

DETAILED CEU COURSE DESCRIPTION

CHLORINATION O&M ONLINE CEU TRAINING COURSE – 24 hours

Chlorination has been proven to be very effective against bacteria and viruses. However, it cannot disinfect all waterborne pathogens. Certain pathogens, namely protozoan cysts, are resistant to the effects of chlorine. This course will focus upon gaseous and liquid form of chlorine (Cl₂) which is a water additive used by municipal water systems to control microbes. It is relatively inexpensive and has the lowest production and operating costs and longest history for large continuous disinfection operations. Chlorine is a powerful oxidant.

Course Purpose

The main purpose of this course is to provide 24 hours of continuing education in understanding various chlorination methods for disinfecting water. Unlike some of the other disinfection methods like ozonation and ultraviolet radiation, conventional chlorination is able to provide a residual to reduce the chance of pathogen regrowth in water storage tanks or within the water distribution system.

At times, distribution systems can be a fair distance from the storage tanks and in dead end sections or where water is not used pathogens may re-grow if a proper (chlorine) residual is cannot be maintained in the treated water sent out for consumption. This results in poor water quality as well as slime and biofilms in the distribution systems that will end up contaminating the clean, treated water being distributed. We will also cover chlorination for wastewater treatment and general laboratory procedures.

Target Audience

The target audience for this course includes water distribution workers, well drillers, pump installers, water treatment operators, and wastewater operators. Also included are people interested in working in a water treatment/wastewater treatment or distribution facility and/or wishing to maintain CEUs for a certification license or to learn how to perform their job safely and effectively, and/or to meet education needs for promotion. There are no prerequisites, and no other materials are needed for this course.

Course Statement of Need

All water and wastewater operators need to be able to describe chlorination procedures and properly demonstrate proper and safe operation of various disinfectants for water and wastewater treatment.

General Learning Objectives

- Disinfection Rules
- Waterborne Pathogens
- Water Chemistry
- Chlorine
- Hypochlorites and Chloramines
- Safety and Chlorination Equipment
- Alternative Disinfectants
- Respiratory Protection
- Lab Analyst Section

When the Student finishes this course...

At the finish of this course, you (the student) should be able to explain and describe

1. Safe Drinking Water Act (SDWA).
2. Various conventional modern water/wastewater treatment disinfectants.
3. Various halogens and halides.
4. History of chlorination.
5. Waterborne diseases and viruses.
6. Chlorine gas.
7. Chlorine exposure limits, residuals and related information.
9. Sodium hypochlorite.
10. Calcium hypochlorite.
11. Chlorine-based disinfectants- Chloramines, and related oxidizers.
12. Chlorination equipment and safety requirements.
13. Chlorine health hazards.
14. Chlorine dioxide.
15. Water disinfection methods.
16. Alternative chlorination methods for water/wastewater disinfection.
17. Conventional bacteriological sampling and monitoring.

Learning Objectives and Minimum Required Time

Chapter 1- Disinfection Rules - Part 1

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water disinfection rules with an emphasis on waterborne pathogens, turbidity and disinfection by products. At the end of this section, you will be able to describe disinfectant by-products and DBPRs regulations. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Pathogens, such as *Giardia*, *Cryptosporidium*, and viruses, are often found in source water and can cause gastrointestinal illness. Illnesses include diarrhea, vomiting, cramps and other health risks. In many cases, water needs to be disinfected to inactivate (or kill) these microbial pathogens.

Chlorination 101 - Chapter 2- Disinfection Rules Part 2

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water disinfection rules with an emphasis on DBPRs regulations and introduction to the Revised Total Coliform Rule. At the end of this section, you will be able to describe disinfectant by-products and DBPRs regulations. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Disinfectants can react with naturally occurring materials in the water to form byproducts including:

- Trihalomethanes (THM),
- Haloacetic acids (HAA),
- Chlorite, and
- Bromate.

EPA has developed the DBPRs to limit exposure to these disinfectant byproducts.

Chapter 3 - Waterborne Pathogens Part 1

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of waterborne diseases and proper bacteria identification. At the end of this section, you will be able to describe commonly found waterborne bacteria. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Water/wastewater treatment operators are committed to keeping the public water supply free of potential risks that lead to waterborne illnesses; investigating transmission of pathogens that may result in such illnesses; and implementing strategies that will reduce the spread of further sickness. Much of this work is done with chlorine as the primary disinfectant agent. The use of water chlorination to disinfect public water supplies, which began in the early 1900s, has had major impacts on the incidence of waterborne disease in the U.S. and worldwide.

Chapter 4 - Waterborne Pathogens Part 2

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of waterborne diseases and proper identification. At the end of this section, you will be able to describe commonly found waterborne organisms and diseases. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Water/wastewater treatment operators are committed to keeping the public water supply free of potential risks that lead to waterborne illnesses; investigating transmission of pathogens that may result in such illnesses; and implementing strategies that will reduce the spread of further sickness.

