



Kentucky Rural Water Association

Helping water and wastewater utilities help themselves

November 27, 2006

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NOV 28 2006

PUBLIC SERVICE
COMMISSION

Ms. Beth O'Donnell, Executive Director
Public Service Commission
P. O. Box 615
Frankfort, KY 40602-0615

Dear Ms. O'Donnell:

Case No. 2006-00501

Kentucky Rural Water Association has implemented six (6) on-line training sessions for continuing education credit for water operators. Four of these courses were designed in conjunction with SunCoast Learning Systems and two were modified for on-line use from training classes offered by Kentucky Rural Water Association. We request that this training be approved for commissioners as referenced in HB-75, KRS 74.020.

Please find enclosed a training summary for each of these sessions, which includes an agenda, a description of each session, and instructional design credentials. The Kentucky Boards of Certification of Wastewater System Operators and Drinking Water Treatment and Distribution System Operators and have approved these courses for ten (10) hours of continuing education training. A copy of their approval is also enclosed.

With this letter and enclosures, Kentucky Rural Water Association is requesting the approval of ten (10) hours for commissioner and board member training for each of these six courses. If additional information is needed, please do not hesitate to call.

Sincerely,

Janet Cole
Education Coordinator

Enclosures



ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

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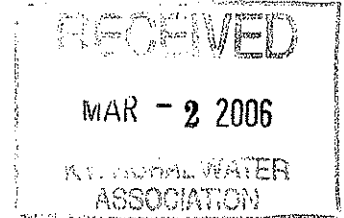
Ernie Fletcher
Governor

Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601
www.kentucky.gov

LaJuana S. Wilcher
Secretary

February 23, 2006

Andy Lange
Kentucky Rural Water Assoc.
P.O. Box 1424
Bowling Green, KY. 42102-1424



Dear Mr. Lange,

At the February 2006 meeting of the Kentucky Board of Certification of Drinking Water Treatment and Distribution System Operators your training request was reviewed.

Results:	Approved
Title:	Basic Water Works Operations
Date	On-line course
Approved hours and type	10 drinking water
DCA Event ID #	3973

Within thirty days of completion of the course, please forward to this office a list of attendees. Include their appropriate water treatment and/or water distribution certification number and the hours earned by each. When forwarding this information, please reference the DCA event ID number provided above.

If you have any questions or need additional information, please contact the Division of Compliance Assistance, Operator Certification at (502) 564-0323

Sincerely,

Lisa Butler
Division of Compliance Assistance
Operator Certification



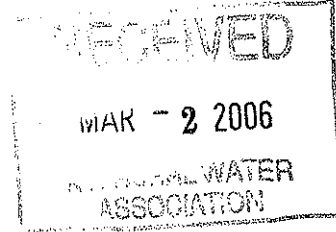
ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

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February 23, 2006



Andy Lange
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P.O. Box 1424
Bowling Green, KY 42102-1424

Dear Mr. Lange,

At the February 2006 meetings of the Kentucky Boards of Certification of Wastewater System Operators and Drinking Water Treatment and Distribution System Operators your training requests were reviewed.

<u>Course Title</u>	<u>Hours and Type</u>	<u>DCA Event ID #</u>
Utility Safety	10 non-process wastewater or 10 drinking water	3972
Pump & Motor Maintenance	10 non-process wastewater or 10 drinking water	3971
Chlorinator Systems & Chemical Handling	10 process wastewater or 10 drinking water	3970
Basic Wastewater Training	10 process wastewater or	3938

Within thirty days of completion of the course, please forward to this office a list of attendees. Include their appropriate water treatment and/or water distribution certification number and the hours earned by each. When forwarding this information, please reference the DCA event ID number provided above.

If you have any questions or need additional information, please contact the Division of Compliance Assistance, Operator Certification at (502) 564-0323

Sincerely,

Lisa Butler
Division of Compliance Assistance
Operator Certification

Basic Water Works Operations – DW

Module	Time Estimate - Minutes
Introduction	60
Operation of the Water System	55
Water Characteristics	45
Water Quality standards	55
Disinfection	70
Groundwater and Wells	90
Surface Water Production	45
Distribution	65
Safety	40
Basic Water Utility Math	75
Total	600

Pump and Motor Maintenance DW/WW

Module	Time Estimate - Minutes
Objectives	10
Developing a Maintenance Program	35
Prime Movers: Electric Motors and Motor Controls	90
Centrifugal Pump Mechanics	90
Centrifugal Pump Hydraulics	160
Lubrication	20
Bearings	45
Compression Packing	50
Mechanical Seals	40
Positive Displacement Pumps	35
Special Pumping Units	10
Water Utilities Safety	15
Total	600

Chlorinator Maintenance and Chemical Handling DW/WW

Module	Time Estimate - Minutes
History of Chlorination and Chloramination	45
Chemical Handling and Safety	75
Physical and Chemical Properties of Disinfectants	45
Process Applications	45
System Types	100
Injectors/Ejectors	65
Containers and Connections	65
Gas Chlorinators and Switchovers	65
Maintenance and Troubleshooting	25
Chlorination Math	70
Total	600

Water Utility Safety DW/WW

Module	Time Estimate - Minutes
Introduction	50
PPE	50
Back Safety	40
Hazard Communication and Chemical Safety	160
Laboratory Safety	35
Biological Hazards	45
Confined Space Safety	60
Emergency Response	25
Electrical Safety	50
Trench Safety	60
Work Zone Safety	25
Total	600

III A. Basic Water works Course Objectives

Operation of a Water Utility

In this module the student will discover the:

- Basic rolls and responsibilities of the team
- Roll of the EPA and the Safe Drinking Water Act

Water Characteristics

In this module the student will be able to:

- Describe the hydrologic cycle
- Describe and understand the definitions and terminology of water characteristics

Water Quality Standards

In this module the student will:

- Be introduced to bacteriological monitoring of water
- Be introduced to Indicator Organisms - the total coliform group
- Understand water sample collection procedures and sampling techniques
- Understand non-acute and acute violations
- Be introduced to Chemical and Radiological Monitoring
- Understand the MCL of inorganic, SOCs, and VOCs
- Understand the MCL of disinfection byproducts

Disinfection

In this module the student will:

- Understand the terms of chlorine dosage, demand and residual
- Understand chlorine residual requirements
- Understand forms and characteristics of chlorine
 - Pure chlorine
 - Sodium hypochlorite
 - Calcium hypochlorite
- Introduced to chlorinator and hypochlorinator feed units
 - Basic operation
 - Regulations
 - Safety
- Understand emergency actions for chlorine leaks including first aid

Ground Water and Wells

In this module the student will:

- Understand the ground water and aquifer characteristics
- Understand criteria for public well location
- Understand the parts of a well and well construction
- Understand basic ground water terminology
- Understand groundwater treatment techniques

Surface Water Production

In this module the student will:

- Understand surface water treatment requirements
 - Pretreatment disinfection
 - Taste and odor control
 - Continuous coagulation
 - Sedimentation
 - Filtration
 - Terminal disinfection
 - Covered storage

Distribution

In this module the student will:

- Be introduced to the major components of a water distribution system
- Understand the design, construction and maintenance of ground storage tanks, elevated storage tanks, standpipes, and pressure tanks
- Understand basic water main piping carrying capacity, joints and couplings
- Understand the basic concepts of water line construction, design, operation, maintenance and cross-connection control
- Be introduced to centrifugal pumps and how they work
- Understand static head

Safety

In this module the student will:

- Be introduced for the need to understand why a good safety program is essential
- Understand safety issues
- Understand the application and use of PPE
- Understand basic concepts of chemical hazards, electrical hazards and trenching and shoring safety
- Understand the safety concerns in confined spaces
- Be introduced to confined space entry program and the definition of confined space
- Understand the steps in conducting a confined space entry
- Understand the need and safe practices of traffic control

Basic Water Utility Math

In this module the student will:

- Understand common equivalents, constants and conversion factors
- Calculate square feet and cubic feet for square, rectangular and circular objects
- Calculate gallons for rectangular tanks, circular tanks and pipe
- Calculate pounds/day, dosage and equivalent pounds

III B. Criteria for Successful Completion by Operators

The student must pass each end-of- module quiz by 70% or higher. Should the student fail the quiz, they may review the course material and take the quiz again, until they pass.

