIS YEAR IS MARKED BY OUR MOVE INTO OUR NEW SPACE IN MODOC HALL (FEATURED ON OUR COVER). OUR TRAINING AND RESEARCH GROUPS FINALLY SHARE THE SAME OFFICE SPACE ALLOWING FOR MORE COLLABORATION AMONG STAFF, MORE EFFECTIVE MANAGEMENT OF RESOURCES, BETTER COMMUNICATION, AND STREAMLINED INFORMATION TECHNOLOGY (IT) SYSTEMS. BECAUSE OF THIS MILESTONE, STAFF DECIDED TO FEATURE AN ARTICLE ABOUT THE HISTORY OF OWP AND ASKED DR. KEN KERRI (FOUNDER OF OWP) TO PREPARE IT. THIS ARTICLE GIVES US AN APPRECIATION OF THE

EFFORT THAT IT TOOK A FEW INDIVIDUALS TO CREATE THIS NATIONALLY AND INTERNATIONALLY RECOGNIZED TRAINING PROGRAM FOR OPERATORS OF WATER AND WASTEWATER TREATMENT PLANTS. IN THIS REPORT YOU WILL ALSO GET A CHANCE TO READ ABOUT THE FUTURE OF THE TRAINING AND RESEARCH GROUPS FROM DR. KURT OHLINGER AND MR. KEVIN MURPHY, RESPECTIVELY.

SINCE 1997, OWP HAS FOCUSED ON THE FOLLOWING GOALS:

- DEVELOP TECHNOLOGY-BASED TRAINING. OWP FUNDED THE DEVELOPMENT OF CD-ROM BASED AND ONLINE TRAINING COURSES. THESE COURSES ARE BEING INTRODUCED TO OUR STUDENTS AS WE COMPLETE THEM.
- INCREASE COLLABORATION WITH THE UNIVERSITY. DR. JOHN JOHNSTON (PROFESSOR OF CIVIL ENGINEERING) STARTED WORKING WITH RESEARCH STAFF IN 1999. DR. JEAN-PIERRE BAYARD (DIRECTOR OF ACADEMIC TECHNOLOGY AND CREATIVE SERVICES)

WE'VE COME A LONG WAY

A BRIEF HISTORY OF THE OFFICE OF WATER PROGRAMS

BY DR. KEN KERRI, P.E., PROFESSOR EMERITUS, OWP CONSULTANT

ONE DAY IN 1968, SOME WASTEWATER TREATMENT PLANT OPERATORS FROM SACRAMENTO COUNTY WALKED INTO MY OFFICE ON CAMPUS AND ASKED ME TO DEVELOP AN OPERATOR TRAINING PROGRAM. THE OPERATORS SAID THAT THERE WERE TRAINING PROGRAMS ON HOW TO PASS OPERATOR CERTIFICATION EXAMS, BUT NOTHING ON HOW TO DO THEIR JOBS. I REPLIED THAT I WAS A PROFESSOR AND KNEW NOTHING ABOUT PLANT OPERATIONS AND MAINTENANCE. THE OPERATORS WERE PERSISTENT, AND FINALLY I SAID, "OK, IF YOU WILL DO ALL THE WORK, I WILL SHUFFLE THE PAPERS." THE OPERATORS GOT TOGETHER WITH THE OPERATOR TRAINING COMMITTEE OF THE CALIFORNIA WATER POLLUTION CONTROL ASSOCIATION (CWPCA), (NOW CALIFORNIA WATER ENVIRONMENT ASSOCIATION, [CWEA]) AND SUBMITTED A SUCCESSFUL PROPOSAL FOR FUNDING TO A PREDECESSOR AGENCY OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY.

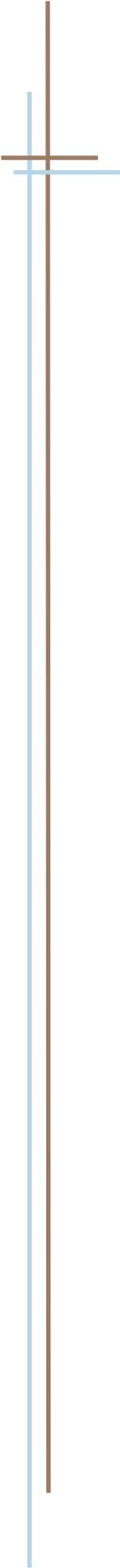


THE OFFICE OF WATER PROGRAMS BEGAN DEVELOPING OPERATOR TRAINING PROGRAMS IN 1968. THE FIRST FIELD STUDY (CORRESPONDENCE OR DISTANCE LEARNING), OPERATION OF WASTEWATER TREATMENT PLANTS, BECAME AVAILABLE IN 1972. OPERATORS IN OTHER ENVIRONMENTAL FIELDS REQUESTED SIMILAR OPERATOR TRAINING PROGRAMS AND SUBSEQUENTLY, THE FOLLOWING PROGRAMS WERE DEVELOPED:

- OPERATION AND MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS, 1976
- WATER TREATMENT PLANT OPERATION, 1983
- WATER SUPPLY SYSTEM OPERATION, 1983 (EXPANDED TO SMALL WATER SYSTEM OPERATION AND MAINTENANCE, AND WATER DISTRIBUTION SYSTEM OPERATION AND MAINTENANCE, 1987)
- INDUSTRIAL WASTE TREATMENT, 1987
- PRETREATMENT FACILITY INSPECTION, 1988

THE DEVELOPMENT OF ALL OF THESE PROGRAMS WAS FUNDED BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY. THE TRAINING PROGRAMS HAVE SINCE BEEN ADMINISTERED, MONITORED, AND KEPT CURRENT BY OWP ON A FINANCIALLY SELF-SUSTAINING BASIS.

IN RECENT YEARS, ENVIRONMENTAL MANAGEMENT TRAINING PROGRAMS HAVE BEEN DEVELOPED AND FUNDED USING OFFICE OF WATER PROGRAMS FUNDS. THE FIRST MANUAL WAS UTILITY MANAGEMENT, AND A NEW MANUAL, MANAGE FOR SUCCESS, BY DAN CAMPBELL AND MIKE CHERNIAK, WILL BE AVAILABLE IN FEBRUARY 2005.



STARTED COLLABORATING WITH OWP STAFF IN 2000 TO DEVELOP TECHNOLOGY-BASED COURSES (CD-ROM AND ONLINE). OWP ALSO COLLABORATED WITH THE UNIVERSITY MEDIA SERVICES (UMS) TO DEVELOP TRAINING VIDEO SERIES FOR THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES (DHS).

- INCREASE COLLABORATION WITH THE PROFESSIONAL COMMUNITY. OWP STAFF DEVELOPED THEIR CAPABILITIES IN CONDUCTING APPLIED RESEARCH IN WATER QUALITY, STORMWATER MANAGEMENT, TREATMENT TECHNOLOGY, AND TRAINING DELIVERY. STAFF WORKED ON PROJECTS AND PLANNED NEW PROJECTS FUNDED BY CALTRANS, DEPARTMENT OF HEALTH SERVICES, INTEGRATED WASTE MANAGEMENT BOARD, STATE WATER RESOURCES CONTROL BOARD, SACRAMENTO COUNTY, AND EL DORADO COUNTY.

- DIGITIZE TRAINING MANUALS. OWP MOVED ITS DOCUMENTATION PROCESS IN-HOUSE SO THAT OUR EDITORS CAN RETAIN CONTROL OF OUR GROWING NUMBER OF MANUALS BY INCREASING THE SECURITY OF STORED DOCUMENTS. UPGRADING FROM WORD PROCESSING TO DESKTOP PUBLISHING SOFTWARE WILL MAKE THE PUBLISHING PROCESS MORE EFFICIENT, SAVING TIME AND PRINTING COSTS.

THE FOLLOWING STATISTICS ENCAPSULATE OUR ACCOMPLISHMENTS THIS YEAR:

- WE SOLD 54,147 MANUALS
- WE ENROLLED 14,274 STUDENTS (10,049 STUDENTS COMPLETED COURSES SUCCESSFULLY THIS YEAR)
- WE SOLD 304 VIDEO SETS
- OUR TOTAL CONTRACTS AMOUNTED TO OVER \$2,025,000. THIS FURTHER EXPANDS OPPORTUNITIES FOR OUR STAFF TO PROVIDE TECHNICAL EXPERTISE IN DEVELOPMENT AND DELIVERY OF NEW TRAINING MATERIALS; AND IN WATER QUALITY, WASTEWATER, AND STORMWATER RELATED ENGINEERING.

