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Executive Summary – 2019:

Introduction:

CEU Plan is an instructional course developer and online training provider dedicated to teaching and inspiring operators of drinking water and wastewater treatment plants since 1999. Based in Tampa Bay, Florida, **CEU Plan**'s reach extends around the globe through the CEU Plan website, www.ceuplan.com, and our secured website for state administrators of operator certification programs, www.ceuplan.org.

The state admin site has been upgraded to provide administrators with a quick reference to any policy or procedure of **CEU Plan**, as well as illustrating the various components of the training organization. The website provides various policy statements and instructional procedures, tutorials available to students, instructors' credentials, and much more. Website: www.ceuplan.org

CEU Plan trains basic, entry-level individuals, medium-to-advanced levels involved in the distribution systems, drinking water operators and technicians, DW support staff, laboratory practices and technicians, collection systems and wastewater treatment operators and technicians, along with supervisors and management personnel of regional treatment operations.

CEU Plan is accredited by IACET and meets the ANSI/IACET Standards 1-2018 for continuing education training. In order to achieve the accreditation, **CEU Plan** completed a rigorous application process, including a review by an IACET site visitor, and successfully demonstrated adherence to the ANSI/IACET standard, addressing the design, development, administration, and evaluation of its programs.

CEU Plan

Course and Program Development:

The expansion of course curriculum, the involvement of subject matter experts, improved program functionality, and cutting edge technologies in the operator training community have made CEU Plan an acknowledged leader in our field. The Instructor Group consists of highly experienced, subject matter experts with a combined experience in access of 1,750 years. The Course Library has grown to over 250 relevant courses, available at any time for continuing education, as well as certification training.

Our long term planning and program development allows students to utilize mobile technology, such as smart phones, IPads, tablets, and other new technologies in their training environment. These new mobile apps are revolutionizing the way people get their news and information – and their training. Are you ready? Soon, we will be faced with wearables and other devices now on the horizon that will provide technical assistance and new learning platforms. Understanding and incorporating these mobile devices into the training program is vital to meeting the requirements of young professionals.

Assessments and tracking/monitoring of the students' progress is made easier through distance education. The students' progress can be measured and evaluated to assist in their skill set improvements. The use of Need-to-Know criteria and developing the lesson plans to better transfer process techniques and troubleshooting concepts are vital to today's operator. The ole' days of counting minutes to hours to obtain ceu's are over, replaced by learning outcomes and objectives, i.e., what did you learn from that training course?

CEU Plan appreciates the opportunity to renew our Training Provider status with you. As indicated above, we have many policies and procedures, along with standard documents (evaluation forms, certificate of completion, etc.) available to you at any time, per your request.

Program Description

CEU Plan is comprised of leading experts within the water and wastewater treatment industry providing a comprehensive online training program. ***CEU Plan*** is one of the first accredited online training programs providing continuing education units (CEU's) to operators across the country via the Internet; approved by ANSI/IACET (American National Standards Institute and the International Association of Continuing Education and Training.

The mission of ***CEU Plan*** is to provide water and wastewater treatment plant operators and supporting staff with the latest in emerging technologies, procedures, methods, and/or concepts; in order to enrich their knowledge and experience within the workplace and obtain required CEU's for license re-certification.

Our program and courses are 100% web based providing the operator (student) with the opportunity to concentrate on their courses at their leisure and available time. Unlike many programs which require you to drive to a school with overnight stay, find a replacement while in training, or taking off time for a training seminar, ***CEU Plan*** provides a convenient and efficient means of advancing the student's understanding and knowledge of various topics. Our course categories continue to expand offering a broad range of subjects and topics allowing the student the opportunity to select courses of interest and areas to improve upon. ***CEU Plan*** has standardized on seventeen categories to better serve each and every operator which include:

- Operation and Control of a Treatment Plant
- Treatment Processes
- Health and Safety
- Employment and Community Right-to-Know
- Toxic and Hazardous Materials Handling
- Solids and Residuals
- Supervision and Management
- Basic Chemistry and Biology
- Mathematics of the Treatment Process
- Laboratory Sampling Procedures
- Equipment Maintenance and Repair
- Computer Application for Water/Wastewater
- Blueprint Reading
- Government Rules & Regulations
- Back Flow Prevention and Cross Connection
- New or Alternative Technologies
- Distribution and Collection Systems

CEU Plan is a Florida based organization designed to provide online training for water and wastewater treatment plant operators for their license renewal. ***CEU Plan*** received approval from ANSI/IACET, as an Approved Provider to provide continuing education training. In addition, we have been approved over forty-nine (49) States across the country. The program has been online since September 2001 with over forty-four thousand registrations, to date. We would like to take this opportunity to illustrate and provide details to many different areas of our online training program to you.

Course Curriculum: ***CEU Plan*** has over two fifty hundred (250) courses available for water and wastewater treatment plant operators from operation and process control, treatment processes, health and safety, mathematics of a treatment plant, government rules and regulations, new technologies, and many more. The key to our program is the flexibility the operator has to select and choose topics or courses of their interest or areas that need strengthening. During the past cycle, CEU Plan had a sizeable amount of professionals enrolling and taking their courses online with a peak daily enrollment of students without any interruptions. Today, we are prepared for any major surge with a bandwidth capacity over 900 gigs at any one moment, back-up dedicated servers to handle any major situation, full time staff for technical support and troubleshooting, and a rapidly growing course catalog. Our courses are divided into one, two, three, four, and five-hour courses.

The national standard for distance education, as developed by ANSI-IACET - American National Standards Institute and International Association of Continuing Education and Training, is the basis of our course development. CEU Plan is a member of ABC, AWWA, and WEF for many years, the Program Administrator, William Edgar, previously serving as Chair and Vice Chair of the Disinfection Committee, former member of the Program Committee, and previously served as Chair and Vice Chair of the WEF Professional Development Committee. And lastly, Edgar has been on the State of Florida DEP Certification Board for two decades.

The creation and development of a continuing education program can vary from the association requirements, internet features and options, system automation, and functionality. <u>It depends on what you want</u>. Currently, every state and association has different unique features to their program which provides the system and database they are comfortable with. It is important, to note, staying abreast of the continual changes in the distance education field provides a comfort to address and implement these future requirements for your continuing education program***.*** ***saceu***, a division of CEU Plan, is involved in custom instructional design of courses to meet your requirements and specifications.