III C. Agenda – Basic Water Works

- Operation of the Water Utility
- Water Characteristics
- Water Quality Standards
- Ground Water and Wells
- Surface Water Production
- Disinfection
- Distribution
- Safety
- Basic Water Utility Math

III D. Instructor's Credentials

Online course, no instructor delivery

IV. Additional Attachments

A. Instructional Design Credentials

Basic Water Works Operations was originally developed as an instructor led course by Len Klandrud of Texas Rural Water Association. The course was later converted to online training by Len Klandrud and SunCoast Learning Systems.

Len Klandrud, Texas Rural Water Association

Master of Science, Health Education - Southwest Texas State University

Bachelor of Science, Health Education - Southwest Texas State University

Bachelor of Science, Biology - Pan American College

Registered Professional Sanitarian

25 plus years working as a Field Investigator with the Public Water Supply section for the state agencies.

Jerry Untiedt, President, SunCoast Learning Systems

Bachelors of Science, Business Administration and Psychology, Augustana College

Instructor and National Course Manager, AT&T

Executive Staff Manager, Sales and Branch Management Training, MCI

Director of Training, Sprint

VP and GM of Why Learning Systems

B. Subject Matter Experts

Len Klandrud, lead subject matter expert and TRWA staff (see above)

Course Content - Basic Water Works Operations

Module 1 Introduction	Error! Bookmark not defined.
Water is Life – What do you know about it?	Error! Bookmark not defined.
Water Works for Us at Home & at Work.....	Error! Bookmark not defined.
Is Fresh Water Scarce?	Error! Bookmark not defined.
Another Challenge: "TERRORISM"	Error! Bookmark not defined.
Module 1 Quiz.....	Error! Bookmark not defined.
Module 2 Operation of the Water Utility	Error! Bookmark not defined.
Quality Water Starts with Quality Operators.....	Error! Bookmark not defined.
It Takes a Team Effort	Error! Bookmark not defined.
Training and Certification Requirements	Error! Bookmark not defined.
Regulation at the National Level	Error! Bookmark not defined.
Public Water Systems.....	Error! Bookmark not defined.
Records & Reports are Necessary.....	Error! Bookmark not defined.
Module 2 Quiz.....	Error! Bookmark not defined.
Module 3 Water Characteristics	Error! Bookmark not defined.
The Chemistry of Water.....	Error! Bookmark not defined.
Water Comes in Three Forms.....	Error! Bookmark not defined.
The Hydrological Cycle: "Nature's way of Recycling our Water".....	Error! Bookmark not defined.
Definitions and Terminology of Water Characteristics.....	Error! Bookmark not defined.
Module 3 Quiz.....	Error! Bookmark not defined.
Module 4 Water Quality Standards	Error! Bookmark not defined.
Bacteriological Monitoring of Water	Error! Bookmark not defined.
Water Sample Collection Procedures	Error! Bookmark not defined.
Chemical and Radiological Monitoring.....	Error! Bookmark not defined.
Primary & Secondary Chemical Limits.....	Error! Bookmark not defined.
Primary Limits:.....	Error! Bookmark not defined.
Disinfection By-Products (DBPs)	Error! Bookmark not defined.
Secondary Limits	Error! Bookmark not defined.
Module 4 Quiz.....	Error! Bookmark not defined.
Module 5 Disinfection	Error! Bookmark not defined.
Introduction to Disinfection.....	Error! Bookmark not defined.
Chlorine Dosage, Demand & Residual Terminology	Error! Bookmark not defined.
Chlorine Residual Requirements	Error! Bookmark not defined.
Forms & Characteristics of Chlorine	Error! Bookmark not defined.
Pure Chlorine (Cl ₂).....	Error! Bookmark not defined.
Hypochlorites Compounds.....	Error! Bookmark not defined.
Chlorinator & Hypochlorinator Feed Units.....	Error! Bookmark not defined.
Emergency Actions for Chlorine.....	Error! Bookmark not defined.
Chlorine Leaks.....	Error! Bookmark not defined.
First Aid Procedures	Error! Bookmark not defined.
Module 5 Quiz.....	Error! Bookmark not defined.

Module 6 Ground Water and Wells	Error! Bookmark not defined.
Ground Water & Aquifer Characteristics	Error! Bookmark not defined.
Well Location	Error! Bookmark not defined.
Parts of a Well	Error! Bookmark not defined.
Well Construction	Error! Bookmark not defined.
Well Completion Requirements	Error! Bookmark not defined.
Well Completion Requirements	Error! Bookmark not defined.
Pumps and Motors.....	Error! Bookmark not defined.
Pumps and Motors.....	Error! Bookmark not defined.
Ground Water Quality	Error! Bookmark not defined.
Ground Water Treatment Techniques.....	Error! Bookmark not defined.
Ground Water Under the Influence of Surface Water: (GWUI).....	Error! Bookmark not defined.
Module 6 Quiz.....	Error! Bookmark not defined.
 Module 7 Surface Water Production	 Error! Bookmark not defined.
Raw Surface Water Sources.....	Error! Bookmark not defined.
Surface Water Source Protection.....	Error! Bookmark not defined.
Plant Raw Water Intake Requirements	Error! Bookmark not defined.
Treatment Plant Location, Security and Access.....	Error! Bookmark not defined.
Surface Water Quality Issues	Error! Bookmark not defined.
Surface Water Treatment Requirements.....	Error! Bookmark not defined.
Module 7 Quiz.....	Error! Bookmark not defined.
 Module 8 Distribution	 Error! Bookmark not defined.
Distribution System Description	Error! Bookmark not defined.
Water Storage Tanks.....	Error! Bookmark not defined.
Purposes	Error! Bookmark not defined.
Design, Construction and Function.....	Error! Bookmark not defined.
Water Main Piping	Error! Bookmark not defined.
Water Meters.....	Error! Bookmark not defined.
Fire Hydrants.....	Error! Bookmark not defined.
Valves.....	Error! Bookmark not defined.
Water Line Construction	Error! Bookmark not defined.
Operation and Maintenance.....	Error! Bookmark not defined.
Cross-Connection Control.....	Error! Bookmark not defined.
Types of Pumps.....	Error! Bookmark not defined.
Pump Operation & Maintenance.....	Error! Bookmark not defined.
Motor Operation & Maintenance	Error! Bookmark not defined.
Module 8 Quiz.....	Error! Bookmark not defined.
 Module 9 Safety	 Error! Bookmark not defined.
Safety Programs.....	Error! Bookmark not defined.
Safety Issues.....	Error! Bookmark not defined.
Module 9 Quiz.....	Error! Bookmark not defined.
 Module 10 Basic Water Utility Math	 Error! Bookmark not defined.
SECTION 1: Equivalent, Constants & Conversion Factors:	Error! Bookmark not defined.
SECTION 2: Calculating Square Feet and Cubic Feet.....	Error! Bookmark not defined.
SECTION 3: Calculating Gallons in a Rectangular Tank, Circular Tank, or Pipe.....	Error! Bookmark not defined.
SECTION 4: Calculating Pounds per Day, Dosage (mg/L) & Equivalent Pounds.....	Error! Bookmark not defined.

C. Needs Analysis of Participants

Prior to development a needs analysis was initiated by Texas Rural Water to its systems and licensed operator base. Based on their feedback Basic Water Works Operations was created.