Chapter 5 - Water Chemistry – Part 1

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water chemistry with an emphasis on chemical compounds, Chlorine and pH. At the end of this section, you will be able to describe basic water chemistry, halogens and pH. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: All treatment operator at some time will either take lab samples or run lab analysis. All operators should know the principles of pH, basic chemistry principles and understand simple treatment chemical compounds.

Chapter 6 - Water Chemistry – Part 2

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water chemistry with an emphasis on raw water. At the end of this section, you will be able to describe basic water quality factors. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: All treatment operator at some time will either take lab samples or run lab analysis. All operators should know water quality diameters

Chapter 7 - Chlorine Section -Part 1

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water disinfection with an emphasis on Chlorine. At the end of this section, you will be able to describe chlorination. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Traditionally, the use of chlorine gas was the most common method of water disinfection. Chlorine gas itself is relatively inexpensive but is a highly toxic chemical that must be transported and handled with extreme caution. It is stored under pressure in large tanks and is released into the water or wastewater as a gas.

Chapter 8 - Chlorine Section – Part 2

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water disinfection with an emphasis on Chlorine. At the end of this section, you will be able to describe chlorination. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Traditionally, the use of chlorine gas was the most common method of water disinfection. Chlorine gas itself is relatively inexpensive but is a highly toxic chemical that must be transported and handled with extreme caution. It is stored under pressure in large tanks and is released into the water or wastewater as a gas.

Chapter 9 - Hypochlorites and Chloramines

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water disinfection with an emphasis on hypochlorites, and chloramines. At the end of this section, you will be able to describe disinfection using hypochlorites and chloramines. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Chloramines - Sodium or Calcium hypochlorite is a diluted liquid form of chlorine that is also commonly used for disinfection.

Chapter 10 - Chlorination Safety and Equipment Section

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of disinfection equipment and safety requirements relating to Chlorine. At the end of this section, you will be able to describe chlorination safety and related equipment. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: You as a treatment operator need to use safe working procedures when exposed to this dangerous chemical substance. You need to master chlorine safety training and safe work practices. This section teaches you about the chemical properties of chlorine, how they may be exposed, and the physical and health hazards of chlorine.

Chapter 11 - Alternative Disinfectants

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

The text is available in pdf format for you to print out in case the internet is slow or has problems.

Section Focus: You will learn the basics of water disinfection with an emphasis on alternative disinfectants. At the end of this section, you will be able to describe various alternative disinfectants. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Traditionally, the use of chlorine gas was the most common method of water disinfection, however, Chlorine gas creates dangerous disinfection by-products. Therefore, we need to utilize alternative disinfectants, like chlorine dioxide, ozone and ultraviolet radiation.

Chapter 12- Respiratory Protection Section Part 1

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Respiratory Protection Chapter

Section Focus: You will learn the basics of respiratory protection. At the end of this section, you will be able to describe the need and rules regarding respiratory protection. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: OSHA 1910.134 – Respiratory Protection

(c) - Respiratory protection program. This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator.

Chapter 13- Respiratory Protection Section Part 2

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

The text is available in pdf format for you to print out in case the internet is slow or has problems.

Respiratory Protection Chapter Part 2

Section Focus: You will learn the basics of respiratory protection. At the end of this section, you will be able to describe the need and rules regarding respiratory protection. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: OSHA 1910.134 – Respiratory Protection

(c) - Respiratory protection program. This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator.

Chapter 14- Laboratory Analysis – Part 1

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water laboratory analysis with an emphasis on Chlorine and microorganisms. At the end of this section, you will be able to describe disinfection related testing and microbial examination techniques. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Laboratory analysis of water quality refers primarily to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to compliance or process control requirements. Laboratory analysis is frequently used by reference to a set of standards against which compliance, generally achieved through treatment of the water, can be assessed.

Chapter 15- Laboratory Analysis – Part 2

60 Minutes of technical reading + 4 random difficult reading validation questions requiring 100% accuracy + 20 random final assessment questions requiring 70% accuracy. 1.7 Hours of time.

Section Focus: You will learn the basics of water laboratory analysis with an emphasis on Chlorine and microorganisms. At the end of this section, you will be able to describe disinfection related testing and microbial examination techniques. There is a post quiz at the end of this section to review your comprehension and a final examination for your contact hours.

Scope/Background: Laboratory analysis of water quality refers primarily to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to compliance or process control requirements. Laboratory analysis is frequently used by reference to a set of standards against which compliance, generally achieved through treatment of the water, can be assessed.

Specific Course Goals and Timed Outcomes (Beta Testing)

Initial Alpha Testing 2005. Chlorination 404, 303, 202, 101 Original Master Course

Originally, this assignment was in modules which allowed the specific breakdown for each specific course.