Course Instructors: is a subject matter expert (SME) in the field and has prepared each online course. Our course outlines illustrate their experience and knowledge pertaining to the course. ***CEU Plan*** has leading researchers, academics, retired operators and managers, and professionals within the fields of water and wastewater, engineering, and regulatory agencies to provide quality assurance in the course curriculum. The Instructor Group is comprised of leading SME experts in the water and wastewater field with a combined experience in excess of 1,750 years. This Instructor Group is a unique feature of the ***saceu*** custom development program.

Course Cost: online courses start at $ 11.95 per one-hour course, to $ 29.95 for advanced graphic and streaming video presentations. ***CEU Plan*** intends to provide quality courses at a reasonable cost. A processing fee is attached to each registration to handle the cost associated with certificates of completion and reporting to the state. Our LMS - course registration system can include your state standardized course numbering system or course title for tracking purposes.

Student Page: upon registration for online courses, the student will receive his or her own personal student page which outlines each course [sections, Q &A's, evaluation form, and printing of their certificate], status of each course, and total amount of CEU's earned.

Course Time: each online course is divided into three sections for each one-hour course. Typically, each section is ten to fifteen minutes in classroom time with questions and answers pertaining to that section at the end of each section. Each section is comprised of a minimum of five single spaced pages of text, eight pages of graphics with text, or eight pages of graphics with streaming video clips inserted to provide for the fifteen-minute time element. After each section, the student will return to their student page, take the test questions; before going to the next section of their course. In each course, the overall minimum requirement of course contract time is based upon the ANSI/IACET standard, including the course material is twenty to twenty-one (20-21) pages of course material with graphics, along with a minimum of five (5) questions and answers per section (15 minimum/course) to equal an one hour course. All test questions are random selected for the student. In multi-hour courses, the sections and Q&A's are the same pattern.

Course Pass/Fail: our system has the feature to require a passing percentage, should it be required. For example, should a 70% passing grade be required for completion of the student's training course; our system recognizes this requirement, whereby the student would not receive their course completion, unless an accumulative grade of 70% had been achieved. The completed course drops into the database, after the student achieves the percentage requirement. In review, the student must complete all course material, complete all questions and answers sections, achieve the accumulative passing grade (if required), prior to the evaluation form icon appearing on the student page.

Course Evaluation: upon completion of all course sections and Q&A's, the student will be required to fill-out an evaluation form which is e-mailed back to our office. In a short essay format, we require the student to list three things which they have learned from the course, followed by a 10-15 word description of how it was used at their job. This evaluation form is very important to us, to monitor and record comments of our students and their input to our instructors concerning their course.

Certificate of Completion: upon completion of the above (course sections, Q&A's, and the evaluation form), the student will receive his or her Certificate of Completion for that course via electronic mail. The certificate will illustrate your approved course seal, either the course title and/or your state course number. At the end of each reporting period, ***CEU Plan*** forwards a consolidated report to the State of the total CEU credits earned by each operator (student) for that period; should it be required.

Database Reporting: At the end of each reporting period, ***CEU Plan*** forwards a consolidated report to the State of the total CEU credits earned by each professional (student) for that period; should it be required. The database report includes the following:

						Course Activity			Assessment	
Student Name	**Type**	**License Number**	**Course Number**	**ID**	**Course Name**	Start	**Completed**	**CEU**	**ETM**	**Score**

Assessment: ETM (elapsed time/minutes) - actual time spent in the training course
Score - accumulative scores of quizzes, average of all course sections

CEU Plan has the experience and in-place facilities to provide you with a LMS (Learning Management System) to meet current and future requirements. Our LMS has been tested and proven to withstand hurricanes, internet hackers, and power outages. It is a system which provides ease in operations and navigation and it is operator friendly.

Learning Management System: Our Learning Management System includes complete tracking and monitoring capabilities with reporting features including student name, license number, and course approval codes and credits, and generates reports on a monthly, quarterly, or other specific time interval. In addition, we are able to provide individual tracking on any student to include accumulative grade scores, verification of logins and time. We utilize a SQL database storage system and our site is totally secured with a SSL 128-bit encryption directly to our e-commerce. Our system requires a minimum Windows 7 operating system with standard Microsoft software for ease in transmitting data. No proprietary software or hardware is utilized, for maximum interface with other systems.

Our dedicated servers are located in one of the largest data centers in the country, with huge fiber commitments with the following carriers, totaling over 10 Gigabit of Ethernet Core, all switch based internet network, backbone connections from Level 3, MCI, and Time Warner. The main datacenter is housed in a 30,000 square foot facility with over 15,000 square feet of hosting space available, located in Tampa, Florida.

Datacenter: the datacenter starts with multiple and diverse pipes into the Internet backbone. They have connections ranging over 47 Gbps in total bandwidth capacity, to UUNet, Qwest, Level 3, Global Crossing and MCI. To handle multi-homed connections, they employ routing through the CISCO edge routers to pick faster route for our Internet traffic. They have close relationships with networking leaders such as CISCO, Juniper and HP to provision our internal network with the latest and the most sophisticated networking gears. This allows our network to operate smoothly and with minimal translation interruptions. Their dual layered network design with multiple routers and switches with independent network paths ensures that there are no single points of failures.

The datacenter features redundant power and HVAC systems, multiple redundant fiber connections, advanced fire suppression capabilities, and VPM connections to other datacenters for secure internal connections. The Tampa Bay datacenter is part of a worldwide Global Datacenter with operations in Chicago, Austin, Tampa, and Vancouver; with continental operations in London, Seoul, and Sydney. The overall operation includes over 10,000 servers managed with a peak bandwidth usage of 47 Gbps and available bandwidth approximately 100 Mbps port, fully burstable.

The power supply to the Tampa Facility includes feeds from multiple substations with a four battery backup UPS, supplied by MGE which insure against temporary outages and sufficiently power for the entire operation. The backup generators are very important to an operation of this size with one 750 KW and one 400 KW diesel driven generators to protect the entire facility. The facility is a fully redundant with an automated and monitored transfer switching system.

The internal environment is monitored and controlled through a dedicated N+1 redundant cooling and ventilation system 24x7x365 to ensure that the temperature and humidity levels are kept at the optimal level. This system includes a 250 ton of cooling capacity with an N+1 redundancy Liebert equipment system. The fire suppression system is Intergen (successor to FM-200) in most datacenter facilities.