D. Field Testing of Course

Basic Water Works has been in service as an instructor led course since 2000 and as an online course since 2003. Prior to release, the instructor led version was subjected to peer review by other RWA subject matter experts. Feedback from both Instructor led and online have been incorporated into the current version. The online course has been praised highly for its content and logic flow. To date SunCoast has not received any negative comments.

E. Ongoing Course Evaluation

Every student has the opportunity to give feedback on the certification email or, at anytime in the course with the pre-formatted email. All they need to do is click on the email icon to access, at anytime during the course. To date no negative feedback has been received. Comments from the field, changes in regulations or technology are incorporated when required.

F. Support Available to Participants

The online course provides for access to a pre-formatted email to send to a subject matter expert at KRWA for course questions or they may call the KRWA listed telephone number.

Students with computer questions or operational problems can email or call SunCoast's 800 number as provided in the courseware. After hours they can call the cell phone of the person on call.

G. List of colleges, universities, regulatory agencies, that have awarded credits for the course.

This course has been state approved for online delivery by the Rural Water Associations in Texas, Florida, Missouri, New York, Delaware, Tennessee, Virginia, Idaho, New Mexico, Nevada, and Utah.

H. Required Assignments and/or Examinations

At the end of most modules is a test. The student must pass with a 70% or higher.

I. Mandatory Time Constraints

The course has no time constraints. Students learn at their own pace. Credit for the course is not given until all work has been satisfactorily completed.

J. Documentation of results

All of the training experience is handled through a Learning Management System (LMS). The student registers, enrolls, pays and takes the course through the LMS system. Student data such as quiz and test scores, time in modules and attempts by module are recorded. Once a student completes a course they must fill out a certification email. The email has pre-printed the students name and course taken (preprinting eliminates any possibility of changing the student name of course taken). The student then fills in the variable data such as address, license number and any course comments. This email is then sent to KRWA, SunCoast Learning and to the student. KRWA can review the student results prior to issuing a certificate of completion.

K. Security Procedures

Credit card transactions are completed on SunCoast's secure site. Hours in course, log in activity including IP address, and module attempts are recorded and only available to KRWA and SunCoast by password.. Students cannot alter course data and cannot change student name or course taken in the course certification.

III B. Criteria for Successful Completion by Operators

The student must pass each end-of-module quiz by 70% or higher. Should the student fail the quiz, they may review the course material and take the quiz again, until they pass.

III C. Agenda: Course Modules - Water Utility Safety

MODULE 1 - Preventing Injuries

Introduction.....	1-3
Accident Causes.....	1-3
Safety Program Controls	1-4
Accident Investigation.....	1-5
Employee Participation.....	1-0
Safety Audits	1

MODULE 2 - Personal Protective Equipment

Introduction.....	2-2
Types of PPE	2-3
Inspection and Maintenance.....	2-9
Cleaning	2-9

MODULE 3 - Back Safety

Introduction.....	3-2
Anatomy of the Back	3-2
Causes of Back Pain	3-3
Back Mechanics	3-4
Maintaining Back Health.....	3-5
Preventing Injury.....	3-5

MODULE 4 - Hazard Communication and Chemical Safety

Material Safety Data Sheets.....	4-7
Container Labels	4-10
Exceptions.....	4-13
Employee Education and Training.....	4-14
Chemical Safety	4-16
Task Evaluation.....	4-16
Chemical Storage.....	4-17
Incompatible Chemicals	4-20
Chemical Container Labels	4-22
Housekeeping	4-22

Emergencies and Spills	4-22
MODULE 5 - Laboratory Safety	
Introduction.....	5-2
OSHA Standard.....	5-2
<i>Employee Exposure Assessments</i>	5-3
<i>Chemical Hygiene Plan</i>	5-3
<i>Employee Training and Information</i>	5-3
<i>Medical Consultation and Examination</i>	5-4
General Guidelines.....	5-5
Lab Emergencies.....	5-7
Waste Disposal Program.....	5-8
MODULE 6 - Biological Hazards	
Introduction.....	6-2
Routes of Entry.....	6-2
Protection	6-3
Summary	6-3
Quiz.....	6-5
MODULE 7 - Confined Space Safety	
Introduction.....	7-2
What is a Confined Space?.....	7-3
To Enter or Not To Enter?	7-5
Written Permit Space Entry Program.....	7-6
The Entry Team.....	7-6
Safe Entry – Three Step Process	7-11
MODULE 8 - Emergency Response	
Introduction.....	8-2
Emergency Action Plan	8-2
Communication	8-4
Training	8-4
Responding to a Medical Emergency	8-6
Fire Extinguisher Use	8-8
MODULE 9 - Electrical Safety	
Introduction.....	9-2
Electrical Hazards.....	9-2
Working with Electricity Safely.....	9-5
Improving Employee Safety.....	9-7
Lockout/Tagout Procedures	9-8
Electrical Accidents	9-10

MODULE 10 - Trench Safety

Introduction.....	10-2
The OSHA Standard.....	10-3
Before Digging.....	10-3
During the Dig	10-4
Before Employees Enter.....	10-4
<i>Soil Characteristics</i>	10-4
<i>Entry and Exit</i>	10-5
<i>Atmospheric Conditions</i>	10-5
<i>Water Accumulation</i>	10-5
<i>Protective Systems</i>	10-6
On-The-Job	10-7
<i>Installation and Use of Protective Systems</i>	10-7
<i>Sloping and Benching</i>	10-7
<i>Shoring</i>	10-8
<i>Shielding</i>	10-8
<i>Daily Inspection</i>	10-9
<i>Fall Protection</i>	10-9
Additional Considerations.....	10-9
Completion of the Job.....	10-
Trenching Accidents`	10-

MODULE 11 - Work Zone Safety

Introduction.....	11-2
Hazards	11-2
Five Areas of a Work Zone.....	11-2
Flaggers	11-5
Flagger Control Methods	11-6
Summary	11-8

III D. Instructor's Credentials

- Online Course, no instructors used to present material

IV. Additional Attachments

A. Instructional Design Credentials

Water Utility Safety was originally developed as an instructor led course by Tammy Pickering of Texas Rural Water Association. The course was later converted to online training by Tammy Pickering and SunCoast Learning Systems.

Tammy Pickering - TRWA

Bachelor of Science, Biology - Eastern New Mexico University

New Mexico Secondary Science Teaching Certificate
Texas Grade "B" Wastewater License
Three years teaching at Melrose Municipal School District.
Three years working as an Industrial Chemist
Three years working as a TRWA Technical Programs and Education Coordinator.
Lead Instructor and Developer of Chlorinator Systems and Chemical Handling Course

Jerry Untiedt, President, SunCoast Learning Systems
Bachelors of Science, Business Administration and Psychology, Augustana College
Instructor and National Course Manager, AT&T
Executive Staff Manager, Sales and Branch Management Training, MCI
Director of Training, Sprint

B. Subject Matter Experts

- Tammy Pickering lead subject matter expert, plus TRWA staff (see above)

Water Utility Safety Learning Objectives

Preventing Injuries

Upon successful completion of this module, the student should know the:

- Causes of accidents;
- Four controls of a safety program;
- Actions that can be taken to prevent accidents;
- Goal of accident investigations; and
- Importance of employee participation.

Upon successful completion of this module, students will be able to:

- Determine the cause of an accident when given a scenario;
- Recommend actions for preventing future accidents based on a given scenario; and,
- Recognize unsafe acts and unsafe conditions.

Personal Protective Equipment

Upon completion of this module, students will know the:

- Workplace hazards resulting in the need for personal protective equipment;
- Different types of personal protective equipment;
- Parts of a hard hat;
- Hazards that result in hand injuries;
- Areas of the foot prone to injuries; and,
- Hazards that require respiratory protection.

Upon completion of this module, students will be able to:

- Identify the class of a hard hat;
- Select the correct eye protection; and
- Select the correct respiratory protection and ensure proper fit.

Back Safety

Upon completion of this module, students will be know the:

- Components of the back;
- Causes of back injuries; and,
- Techniques to prevent back injuries.