Twenty students were given a task assignment survey in which to track their times on the above learning objectives (course content) and utilized a multiple-choice style answer sheet to complete their final assignment. All students were given 30 days to complete this assignment and survey. Twenty students were selected for this assignment. Thirteen of the students held water distribution or water treatment operator certification positions, and seven students were wastewater treatment operators. The assignment was based upon the breakdown of the section focus areas.

Fourteen out of twenty students were successfully tested. None of the test group received credit for their assignment. Six students failed the final examination. All of the students completed the reading assignment. All of the wastewater treatment operators passed the assignment. The average times were based upon the outcomes of the fourteen students who passed. Rusty Randall, Proctor, February 2005

Second Beta Testing and Course Adjustment

In the subsequent time, one hundred water/wastewater operator students were selected to complete the assignment and the completion statistics are as follows: After adjustments: 78 percent passing rate with an overall average score of 82 percent within a 90-day assignment completion period. The primary student response was the assignment was too difficult and too long.

The tasks were measured using times spent on each specific objective goal and final assignment grading of 70% and higher. The student survey was utilized to work out all problems in the assignment and was utilized for course corrections. Rusty Randall, Proctor, July 2012. The average time necessary to complete each task was originally recorded as stated in the objectives and timed outcome section (Section Focus).

Final Outcome

Average completion time for Chlorination O&M was 25.5 hours with an average score of 86 percent.

We are asking for 24 hours of credit.

Beta Assessment Survey Results

1. The difficulty of your course.

Very Easy 0 1 2 3 4 5 Very Difficult

2. Please rate the difficulty of the testing process.

Very Easy 0 1 2 3 4 5 Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.

Very Similar 0 1 2 3 4 5 Very Different

Task Analysis and Training Needs Assessment Process Information Gathering

Task Analysis and Training Needs Assessments have been conducted to determine or set Needs-To-Know for the basis of TLC's continuing education courses. The following is a listing of some of those who have conducted extensive valid studies from which TLC has based the continuing education program upon: the Environmental Protection Agency (EPA), the Arizona Department of Environmental Quality (ADEQ), the Texas Commission of Environmental Quality (TCEQ), Pennsylvania Dept of Environmental Protection (PDEP) and the Association of Boards of Certification (ABC).

TLC has primarily used Training Provider Manual for the Pennsylvania Water and Wastewater System Operator Training Program for course goal setting and learning objectives for all three training formats; conventional classroom, distance paper based and web based training.

The titles or names of subjects (Learning Objectives) may be changed for readability purposes. Some of the terms used in this document may be part of a copyrighted adult learning assessment process and in these cases, we utilize generic terminology. The needs assessment/survey maintains our training and education materials criteria. Assessments and changes are performed based on changes in technology, evaluations of the students, regulatory changes and editorial corrections. Most of this information is considered intellectual property and may not be owned by TLC but by third –parties.

ADDIE

TLC utilizes a five-phase instructional design model consisting of Analysis, Design, Development, Implementation, and Evaluation for our continuing education courses. Each course design step has an outcome that feeds into the next step in the sequence. The five phases of ADDIE are as follows:

ANALYSIS

During the Training Needs Assessment Process Information Gathering Analysis phase, the course designer(s)(see Subject Matter Experts and Contributing Editors) identifies the learning need, the goals and objectives, the student's needs, existing knowledge, Course Statement of Need, and any other relevant characteristics (State or Federal Need-to-Know) and to ensure that students are learning what is relevant for their job.

DESIGN

This is the systematic process of specifying learning objectives from the Training Needs with a focus on Bloom's Taxonomy. A detailed storyboard following the Needs Assessment/Survey and/or Course Statement of Need will determine the course content.

DEVELOPMENT

The actual creation (production) of the training content will begin based upon the Design phase using Bloom's Taxonomy. At this time, a decision is made to proceed or table the course.

IMPLEMENTATION

During implementation, the Alpha testing plan is put into action and a procedure for course and/or assessment revision is implemented. These course materials and assessments are delivered or distributed to the student group. After delivery, the effectiveness of the training materials is evaluated in Beta testing phase. All of our courses have extensive Alpha and Beta testing to ensure job relevancy, correct information and course learning objectives are met.

EVALUATION

This phase consists of (1) formative and (2) summative evaluation from Alpha and Beta testing. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation consists of tests designed for criterion-related referenced items and providing opportunities for feedback from the students and proctor.

Ongoing Course Evaluation: Administrative and instructional staff will collect all student concerns (verbal, written and surveys) and distribute these to TLC Administrative personnel for evaluation and course corrections. Course and/or Assessment revisions are made as necessary.

Precept-Based (Micro-Learning) Training Course

TLC's training courses are based upon a form of induction training, made of topical and technical precepts that are discovered in the Needs Assessment/Survey and/or Training Needs Assessment Process Information Gathering. The training topics or learning objectives are made up of "micro-content" or "precepts" – or small chunks of information that can be easily digested. These bite-size pieces of technical information are considered to be one of the most effective ways of teaching students new or important information (regulatory or technical) because it helps the mind retain knowledge easier.