IT IS NICE TO SHOW SOME STATISTICS TO HIGHLIGHT OUR ACCOMPLISHMENTS. HOWEVER, THIS IS ONLY POSSIBLE BECAUSE OF THE HARD WORK OF OWP STAFF. THEY TAKE CARE OF OUR STUDENTS AND CUSTOMERS ON A DAILY BASIS. I AM FORTUNATE TO BE ASSOCIATED WITH SUCH A GROUP OF PEOPLE.

DR. MAHMOOD HAS BEEN A CSUS FACULTY MEMBER SINCE 1994. HE WAS ELECTED DIRECTOR OF THE OFFICE OF WATER PROGRAMS IN 1997. DR. MAHMOOD CURRENTLY SERVES AS CHAIR OF THE DEPARTMENT OF CIVIL ENGINEERING.

ALL OF THESE PROGRAMS WERE DEVELOPED AND PREPARED BY OPERATORS WHO FOCUSED ON THE KNOWLEDGE, SKILLS, AND ABILITIES THEY NEEDED TO DO THEIR JOBS. IN ADDITION, OPERATORS WITH SACRAMENTO COUNTY, THE CITY OF SACRAMENTO, AND MANY OTHER WATER AND WASTEWATER UTILITY AGENCIES HELPED WITH THE REVIEWS AND INITIAL FIELD TESTS OF THE TRAINING MATERIALS AND MANUALS, AS DID KNOWLEDGEABLE INDIVIDUALS IN MANY STATE AGENCIES.



THE OFFICE OF WATER PROGRAMS AND MANY ORGANIZATIONS COOPERATED IN THE DEVELOPMENT OF THE TRAINING PROGRAMS. THE WASTEWATER COLLECTION AND TREATMENT PROGRAMS WERE DEVELOPED IN COOPERATION WITH THE OPERATOR COMMITTEES OF THE CALIFORNIA WATER ENVIRONMENT ASSOCIATION. THE WATER TREATMENT, WATER SUPPLY SYSTEM, WATER DISTRIBUTION SYSTEM, AND SMALL WATER SYSTEMS MANUALS AND PROGRAMS WERE DEVELOPED IN PARTNERSHIP WITH:

- THE NATIONAL ENVIRONMENTAL TRAINING ASSOCIATION (NETA) (NOW THE NATIONAL ENVIRONMENTAL SAFETY AND HEALTH TRAINING ASSOCIATION [NESHTA])
- THE CALIFORNIA-NEVADA SECTION OF THE AMERICAN WATER WORKS ASSOCIATION (AWWA)
- THE WATER POLLUTION CONTROL FEDERATION, (WPCF) (NOW THE WATER ENVIRONMENT FEDERATION, [WEF])

AWWA HELPED WITH THE DEVELOPMENT AND REVIEW OF THE WATER TRAINING MANUALS AND PROGRAMS AND BOTH THE AWWA AND WEF GRACIOUSLY ALLOWED THE OFFICE OF WATER PROGRAMS TO USE THEIR COPYRIGHTED MATERIALS, INCLUDING DRAWINGS, PHOTOS, FIGURES, AND TABLES.

THE OFFICE OF WATER PROGRAMS ALSO WORKED CLOSELY WITH THE ASSOCIATION OF BOARDS OF CERTIFICATION (ABC) ON THE DEVELOPMENT OF ABC EXAM QUESTIONS AND THE REFERENCING OF MOST OF ABC'S QUESTIONS TO THE OFFICE OF WATER PROGRAMS' OPERATOR TRAINING MANUALS. I SERVED ON THE BOARDS OF CAL-NEV, AWWA, CWEA, NETA, AND ABC, AND WAS ALSO PRESIDENT OF CWEA, NETA, AND ABC.

THE OFFICE OF WATER PROGRAMS HAS BEEN BLESSED WITH OUTSTANDING ADMINISTRATORS WHO HAVE VERY EFFECTIVELY AND EFFICIENTLY MANAGED THE OFFICE AND TRAINING PROGRAMS. SANDY TOMINE, CHRISTINE UMEDA, AND GAY KORNWEIBEL HAVE RECRUITED INTELLIGENT STAFF, TRAINED THEM, AND RETAINED THEM. THESE ADMINISTRATORS HAVE MOTIVATED THE STAFF AND INSTILLED IN THEM A PRIDE AND DEDICATION TO SERVING THE OPERATORS WHO RELY ON OUR PROGRAMS.

PEG HANNAH, OUR RECENTLY RETIRED PUBLICATIONS MANAGER, HAS READ EVERY WORD IN EVERY MANUAL MANY TIMES. PEG HAS THE ABILITY TO READ COMPLEX TECHNICAL JARGON AND TRANSLATE THE MATERIAL INTO CONCISE, EASILY READ, UNDERSTANDABLE INFORMATION. OPERATORS READING OUR MANUALS HAVE PRAISED PEG'S UNIQUE ABILITY AND SUCCESSFUL PRESENTATION OF OUR MANUALS.

TODAY, THE OPERATOR TRAINING MANUALS HAVE BEEN ADOPTED AS TEXTBOOKS BY OVER 300 COLLEGES AND UNIVERSITIES THROUGHOUT THE WORLD, AND THE MANUALS HAVE BEEN TRANSLATED INTO 12 DIFFERENT LANGUAGES. IN 2005, THE OFFICE OF WATER PROGRAMS EXPECTS TO SELL ITS ONE MILLIONTH OPERATOR TRAINING MANUAL.

KEN KERRI WAS THE PROJECT DIRECTOR FOR THE OFFICE OF WATER PROGRAMS FROM 1968 UNTIL HE RETIRED FROM TEACHING IN 1997. SINCE THEN, HE HAS CONTINUED TO WORK ON PROMOTING MANUALS AND TRAINING PROGRAMS, AND KEEPS THEM UP TO DATE WITH CURRENT REGULATIONS AND TECHNOLOGY.

INTRODUCTION

THE OFFICE OF WATER PROGRAMS (OWP) IS A NON-PROFIT ORGANIZATION AFFILIATED WITH THE DEPARTMENT OF CIVIL ENGINEERING AT CALIFORNIA STATE UNIVERSITY SACRAMENTO (CSUS). OWP IS A SELF-SUPPORTING UNIT OF CALIFORNIA STATE UNIVERSITY, SACRAMENTO FOUNDATION, AND CONSISTS OF THE TRAINING AND RESEARCH GROUPS.

THE TRAINING GROUP DEVELOPS AND PROVIDES TRAINING TO OPERATORS OF DRINKING WATER AND WASTEWATER FACILITIES. OWP IS THE PREMIER PROVIDER OF OPERATOR EDUCATION IN THE WORLD, ENROLLING OVER 14,000 STUDENTS PER YEAR IN OUR CORRESPONDENCE, VIDEO, AND COMPUTER-BASED TRAINING COURSES, AND SELLING OVER 50,000 TRAINING MANUALS PER YEAR. DURING THE 2003-2004 FISCAL YEAR, OVER 16,000 ORDERS WERE PROCESSED AND SHIPPED: THESE SHIPMENTS WERE FOR 54,017 MANUALS, 14,288 ENROLLMENTS, AND 205 SETS OF VIDEOS. A TOTAL OF 10,178 STUDENTS SUCCESSFULLY COMPLETED OUR COURSES.