Hazard Communications and Chemical Safety

Upon successful completion of this module, the student should know the:

- Purpose of the OSHA standard;
- Responsibilities of the employer as required by the OSHA standard;
- Components of a material safety data sheet;
- Components of a container label;
- Requirements for container labeling;
- General safety rules for working with chemicals; and,
- Different groups of chemicals.

Upon successful completion of this module, students will be able to:

- Interpret and use a material safety data sheet;
 - Identify routes of entry into the body
 - Identify the physical characteristics of the chemical.
 - Locate the emergency and first aid procedures
 - Determine the correct personal protective equipment
- Identify the chemical, hazards and the personal protective equipment recommended from a container label; and,
- Determine if a container is properly labeled.

Laboratory Safety

Upon completion of this module, students should know the:

- Provisions of the OSHA standard for working in a laboratory;
- General work practices for the laboratory;
- Required personal protective equipment; and,
- Procedures for responding to laboratory emergencies.

Biological Hazards

Upon completion of this module, students will know the:

- Biological hazards in the workplace, and
- Techniques for preventing disease transmission.

Upon completion of this module, students will be able to demonstrate:

- How good personal hygiene can prevent contamination and illnesses.

Confined Space Safety

Upon completion of this module, students will know the:

- Definition of a confined space;
- Difference between a confined space and a permit-required confined space;
- Types of hazards found in confined spaces;
- Categories of atmospheric hazards;
- Importance and order of atmospheric testing;
- Duties of each member of the confined space entry team; and
- Importance of proper notification of rescue services.

Upon completion of this module, students will be able to demonstrate the:

- Ability to choose the proper atmospheric testing equipment;
- Ability to use confined space entry equipment; and
- Ability to use the OSHA standard to identify requirements of permit-required confined space entry.

Electrical Safety

Upon completion of this module, students will know the:

- Electrical hazards;
- Effects of electricity on the human body;
- Importance of safety equipment when working around electricity;
- Safe procedures for working around electricity; and,
- Six step lockout/tag-out procedures.

Upon completion of this module, students will be able to demonstrate:

- Inspection of an extension cord to determine if it is safe to use, and
- Emergency procedures to be used in electrical accident.

Trench Safety

Upon completion of this module, students should know the:

- Hazards of excavation work;
- Definition of a competent person;
- Different types of soil;
- Conditions when protective systems are required in an excavation;
- Conditions when a means of exit from an excavation are required; and,
- Different types of excavation protective systems.

Work Zone Safety

Upon completion of this module, students will know the:

- Hazards of routing traffic around a work site;
- Five different areas of traffic control; and,
- Proper procedures for flagging operation.

C. Needs Analysis of Participants

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D. Field Testing of Course

Water Utility Safety has been in service as an instructor led course since 2000 and as an online course since 2003. Prior to release, the instructor led version was subjected to peer review by other RWA subject matter experts. Feedback from both Instructor led and online have been incorporated into the current version. The online course has been praised highly for its content and logic flow. To date SunCoast has not received any negative comments.

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III A. Pump and Motor Maintenance Course Learning Objectives

The student should be able to:

- Explain the need for a maintenance program
- Explain the five approaches to maintenance
- State the objective of a Maintenance Management System (MMS)
- Discuss the parts of a MMS
- Explain maintenance schedules
- Explain a monitoring program for pumps and motors
- Discuss the terms associated with electricity
- Explain horsepower
- Explain OHMS law
- Identify common meters used to test motors
- Explain how to set up a testing program
- Explain how electrical equipment is protected from overloads
- Explain the different types of electric motors
- Discuss the importance of equipment name plate data and use it to improve maintenance
- Discuss motor maintenance
- Explain how to use a troubleshooting guide
- Explain how a centrifugal pump works
- Identify centrifugal pump components
- Discuss how pumps are classified
- Explain how pumps are selected
- Define centrifugal pump terminology
- Explain the purpose and importance of proper lubrication of bearings
- Discuss the four classes of lubricants
- Discuss the characteristics of lubricants
- Discuss the types of lubrication systems
- Explain the function of bearings
- Discuss the types of bearings
- Explain why bearings fail
- Use a troubleshooting guide on bearing problems
- Explain the function of packing
- Discuss how packing works
- Explain why packing fails
- Explain how packing is selected and how to correctly size and cut packing
- Explain how to check pump run-out, endplay, shaft sleeve wear and stuffing box wear
- Explain the proper procedure for installing packing
- Explain the purpose of mechanical seals
- Discuss the basic components of mechanical seals
- Explain how seals are classified and the variations of each design
- Discuss how mechanical seals are selected

III B. Criteria for Successful Completion by Operators

The student must pass each end-of- module quiz by 70% or higher. Should the student fail the quiz, they may review the course material and take the quiz again, until they pass.

III C. Agenda – Pump and Motor Maintenance

MODULE 1 - DEVELOPING A MAINTENANCE PROGRAM ERROR! BOOKMARK NOT DEFINED.

MAINTENANCE	ERROR! BOOKMARK NOT DEFINED.
MAINTENANCE MANAGEMENT SYSTEM	ERROR! BOOKMARK NOT DEFINED.
BASIC PARTS OF A MMS	ERROR! BOOKMARK NOT DEFINED.
MAINTENANCE PROCEDURES	ERROR! BOOKMARK NOT DEFINED.
MAINTENANCE SCHEDULES	ERROR! BOOKMARK NOT DEFINED.
SCHEDULE CYCLE	ERROR! BOOKMARK NOT DEFINED.
RECORD KEEPING	ERROR! BOOKMARK NOT DEFINED.
FEEDBACK SYSTEM	ERROR! BOOKMARK NOT DEFINED.
MONITOR THE SYSTEM	ERROR! BOOKMARK NOT DEFINED.
MAINTENANCE TRAINING	ERROR! BOOKMARK NOT DEFINED.

MODULE 2 - PRIME MOVERS ELECTRIC MOTORS & MOTOR CONTROLS..... ERROR! BOOKMARK NOT DEFINED.

ELECTRICITY	ERROR! BOOKMARK NOT DEFINED.
BASIC ELECTRICAL TERMS	ERROR! BOOKMARK NOT DEFINED.
ELECTRICAL EQUIPMENT PROTECTION DEVICES	ERROR! BOOKMARK NOT DEFINED.
TYPES OF AC MOTORS	ERROR! BOOKMARK NOT DEFINED.
MOTOR NAME PLATE DATA	ERROR! BOOKMARK NOT DEFINED.
INDUCTION MOTORS	ERROR! BOOKMARK NOT DEFINED.
SYNCHRONOUS MOTORS	ERROR! BOOKMARK NOT DEFINED.
MOTOR MAINTENANCE	ERROR! BOOKMARK NOT DEFINED.
SUBMERSIBLE MOTORS	ERROR! BOOKMARK NOT DEFINED.
MAINTENANCE SUMMARY	ERROR! BOOKMARK NOT DEFINED.
OPERATIONAL INSPECTIONS	ERROR! BOOKMARK NOT DEFINED.
TROUBLESHOOTING GUIDE FOR MOTORS	ERROR! BOOKMARK NOT DEFINED.
EQUIPMENT I.D. CARD	ERROR! BOOKMARK NOT DEFINED.

MODULE 3 - CENTRIFUGAL PUMP TECHNOLOGYERROR! BOOKMARK NOT DEFINED.

CENTRIFUGAL PUMP THEORY	ERROR! BOOKMARK NOT DEFINED.
CENTRIFUGAL PUMPS NOMENCLATURE	ERROR! BOOKMARK NOT DEFINED.
CENTRIFUGAL PUMPS SELECTION AND TYPES	ERROR! BOOKMARK NOT DEFINED.
CENTRIFUGAL PUMP TERMINOLOGY	ERROR! BOOKMARK NOT DEFINED.

MODULE 4 - LUBRICATIONERROR! BOOKMARK NOT DEFINED.