Micro-learning or precept-based training doesn't rely on the student to process a large amount of information before breaking it down. Our method includes short modules with clearly defined learning goals for each section. This method allows a student to hone in on a particular skill, then given the opportunity to exhibit their knowledge in the final assessment (assignment).

Course Training/Assessment Needs Methodology

Technical Learning College identified training/assessment needs by placing identifying them in two categories; internal and external.

Internal Methods include:

- ✓ Observation
- ✓ Interviews
- ✓ Instruments: Perception instruments and Knowledge based assessments
- ✓ Student records and reports
- ✓ Group problem analysis (Classroom or Seminars)
- ✓ Performance or Survey appraisals

External Methods include:

- ✓ Outside consultants (Completion)
- ✓ Government Certification Reviews (Training Needs)
- ✓ Records and reports from other agencies

The needs assessment/survey maintains our training and education materials criteria. Assessments and course material changes are performed based on changes in technology, evaluations of the participants and regulatory changes. Materials are assessed yearly or as needed to insure course integrity.

Melissa Durbin

This course was co-authored by Melissa Durbin; she has over 25 years of wastewater treatment teaching experience as a college instructor. Melissa has written the several nationally accepted wastewater treatment manuals since 2001. This course has been accepted in most States for continuing education credit. Melissa has taught approximately 10,000 students about water/wastewater treatment, disinfection and related classes. She will be available to answer questions relating this course.

Extensive Academic Research

Technical Learning College's (TLC's) continuing education course material development was based upon several factors; field experience working in the water quality field, extensive academic research (teaching in the community college system), advice from subject matter experts (State officials and industry leaders), data analysis, task analysis and training needs assessment process information gathered from other states.

Both Melissa and Jeff Durbin are the two primary Instructors, Subject Mater Experts and Technical Writers have trained and/or certified more than ten thousand students. These two Instructors teach on a daily basis in a classroom setting throughout Arizona and on-line to students nationwide. See below for more information.

Advice from Subject Matter Experts

Both Melissa and Jeff Durbin are professional trainers and have been educated in current trends in professional education and continuing education needs.

Primary Course Designers Melissa and Jeff Durbin

Melissa Durbin

This course was co-designed by Melissa Durbin; she has over 25 years of teaching water and wastewater treatment experience as a college instructor. Melissa has written the several nationally accepted water and wastewater treatment manuals. Melissa has taught approximately 10,000 students about water and wastewater treatment and related classes. She will be available to answer questions relating this course.

Jeff Durbin

This course was co-designed by Jeff Durbin, over 10 years of water and wastewater treatment experience as a backflow inspector for the City of Phoenix and 20 years of water and wastewater treatment experience. Jeff has taught approximately 10,000 students about water and wastewater treatment primarily in water distribution, and pollution control (water quality) related classes. Jeff will also be able to answer any question pertaining to disinfection or chlorination.

Course Compiler

Peter Easterberg, Detail-oriented technical writer/technical editor/desktop publisher/copy editor. 20 years' experience editing and writing feasibility and trade-off studies, test procedures, specifications, user manuals, company policies, HR forms, and ISO-9000 documents. Exceptional grammatical/written communication skills. "Go-to" person for Microsoft Word, Outlook, and general computer questions. Internet Webmaster Certificate (including HTML)

Contributing Editors

James L. Six Received a Bachelor of Science Degree in Civil Engineering from the University of Akron in June of 1976, Registered Professional Engineer in the State of Ohio, Number 45031 (Retired), Class IV Water Supply Operator issued by Ohio EPA, Number WS4-1012914-08, Class II Wastewater Collection System Operator issued by Ohio EPA, Number WC2-1012914-94

Joseph Camerata has a BS in Management with honors (magna cum laude). He retired as a Chemist in 2006 having worked in the field of chemical, environmental, and industrial hygiene sampling and analysis for 40 years. He has been a professional presenter at an EPA analytical conference at the Biosphere in Arizona and a presenter at an AWWA conference in Mesa, Arizona. He also taught safety classes at the Honeywell and City of Phoenix, and is a motivational/inspirational speaker nationally and internationally.

James Bevan, Water Quality Inspector S.M.E. Twenty years of experience in the environmental field dealing with all aspects of water regulations on the federal, state, and local levels. Experience in the water/wastewater industry includes operation of a wastewater facility, industrial pretreatment program compliance sampling, cross-connection control program management, storm water management, industrial and commercial facility inspections, writing inspection reports for industry, and technical reports per EPA permit requirements.

Teacher and Proctor in Charge for Backflow Certification Testing at the ASETT Center in Tucson for the past 15 years and I possess an Arizona Community College, Special Teaching Certificate in Environmental Studies. Extensive knowledge and experience in college course and assignment/assessment writing.