THE RESEARCH GROUP CONTINUES ITS LONG-STANDING CONTRACT WITH CALTRANS, EXPANDING ITS SCOPE OF WORK TO INCLUDE SEVERAL NEW PROJECTS, INCLUDING THE TECHNICAL OVERSIGHT AND MANAGEMENT OF THE CALTRANS STORMWATER LIBRARY. THE USED OIL DEMONSTRATION PROJECT FOR THE CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD FOR TESTING DRAIN INLET INSERTS HAS BEEN CONSTRUCTED ON CAMPUS AND IS IN USE. THE RESEARCH GROUP BEGAN DEVELOPING STUDY GUIDES AND TESTS FOR FOUR STORMWATER BEST MANAGEMENT PRACTICE HANDBOOKS. UNDER A NEW 2-YEAR CONTRACT WITH EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION (DOT), RESEARCH ENGINEERS WILL PROVIDE EXPERT ASSISTANCE IN STORMWATER QUALITY RESEARCH AND REGULATORY COMPLIANCE.

THE MOVE TO MODOC HALL

IN SPRING 2004, THE OFFICE OF WATER PROGRAMS MOVED INTO MODOC HALL FROM OFFICES AND WORKSPACES SCATTERED AROUND THE CAMPUS AND NEARBY AREAS. THE TRAINING AND RESEARCH GROUPS NOW ENJOY SPACIOUS AND MODERN WORK SPACE, AND BOTH GROUPS ARE ABLE TO SHARE RESOURCES MUCH MORE EFFICIENTLY.

THE NEW SPACE HAS PERMITTED IT STAFF TO CREATE TWO SPECIALIZED ROOMS: A WORKROOM DEDICATED TO DIAGNOSING, REPAIRING, AND REBUILDING COMPUTERS AND A SERVER ROOM.

THE WORKROOM IS ALREADY LOWERING COMPUTER SUPPORT AND UPGRADE COSTS WHILE IMPROVING RESPONSE TIME TO USER REQUESTS. ALL USERS AND SERVERS ARE NOW ON A SINGLE NETWORK, WHICH ALLOWS PRINTERS AND SERVERS TO BE SHARED. IT STAFF ARE BETTER ABLE TO SERVE USERS AND MAINTAIN SYSTEMS, ALLOWING MUCH MORE TIME FOR NEW DEVELOPMENT.

IT STAFF WERE ALSO INVOLVED IN REDESIGNING THE SHIPPING AREA TO IMPROVE EFFICIENCY AND CUT DOWN SHIPPING TIME. THE NEW SHIPPING AREA IN MODOC HALL IS LARGE ENOUGH TO STORE NEARLY A MONTH'S WORTH OF STOCK, WHERE BEFORE STOCK WAS LIMITED TO ONLY A TWO OR THREE DAY SUPPLY. THIS HAS SIGNIFICANTLY REDUCED THE TIME AND MONEY SPENT RESTOCKING.

THE RESEARCH GROUP'S NEW SAMPLE PREPARATION ROOM IN MODOC HALL IS DESIGNED FOR BENCH-SCALE TESTING AND AS A STAGING AREA FOR FIELD SAMPLING ACTIVITIES SUCH AS THOSE TAKING PLACE AT THE USED OIL DEMONSTRATION PROJECT ON THE CSUS CAMPUS. OWP RESEARCH ENGINEERS CAN TEST EQUIPMENT, PREPARE SAMPLE MATERIALS SUCH AS FILTER MEDIA, AND RUN PRELIMINARY TESTS BEFORE DEPLOYMENT TO PROJECT SITES.

THE SAMPLE PREPARATION ROOM ALSO GIVES ENGINEERING GRADUATE STUDENTS SPACE TO SET UP LONG-TERM PROJECTS. THE CURRENT LABORATORY IN THE CIVIL ENGINEERING DEPARTMENT CANNOT ACCOMMODATE THESE STUDENTS DUE TO LIMITED SPACE AND UNDERGRADUATE TEACHING NEEDS.



TRAINING GROUP

THE TRAINING GROUP PROVIDES HIGH-QUALITY, LOW-COST TRAINING PROGRAMS FOR OPERATORS OF DRINKING WATER TREATMENT PLANTS AND DISTRIBUTION SYSTEMS, AND FOR WASTEWATER COLLECTION AND TREATMENT FACILITIES.

LOOKING AHEAD AT TRAINING

BY DR. KURT OHLINGER, P.E., ASSOCIATE DIRECTOR



THE PROMULGATION OF NEW WATER QUALITY STANDARDS, THE NEED TO TREAT NEW TYPES OF CONTAMINANTS, AND THE INCREASING COST OF TREATMENT REQUIRE THAT OPERATORS OF WASTEWATER AND DRINKING WATER TREATMENT PLANTS CONTINUALLY UPDATE THEIR KNOWLEDGE. THE OFFICE OF WATER PROGRAMS RESPONDS TO OPERATORS' 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.

WE ARE COMMITTED TO INCORPORATING NEW TRAINING METHODS INTO OUR EXISTING DISTANCE LEARNING OFFERINGS WHEN THE NEW METHODS OFFER ENHANCEMENTS AND IMPROVEMENTS TO EXISTING DELIVERY METHODS. TOWARD THAT END, THE OFFICE OF WATER PROGRAMS HAS INTRODUCED SIX NEW ON-LINE COURSES OVER THE PAST YEAR, AND IS PRESENTLY DEVELOPING MORE OF THESE COURSES. MOREOVER, WE ARE DEVELOPING ON-LINE EXAMS FOR ALL OF OUR COURSES THAT WILL GENERATE UNIQUE EXAMS FOR EACH STUDENT, WITH QUESTIONS DRAWN FROM A LARGE DATABANK. THIS PROCESS, WHEN IMPLEMENTED, WILL ENHANCE EXAM SECURITY AND WILL ENABLE STUDENTS TO RECEIVE INSTANT FEEDBACK UPON COMPLETING AN EXAM.

OWP PROFESSIONAL STAFF ALSO PLAN TO INCREASE ACTIVITY IN PURSUING AND PROVIDING CONSULTING SERVICES FOR OPERATOR TRAINING AND CERTIFICATION, AS WELL AS ENGINEERING AND SCIENTIFIC CONSULTING SERVICES. RECENT EXAMPLES OF THESE ACTIVITIES INCLUDE EVALUATING ALTERNATIVE TECHNOLOGIES FOR WATER RECYCLING BY A CALIFORNIA UTILITY, AND SUBMITTING A PROPOSAL TO DEVELOP ON-LINE TRAINING AND EXAMS FOR A STATE OPERATOR CERTIFICATION OFFICE.

AS CHANGING NEEDS AND DEMANDS CALL FOR DEVELOPING NEW TRAINING METHODS AND MATERIALS, THE OFFICE OF WATER PROGRAMS 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 PROVIDER OF OPERATOR TRAINING BY PROVIDING OPERATORS WITH THE TRAINING MATERIALS AND METHODS

THEY DESIRE.

DR. OHLINGER, ASSOCIATE DIRECTOR, HAS BEEN WITH THE OFFICE OF WATER PROGRAMS SINCE 1999, AND ESTABLISHED THE WATER TREATMENT PLANT OPERATION SPECIALIST CERTIFICATE PROGRAM. HE HAS OVER 12 YEARS EXPERIENCE IN PROCESS CONTROL ENGINEERING AND OPERATIONS MANAGEMENT IN THE WASTEWATER TREATMENT INDUSTRY, AND HOLDS A CALIFORNIA GRADE 5 WASTEWATER OPERATIONS CERTIFICATE. DR. OHLINGER IS ALSO A PART-TIME FACULTY MEMBER IN THE DEPARTMENT OF CIVIL ENGINEERING.

NEW COMPUTER-BASED COURSES

THE RAPID EXPANSION OF COMPUTER AVAILABILITY HAS FOSTERED A DEMAND FOR COMPUTER-BASED AND INTERNET-BASED TRAINING. IN RESPONSE TO THAT DEMAND, THE OFFICE OF WATER PROGRAMS IS DEVELOPING COMPUTER-BASED TRAINING THAT INTEGRATES THE INTERNET AND CD-ROMS WITH OUR TRAINING MANUALS. THESE ENHANCED LEARNING TOOLS COMPLEMENT OUR TRAINING MANUAL-BASED CORRESPONDENCE COURSES.