The Network Operations Center (NOC) is staffed 24 hours a day/seven days a week to monitor the facility, network, and server infrastructures. The NOC staff is certified experts in network and system administration. Network traffic never stops and neither does their work to safeguard our hosted systems. All critical system and network health and performance information is fed into our early warning system and any abnormalities are investigated and reacted to instantly.

The datacenter sit on top of the major Internet backbone networks. The fiber connections to the datacenter are routed through multiple communication conduits to ensure fail-over. The ultra-secure datacenter is built to withstand the toughest physical and virtual conditions. The datacenter is segregated into different logical and physical partitions to limit and control access to only those who need it and to minimize damage if, however unlikely, intrusion occurs. Access to the entire datacenter space is controlled through multiple security checkpoints, which include both security guards and keycard entries. Each segregated and tiered partition can only be accessed by passing through additional security checkpoints. Access to the datacenter space is strictly controlled and is limited to a select few. When entering the data center, all collocation customers are escorted and monitored by one of the NOC staff. The datacenter are constantly observed through a closed-circuit video monitoring system that records every movement made.

We would be pleased to answer any question or provide details of our totally automated system to track, monitor, and report students for our program. We have been involved in various conferences and demonstrations during the past five years to obtain and develop the unique operating system. Our programming staff has developed our own internal system to provide prompt response to any technical support, troubleshooting, or administrative requirement, when it is required. Our system has been tested and re-tested to provide for as foolproof system as possible, however we continue to work on perfecting the system to maintain and upgrade, as the industry changes.

Our **.org** site is our administrative site which has been designed for the state reviewer. It will provide them with access to our courses via a pdf format, where they can review any course online, course summary and many additional features in the future. We realize staffing has been cut-back and it is difficult to review all courses from us, as well as, others. We want to streamline our new course offerings providing them with quick access, blanket approval program for activating any of our new courses when they are available, and enhanced learning techniques for environmental professionals to retain the continuing education courses utilized on the job.

We would appreciate your consideration and approval of our program. Should you have any questions, want to audit any of our courses, or require additional information, we would be pleased to provide it to you. ***CEU Plan*** is committed to providing a quality program and developing online courses and topics for the environmental professional to choose from. We would appreciate your input and suggestions to our program, to serve you and your state association.

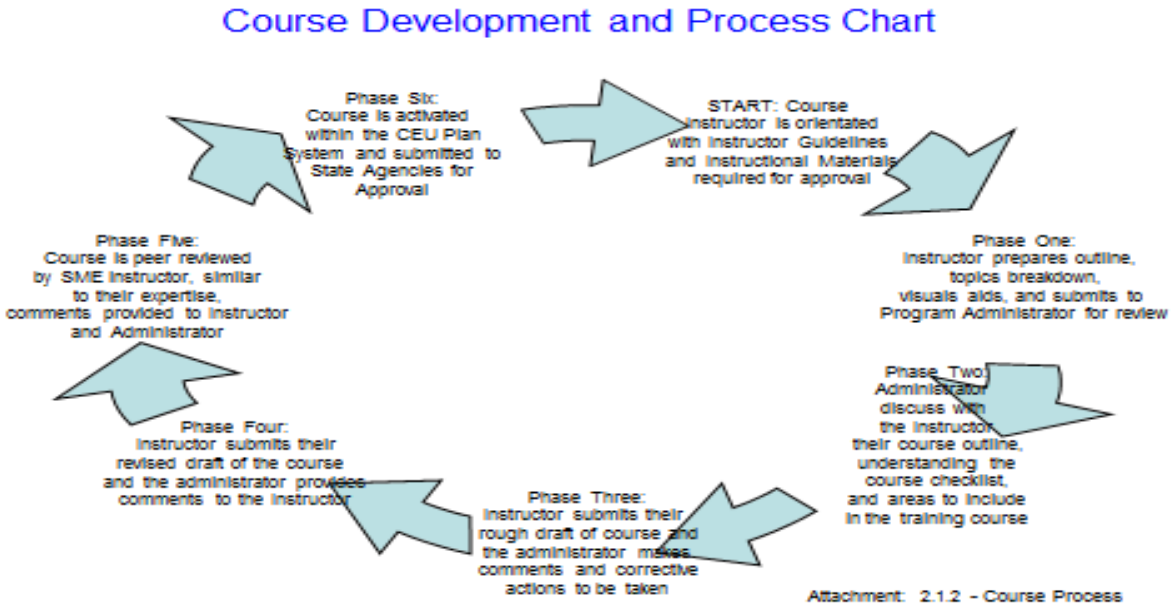
I, William W. Edgar, certify and confirm that all information provided with this proposal, discussion of our courses and online training programming are accurate to the best of my knowledge and that a database will be established for recording and maintaining records of all courses taken and credits assigned to each and every water or wastewater professional. Should you have any questions or require additional information pertaining to our program or this proposal, please feel free to contact me directly at (352) 754-1259 or e-mail at: wwedgar@ceuplan.org

Sincerely,

William W. Edgar
Program Administrator

Instructional Course Design

CEU Plan utilizes the instructional course design worksheet developed by IACET. This worksheet is prepared for each course to show the relationship between identified needs, learning outcomes, types of instruction and assessment methods. The below Course Development and Process Chart illustrates the six phases of instructional course design.



Attachment: 2.1.2 - Course Process

Once the Instructor is oriented in the CEU Plan process for course development, the first tier of beta testing takes place. The Program Administrator and Instructor review the objectives of the training course, along with the Need-to-Know criteria included in the course. This phase includes discussing the visual aids with the topics breakdown, inserting pertinent "war stories" as well as actual experiences of the Instructor and following the course checklist for development. Between phases two and three, these aspects of the training course are refined and submitted for review by CEU Plan. Upon completion of these design phases, the course goes into phase four, where the Technical Director interfaces and begins to implement content into the Course Content Templates. This very important phase allows everyone involved to electronically review the course in a rough draft format and to assess areas for improvement. During this phase, a second beta test of the training course is conducted to include an assessment by an independent subject matter expert, who reviews the course content for accuracy, verifies fact checking and content completion time. At the conclusion of these instructional design phases, the course is reviewed by the Technical Director and Instructor for any minor typo or similar correction required. And lastly, the Program Administrator verifies the above review and performs a final audit of the training course - learning outcomes, course content, exam - questions and answers, and overall review of the final course checklist; prior to activation.