Dr. Pete Greer S.M.E., Retired biology instructor, chemistry and biological review.

Jack White, Environmental, Health, Safety expert, City of Phoenix. Art Credits

Ongoing Course Evaluation

Administrative and instructional staff will collect all student concerns (verbal, written and surveys) and distribute these to the Course Editor or Copyeditors for evaluation and course corrections. Administrative and instructional staff will collect all student concerns (verbal, written and surveys) and distribute these to TLC Administrative personnel for evaluation and course corrections. Course and/or Assessment revisions are made as necessary.

Editor's Discretion

The Course Editor may change the course assessment (assignment), course text, objective, artwork and topical order as necessary for security, corrective, printing, readability or typesetting purposes. The assessment may be rotated for security purposes and the course material may be updated to reflect any regulatory updates and/or corrections.

The overall course objective or topic guide may be in a different order than the course manual for the reason of typesetting or copy-editing purposes. Course materials, charts and artwork amendments, adjustments, modifications may be performed to reflect regulatory/safety text/artwork updates, Bloom's taxonomy changes, error adjustments and comprehension. These changes generally do not reflect major course material changes, but are minor in nature.

Course Procedures for Registration and Support

All of Technical Learning College's distance learning courses have complete registration and support services offered. Delivery of services will include e-mail, web site, telephone, fax and mail support. TLC will attempt immediate and prompt service. When a student registers for a correspondence course, he/she is assigned a start date and an end date. It is the student's responsibility to note dates for assignments and keep up with the course work. If a student falls behind, he/she must contact TLC and request an end date extension in order to complete the course. It is the prerogative of TLC to decide whether to grant the request. All students will be tracked by a unique computer generated number assigned to the student.

Disclaimer and Security Notice

The student shall understand that it their responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. The student shall understand and follow State laws and rules concerning distance learning courses and understand these rules change on a frequent basis and will not hold Technical Learning College responsible for any changes. The student shall understand that this type of study program deals with dangerous conditions and will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury caused by this CEU education training course material. The student shall contact TLC if they need help or assistance and double-check to ensure my registration page and assignment has been received and graded.

Student's Identity, Attendance, and Participation Verification

A proctoring report and/or computer-tracking program validates proper identity, attendance and participation. The student shall submit a driver's license for signature verification and track their time worked on the assignment. The student shall also sign an affidavit verifying they have not cheated and worked alone on the assignment. We follow up with telephone confirmation and/or quiz review assessment. All student attendance is tracked on TLC's student attendance database.

TLC's Teaching Techniques and Assessment Tools

Our training courses are based upon a form of induction training, made of topical and technical precepts. The training topics are made up of "micro-content" or "precepts"– or small chunks of information that can be easily digested. These bite-size pieces of technical information are considered to be one of the most effective ways of teaching people new information because it helps the mind retain knowledge easier. Micro-learning or precept-based training doesn't rely on the student to process a large amount of information before breaking it down. Our method includes short modules with clearly defined learning goals for each section with a post quiz and a final assessment (quiz). This method of pre-quiz allows a student to hone in on a particular skill, then given the opportunity to exhibit their knowledge in the final assessment.

TLC's Educational Learning Objective Topics

The general course descriptions or topic titles may be different from the detailed description of the course's outline or learning objectives. These terms may be an alternative expression or a substitute but essentially having the same meaning. This is done for reading or for editing purposes. The detailed alpha and beta-testing data is not available in this document and is proprietary information belonging to a third party. The CEU course covers several educational topics/functions/purposes/objectives of compliance. The general course description of topics may be different from the detailed description. These differences are cosmetic only. The topics listed are to assist in determining which educational objective or goal that is covered for a specific educational topic area. The general information is available in the detailed beta-testing

information and may be found in the course's table of contents. The detailed testing information is not available in this document and is proprietary information.

Final Examination for Credit

Opportunity to pass the final comprehensive examination is limited to three attempts per course enrollment.

Instructions for Written Assignments

The CEU Training course uses a multiple-choice answer key.

Feedback Mechanism (examination procedures)

Each student will receive a feedback form as part of his or her study packet. You will be able to find this form in the front of the course assignment or lesson.

Security and Integrity

All students are required to do their own work. All lesson sheets and final exams are not returned to the student to discourage sharing of answers. Any fraud or deceit will result in forfeiture of all fees, and the appropriate agency will be notified.

Required Texts

The Chlorination O&M CEU training course comes complete with a short summary of the EPA's Rules and Regulations (TCR Rule) and drinking water standards. If you need more information or a complete set of Rules, you can download them off the EPA's web page, www.epa.gov or contact your local state environmental agency. You may need to contact a laboratory or state agency for certain sampling information.

ADA Compliance

TLC will make reasonable accommodations for persons with documented disabilities. Students should notify TLC and their instructors of any special needs. Course content may vary from this outline to meet the needs of this particular group.