THE FIRST OF A SIX-PART COMPUTER-BASED TRAINING COURSE FOR SMALL WATER SYSTEM OPERATORS WAS OFFERED LAST YEAR. THIS YEAR THE REMAINING FIVE COURSES WERE LAUNCHED. STUDENTS EARN 15 CONTACT HOURS (1.5 CEUs) FOR SUCCESSFULLY COMPLETING EACH COURSE. THE COURSES ARE DELIVERED VIA THE INTERNET AND INCLUDE VIDEO CLIPS, INTERACTIVE EXERCISES, ELECTRONIC FORMAT QUIZZES AND TESTS, ANIMATIONS, AND ELECTRONIC, SEARCHABLE TEXT.

THE COURSES ARE:

- WAT 702A SMALL WATER SYSTEMS—WATER SOURCES AND TREATMENT
- WAT 702B SMALL WATER SYSTEMS—WELLS
- WAT 702C SMALL WATER SYSTEMS—SMALL WATER TREATMENT PLANTS
- WAT 702D SMALL WATER SYSTEMS—DISINFECTION
- WAT 702E SMALL WATER SYSTEMS—WATER RATES/SAFETY
- WAT 702F SMALL WATER SYSTEMS—LABORATORY

FOR DESCRIPTIONS OF THESE COURSES, SEE APPENDIX A AND VISIT OUR WEBSITE AT WWW.OWP.CSUS.EDU.

THE RESEARCH GROUP IS CURRENTLY DEVELOPING TESTS AND STUDY GUIDES BASED ON FOUR CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA) STORMWATER BEST MANAGEMENT PRACTICE (BMP) HANDBOOKS. THE STUDY GUIDES WILL BE AVAILABLE ON CDS, AND THE TESTS WILL BE TAKEN VIA THE INTERNET. STUDENTS CAN EARN TWO CONTINUING EDUCATION UNITS (CEUs) FOR EACH COURSE BEGINNING FALL 2004.



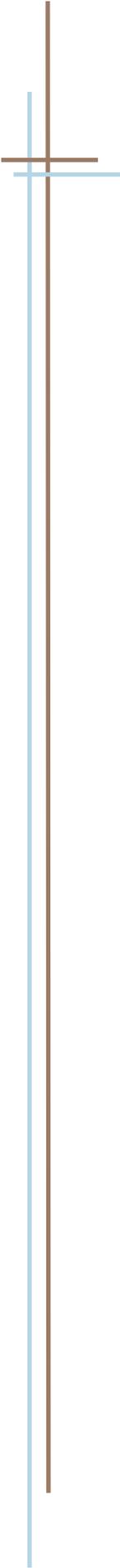
NEW VIDEO COURSES

THE DEMAND FOR COURSES WITH VARYING VALUES OF CONTACT HOURS OR CEUs FOR OPERATORS TRYING TO QUALIFY FOR OR RENEW THEIR LICENSES HAS LED TO THE DEVELOPMENT OF THREE NEW COURSES BASED ON MATERIALS ALREADY AVAILABLE:

- *PRETREATMENT FACILITY INSPECTION TRAINING VIDEOS*
AN EXCELLENT 5-VIDEO COURSE PRESENTING THE KNOWLEDGE, SKILLS, AND ABILITIES NEEDED BY NEW PRETREATMENT FACILITY INSPECTORS, AND PROVIDING SIX CONTACT HOURS (0.6 CEUs) UPON SUCCESSFUL COMPLETION OF THE COURSE.
- *COLLECTION SYSTEM OPERATION AND MAINTENANCE TRAINING VIDEOS*
AN IMPORTANT 6-VIDEO SERIES FOR TRAINING NEW AND EXPERIENCED COLLECTION SYSTEM OPERATORS TO SAFELY OPERATE AND MAINTAIN BOTH SANITARY AND COMBINED SEWER SYSTEMS, ALSO PROVIDING SIX CONTACT HOURS (0.6 CEUs) UPON SUCCESSFUL COMPLETION OF THE COURSE.
- *COLLECTION SYSTEMS: METHODS FOR EVALUATING AND IMPROVING PERFORMANCE*
AN EXCELLENT SOURCE TO HELP PREPARE COLLECTION SYSTEM AGENCIES AND THEIR OPERATORS TO EVALUATE THE ADEQUACY AND EFFECTIVENESS OF THEIR O&M PROGRAM AND IDENTIFY AREAS WHERE IMPROVEMENTS COULD BE MADE. STUDENTS SUCCESSFULLY COMPLETING THIS COURSE EARN 30 CONTACT HOURS (3 CEUs).

IN DEVELOPMENT

RECURRING DEMAND FOR MORE INFORMATION ON RUNNING A UTILITY AGENCY PROMPTED OWP TO PREPARE A COURSE, *MANAGE FOR SUCCESS*, WHICH WILL BE AVAILABLE FEBRUARY 2005. 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.



A NEW GRANT FROM THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES TO DEVELOP A BASIC SMALL WATER SYSTEM OPERATIONS COURSE WILL ALLOW SUCCESSFUL CANDIDATES TO QUALIFY FOR THE CALIFORNIA WATER TREATMENT OPERATOR AND WATER DISTRIBUTION SYSTEM OPERATOR CERTIFICATION EXAMINATIONS. THE INFORMATION PRESENTED IN THIS BASIC COURSE IS BEING DEVELOPED TO PROVIDE STUDENTS WITH AN INTRODUCTION TO THE BASIC OPERATION AND MAINTENANCE ASPECTS OF SMALL WATER SYSTEMS. STUDENTS MUST IDENTIFY PROBLEMS, ANALYZE THE CAUSES OF PROBLEMS, AND SOLVE OPERATION AND MAINTENANCE PROBLEMS TO COMPLETE THE COURSE.

NEW CONTRACTS

SACRAMENTO COUNTY REGIONAL SANITATION DISTRICT

THE OWP HAS BEEN AWARDED A 3-YEAR CONTRACT WITH THE SACRAMENTO COUNTY REGIONAL SANITATION DISTRICT TO PROVIDE CONSULTING SERVICES. INITIAL TASKS INCLUDE ASSESSING AND SELECTING APPROPRIATE TECHNOLOGIES FOR TREATING RECLAIMED WASTEWATER TO MEET STANDARDS FOR RECYCLED WATER. TECHNOLOGIES BEING INVESTIGATED ARE MEMBRANE TREATMENT, CLOTH FILTRATION, AND GRANULAR MEDIA FILTRATION. THE RECLAIMED WATER WILL BE USED TO IRRIGATE MEDIAN LANDSCAPING, GOLF COURSES, PARKS, ETC. PILOT TESTING WILL BE CONDUCTED DURING SUMMER 2005.

WATER TREATMENT PLANT OPERATION SPECIALIST CERTIFICATE

STUDENTS CAN EARN THE WATER TREATMENT PLANT OPERATION SPECIALIST CERTIFICATE FROM CSUS BY COMPLETING THREE CORRESPONDENCE COURSES AND PASSING A COMPREHENSIVE FINAL EXAM FOR EACH COURSE (THE FINAL EXAM MUST BE TAKEN ON LINE). EACH OF THE THREE COURSES AWARDS SIX LOWER DIVISION ACADEMIC UNITS. TO DATE, 11 OPERATORS HAVE RECEIVED THIS SPECIALIST CERTIFICATE. CURRENTLY 25 STUDENTS HAVE COMPLETED AT LEAST ONE OF THE THREE REQUIRED COURSES, AND 18 STUDENTS ARE ENROLLED IN AT LEAST ONE COURSE.

EXPANDING OUR IN-HOUSE CAPABILITIES

IN 2004, THE TRAINING GROUP EMBARKED ON A LARGE-SCALE EFFORT TO ESTABLISH PROCEDURES FOR COMPLETE IN-HOUSE EDITING OF THEIR POPULAR TRAINING MANUALS. TO SUPPORT THIS EXCITING PROJECT, A NEW SERVER WITH THE CAPACITY TO STORE OVER A FULL TERABYTE OF DATA WAS PURCHASED AND INSTALLED BY THE IT STAFF. ALL MANUALS WILL BE EDITED, UPDATED, AND STORED ELECTRONICALLY IN-HOUSE ON THE NEW SERVER.