INTRODUCTION	ERROR! BOOKMARK NOT DEFINED.
ROLLER BEARINGS	ERROR! BOOKMARK NOT DEFINED.
PURPOSE OF LUBRICATION	ERROR! BOOKMARK NOT DEFINED.
TYPE OF LUBRICANTS	ERROR! BOOKMARK NOT DEFINED.
FLUID FILM THEORY	ERROR! BOOKMARK NOT DEFINED.
LUBRICANT CHARACTERISTICS	ERROR! BOOKMARK NOT DEFINED.
LUBRICATION FREQUENCY	ERROR! BOOKMARK NOT DEFINED.

LUBRICATION SYSTEMS.....	ERROR! BOOKMARK NOT DEFINED.
OIL SUPPLY SYSTEMS.....	ERROR! BOOKMARK NOT DEFINED.
SLEEVE OR JOURNAL BEARING.....	ERROR! BOOKMARK NOT DEFINED.
SUMMARY	ERROR! BOOKMARK NOT DEFINED.
MODULE 5 - BEARINGS	ERROR! BOOKMARK NOT DEFINED.
INTRODUCTION	ERROR! BOOKMARK NOT DEFINED.
FUNCTION	ERROR! BOOKMARK NOT DEFINED.
TYPES OF BEARINGS.....	ERROR! BOOKMARK NOT DEFINED.
BEARING NOMENCLATURE	ERROR! BOOKMARK NOT DEFINED.
BEARING NUMBERS	ERROR! BOOKMARK NOT DEFINED.
BEARING LIFE.....	ERROR! BOOKMARK NOT DEFINED.
BEARING FAILURE.....	ERROR! BOOKMARK NOT DEFINED.
BEARING REMOVAL AND INSTALLATION	ERROR! BOOKMARK NOT DEFINED.
TROUBLESHOOTING	ERROR! BOOKMARK NOT DEFINED.
MODULE 6 - COMPRESSION PACKING	ERROR! BOOKMARK NOT DEFINED.
SEALING.....	ERROR! BOOKMARK NOT DEFINED.
PACKING REQUIREMENTS	ERROR! BOOKMARK NOT DEFINED.
EFFECTIVE SEALING	ERROR! BOOKMARK NOT DEFINED.
PACKING FAILURE.....	ERROR! BOOKMARK NOT DEFINED.
WHY PACKING FAILS.....	ERROR! BOOKMARK NOT DEFINED.
PACKING THE SYSTEM	ERROR! BOOKMARK NOT DEFINED.
SELECTION OF PACKING.....	ERROR! BOOKMARK NOT DEFINED.
LUBRICANTS.....	ERROR! BOOKMARK NOT DEFINED.
PACKING INSTALLATION	ERROR! BOOKMARK NOT DEFINED.
TROUBLESHOOTING PACKING	ERROR! BOOKMARK NOT DEFINED.
MODULE 7 - MECHANICAL SEALS.....	ERROR! BOOKMARK NOT DEFINED.
PURPOSE	ERROR! BOOKMARK NOT DEFINED.
GENERAL	ERROR! BOOKMARK NOT DEFINED.
SEAL CLASSIFICATION.....	ERROR! BOOKMARK NOT DEFINED.
BASIC SEAL DESIGN	ERROR! BOOKMARK NOT DEFINED.
SEAL VARIATIONS.....	ERROR! BOOKMARK NOT DEFINED.
SEAL CONFIGURATIONS	ERROR! BOOKMARK NOT DEFINED.
MECHANICAL SEAL SELECTION.....	ERROR! BOOKMARK NOT DEFINED.
SEAL FLUSH SYSTEMS.....	ERROR! BOOKMARK NOT DEFINED.
SEAL INSTALLATION	ERROR! BOOKMARK NOT DEFINED.
MECHANICAL SEAL TROUBLESHOOTING.....	ERROR! BOOKMARK NOT DEFINED.
MODULE 8 - WATER UTILITIES SAFETY.....	ERROR! BOOKMARK NOT DEFINED.
WHAT IS SAFETY?	ERROR! BOOKMARK NOT DEFINED.
INTRODUCTION	ERROR! BOOKMARK NOT DEFINED.
ACCIDENT CAUSES	ERROR! BOOKMARK NOT DEFINED.
SAFETY PROGRAM.....	ERROR! BOOKMARK NOT DEFINED.
EMPLOYEE PARTICIPATION.....	ERROR! BOOKMARK NOT DEFINED.
SAFETY AUDITS.....	ERROR! BOOKMARK NOT DEFINED.
ELECTRICAL HAZARDS	ERROR! BOOKMARK NOT DEFINED.
CHEMICAL HAZARDS AND SAFETY	ERROR! BOOKMARK NOT DEFINED.
CONFINED SPACE INTRODUCTION.....	ERROR! BOOKMARK NOT DEFINED.
HAZARDS	ERROR! BOOKMARK NOT DEFINED.
MODULE 9 - CENTRIFUGAL PUMP HYDRAULICS	ERROR! BOOKMARK NOT DEFINED.
INTRODUCTION	ERROR! BOOKMARK NOT DEFINED.
CENTRIFUGAL PUMP HYDRAULIC	ERROR! BOOKMARK NOT DEFINED.
BASIC HYDRAULICS	ERROR! BOOKMARK NOT DEFINED.

FLOW AND VELOCITY	ERROR! BOOKMARK NOT DEFINED.
SPECIFIC GRAVITY.....	ERROR! BOOKMARK NOT DEFINED.
HORSEPOWER.....	ERROR! BOOKMARK NOT DEFINED.
AFFINITY LAWS.....	ERROR! BOOKMARK NOT DEFINED.
HORSEPOWER AND KILOWATTS.....	ERROR! BOOKMARK NOT DEFINED.
AFFINITY LAWS II.....	ERROR! BOOKMARK NOT DEFINED.
SHUT-OFF HEAD AND BEST EFFICIENCY POINT.....	ERROR! BOOKMARK NOT DEFINED.
SHAFT DEFLECTION.....	ERROR! BOOKMARK NOT DEFINED.
SPECIFIC SUCTION SPEED.....	ERROR! BOOKMARK NOT DEFINED.
PUMP PIPING HYDRAULICS.....	ERROR! BOOKMARK NOT DEFINED.
NET POSITIVE SUCTION HEAD.....	ERROR! BOOKMARK NOT DEFINED.
CAVITATION.....	ERROR! BOOKMARK NOT DEFINED.
WATER HAMMER.....	ERROR! BOOKMARK NOT DEFINED.
PUMP CURVES.....	ERROR! BOOKMARK NOT DEFINED.

III D. Instructor Credentials

Online Course, No instructor delivery

IV. Additional Attachments

A. Instructional Design Credentials

Pump and Motor Maintenance was originally developed as an instructor led course by Wade Gomillion and Dan Siebeneicher of Texas Rural Water Association. The course was later converted to online training by and SunCoast Learning Systems.

Course Developers

Wade Gomillion – Texas Rural Water Association

Texas Grade "A" Water License

Texas Commission on Environmental Quality - "Approved" to teach water, waste water, and laboratory subjects.

30 plus years working in water, waste water, and laboratory fields.

25 plus years as a instructor. (Over 300 plus hours of Industrial Vocational Instructional Education Classes)

8 years of actual water and wastewater operation plant experience.

5 years experience operating a State Approved Certified Laboratory.

Dan Siebeneicher – Texas Rural Water Association

Master of Urban Planning - Texas A & M University

Bachelor of Science, Recreation and Parks, Texas A & M University

Texas Grade "B" Water License.

30 plus years working in water, waste water, and laboratory fields.

25 plus years as a instructor.

Certified Vocational Teacher by TEA.

Worked with USEPA on writing four manuals and conducting EPA training classes.