Educational Learning Objective Topics

The CEU course covers several educational topics/functions/purposes/objectives. The topics listed are to assist in determining which educational objective or goal is covered for a specific topic area. This information is available in the detailed beta-testing information and may be found in the course's table

Feedback Mechanism (Examination Procedures)

Each student will receive a feedback or survey form as part of his or her study packet. The student will be able to find this form at the end of the assignment or lesson (assessment). The student can e-mail, snail mail or telephone TLC for any concern at any time.

Student Concerns

Most of student/training course related concerns are generally answered within 2 hours but not more than 24 hours. TLC has three support staff administrators with computers and telephones and have excellent communication and computer skills and able to respond and track all students and obtain or submit required forms and assignments. TLC has a dedicated computer student tracking system database that is backed-up on a daily bases and this information is secured and stored at a secure offsite location in case of fire or security problems. All student website information is tracked and documented for security measures.

Recordkeeping and Reporting Practices

TLC keeps all student records for a minimum of five years. It is the student's responsibility to give the completion certificate and/or paperwork to the appropriate government agencies. If necessary, we will electronically submit the required information to New York, Colorado, Texas, Indiana, Pennsylvania and any other required state for your certification renewals.

TLC Record Storage

TLC's training records include the following elements:

1. Individual course training (assessment) and registration page (Customer Order Record) is recorded in Excel format and the hard copies are scanned and stored in a computer database for 5 years and include the following:
 - a. the instructor(s) who taught each session on that date the of the training session or grading was offered (in comments section registration page) as well as which instructor was considered to be the lead instructor(s) and by the Director.
 - b. the name of the instructor(s) and facilitator(s) who proctored and/or graded the examination for each training session if applicable (in comments section registration page);
 - c. the attendance sign-in sheet(s) (registration page) for each training course or session;
 - d. all graded and dated validated examination answer (Assessment) sheets for each examination attempt including an explanation (written in comments and/or Excel list) for any retests as well as a narrative explaining any assistance provided to the attendee before the re-test; and
 - e. session evaluation(survey)forms (in comments section registration page and or Excel list).

Grading Criteria

TLC offers students the option of either pass/fail or assignment of a standard letter grade. If a standard letter grade is not requested, a pass/fail notice will be issued. Final course grades are based on the total number of possible points. The grading scale is administered equally to all students in the course. Do not expect to receive a grade higher than that merited by your total points. No point adjustments will be made for class participation or other subjective factors. For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity.

Final Assignment

The final examination assignment is determined by the examination administrator or the instruction and there are generally three versions that are readily available. There are also three levels of the examination from average, (5 Answers) Difficult (5 +All of the above) and very difficult (Six answers and All of the above). The student is provided the average rated examination unless there is a condition or concern that requires a more difficult examination. Example, two or more students at the same address or any suspicion of cheating or potential fraud. We try to ensure the security and learning experience. Assignments/answer keys are only accessible to instructors and administrative staff that have a need to know clearance.

Failure

If the student fails the examination, they are provided with two more chances to successfully pass the exam with a score of 70% or better. The student may receive a different and randomly generated exam. Upon failure of an exam, the student can submit their concerns in writing or submit a survey form and has the option to receive instructor assistance that would be equivalent to conventional classroom assistance in discovering the areas that are deficient. The instructor has the option in describing the assistance method or procedure depending upon the student's deficiencies.

Grading Criteria

TLC will offer the student either pass/fail or a standard letter grading assignment.

- A 900 – 1000 points
- B 800 – 899 points
- C 700 – 799 points
- D 600 – 699 points
- F <600 points

In order to successfully pass this course, you will need to have 70% on the final exam. The entire assignment is available on TLC's Website in a Word document format for your convenience.

Forfeiture of Certificate (Cheating)

If a student is found to have cheated on an examination, the penalty may include--but is not limited to--expulsion; foreclosure from future classes for a specified period; forfeiture of certificate for course/courses enrolled in at TLC; or all of the above in accordance with TLC's Student Manual. A letter notifying the student's sponsoring organization (State Agency) of the individual's misconduct will be sent by the appropriate official at TLC. No refund will be given for paid courses. An investigation of all other students that have taken the same assignment within 60-day period of the discovery will be re-examined for fraud or cheating. TLC reserves the right to revoke any published certificates and/or grades if cheating has been discovered for any reason and at any time. Students shall sign affidavit agreeing with all security measures. The student shall submit a driver's license for signature verification and track their time worked on the assignment. The student shall sign an affidavit verifying they have not cheated and worked alone on the assignment.

Note to students: Keep a copy of everything that you submit.

If your work is lost, you can submit your copy for grading. If you do not receive your certificate of completion or quiz results within two or three weeks after submitting it, please contact us immediately. We expect every student to produce his/her original and independent work.