WITHIN THE NEXT YEAR, ALL ELECTRONIC FILES WILL BE TRANSFERRED TO THE NEW SERVER, ESTABLISHING CONTROLLED USER ACCESS, AND IMPLEMENTING A TRACKING SYSTEM FOR EDITING CHANGES TO ALL FILES. THIS NEW SYSTEM WILL ALLOW SIMULTANEOUS EDITING

WHILE MAINTAINING THE INTEGRITY OF CURRENT FILES, AND ALLOW SECURE ARCHIVING OF PREVIOUS EDITIONS OF THE MANUALS. INSTITUTING THE WebDAV SYSTEM WILL GIVE THE EDITORS COMPLETE CONTROL OF THE DOCUMENTATION PROCESS, FROM CREATION THROUGH FINAL COPY-READY FILES FOR PRINTING.

RESEARCH GROUP

FOR THE PAST SIX YEARS, OWP ENGINEERS AND SCIENTISTS HAVE ASSISTED CALTRANS IN PLANNING AND MANAGING ITS STORMWATER MANAGEMENT PROGRAM. THE MAJOR ELEMENTS OF THIS PROGRAM ARE CHARACTERIZATION MONITORING, FIELD TESTING OF BEST MANAGEMENT PRACTICES (BMPs), AND EROSION CONTROL. THE OWP IS AN AFFILIATE MEMBER OF THE CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA).

LOOKING AHEAD AT RESEARCH

KEVIN MURPHY, P.E., ENGINEERING MANAGER

THE RESEARCH GROUP CONTINUES TO SEEK OPPORTUNITIES TO WORK IN THE FIELDS OF STORMWATER QUALITY, NON-POINT SOURCE POLLUTION, WATERSHED ASSESSMENT, LOW IMPACT DEVELOPMENT AND TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT. OUR TARGET CLIENTS ARE FEDERAL, STATE AND LOCAL GOVERNMENT; NONPROFIT ORGANIZATIONS; METROPOLITAN PLANNING ORGANIZATIONS; AND GRANT PROGRAMS SUCH AS PROPOSITIONS 13 AND 50, AS WELL AS CWA 319H. THE UNVEILING OF THE CASQA STORMWATER BMP HANDBOOK CONTINUING EDUCATION COURSES IS AN EXAMPLE OF THE TYPES OF EDUCATION SERVICES THE GROUP CONTINUES TO PURSUE. THE NEW CONTRACT WITH EL DORADO COUNTY AND THE EXTENDED CALTRANS CONTRACT ARE A TESTAMENT TO OUR REPUTATION, AND THE GROUP IS CONFIDENT THAT HIGH QUALITY PRODUCTS AND SERVICES WILL CONTINUE TO RESULT IN ADDITIONAL WORK.



KEVIN MURPHY HAS BEEN AN APPLIED RESEARCH ENGINEER WITH THE RESEARCH GROUP FOR FOUR YEARS. HE HAS BEEN ENGINEERING MANAGER FOR THREE YEARS, IS OPERATIONS MANAGER FOR ALL CALTRANS CONTRACTS, AND LEADS THE APPLIED STUDIES TEAM.

THE RESEARCH GROUP CONTINUES ITS LONG-STANDING CONTRACT WITH CALTRANS, EXPANDING ITS SCOPE OF WORK TO INCLUDE SEVERAL NEW PROJECTS, INCLUDING THE TECHNICAL OVERSIGHT AND MANAGEMENT OF THE CALTRANS STORMWATER LIBRARY. THE USED OIL DEMONSTRATION PROJECT FOR THE CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD FOR TESTING DRAIN INLET INSERTS HAS BEEN CONSTRUCTED ON CAMPUS AND

IS IN USE. THE RESEARCH GROUP BEGAN DEVELOPING STUDY GUIDES AND TESTS FOR FOUR STORMWATER BEST MANAGEMENT PRACTICE HANDBOOKS. UNDER A NEW 2-YEAR CONTRACT WITH EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION (DOT), RESEARCH ENGINEERS WILL PROVIDE EXPERT ASSISTANCE IN STORMWATER QUALITY RESEARCH AND REGULATORY COMPLIANCE.

DURING THE PAST YEAR, THE RESEARCH GROUP ASSISTED CALTRANS WITH THE COMPLETION OF A PROJECT THAT DETERMINED THE TYPES AND CONCENTRATIONS OF POLLUTANTS PRESENT IN THE STORMWATER RUNOFF FROM 120 SITES THROUGHOUT THE STATE. AS PART OF THIS EFFORT, VARIOUS DATA VALIDATION, MANAGEMENT, AND EVALUATION TOOLS WERE DEVELOPED OR ENHANCED. ADDITIONAL SPECIAL PROJECTS ARE ALSO ONGOING TO STUDY LITTER, HIGHWAY CONGESTION, THE EFFECTIVENESS OF DRAIN INLET CLEANING, PATHOGENS, HERBICIDES, TOXICITY, CALIFORNIA TOXICS RULE (CTR) CONSTITUENTS, AND FIRST FLUSH CHARACTERISTICS. ALL OF THESE EFFORTS ARE IN COMPLIANCE WITH THE EXISTING NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT OR COURT ORDERED REQUIREMENTS, OR IN ANTICIPATION OF EXPECTED FUTURE REGULATIONS. RESULTS OF THESE STUDIES HAVE BEEN AND WILL CONTINUE TO BE APPLIED IN THE DESIGN AND DEVELOPMENT OF STORMWATER TREATMENT TECHNOLOGIES.

THE APPLIED STUDIES TEAM HAS JUST COMPLETED OR IS CURRENTLY CONDUCTING VARIOUS STAGES OF 111 FULL-SCALE PILOT STUDIES AND VARIOUS SMALL-SCALE STUDIES. FIFTY-SEVEN PILOT STUDIES WERE COMPLETED DURING THE PAST YEAR AND INCLUDED THE FOLLOWING TECHNOLOGIES: ALTERNATIVE MEDIA FILTERS, CONSTRUCTED WETLANDS, DRAIN INLET INSERTS, EXTENDED DETENTION BASINS, GROSS SOLIDS REMOVAL DEVICES (GSRDs), INFILTRATION, OIL/WATER SEPARATORS, SAND FILTERS, SAND TRAPS, AND ROADSIDE VEGETATED TREATMENT SYSTEMS. TWENTY-NINE PILOTS ARE IN THE MONITORING STAGE AND INCLUDE THE FOLLOWING TECHNOLOGIES: DETENTION BASINS, MEDIA FILTERS, SAND TRAPS, AND GSRDs. TWENTY-FIVE PILOT STUDIES ARE IN THE SCOPING/DESIGN/CONSTRUCTION PHASE AND INCLUDE THE FOLLOWING TECHNOLOGIES: MEDIA FILTERS, BIORETENTION, DETENTION BASIN OPTIMIZATION, VEGETATED TREATMENT SYSTEMS, AND GSRDs.

THE SMALL-SCALE TESTING FACILITY IN THE LAKE TAHOE BASIN IS BEING USED FOR TESTING VARIOUS COMBINATIONS OF SEDIMENTATION, FILTRATION, AND CHEMICAL ADDITION. FORTY-FIVE STUDIES WERE COMPLETED DURING THE PAST YEAR, AND MORE STUDIES ARE IN THE DESIGN PHASE.



THIS YEAR'S EROSION RESEARCH PROJECTS FO-

CUSED ON IMPROVING VEGETATION ESTABLISHMENT AND WATER QUALITY FOR ROADSIDE SLOPES.

NEW CONTRACTS

CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD
OWP RESEARCHERS ARE EVALUATING THE EFFECTIVENESS OF SEVERAL DRAIN INLET INSERTS FOR REMOVING OIL AND GREASE FROM STORMWATER. A SMALL TESTING FACILITY WAS CONSTRUCTED ON THE CSUS CAMPUS AND THE USED OIL DEMONSTRATION PROJECT WILL RUN THROUGH APRIL OF 2005.

STATE WATER RESOURCES CONTROL BOARD

THE STATE WATER RESOURCES CONTROL BOARD HAS CONTRACTED WITH THE OFFICE OF WATER PROGRAMS TO SURVEY SIX COMMUNITIES TO ESTIMATE THE COSTS TO MUNICIPALITIES OF COMPLYING WITH THEIR STORMWATER PERMITS. THIS PROJECT WILL BE COMPLETED IN JANUARY 2005.