To provide a visual illustration of the Instructional Course Design Worksheet, third tier of beta testing, and student comments and feedback; we offer the following two one-hour courses.

CEU Plan ID # 145 - Hydrologic Cycle and Aquifers, Introduction to
CEU Plan ID # 284 - Distribution System Monitoring

In these samples, you will find the breakdown of the learning outcomes for each course section; you will observe the method used in the learning styles and assessment, and instructional materials used. The allotted time is broken down into the amount of time for the sectional content followed by the amount of time for assessment (one minute for each exam question). We do not time the essay portion of the student feedback; however, 5 to 10 minutes could be included for the assessment exercise. The cumulative time chart listed below the Design Document provides the results of the second tier of beta testing. This beta test is performed internally and must meet the CEU requirements of the course; prior to activation. The next item is the Student Feedback which is taken directly from the essay requirements of the course. These student comments are not judged on grammar or typos, but on the student's cognitive knowledge transfer and expression of the student's understanding of the training course and its content. This feedback is very important to CEU Plan and is utilized in the development and improvements of the training courses. And lastly, the Beta Test--Students is our third tier of testing. We randomly select students to make note of their progress in the courses, measuring the amount of time spent to complete the course, reviewing their assessment scores, and evaluating their essays and feedback. Typically, ten students are selected from the course completion roster for the third tier beta test.

Content & Instructional Methods
DESIGN DOCUMENT

CEU Plan # 145 – Introduction to the Hydrologic Cycle & Aquifers

Unit/Lesson Name	Time Allotted	Content Description and/or Purpose	List Learning Outcomes	Method Used (Demonstrate Accommodation of Different Learning Styles	Assessment Method	Instructional Materials Used	Comments/ Notes
							No Pre-Work is required
Section 1	**content:** 20 minutes **quiz:** 5 minutes **accumulative: 25** minutes	Introduction to the Hydrologic Cycle and Aquifers	Recognize the underground aquifer storage system. Describe the hydrologic cycle. Apply the knowledge of an ASR system.	Blended Learning of Text and Streaming Base Online	Written Exam	Required view of text material and illustrations, along with viewing streaming clips, listen to audio presentation via streaming – take quiz upon completion of course material section	Inform students of the required text reading in their course enrollment confirmation Student provided with login and instructions to begin their online training. Tutorial illustrating the step-by-step process and requirements for ceu credit, linked on the home page

Section 2	**content:** 16 minutes **quiz:** 5 minutes **accumulative: 21** minutes	The Hidden Rivers of Florida	Describe the hydrologic cycle. Apply the knowledge of an ASR system. Evaluate a storm water collection system.	Blended Learning of Text and Streaming Base Online	Written Exam	Required view of text material and illustrations, along with viewing streaming clips, listen to audio presentation via streaming – take quiz upon completion of course material section	Inform students of the required assignments in the top header of the content section. At the conclusion of the course section, instructions to proceed to the quiz will be indicated.
Section 3	**content:** 18 minutes **quiz:** 5 minutes **accumulative: 23** minutes	Aquifer Deterioration	Apply the knowledge of an ASR system. Evaluate a storm water collection system. Formulate a tracking system for groundwater area	Blended Learning of Text and Streaming Base Online	Written Exam Essay applying to worksite skills	Required view of text material and illustrations, along with viewing streaming clips, listen to audio presentation via streaming – take the final quiz upon completion of course material section	At the conclusion of the course section, instructions to proceed to the final quiz will be indicated; followed by completing the evaluation form, then view and print - their certificate of completion - My Transcripts.

Accumulative Time:

sec 1 =	25
sec 2 =	21
sec 3 =	23

accumulative time total : 69 minutes = 1 hours = 0.1 CEU

Student Feedback:

● I learned about Florida's underground water supply. It helps me to better understand Hawaii's aquifers. I learned about how water mixed with CO2 can erode limestone. This helps me to better understand some of our underwater formations. I learned that less than 1% of Earth's water is usable fresh water. This helps me to better respect our freshwater resources.

● The importance of protecting aquifers. How water is purified and contaminated. Importance of conserving water. We inspect water discharge, limit waste, and repeated testing to be in compliance with EPA laws.

● 1 - How aquifers are formed. 2 - How pollution enters the aquifer. 3 - How we can improve the aquifer with better fertilizer use and with water conservation. In California we do not have a problem with sink holes and don't have that many natural springs.

● where the aquifers are what an aquifer looks like how important an to not dump anything in it How it’s important not over fertilize and protect the area where my water comes from.

● Hydrologic cycle works recycling water between earth and sky how an aquifer is formed from the earth and the water flow through the aquifer the Floridian water way and how they mapped and tracked how it flowed

● 1) A better understanding of aquifers. 2)how an aquifer can travel through and under any structure. 3) how dumping in sink holes affects aquifers. In recent years, we have added a wash bay to clean our equipment indoors.

●How massive the Florida aquifers are. How easy it is to pollute the aquifers Several ways to help to not pollute the aquifers. My job is to provide clean drinking water to our town and this show several thing not to do to make this happen.

● the Florida springs need to be protected fertilizer use needs to be curtailed water pollution in any form is bad

- 1. The importance of correct fertilization 2. The importance of using proper landscaping techniques 3. How our aquifer are interconnected By working with and teaching farmers new fertilizing techniques

Beta Testing - Students

course # 145 - Introduction to Hydrologic Cycle and Aquifers - one hour

Beta Testing Update: 7-1-2016

	1	2	3	4	5	6	7	8	9	10	Total - ETM	Avg/Sec
Section 1	15	15	18	33	25	21	**40**	20	**25**	22	169	21.13
Section 2	15	28	27	26	18	18	**43**	19	**55**	28	179	22.80
Section 3	18	21	20	25	19	17	**34**	17	**38**	23	160	20.00
Total - ETM	48	64	65	84	62	56		56		73		63.93
							117		118			

		completion
1 -	Perman, Dean	1-Jul
2 -	Rose, Brenda	29-Jun
3 -	Watters, Christopher	23-Jun
4 -	Williams, Louie	22-Jun
5 -	Fowlkes, Andrew	17-Jun
6 -	Hall, David	16-Jun
7 -	Strunk, Sammy	16-Jun
8 -	Richardson, David	10-Jun
9 -	Mayorga, Salvador	8-Jun
10 -	Johnson, Corey	23-May