Any student whose work indicates a violation of the Academic Misconduct Policy (cheating, plagiarism) can expect penalties as specified in the Student Handbook, which is available through Student Services; contact them at (928) 468-0665. A student who registers for a distance learning course is assigned a "start date" and an "end date." It is the student's responsibility to note due dates for assignments and to keep up with the course work. If a student falls behind, she/he must contact the instructor and request an extension of her/his *end date* in order to complete the course. It is the prerogative of the instructor to decide whether or not to grant the request.

Your assignments are due on time. Any assignment or mailed-in examination that is one to five days late will be marked down one letter grade. Any assignment or mailed-in examination that is turned in *later* than five days will not be accepted and will be recorded in my grade book as "non-participating" and you can be withdrawn from class. (See final grade options.)

Proctoring Instructions

Students enrolled in Technical Learning College's CEU courses that require proctored testing and **who do not live in the physical service area** of the Technical Learning College Test Center must nominate and gain prior approval of a proctor who will monitor course tests. A new proctor nomination form is required for each term and for each class.

PROCTORS, *If Necessary...*

A proctor is an individual who agrees to receive and administer a student's test(s) from Technical Learning College at the proctor's business email address. The test(s) will be ethically and professionally administered in a suitable testing environment (e.g., college/library or professional office). The proctor will return the test(s) to the Technical Learning College Test Center via fax immediately after administration, and the proctor will mail the exam within one (1) work day of administration to the Technical Learning College Test Center.

Proctors certify in writing to the Technical Learning College Test Center that the student completed the test according to all of the specific directions provided in the proctor guidelines letter. As the Proctor Nomination Form indicates, the student will identify the specific test(s) the proctor will monitor.

Any proctor the student nominates must be acting in the official capacity in one of the following positions:

- **College or University Personnel:** Dean, Department Chair, Student Records, Professional Staff Member of an adult/continuing education office or counseling center, Librarian, Professor, or any official testing center personnel if the tests are administered in the center.
- **Armed Forces Education Office Personnel**
- **Public or Private School Personnel:** Superintendent, Principal, Guidance Counselor, or Librarian.
- **Other:** Civil Service Examiner, Librarian for City/County, HR Professional, or Education/Training Coordinator.

The following persons do not qualify as proctors:

- Co-workers, someone who reports to you or your immediate supervisor
- Friends
- Neighbors
- Relatives

Nominating a Proctor

Students are responsible for identifying, nominating, and making all of the arrangements for the proctoring of their course tests, including the payment of any fees for services and the return of test materials to Technical Learning College Test Center (cost of FAX or postage). The proctor must be able to receive the student's test(s) via email as attachments. The Technical Learning College Test Center does not accept Yahoo, AOL, G-mail, Hotmail, or etc. email addresses.

If the student is unable to find a suitable proctor, they must contact the Technical Learning College Test Center for assistance immediately via [email](#).

Proctor Nomination Form

Students will use the Proctor Nomination Form for nomination and approval of a proctor. The student will complete the top part of the form for each course s/he is taking, even if the same proctor is used for all tests. The student must click on the submit button for the data to be electronically transmitted to the Technical Learning College Test Center.

Disclaimer Notice

It is ultimately the student's responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. The student shall understand State laws and rules change on a frequent basis and believe this course is currently accepted in their State for CEU or contact hour credit, if it is not, the student shall not hold Technical Learning College responsible. The student shall also understand that this type of study program deals with dangerous conditions and that the student shall not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury caused by this CEU education training course material. The student shall call or contact TLC if help or assistance is needed and double-check to ensure the registration page and assignment has been received and graded.

Affidavit of Exam Completion

The student shall affirm that they alone completed the entire text of the course. The student shall affirm that they completed the exam without assistance from any outside source. The student shall understand that it is their sole responsibility to file or maintain their certificate of completion as required by the state.

Refund Policy

We will beat any other training competitor's price for the same CEU material or classroom training. Student satisfaction is guaranteed. We will refund course fees if the course is not accepted for credit by the State. Otherwise, any other problem will be given an exchange credit towards an acceptable or approved course for the State. Once we are notified of the refund or exchange, we will generally issue a refund in 30 days of the problem and exchange within the same day.

Continuing Education Units

You will have 90 days from receipt of this manual to complete it in order to receive your Continuing Education Units (**CEUs**) or Professional Development Hours (**PDHs**). A score of 70% or better is necessary to pass this course. If you should need any assistance, please visit our Assistance Page on the website. Please e-mail all concerns and the final test to info@tlch2o.com.

Mission Statement

Our only product is educational service. Our goal is to provide you with the best possible education service possible. TLC will attempt to make your learning experience an enjoyable opportunity.

Student is required to submit the following information for assignment grading...