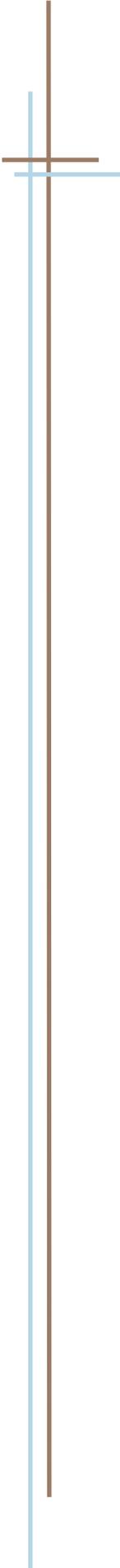
EL DORADO COUNTY

OWP HAS A NEW CONTRACT WITH EL DORADO COUNTY DOT TO PROVIDE ON-CALL STORMWATER TECHNICAL EXPERTISE SERVICES. THIS 2-YEAR CONTRACT AND SPECIFIC TASK ORDERS ARE CURRENTLY UNDER NEGOTIATION WITH COUNTY PERSONNEL.

SHARING OUR RESEARCH

THE RESEARCH GROUP SHARES ITS EXPERTISE WITH TRANSPORTATION AND STORMWATER PROFESSIONALS BY PUBLISHING AND PRESENTING RESEARCH RESULTS AT MEETINGS AND CONFERENCES. THIS PAST YEAR, A RESEARCH PAPER TITLED EFFECTIVENESS OF NATIVE VEGETATION PLANTING TECHNIQUES TO MINIMIZE EROSION, WAS PRESENTED AT THE INTERNATIONAL EROSION CONTROL ASSOCIATION (IECA) CONFERENCE, AND OWP AUTHORS WERE HONORED WITH THE MOST DISTINGUISHED TECHNICAL PAPER AWARD FOR THE SECOND CONSECUTIVE YEAR. APPENDIX C 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.



APPENDIX A

ON-LINE COURSES

OUR FIRST COMPUTER-BASED TRAINING COURSE FOR SMALL WATER SYSTEM OPERATORS WAS OFFERED FOR THE FIRST TIME LAST YEAR. THIS YEAR THE TRAINING GROUP DEVELOPED AND LAUNCHED FIVE NEW COMPUTER-BASED TRAINING COURSES FOR SMALL WATER SYSTEM OPERATORS. STUDENTS EARN 15 CONTACT HOURS (1.5 CEU) FOR SUCCESSFULLY COMPLETING EACH COURSE. THE COURSES ARE DELIVERED VIA THE INTERNET AND INCLUDE VIDEO CLIPS, INTERACTIVE EXERCISES, ELECTRONIC FORMAT QUIZZES AND TESTS, ANIMATIONS, AND ELECTRONIC, SEARCHABLE TEXT.

WAT 702A SMALL WATER SYSTEMS—WATER SOURCES AND TREATMENT
(FIRST EDITION, 2003)

44 ENROLLMENTS
24 COMPLETIONS
49 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)

90 ENROLLMENTS
36 COMPLETIONS
74 COMPACT DISKS

TOPICS INCLUDE: GROUNDWATER AND THE HYDROLOGIC CYCLE; WELLHEAD PROTECTION; GROUNDWATER PROTECTION; SURFACE FEATURES OF A WELL; WELL APPURTENANCES; WELL MAINTENANCE AND REHABILITATION; WELL PUMPS; WELL DISINFECTION; OPERATOR RESPONSIBILITIES; RECORDKEEPING; ELECTRICAL SUPPLY; TROUBLESHOOTING; WELL TESTING; PUMP TESTING; AND WELL ABONDAMENT.

WAT 702C SMALL WATER SYSTEMS—SMALL WATER TREATMENT PLANTS
(FIRST EDITION, 2003)

21 ENROLLMENTS
10 COMPLETIONS
28 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)

24 ENROLLMENTS
7 COMPLETIONS
34 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)

0 ENROLLMENTS
0 COMPLETIONS
2 COMPACT DISKS

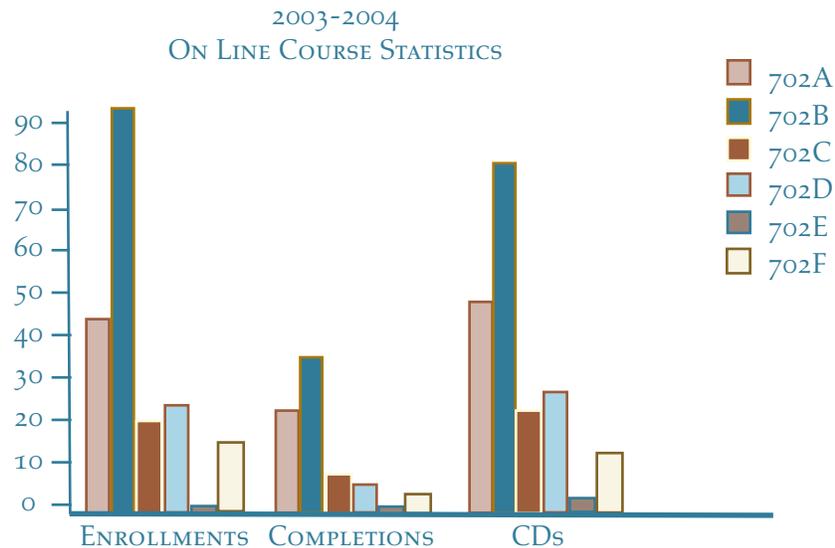
TOPICS INCLUDE: DEVELOPING AND IMPLEMENTING A SAFETY PROGRAM FOR WORKERS AT WATER TREATMENT AND DISTRIBUTION FACILITIES; UNDERSTANDING AND PROPERLY USING SAFETY EQUIPMENT; INSTITUTING SAFE PRACTICES AROUND WELLS, TREATMENT WORKS, CHEMICAL PROCESSES, PUMPS, STREETS AND TRENCHES, CONFINED SPACES, AND WATER STORAGE FACILITIES; PRACTICING LOCK-OUT/TAG-OUT PROCEDURES; AND CONDUCTING SAFETY INSPECTIONS. TOPICS COVERED IN THE SECOND COMPONENT OF THE COURSE IN-

CLUDE: 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)

15 ENROLLMENTS
3 COMPLETIONS
17 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.

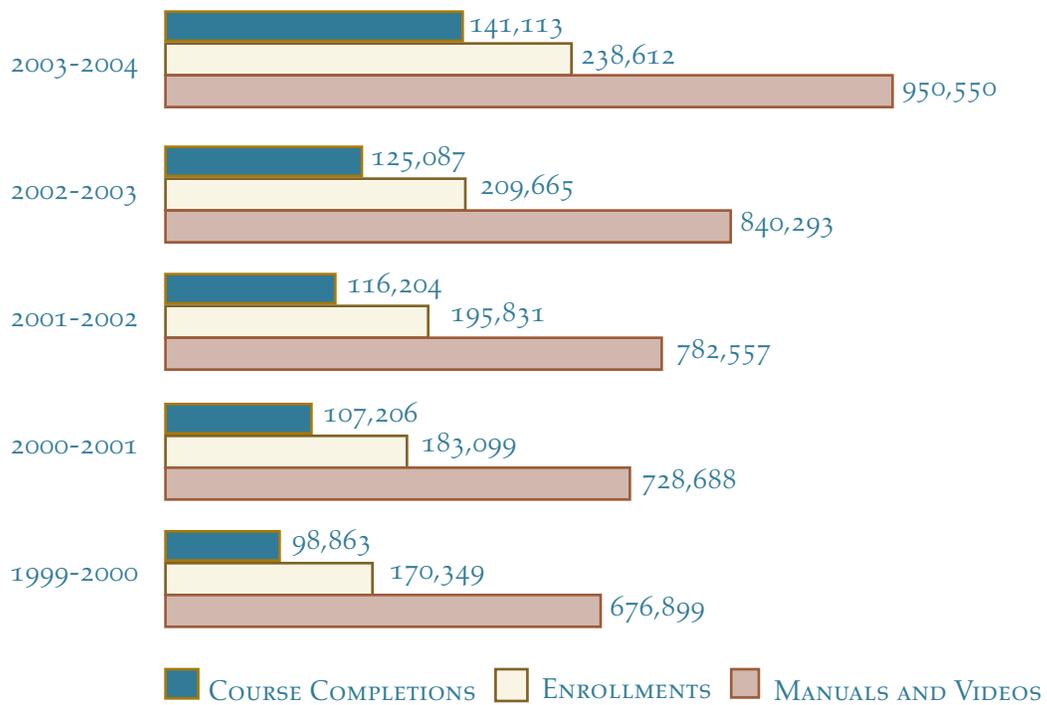


APPENDIX B

CUMULATIVE TOTALS

TOTALS FOR ACTIVITY DURING THE FISCAL YEAR 2003-2004 BROUGHT OWP OVERALL CUMULATIVE TOTALS TO 950,246 MANUALS SOLD; 238,612 ENROLLMENTS ASSIGNED; AND 144,330 SUCCESSFUL COMPLETIONS.