- Student # 7 and # 9 have been deleted, as the top 2 of the test
- The Total/ETM column L = time spent by 8 students for individual section
- The Avg/Sec column M = average time spent by 8 students in the beta test
- The Total/ETM column A = average time spent by 8 students for the course
- This beta test illustrates the students are spending near the original beta time for the course, and the course development estimates
- Student comments = above average rating and high marks for content

CEU Plan – Content & Instructional
Course Design Worksheet

activated: 11-9-2015

CEU Plan # 284 – Distribution System Monitoring

Instructor: Mike Harrington

amount of course hours**:** one

Unit/Lesson Name	Time Allotted	Content Description and/or Purpose	List Learning Outcomes	Method Used (Demonstrate Accommodation of Different Learning Styles	Assessment Method	Instructional Materials Used	Comments/ Notes
Section 1	**content:** 14.28 Minutes **quiz:** 7 minutes **accumulative: 21** minutes	Low Cost Continuous Distribution System Monitoring	● identify the Early Warning Monitoring aspects of Distribution ● list some of the Safety & Security issues related to your Distribution System ● describe the Biological Contamination within your system ● discuss some of the chemical contamination found in Distribution lines	Streaming Based Online	Written Exam	Required text reading of content material and view of streaming clip, via streaming – take quiz upon completion of course material section View table, Charts, and Photograph Images	Inform students of the required text reading in their course enrollment confirmation – Auto response At the conclusion of the course section, instructions to proceed to the quiz will be indicated.

Lesson Name	**Time**	**Content Description**	**Learning Outcomes**	**Learning Styles**	**Assessment**	Instructional Materials	**Comments**
Section 2	**content:** 24.36 Minutes **quiz:** 7 minutes **accumulative: 31** minutes	Down to Earth Examples	● discuss the ORP measurements found in water ● illustrate the differences of oxidizers and reducers related to ORP – oxidation v/s ORP ● understanding toxic elements being introduced into the water supply	Streaming Based Online	Written Exam	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course material section View table, Charts, and Photograph Images	Inform students of the required assignments in the top header of the content section. At the conclusion of the course section, instructions to proceed to the quiz will be indicated.
Section 3	**content:** 12.54 Minutes **quiz:** 7 minutes **accumulative: 20** Minutes	Instrumentation Selection	● describe instruments used in monitoring your distribution system ● explain the selection of monitoring points in the Distribution System ● identify the probe measurements for sampling for ORP - Conductivity	Streaming Based Online	Written Exam	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course material section View table, Charts, and Photograph Images	Inform students of the required assignments in the top header of the content section. At the conclusion of the course section, instructions to proceed to the quiz will be indicated.

Accumulative Time:

sec 1 =	21									
sec 2 =	31									
sec 3 =	20									

accumulative time total : 72 minutes = 1 hours = 0.1 CEU

Student Feedback:

- ORP and conductance are two probe systems that can be used to monitor distribution systems. Also how to calibrate the probes and the differences between the two. Use the information to review our distribution monitoring capabilities and potential improvement strategies

- Most vulnerable parts of a distribution system. Things that could be done to monitor parts of a distribution system using ORP meter. How a SCADA system could be expanded to monitor safety of water that may be targeted for by terrorist.

- Security and emergency response are essential in managing drinking water systems. Having good communication with the customers is essential. It is very important to make sure there is a vulnerability assessment done as well.

- Dissolved solids - I was not aware of the fact a filter could take so much out of the water. TDS - The higher the TDS the more conductivity it. I did not know this. ORP/Conductivity Probes - I did not know there were so many different types of probe available off the shelf.

- Instrumentation selection; ORP, data logging, SCADA, things could be much cheaper than I had thought to public safe. I felt the course was well structured, and I was able to stop and perform work task at will. Thank you.

- Never heard of ORP before so learned quite a lot about it specifically.

- How two common known toxics could respond in a distribution system. A way of monitoring a distribution system, with the ORP dose response. The Ph/ORP correlation on the free chlorine drop.

- Excellent training. This was the first I have been introduced to the OPR/TDS monitoring protocols.

- what different parameters can be used in the monitoring process these parameters may not be typically used on a regular basis, but a sudden change in them can trigger an alarm, or action level.

Beta Testing - Students

course # 284 - Distribution System Monitoring - one hr. course

Beta Testing Update: 1-23-2017

	1	2	3	4	5	6	7	8	9	10	Total - ETM	Avg/Sec
Section 1	16	34	25	30	28	25	26	21	25	24	145	24
Section 2	16	18	28	40	36	34	52	19	45	33	148	24
Section 3	16	15	21	61	35	23	33	16	24	24	115	19
Total - ETM	48	67	74			82		56		81	408	67
				131	99		111		94			

		completion
1 -	Hromco, George	15-Jan
2 -	Rivera, Eladio	14-Jan
3 -	Hammond, Gary	12-Jan
4 -	Manns, Stephen	10-Jan
5 -	Faircloth, Wendell	9-Jan
6 -	Pohlman, Jerry	7-Jan
7 -	Howell, Kelly	4-Jan
8 -	Murschel, Keith	3-Jan
9 -	Wilson, Ed	1-Jan
10 -	Evans, Eric	30-Dec

- Student # 4, # 5, #7 and # 9 have been deleted, as the top 4 of the test
- The Total/ETM column L = time spent by 6 students for individual section
- The Avg/Sec column M = average time spent by 6 students in the beta test
- The Total/ETM column A = average time spent by 6 students for the course
- This beta test illustrates the students are spending near the original beta time for the course, and the course development estimates
- Student comments = above average rating and high marks for content

Typical – Training Provider Specifications

An approved online training provider may be an organization or an individual, and shall be responsible for the following:

- exhibiting a high standards of professional conduct with respect to all students
- ensuring that qualified instructors or subject matter experts are used in the instructional design of the training course and are approved by the _____ .
- obtaining approval before the training occurs and delivering the training as approved
- tracking, monitoring, recording, and reporting of successful training completion
- displaying a high level of relevant and current technical knowledge of subject matter
- illustrating students' learning styles and needs with the instructional course design

The training shall include and provide the student with learning objectives. Visual aids, graphics, and student activities must be included in the training course. Training should be designed to allow the instructor, training provider, or subject-matter expert to track and monitor the students' progress, review assessments to include feedback, and determine that the student has successfully completed the assignment. Learning assessments shall be measurable, observable, clearly stated, and focused on student performance. The training must include "hands-on" exercises, in accordance with the _____ .