Jerry Untiedt, President, SunCoast Learning Systems

Bachelors of Science, Business Administration and Psychology, Augustana College

Instructor and National Course Manager, AT&T

Executive Staff Manager, Sales and Branch Management Training, MCI
Director of Training, Sprint
VP and GM, Why Learning Systems

B. Subject Matter Experts

- See Course developers above

C. Needs Analysis of Participants

Prior to development a needs analysis was initiated by Texas Rural Water to its systems and licensed operator base. Based on their feedback Chlorinator Systems and Chemical Handling was created.

D. Field Testing of Course

Chlorinator Maintenance has been in service as an instructor led course since 2000 and as an online course since 2003. Prior to release, the instructor led version was subjected to peer review by other RWA subject matter experts. Feedback from both Instructor led and online have been incorporated into the current version. The online course has been praised highly for its content and logic flow. To date SunCoast has not received any negative comments.

E. Ongoing Course Evaluation

Every student has the opportunity to give feedback on the certification email or, at anytime in the course with the pre-formatted email. All they need to do is click on the email icon to access, at anytime during the course. To date no negative feedback has been received. Comments from the field, changes in regulations or technology are incorporated when required.

F. Support Available to Participants

The online course provides for access to a pre-formatted email to send to a subject matter expert at KRWA for course questions or they may call the KRWA listed telephone number.

Students with computer questions or operational problems can email or call SunCoast's 800 number as provided in the courseware. After hours they can call the cell phone of the person on call.

G. List of colleges, universities, regulatory agencies, that have awarded credits for the course.

This course has been state approved for online delivery by the Rural Water Associations in Texas, Florida, Missouri, New York, Delaware, Tennessee, Virginia, Idaho, New Mexico, Nevada, and Utah.

H. Required Assignments and/or Examinations

At the end of most modules is a test. The student must pass with a 70% or higher.

I. Mandatory Time Constraints

The course has no time constraints. Students learn at their own pace. Credit for the course is not given until all work has been satisfactorily completed.

J. Documentation of results

All of the training experience is handled through a Learning Management System (LMS). The student registers, enrolls, pays and takes the course through the LMS system. Student data such as quiz and test scores, time in modules and attempts by module are recorded. Once a student completes a course they must fill out a certification email. The email has pre-printed the students name and course taken (preprinting eliminates any possibility of changing the student name of course taken). The student then fills in the variable data such as address, license number and any course comments. This email is then sent to KRWA, SunCoast Learning and to the student. KRWA can review the student results prior to issuing a certificate of completion.

K. Security Procedures

Credit card transactions are completed on SunCoast's secure site. Hours in course, log in activity including IP address, and module attempts are recorded. Students cannot alter course data and cannot change name and course taken in the course certification. All quiz/test questions are randomized.

Section III Required Items

Chlorinator Systems and Chemical Handling Course

A. Course Learning Objectives

History of Chlorination and Chloramination

MODULE 1 OBJECTIVES:

In this Module, students will discover the:

- Other uses of chlorine besides in the water and wastewater industry;
- Three groups of pathogenic organisms and the diseases they cause;
- First countries and cities to continuously apply chlorine for disinfection;
- Difference between disinfection and sterilization;
- Two pieces of legislation regulating water and wastewater treatment and their goals;
- Agencies responsible for the guidelines and regulations for the safe use, and handling of chlorine.

Upon successful completion of this Module, students will be able to:

- Identify the waterborne diseases and the three groups of human pathogenic organisms;
- Distinguish between disinfection and sterilization;
- List other methods of disinfection apart from chlorination; and,
- Explain the goals of the Clean Water Act and the Safe Drinking Water Act.

Physical and Chemical Properties of Disinfectants

MODULE 2 OBJECTIVES:

In this Module, students will discover the:

- Physical and chemical properties of:
 - Chlorine;
 - Ammonia;
 - Sodium hypochlorite;
 - Calcium hypochlorite;
 - Chlorine dioxide; and,
- Reactions of chlorine and water.

Upon successful completion of this Module, students will be able to:

- List the products of the reaction of chlorine and water;
- Distinguish between dry and wet chlorine;
- Identify ammonia and chlorine physical properties in both gas and liquid state:
 - color
 - odor
 - specific gravity
 - vapor density
 - boiling point
 - freezing point;
- Explain how chlorine dioxide is produced and its physical and chemical characteristics;
- Identify the process and products of the production of chlorine gas; and,
- List the factors that affect the disinfection process.

CHEMICAL HANDLING AND SAFETY

MODULE 3 OBJECTIVES

In this Module, students will discover the:

- Importance and requirements for safe chemical handling;
- Meaningful information on a chemical label;
- Shipping containers and handling and storage requirements for chlorine gas;
- Health effects from exposure to chlorine gas, the hypochlorite compounds, and ammonia.
- PPE requirements for safe handling of chlorine, the hypochlorite compounds, and ammonia;
- Additional safety equipment and first aid procedures; and,
- Requirements and information found in the Risk Management Plan and an Emergency Action Plan.

Upon successful completion of this Module, students will be able to:

- Distinguish the color and number code of a chemical placard;
- Identify the proper kit for repair of a 150-lb cylinder and ton container;
- Identify the proper location for gas detection equipment for chlorine and ammonia;
- List appropriate PPE when using disinfection chemicals; and
- Explain proper storage and handling procedures for chlorine cylinders and containers.

Process Applications

MODULE 4 OBJECTIVES:

In this Module, students will discover the:

- Definitions of dosage, demand and residual;
- Difference between free and combined residuals;
- Three forms of combined residual;
- Approved methods for determining residuals in the treatment plant and distribution system;
- Breakpoint phenomenon and its application in water treatment;
- Relationship between disinfectant concentration and contact time;
- Explanation of disinfectant by-product formation and prevention;

Upon successful completion of this Module, students will be able to:

- Distinguish between dosage, demand and residual;
- Identify the three forms of combined residual;
- Label the breakpoint curve and explain its application to water treatment;
- Explain the relationship between disinfectant concentration and contact time;

System Types

MODULE 5 OBJECTIVES

In this Module, students will discover the:

- Theory of chlorinator operation;
- Types of systems and components of each;
- State regulations for disinfection equipment; and,
- Withdrawal rates of each system type.

Upon successful completion of this Module, students will be able to:

- Label the components of a system;
- Describe how it works;
- Recognize the materials for containing gas under pressure and gas under vacuum;
- Explain what reliquefaction is and how it occurs; and,
- Identify the withdrawal rates of each system.

Injectors/Ejectors

MODULE 6 OBJECTIVES

In this Module, students will discover the:

- Theory of injector operation;
- Components of the injector;
- Chemical induction units;

- Common injector problems; and,
- Maintenance and troubleshooting.

Upon successful completion of this Module, students will be able to:

- Label the components of the injector;
- Describe how it works;
- Identify the three components which must be sized properly;
- Distinguish between remote installation and local installation;
- Three main categories of injector problems; and,
- Identify the minimum pressure differential to achieve chlorinator feed.

Containers and Connections

MODULE 7 OBJECTIVES

In this Module, students will discover the:

- Container types, design and construction;
- Container markings, tare weights, and total weights;
- Container valve design and construction; and,
- Change-out procedures for cylinders and containers.

Upon successful completion of this Module, students will be able to:

- Distinguish between cylinder and container valves;
- Identify tare weights and markings on cylinders and containers;
- Explain why scales must be used for measuring chlorine use; and,
- Perform proper start up and shut down procedures for cylinders and containers of various systems.

Gas Chlorinators and Switchovers

MODULE 8 OBJECTIVES

In this Module, students will discover the:

- Components of gas chlorinators;
- Composition of functions of each component in a gas chlorinator; and,
- Components and operating conditions of switchovers.
- TCEQ regulations for

Upon successful completion of this Module, students will be able to:

- Identify the components of a gas chlorinator;
- Explain the purpose and function of each component of a gas chlorinator;
- Describe the flow through a chlorinator; and,
- Identify the operating condition of a given automatic switchover.