FOUR-YEAR CUMULATIVE SUMMARY



WASTEWATER

SMALL WASTEWATER SYSTEM OPERATION AND MAINTENANCE, VOLUME I
(FIRST EDITION, 1997)

5,531 MANUALS
2,326 ENROLLMENTS
1,440 COMPLETIONS

MORE THAN 60 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. THE MANUAL AND COURSE ENROLLMENTS HAVE BEEN PURCHASED IN THE U.S., CANADA, AND 23 OTHER COUNTRIES.

SMALL WASTEWATER SYSTEM OPERATION AND MAINTENANCE, VOLUME II
(FIRST EDITION, 2002)

965 MANUALS
317 ENROLLMENTS
160 COMPLETIONS

MORE THAN 20 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. THE MANUAL AND COURSE ENROLLMENTS HAVE BEEN PURCHASED IN THE U.S., CANADA, AND 23 OTHER COUNTRIES.

OPERATION OF WASTEWATER TREATMENT PLANTS, VOLUME I
(FIRST EDITION, 1971; FIFTH EDITION, 2002)

188,357 MANUALS
136 CDs
57,455 ENROLLMENTS
34,093 COMPLETIONS

MORE THAN 453 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. THE MANUAL AND COURSE ENROLLMENTS

HAVE BEEN PURCHASED IN THE U.S., CANADA, AND 51 OTHER COUNTRIES.

OPERATION OF WASTEWATER TREATMENT PLANTS, VOLUME II
(FIRST EDITION, 1971; SIXTH EDITION, 2003)

136,118 MANUALS
29,583 ENROLLMENTS
17,422 COMPLETIONS

MORE THAN 403 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. THE MANUAL AND COURSE ENROLLMENTS HAVE BEEN PURCHASED IN THE U.S., CANADA AND 55 OTHER COUNTRIES.

ADVANCED WASTE TREATMENT
(FIRST EDITION, 1987; FOURTH EDITION, 2002)

53,001 MANUALS
12,425 ENROLLMENTS
8,166 COMPLETIONS

MORE THAN 246 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. COMPANIES AND INDIVIDUALS IN THE U.S., CANADA, AND 47 OTHER COUNTRIES HAVE PURCHASED MANUALS AND ENROLLMENTS.

INDUSTRIAL WASTE TREATMENT, VOLUME I
(FIRST EDITION, 1987; SECOND EDITION, 1994)

27,511 MANUALS
4,953 ENROLLMENTS
2,920 COMPLETIONS

MORE THAN 174 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. THE MANUALS AND COURSE ENROLLMENTS HAVE BEEN PURCHASED IN THE U.S., CANADA, AND 47 OTHER COUNTRIES.

*INDUSTRIAL WASTE TREATMENT,
VOLUME II*
(FIRST EDITION, 1987; SECOND EDITION, 1995)

14,722 MANUALS
1,994 ENROLLMENTS
1,263 COMPLETIONS

MORE THAN 138 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. INDIVIDUALS AND COMPANIES IN THE U.S., CANADA, AND 43 OTHER COUNTRIES HAVE PURCHASED MANUALS AND ENROLLMENTS.

*TREATMENT OF METAL
WASTE-STREAMS*
(FIRST EDITION, 1986; THIRD EDITION, 2003)

27,910 MANUALS
7,592 ENROLLMENTS
6,125 COMPLETIONS

MORE THAN 141 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. INDIVIDUALS AND COMPANIES IN THE U.S., CANADA, AND 42 OTHER COUNTRIES HAVE PURCHASED MANUALS AND ENROLLMENTS.

PRETREATMENT FACILITY INSPECTION
(FIRST EDITION, 1988; THIRD EDITION, 1996)

15,636 MANUALS
5,967 ENROLLMENTS
3,901 COMPLETIONS

MORE THAN 115 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. INDIVIDUALS AND COMPANIES IN THE U.S., CANADA, AND 37 OTHER COUNTRIES HAVE PURCHASED MANUALS AND ENROLLMENTS.

PRETREATMENT FACILITY INSPECTION TRAINING VIDEOS
(FIRST EDITION VIDEOS, 1998; COURSE, 2003)

1,184 SETS OF VIDEOS
2 ENROLLMENTS

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)

59,720 MANUALS
12,291 ENROLLMENTS
8,573 COMPLETION

MORE THAN 188 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. INDIVIDUALS AND COMPANIES IN THE U.S., CANADA, AND 45 OTHER COUNTRIES HAVE PURCHASED MANUALS AND ENROLLMENTS.

*OPERATION AND MAINTENANCE OF
WASTEWATER COLLECTION SYSTEMS,
VOLUME II*

(FIRST EDITION, 1976; SIXTH EDITION,
2004)

43,499 MANUALS
6,239 ENROLLMENTS
4,458 COMPLETIONS

MORE THAN 173 COLLEGES AND UNI-
VERSITIES USE THIS MANUAL AS A TEXT-
BOOK. INDIVIDUALS AND COMPANIES
IN THE U.S., CANADA, AND 45 OTHER
COUNTRIES HAVE PURCHASED MANUALS
AND ENROLLMENTS.

*COLLECTION SYSTEM OPERATION
AND MAINTENANCE TRAINING
VIDEOS*

(FIRST EDITION, 1997; COURSE 2004)

1,377 VIDEOS
20 ENROLLMENTS
3 COMPLETIONS

CREATED FOR OPERATORS OF WASTE-
WATER 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 MANUAL, 1998; COURSE
2004)

2129 COPIES PURCHASED
64 ENROLLMENTS
13 COMPLETIONS

THIS UNIQUE RESOURCE FOR OPERA-
TORS AND MANAGERS OF WASTEWATER
COLLECTION SYSTEMS HAS BEEN SOLD
THROUGHOUT THE UNITED STATES AND
CANADA, IN 13 OTHER COUNTRIES, AND
TO 31 COLLEGES AND UNIVERSITIES.

DRINKING WATER

*WATER TREATMENT PLANT OPERA-
TION, VOLUME I*

(FIRST EDITION, 1983; FIFTH EDITION,
2004)

123,004 MANUALS
39,134 ENROLLMENTS
20,894 COMPLETIONS

MORE THAN 355 COLLEGES AND UNI-
VERSITIES USE THIS MANUAL AS A TEXT-
BOOK. INDIVIDUALS AND COMPANIES
IN THE U.S., CANADA, AND 49 OTHER
COUNTRIES HAVE PURCHASED MANUALS
AND ENROLLMENTS.

*WATER TREATMENT PLANT OPERA-
TION, VOLUME II*

(FIRST EDITION, 1983; FOURTH EDI-
TION, 2004)

78,460 MANUALS
18,163 ENROLLMENTS
10,936 COMPLETIONS

MORE THAN 314 COLLEGES AND UNI-
VERSITIES USE THIS MANUAL AS A TEXT-
BOOK. INDIVIDUALS AND COMPANIES
IN THE U.S., CANADA, AND 45 OTHER
COUNTRIES HAVE PURCHASED MANUALS
AND ENROLLMENTS

SMALL WATER SYSTEM OPERATION AND MAINTENANCE
(FIRST EDITION, 1983; FOURTH EDITION, 1999)

62,741 MANUALS
12,780 ENROLLMENTS
7,100 COMPLETIONS

MORE THAN 211 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. INDIVIDUALS AND COMPANIES IN THE U.S., CANADA, AND 52 OTHER COUNTRIES HAVE PURCHASED MANUALS AND ENROLLMENTS.