Prior to the student's enrollment or sign up, provider must notify prospective participants of all requirements, including fees, successful completion requirements and the process for reporting their training. Approved online training organizations shall have procedures to verify student identity, contact time with the learning source, and successful completion. Providers are required to retain and ensure the accuracy of records, for a minimum of eight years to validate successful training completion for certification. Training shall be verifiable from the provider LMS records.
.
After the _____ , has reviewed the training, it will send written notification of approval, denial, or deficiencies in the application materials or training. Written approvals may also include conditions. The training must meet all general requirements of the _____ standards and contain content addressing the knowledge and skills determined necessary to perform critical tasks associated with the treatment of water or wastewater. Training events must not be advertised as "approved" until written approval is received from _____ .

Upon approval, any advertisements should clearly inform students of all requirements and costs to complete their training and to report training credits to _____ . Training providers may be asked to update a course or manual to ensure that it complies with the latest rules and regulations of the _____ Standard. _____ may request that approved training be re-submitted for review in response to changes in rules, policy, technology, or industry standards or in response to complaints. The online training provider will have an opportunity to revise the training to comply with current requirements or eliminate identified problems; however, failure to comply with a training recall may result in modifying or rescinding an existing approval.

Any quoted or reproduced material that is not an original creation of the training provider must be sourced and such reproduction or quotation must comply with the "fair use" provisions of federal copyright law. It is the responsibility of the training provider, to safeguard and secure all student records related to but not limited to: student contact information, e-mail address, contact phone number and/or social security number.

Instructors must be approved by the _____ and have adequate teaching experience to enable them to communicate clearly and effectively at all learning levels of the student and to perform consistently with the objectives of the training course and program. In the event that an instructor is determined unqualified and not _____ approved to teach a course, the training provider will lose approval for the course, unless a qualified instructor is employed as a replacement.

Distance Education

Distance learning occurs when the student is separated by place and time from instructors or other learning resources. Knowledge is acquired through various training formats, where the student controls the pace of the training, i.e. self-study. The approved online training provider shall meet all _____ Standards related to the minimum contact time for certification training. Verification of training time, student identity, and successful completion of performance-based assessments are required for approval of distance learning.

Approval Criteria:

■ Online-based training requires the student to interact with the computer such as the keyboard, computer monitor, screen, and supplemental pdf activities. Distance training may only be submitted for review and approval from the following groups:

- ■ governmental authorities, state and federal regulatory agencies;
- ■ non-profit industry associations, nationally recognized industry associations;
- ■ colleges listed by accrediting agencies and recognized by the U.S. Department of Education,
- ■ individuals or organizations that demonstrate comparable expertise and knowledge of, and experience with, educational principles and effective instructional course design as determined by the IACET 1-2013 Standards; accredited IACET Training Provider.

The Online Training Provider must:

■ comply with the general rules and regulations of the _____ Standards, the distance learning requirements listed above, and the delivery standards listed below:

- ■ achieve learning objectives — and listed for each chapter or course section
- ■ incorporate the use of graphics, streaming clips, simulations, animations, scenarios and student activities, review questions, and assignments to assist the student with the need-to-know criteria; develop - perform beta testing of all course content for _____ compliance;
- ■ provide students with reasonable access to the instructor or qualified experts who can answer their questions within reasonable time frame - one business day;
- ■ supply each student with course description summary and instructor profile, describe the availability and contact procedures for technical support for both course content and program policies;
- ■ periodically test students' comprehension of the training material throughout the course;
- ■ include tracking and monitoring of student's progress and assessments in written formats and hands-on exercises;
- ■ establish the date of completion of the training as the date the final performance assessment(s) are submitted, including any assignments or projects as part of the training, if the student has met the grading – pass-fail criteria. Provide student with certificate of completion for the training course;
- ■ submit a copy of each course-completion roster of the student's completion to _____, to include the provider name and number, student name and identification number, course name and number, CEU hours earned for the certification training, and completion date.

Developing an Electronic Spreadsheet for Training Providers

For many years, I have researched and implemented reporting documents for continuing education credits. We are blessed today with some credits being utilized for the student (operator) certification training hours. Technology has allowed us to report and consolidate data in a streamlined process, to the extent that all vital data can be contained on one page. The important data, broken into vertical columns on a simple spreadsheet, allow for identification of vital personal data as well as subject matter of importance, presenting everything on one page and minimizing the whistles and bells that are better left to other reporting breakdowns.

The first and most important column is the name identification. Consolidating the name in one vertical column is standard, ordered by Last/First Name, since we have some Seniors and Juniors; thus placing the first name after the last has become the universal standard. In the second vertical column is the license type (DW, DS, WW, CS, etc.,) which is especially important when a long term objective is to separate accounting and compliance of training credit hours by license type. In some cases, a centralized ID numbering system is assigned for long term application or is utilized today, whether it is called Client ID, Operator ID, or License ID; this vertical column could be eliminated where unnecessary. The next column would be the unique license or identification number; this numeric would be available to cross reference against the Last/First Name, allowing for cross reference between the operator's name and his or her licenses. In the illustration below, you will see the layout of these vertical columns:

A	B	C	D	E	F	G	H	I	J	K
						Course	Activity			Assessment
Student Name	Type	License #	Course #	CEU ID	Course Name	Start	Completed	CEU	ETM	Score

The next series of vertical columns should be arranged to display the course number, its reference number, the name of the course, the credits to be applied and the dates of completion. To better illustrate these columns, let's start with the column after the license identification number. This vertical column could be listed as "D," should you be utilizing the full column layout shown above. Course Number - Approved Course ID would be illustrated here, as an indicator of the course identification and its process. In the next column (E), this is an optional column for miscellaneous identification or training labeling - such as: PC - NPC (process control vs non process control), S (safety), OM (operation and maintenance), X (management or safety), or any of numerous arrangements to gauge and monitor training subject matter or topics, along with a long term option of gauging operators' training /skill sets. The next column is very important as a cross reference to the course code number. By listing the name of the course, that is, its title, one eliminates the blind

referencing of course numbers. It facilitates a verification step or cross reference by a student, an operator, the compliance staff or employer to validate involvement in the course. This brings us to two major aspects of course validation in tracking and monitoring – the number of contact hours, and the date of completion.