Maintenance and Troubleshooting

MODULE 9 OBJECTIVES

In this Module, students will discover the:

- Chlorinator performance checks to ensure efficient operation is maintained;
- Methods for cleaning chlorinators;
- Frequency and importance of preventative maintenance; and,
- Approaches to troubleshooting the system when problems occur.

Upon successful completion of this Module, students will be able to:

- Identify possible problems when chlorinator fails performance check;
- Clean chlorinators; and
- Develop a flow chart or decision chart for solving common problems.

Chlorination Math

MODULE 10 OBJECTIVES

In this Module, students will discover the:

- Mathematical relationship of dosage, demand and residual;
- Formulas for calculating:
 - Pounds of chlorine or hypochlorite needed to achieve given dosage;
 - Gallons of bleach needed to achieve given dosage;
 - Concentration in a tank;
 - Feed pump rates; and
 - Actual feed rates.

Upon successful completion of this Module, students will be able to:

- Perform calculations for determining:
 - pounds of chlorine or hypochlorite needed to achieve given dosages;
 - concentration in a tank;
 - actual dosages
 - how to set feed pump rates; and,
 - actual feed rates.

III B. Criteria for Successful Completion by Operators

The student must pass each end-of- module quiz by 70% or higher. Should the student fail the quiz, they may review the course material and take the quiz again, until they pass.

III C. Agenda: Course Modules

History of Chlorination and Chloramination

Physical and Chemical Properties of Disinfectants

Chemical Handling and Safety

Process Applications

System Types

Injectors/Ejectors

Containers and Connections

Gas Chlorinators and Switchovers

Maintenance and Troubleshooting

Chlorination Math

III D. Instructor's Credentials

- Online Course, no instructors delivering material

IV. Additional Attachments

A. Instructional Design Credentials

Chlorinator Systems and Chemical Handling was originally developed as an instructor led course by Tammy Pickering of Texas Rural Water Association. The course was later converted to online training by Tammy Pickering and SunCoast Learning Systems.

Tammy Pickering - TRWA

Bachelor of Science, Biology - Eastern New Mexico University

New Mexico Secondary Science Teaching Certificate

Texas Grade "B" Wastewater License

Three years teaching at Melrose Municipal School District.

Three years working as an *Industrial Chemist*

Three years working as a TRWA Technical Programs and Education Coordinator.
Lead Instructor and Developer of Chlorinator Systems and Chemical Handling Course

Jerry Untiedt, President, SunCoast Learning Systems
Bachelors of Science, Business Administration and Psychology, Augustana College
Instructor and National Course Manager, AT&T
Executive Staff Manager, Sales and Branch Management Training, MCI
Director of Training, Sprint

B. Subject Matter Experts

Tammy Pickering –TRWA (see above)

C. Needs Analysis of Participants

Prior to development a needs analysis was initiated by Texas Rural Water to its systems and licensed operator base. Based on their feedback Chlorinator Systems and Chemical Handling was created.

D. Field Testing of Course

Chlorinator Maintenance has been in service as an instructor led course since 2000 and as an online course since 2003. Prior to release, the instructor led version was subjected to peer review by other RWA subject matter experts. Feedback from both Instructor led and online have been incorporated into the current version. The online course has been praised highly for its content and logic flow. To date SunCoast has not received any negative comments.

E. Ongoing Course Evaluation

Every student has the opportunity to give feedback on the certification email or, at anytime in the course with the pre-formatted email. All they need to do is click on the email icon to access, at anytime during the course. To date no negative feedback has been received. Comments from the field, changes in regulations or technology are incorporated when required.

F. Support Available to Participants

The online course provides for access to a pre-formatted email to send to a subject matter expert at KRWA for course questions or they may call the KRWA listed telephone number.

Students with computer questions or operational problems can email or call SunCoast's 800 number as provided in the courseware. After hours they can call the cell phone of the person on call.

G. List of colleges, universities, regulatory agencies, that have awarded credits for the course.

This course has been state approved for online delivery by the Rural Water Associations in Texas, Florida, Missouri, New York, Delaware, Tennessee, Virginia, Idaho, New Mexico, Nevada, and Utah.

H. Required Assignments and/or Examinations

At the end of most modules is a test. The student must pass with a 70% or higher.

I. Mandatory Time Constraints

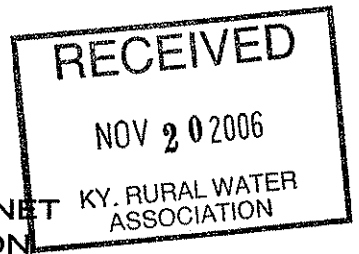
The course has no mandatory time constraint other than the course must be successfully completed before the expiration of their license in order to receive credit.

J. Documentation of results

All of the training experience is handled through a Learning Management System (LMS). The student registers, enrolls, pays and takes the course through the LMS system. Student data such as quiz and test scores, time in modules and attempts by module are recorded. Once a student completes a course they must fill out a certification email. The email has pre-printed the students name and course taken (preprinting eliminates any possibility of changing the student name of course taken). The student then fills in the variable data such as address, license number and any course comments. This email is then sent to KRWA, SunCoast Learning and to the student. KRWA can review the student results prior to issuing a certificate of completion.

K. Security Procedures

Credit card transactions are completed on SunCoast's secure site. Hours in course, log in activity including IP address, and module attempts are recorded. Students cannot alter course data and cannot change name and course taken in the course certification.



ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

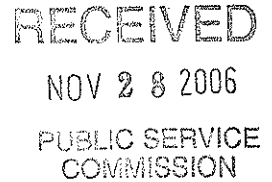
Ernie Fletcher
Governor

Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601
www.kentucky.gov

LaJuana S. Wilcher
Secretary

November 16, 2006

Janet Cole
Kentucky Rural Water Assoc.
P.O. Box 1424
Bowling Green, KY 42102-1424



Dear Ms. Cole,

At the November 2006 meetings of the Kentucky Boards of Certification of Wastewater System Operators and Drinking Water Treatment and Distribution System Operators your training requests were reviewed.

Course Title	Hours and Type	DCA Event ID #
Drinking Water Mathematics (on-line)	10 drinking water	4594
Introduction to Utility Management (on-line)	10 wastewater non-process 10 drinking water	4595

Within thirty days of completion of the course, please forward a list of attendees to this office. Include the appropriate wastewater or water treatment and/or water distribution certification number and the hours earned for each. When forwarding this information, please reference the DCA event ID number provided above.

If you have any questions or need additional information, please contact the Division of Compliance Assistance, Operator Certification at (502) 564-0323 or (800) 926-8111.

Sincerely,

Lisa Butler
Certification Program Coordinator
Division of Compliance Assistance

Introduction to Utility Management

Section III. Required Items

A & C. Course Learning Objectives & Timed Agenda

Module 1 Historical Background (1.25 Hours)

- The Hydrologic Cycle
- A Global View of Water
- Water Usage History
- Ancient History of Drinking Water
- Modern History of Drinking Water

Module 2 Federal Regulations (1.25 Hours)

- The Safe Drinking Water Act
- The Clean Water Act
- Capacity Development Issues

Module 3 State Regulations (1.25 Hours)

- Kentucky Division of Water's Drinking Water Program
- Kentucky Public Service Commission
- Kentucky Infrastructure Authority
- Water and Wastewater Planning

Module 4 Organizational Structures (1.5 Hours)

- **Drinking Water Utilities**

Municipal Utilities
Water Districts
Water Associations
Regional Water Commissions
Privately-owned Utilities

- **Wastewater Utilities**

- Municipal Utilities
 - Sewer Districts
 - Joint Sewer Agencies
 - Sanitation Districts

Module 5 Board/Manager Relationships (1.25 Hours)

- Role of the Board
- Role of the Manager/Superintendent
- Management Models

Module 6 Utility Finance (1 Hour)

- Introduction to Utility Finance
 - Budgets
 - Financial Reporting
- Rates Across Kentucky
 - Rate Structures
 - Water Rate Survey
 - Sewer Rate Survey

Module 7 Personnel Administration (1.5 Hours)

- Staff and Teamwork
- Nepotism & Conflict of Issues
- Kentucky Labor Laws

Module 8 Customer Relations (1 Hour)

- Becoming a Customer-friendly Utility
- Customers and You: Practical Communications for Small Systems
- Customer Information Programs and Materials

B. Criteria for Successful Completion

The student must pass each end-of-module quiz with 70% or higher. Should a student fail a quiz, they may review the course module and take a new quiz, until they pass. Once all end-of-module quiz has been passed, the course is completed.