WATER DISTRIBUTION SYSTEM OPERATION AND MAINTENANCE
(FIRST EDITION, 1983; FOURTH EDITION, 2000)

91,029 MANUALS
19,363 ENROLLMENTS
11,236 COMPLETIONS

MORE THAN 244 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. THE MANUALS AND COURSE ENROLLMENTS HAVE BEEN PURCHASED IN THE U.S., CANADA, AND 25 OTHER COUNTRIES.

UTILITY MANAGEMENT
(FIRST EDITION, 1998; SECOND EDITION, 2004)

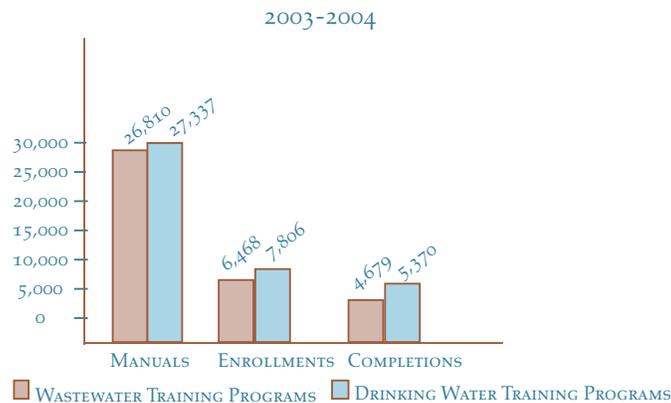
9,345 MANUALS
4,371 ENROLLMENTS
3,545 COMPLETIONS

MORE THAN 52 COLLEGES AND UNIVERSITIES USE THIS MANUAL AS A TEXTBOOK. INDIVIDUALS AND COMPANIES IN THE U.S., CANADA, AND 26 OTHER COUNTRIES HAVE PURCHASED MANUALS AND ENROLLMENTS.

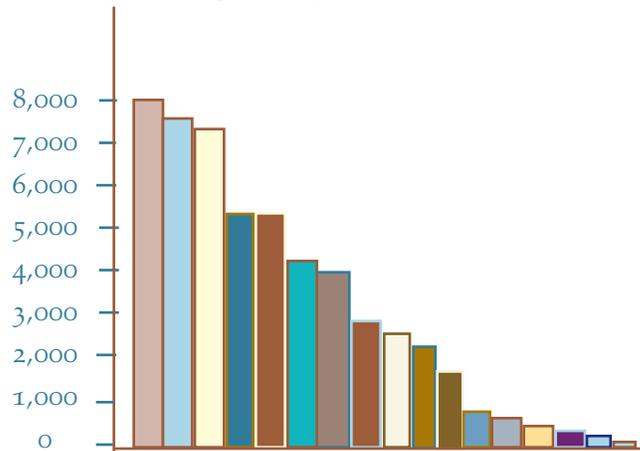
SMALL WATER SYSTEMS VIDEO INFORMATION SERIES
(FIRST EDITION, 2001)

337 SETS
122 ENROLLMENTS
75 COMPLETIONS

MORE THAN 4 COLLEGES AND UNIVERSITIES USE THIS VIDEO SERIES. INDIVIDUALS AND COMPANIES IN THE U.S., CANADA, AND XX OTHER COUNTRIES HAVE PURCHASED THIS VIDEO SERIES.

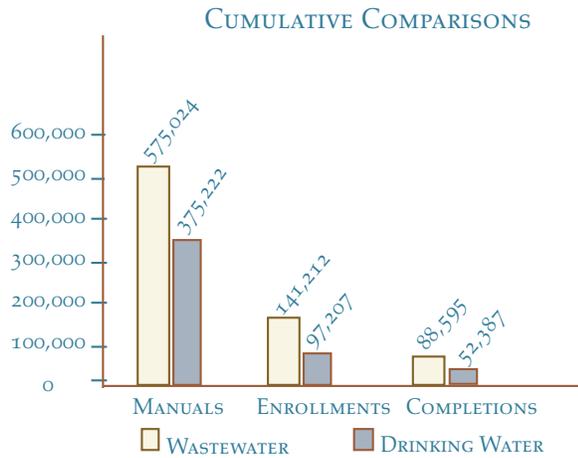
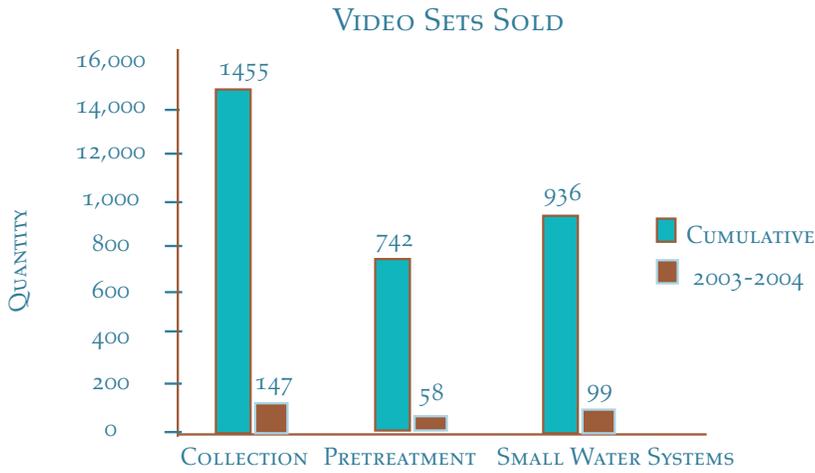
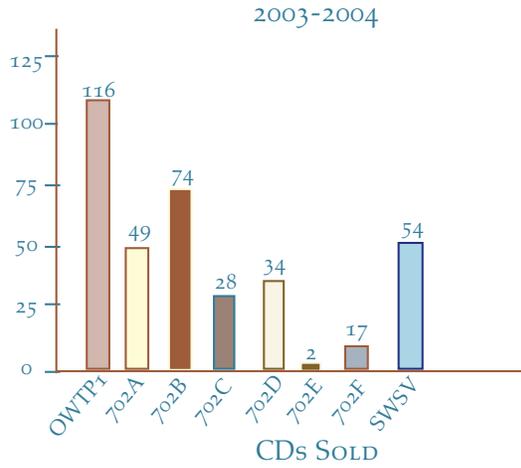


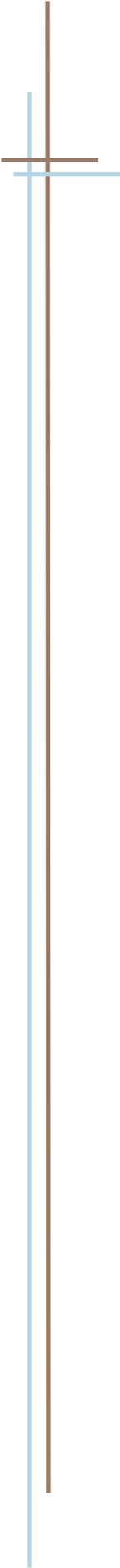
2003-2004 MANUALS SOLD



KEY TO ABBREVEVIATIONS

■ WDS:	WATER DISTRIBUTION SYSTEM OPERATION AND MAINTENANCE
■ OWTP I:	OPERATION OF WASTEWATER TREATMENT PLANTS, VOL. I
■ 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
■ 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 C

RESEARCH GROUP PAPERS AND PRESENTATIONS

AWARD—MOST DISTINGUISHED TECHNICAL PAPER

HALLOCK, B., K. DETTMAN, S. REIN, M. CURTO, M. SCHARFF, "EFFECTIVENESS OF NATIVE VEGETATION PLANTING TECHNIQUES TO MINIMIZE EROSION." INTERNATIONAL EROSION CONTROL ASSOCIATION (IECA), 35TH ANNUAL CONFERENCE, PHILADELPHIA, PA, FEBRUARY, 2004.

CONFERENCE PRESENTATIONS

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