As illustrated under the Course Activity columns (G & H), you will find two vertical columns stating Start and Completion. The benefit for accurate reporting of the actual start date and actual completion dates will allow for evaluating the length of time the student was engaged with the training course. It is practical to assess the amount of time, length of the training and duration of interactivity, along with any unique assessment tools, in the record of training. Many database reports of today state a START date, but prefer you to insert the actual course completion date. This minor error needs to be addressed and corrected, to state: Completion Date, as it will provide numerous benefits and long term advantages. The next column would be the actual Completion Date. This provides a gauge of the duration of the training; did the student take one - two days, two weeks, four months, or four years? It is difficult for educators to issue credits for a training course when it takes two years to complete, or even six months -- what has the student learned? In addition, regulations are now being incorporated to state that training courses may not exceed four-to-six months in duration; no credits will be allowed for courses started and completed outside of that time frame. These columns allow for for compliance checks, should these regulations be enforced or planned for the future of your training program.

The next column (I) is the number of CEUs. The ANSI / IACET Standards (American National Standards Institute - International Association of Continuing Education Training) establish the tracking, monitoring and reporting of course completion credits in units of one hour.

One Hour = 0.1 Five Hours = 0.5 Ten Hours = 1.0

These illustrations are in the base-of-ten ratio, allowing us to convert to full hours the CEUs credited for a training course while retaining a numeric reporting system to account for all training.

The next two columns (J & K) are the Assessment columns. In many reports, this is a long term or future option to allow for better compliance and skill set evaluations--questions for your training program, such as:

- How much time is being spent in the training?
- Is the one hour truly being spent in training?
- Is the forty hour course actually accounted for?
- What assessments for pass/fail are in practice?

Through these questions, the future of training and student/operator training evaluations can be accounted for, in terms of the MINUTES spent in training, as illustrated in the vertical column (J) ETM (elapsed time/minutes). Through the use of minutes versus hours or fractions of hours, the cumulative

training time in minutes allows for ease in cross referencing, in that CEUs are credited in hours, but are tracked, monitored and reported in minutes, so NOT to confuse or mislead anyone.

The last column (K) of our illustration presents quiz scores under the Assessment heading. Some state regulations require a70% pass/fail minimum for training credit and other institutions may soon be changing to adopt this requirement, as well. This is true for correspondence and online training courses, and increasingly required of classroom/workshop training. This balanced and equal approach increases the quality of the training and skill set transfers to the workforce. Should 70% comprehension be found excessive for training credit, some set point for compliance and assessment should be established nonetheless, in the long term approach.

Comparing the last two columns (J &K) allows for both current and long term evaluation of the students' training, and establishes a benchmark for updates in the future. The eleven vertical columns above provide a basic model for establishing your simple electronic spreadsheet for training programs. It allows for future consideration of:

- Consolidating into a one page report
- Streamlining the connection of training taken and operator identification for credit
- Tracking and monitoring time spent
- Cross references to eliminate/minimize/correct operator identification issues
- Tracking and compliance of contact time - assessments
- Options to ADD further vertical columns, all controlled by the single horizontal rows of the operator Last/First Name indicated in the first column (A).

It is my hope that this is helpful to you. Through many years of working with various formats and seeing the frustration and changes made in reporting, we have decided to publish this simple approach. Maintaining all data categories in one horizontal row is very important, and the breakdown of the vertical columns and their location and intersection allows for streamlining the events of reporting credits, database processing, and compliance within the regulations, to substantiate training requirements for license renewal. Once a system is perfected and in-place, online license renewal is a "piece of cake." These minor IT improvements in your Operator Certification program will stabilize staff time, as errors and troubles in the existing tracking and monitoring requirements of licensed operators training credits are costing a lot of staff time to address and resolve, especially with new entry level candidates.

In this brief development summary, I would like to illustrate a couple of reporting formats, for your information:

License_Number	License_Type	Course_Number	Course_Title	Start_Date	CEU	License_Cycle
0002627	DW	00023071	XXX	5/31/2004	0.3	2005

TCH Activity Report

DCA Course Number : (*)

Course Title :

Course Location :

Course Dates: to

Course Sponsor's Name :

Phone Number :

AI ID : 108551: CEU Plan.com

COURSE_APPROVAL_NUM	CORE_PERSON_ID	START_DATE	END_DATE

DEP Distance Education Roster Report

Sponsor: CEU Plan
Sponsor Id: 45

Month: September
Year: 2016

Completion Date	Course ID	Client ID	Client Name

Three of the above four formats are uploaded under a simple spreadsheet with the individual vertical columns illustrating the data required. Each horizontal row would include the data related to a single course taken by the operator who is listed under the name column. Ohio and Pennsylvania each require only four columns of reportable data, whereas Florida requires seven columns. In the Kentucky illustration, once the DCA Course Number is inserted, the course title and other rows are populated; the training provider then inserts the Agency ID number and credits to finalize the report, and it is posted.

This document is available to all, and the only disclaimer is that these states' formats and others may change or improve over time. We plan to update and report back to you in coming years, to help make your data management as simple and effective as possible. This white paper (document) may be used in ***Train-the-Trainer*** Programs, in order to inform, educate, and improve Operator Training for all.

William W. Edgar
November 15, 2016

Preparing for Data Center Disaster:

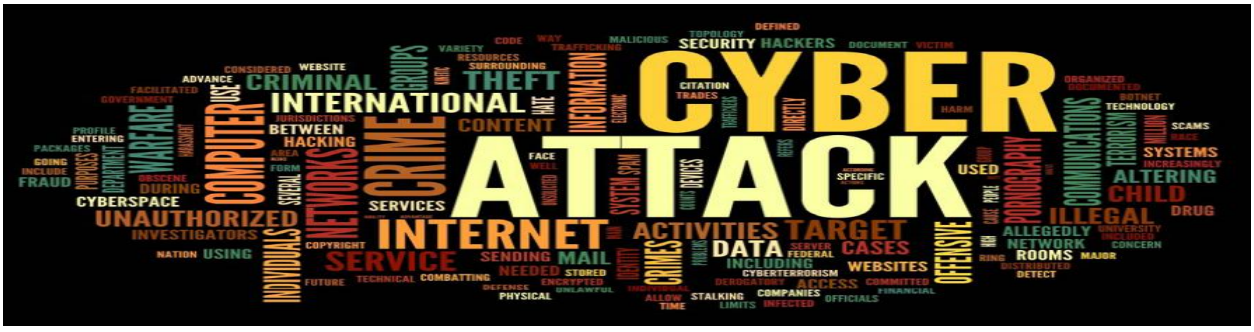
As Hurricane Isaac took aim at the Gulf Coast of Florida, last year, data centers up and down the seaboard, including ours in Tampa, Florida, dusted off their hurricane plans to prepare for the storm. Being accustomed to this type of natural threat, most of us were well prepared to handle whatever the storm could throw our way.