D. Credentials for Instructor

This is an online course with no instructor. Questions can be referred to KRWA or SunCoast Learning Systems staff.

IV. Additional Attachments

A. Instructional Design

This is an online course adapted from the "Utility Management 101" course which is the introductory section of a six-course series developed by the Kentucky Rural Water Association and Western Kentucky University as part of the Utility Management Institute (UMI).

I. Mandatory Time Constraints

Once the online course is started, the student has one year to complete the course requirements.

J. Documentation of Results to Students

Upon successful completion of the course, students are provided a certificate of completion from KRWA.

BIOGRAPHY

Phillip N. East
Education Services Director
Kentucky Rural Water Association

Phillip East served as the Education Services Director for KRWA from 1997 until January, 2006. Prior to coming to work as a Circuit Rider for the Kentucky Rural Water Association (KRWA) in September 1996, Phillip East served as Water Treatment Superintendent for the City of Franklin, Kentucky. Before moving to Kentucky, Mr. East worked as Treatment Plant Operator for the Hendersonville Utility District in Hendersonville, Tennessee.

Mr. East earned a Bachelor of Science Degree from the University of Texas at Austin and completed graduate work in Public Administration at South West Texas State University at San Marcos, Texas.

Mr. East has also worked for the City of Odessa, Texas and the City of Austin, Texas where he worked his way up through the ranks serving as Chemical and Filter Operator, Instrument Technician, Maintenance Mechanic Foreman, Chief Operator, Assistant Plant Superintendent, Plant Supervisor, and Plant Operations Supervisor. In addition to having been a member of the Capital Area Water and Wastewater Association in Texas, the Texas Water Utilities Association, and the American Water Works Association, Mr. East held water treatment certification in Texas, Tennessee and Kentucky at the highest available technical levels.

BIOGRAPHY

Andrew C. Lange

Andy Lange is the Assistant Director for the Kentucky Rural Water Association (KRWA) and has been employed there since 1989. Prior to joining KRWA, Mr. Lange worked for the Barren River Area Development District for five (5) years, providing administrative and financial assistance to local governments in the ten-county BRADD region. Mr. Lange has earned a Bachelor of Science in Geography and a Master of Public Administration from Western Kentucky University in Bowling Green, Kentucky.

As Assistant Director, Mr. Lange is involved with all management and administrative activities of the Association. He was originally responsible for performing loan sub-servicing under the Asset Management Program contract with National Rural Water Association (NRWA) for eight (8) years, ending in 1997. He also currently oversees KRWA's partnership with Western Kentucky University (WKU). These programs are the WKU Small System Circuit Rider, the Utility Management Institute (UMI), and the Technology Demonstration Project. Mr. Lange received the "Field Representative of the Year" award at NRWA's 1996 Annual Conference.

Mr. Lange's other responsibilities at KRWA include: coordinating and monitoring internal membership activities, producing and editing KRWA printed publications, and assisting in the administration of KRWA finance programs. In addition, Mr. Lange has been involved in the production of over seventy-five operation and maintenance manuals for water systems, has produced the final report for the Kentucky River Authority Water Counts project, and has participated in, and written, Operation Review studies for three (3) water and wastewater utilities since 1995.

Joan Martin

Assistant Director
Center for Math, Science and Environmental Education
Western Kentucky University
Bowling Green, Kentucky

As the Assistant Director for the Center for Math, Science and Environmental Education, Joan Martin worked with Phillip East and Andy Lange to develop the series of six (6) training manuals for the Utility Management Institute program. The courses include:

- Utility Management 101
- Utility Organization, Regulation, and Law
- Utility Finance and Administration
- Human Resource Management for Utilities
- Modern Technology and Utility Management
- Public Relations in Utility Management

Joan Martin's contribution to the program included layout and design of the coursework material as developed by Phillip East and Andy Lange.

Drinking Water Mathematics

Section III. Required Items

A & C. Course Learning Objectives & Timed Agenda

Module 1 The “10-7-3” Problem Solving Method (1 Hour)

- 10 Simple Calculations
- 7 Steps in Solving
- 3 Elements of a Math Formula
- Using the Formulas

Module 2 Useful Conversions (1 Hour)

- Gallonage
- Temperature

Module 3 Area, Volume & Perimeter (1.5 Hours)

- Perimeter, Circumference & Diameter
- Area of Rectangle, Triangle, Circle & Sphere
- Surface Area Calculations
- Volume of Basins

Module 4 Dosage, Dilution & Concentration (1 Hour)

- Chemical Dosage
- Dilution and Concentration

Module 5 Velocity, Flow & Detention (1.5 Hours)

- Velocity in feet

- Flow Rate (gallons per foot)
- Detention Time
- Flow Rate (gallons per day)

Module 6 Weirs, Filters & Wells (2 Hours)

- Weir Loading & Overflow Rates
- Filter Loading & Backwash Rates
- Well Yield & Drawdown
- Specific Capacity & Gravity
- Head & Pressure

Module 7 Horsepower & Efficiency (2 Hours)

- Pumping Rate
- Water, Brake & Motor Horsepower
- Pump, Motor & Overall Efficiency
- Wire-to-Water Efficiency
- KWH/1000 Gallons

B. Criteria for Successful Completion

The student must pass each end-of-module quiz with 70% or higher. Should a student fail a quiz, they may review the course module and take a new quiz, until they pass. Once all end-of-module quiz has been passed, the course is completed.

D. Credentials for Instructor

This is an online course with no instructor. Questions can be referred to KRWA or SunCoast Learning Systems staff.

IV. Additional Attachments

A. Instructional Design

This is an online course adapted from a course titled, "Mathematics & Regulation Review for Water and Wastewater Treatment, Operations & Maintenance" developed by Phillip East.

I. Mandatory Time Constraints

Once the online course is started, the student has one year to complete the course requirements.

J. Documentation of Results to Students

Upon successful completion of the course, students are provided a certificate of completion from KRWA.

BIOGRAPHY

Phillip N. East
Education Services Director
Kentucky Rural Water Association

Phillip East served as the Education Services Director for KRWA from 1997 until January, 2006. Prior to coming to work as a Circuit Rider for the Kentucky Rural Water Association (KRWA) in September 1996, Phillip East served as Water Treatment Superintendent for the City of Franklin, Kentucky. Before moving to Kentucky, Mr. East worked as Treatment Plant Operator for the Hendersonville Utility District in Hendersonville, Tennessee.

Mr. East earned a Bachelor of Science Degree from the University of Texas at Austin and completed graduate work in Public Administration at South West Texas State University at San Marcos, Texas.

Mr. East has also worked for the City of Odessa, Texas and the City of Austin, Texas where he worked his way up through the ranks serving as Chemical and Filter Operator, Instrument Technician, Maintenance Mechanic Foreman, Chief Operator, Assistant Plant Superintendent, Plant Supervisor, and Plant Operations Supervisor. In addition to having been a member of the Capital Area Water and Wastewater Association in Texas, the Texas Water Utilities Association, and the American Water Works Association, Mr. East held water treatment certification in Texas, Tennessee and Kentucky at the highest available technical levels.

Kentucky Rural Water Association

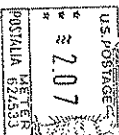
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