1. 70 PERCENT ON FINAL ASSESSMENT
2. DRIVER'S LICENSE
3. SCHEDULE OF TIME WORKED ON ASSIGNMENT
4. AFFIDAVIT OF EXAM COMPLETION
5. PROCTOR CERTIFICATION
6. TELEPHONE CONFIRMATION

Educational Mission

The educational mission of TLC is:

To provide TLC students with comprehensive and ongoing training in the theory and skills needed for the environmental education field,

To provide TLC students with opportunities to apply and understand the theory and skills needed for operator certification,

To provide opportunities for TLC students to learn and practice environmental educational skills with members of the community for the purpose of sharing diverse perspectives and experience,

To provide a forum in which students can exchange experiences and ideas related to environmental education,

To provide a forum for the collection and dissemination of current information related to environmental education, and to maintain an environment that nurtures academic and personal growth.

At the conclusion of this course...

At the finish of this course, the student will be able to explain and describe: Various conventional modern water/wastewater treatment disinfectants, Various halogens and halides, History of chlorination, Waterborne diseases and viruses, Chlorine gas, Chlorine exposure limits, residuals and related information, Sodium hypochlorite, Calcium hypochlorite, Chlorine-based disinfectants- Chloramines, and related oxidizers, Chlorination equipment and safety requirements, Chlorine health hazards, Chlorine dioxide, Alternative chlorination methods for water/wastewater disinfection, Conventional bacteriological sampling and monitoring.



Melissa Durbin, Author and Dean of Instruction.

30 years' experience in water quality and water treatment along with 18 years of college instruction. I have taught this course to hundreds of students and still learn more each day about microorganisms. Call me or any of the other Instructors for course assistance. I welcome your input and comments and hope you enjoy this course.

Affidavit

State Requirements- Each State has 1 or more of these requirements.

Photo Identification

We will require a photocopy of your driver's license or official government ID to verify your identity. You can upload a copy of your driver's license or other official ID to this computer program or submit a photocopy with your assignment. You can take a photo of your ID with your cell phone and upload the photo. No certificate of completion or reporting to the State will be issued until we receive your identification.

Proctoring Report

If your State requires a proctoring report, we have a copy on this site for you to download and provide to your proctor. If you are unsure if you need a proctoring report, contact your State Agency or email us. Info@tlch2o.com You can also upload the report to us in this computer program.

Security and Disclaimer Affidavit

You must agree to the terms below before moving forward.

I understand that I am 100 percent responsible to ensure that this course is approved and/or accepted for credit by my State Agency. I understand that TLC has a zero tolerance towards not following their rules, cheating or hostility towards staff or instructors. I need to complete the entire assignment for credit. There is no credit for partial assignment completion. I will provide an official government ID card to verify my identity.

Some States require your computer camera to be on during the training program to ensure that you alone are competing the work.

If necessary by my State agency, my exam was proctored. I will contact TLC if I do not hear back from them within 2 days of final exam submission. I will forfeit my purchase costs and will not receive credit or a refund if I do not abide with TLC's rules. I will not hold them liable for any misinformation or any injury. I will allow TLC to email and/or call me.

You can take breaks between the text reading assignments and quizzes.

You can take notes.

You will need to pass the quizzes with 100% and the final exam with 70%.

There is a customer survey at the end of the program.

CERTIFICATION OF COURSE PROCTOR

Technical Learning College requires that our students who takes a correspondence or home study program course must pass a proctored course reading, quiz and final examination. The proctor must complete and provide to the school a certification form approved by the commission for each examination administered by the proctor.

Instructions. When a student completes the course work, fill out the blanks in this section and provide the form to the proctor with the examination.

Name of Course: _____

Name of Licensee: _____

Instructions to Proctor. After an examination is administered, complete and return this certification and examination to the school in a sealed exam packet or in pdf format.

I certify that:

1. I am a disinterested third party in the administration of this examination. I am not related by blood, marriage or any other relationship to the licensee which would influence me from properly administering the examination.
2. The licensee showed me positive photo identification prior to completing the examination.
3. The enclosed examination was administered under my supervision on _____. The licensee received no assistance and had no access to books, notes or reference material.
4. I have not permitted the examination to be compromised, copied, or recorded in any way or by any method.
5. Provide an estimate of the amount of time the student took to complete the assignment.

Time to complete the entire course and final exam. _____

Notation of any problem or concerns:

Name and Telephone of Proctor (please print):

CUSTOMER SERVICE RESPONSE CARD

NAME: _____

E-MAIL _____ PHONE _____

PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.

1. Please rate the difficulty of your course.

Very Easy 0 1 2 3 4 5 Very Difficult

2. Please rate the difficulty of the testing process.

Very Easy 0 1 2 3 4 5 Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.

Very Similar 0 1 2 3 4 5 Very Different

4. How did you hear about this Course? _____

5. What would you do to improve the Course?

How about the price of the course?

Poor ____ Fair ____ Average ____ Good ____ Great ____

How was your customer service?

Poor ____ Fair ____ Average ____ Good ____ Great ____

Any other concerns or comments.