But, coastal centers aren't the only providers who need to be prepared for weather-related disasters. Wind, snow, ice and rain can wreak havoc on vital infrastructure in any part of the country, and these natural threats can prove particularly problematic in places where extreme weather is uncommon – such as the ice storm that crippled Atlanta in January 2011, or the severe flooding that struck the normally arid Phoenix, Ariz. area.

Preparing your data center and training your staff can take time, and when you've never experienced a natural disaster, it might feel like a low priority. But if there's one thing Mother Nature teaches us time and time again, it's that she's full of surprises.

Need to revisit your disaster preparedness strategy? Here are some good places to start:

- Verify backup generators have received preventative maintenance and are in full working order.
- Top off generator fuel levels to ensure sufficient running time, and plan a refueling schedule to prevent an unexpected shutdown.
- Develop emergency fuel contracts to obtain priority reserve gasoline, if required.
- Prepare window shields to protect the building from high winds.
- Communicate disaster plans with partners.
- Schedule staff to remain on site if necessary.
- Stockpile food, beverages and other supplies for staff that will be manning the data center – and perhaps staying overnight – during the weather emergency.
- Inform clients about how their data will be protected in the instance of a natural disaster. Keep them in the know about updated policies and procedures during quiet times, and plan to provide them with reassuring updates via email or another mode of communication during the actual event.
- Arrange for additional telephone support in remote locations to reroute calls in the event an overflow is needed.
- Despite meteorologists' best efforts, weather remains largely unpredictable. Always err on the side of caution: Be prepared for storms to change course, stall out or speed up – and what kind of implications these changes may have for your data center.
- Verify that redundant backups to off-site locations are complete.

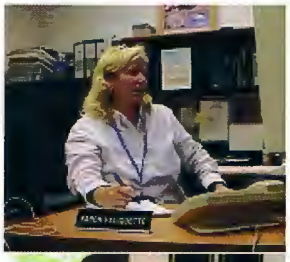






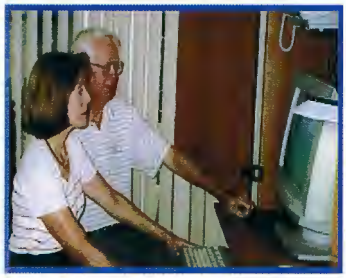











Online Training for Water & Wastewater

- Basic and fundamental training for certification and continuing education with measurable results
- Assessment and student progress reporting

Meet our Instructors' Group

- over 40 instructors with a combined experience of 1,750 years
- over 250 courses available in video and text base formats
- online – available 24/7/365 – affordable – self paced
- accredited through AUTHORIZED IACET PROVIDER

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CEU Plan has over 40 Instructors around the country with a combined experience in excess of 1,750 years in the drinking water and wastewater treatment industry with nearly 300 courses online…….

Course listing by Category

Drinking Water

Analytical Chemistry Techniques
Arsenic
Asset Management
Backflow Prevention, Introduction to
Cross Connection, Introduction to
Disinfectants/Disinfection By-Products
Distribution System Monitoring
Dye Tracing of the Path of Water
Enhanced Coagulation
Ground Water System Operations
Hydrologic Cycle and Aquifers, Introduction to the
Lead and Copper Rule
Lime/Soda Ash Softening for Water Plants
Reclaimed Water, Introduction to
Reverse Osmosis
Revised Total Coliform Rule
Terrorism Vulnerability Assessment
Water Loss
Water Storage, Reuse, & Recovery
Water Treatment Techniques (WTT): Course series
WTT: Filtration
WTT: Settling and Clarification
WTT: Distillation
WTT: Ion Exchange
WTT: Membrane Separation
Watersheds and Riversheds, Introduction to

Disinfection

Introduction to Chlorine
Components of Chlorine
Chlorinators
Chlorine Procedures
Chlorine Dioxide
Chloramination
Common Pitfalls in Chemical Feed
Dechlorination: Gas Application & Usage
Disinfection Alternatives
History of Ultraviolet Disinfection
Introduction to UV technologies
On-Site Sodium Hypochlorite Generation
Principles of Chlorination & Dechlorination
Procedures for UV Pilot Testing
UV Disinfection - Sizing a UV & Factors affecting Operations

Wastewater

Activated Sludge: Complete Course
Activated Sludge I: Introduction and Overview
Activated Sludge II: 2nd Clarifiers and RAS-WAS
Activated Sludge III: Oxygen Demand - Transfer - Uptake
Activated Sludge IV: Process Control & Troubleshooting
Activated Sludge V: Troubleshooting
Backflow Prevention, Introduction to
Biological Nutrient Removal, Introduction in
Clarifier Operations
Collection System: Getting to the Root of the Sewer Problem
Disinfectants/Disinfection By-Products
Filamentious Bacteria & Process Control
FOG: Fats, Oils, and Grease
Grit Removal
Hydrologic Cycle and Aquifers, Introduction to the
Industrial Wastewater Sludge
Industrial Wastewater Treatment
Jar Testing
Lift Station Repair
ORP - Wastewater Biological Nutrients Removal Process
Primary Treatment
Pump Station Maintenance
Reclaimed Water, Introduction to
Septage Handling at the Treatment Plant
Sludge Digestion and Solids Handling: Complete Course
SDSH: Introduction to Solids Handling - Stabilization
SDSH: Stabilizations
SDSH: Sludge Conditioning & Dewatering
SDSH: Sludge Digestion and Beneficial Use

Trickling Filters
Wastewater Microbiology & Process Control, Introduction to
Wastewater Microbiology & Process Control - part one
Wastewater Microbiology & Process Control - part two
Wastewater Operational Tools
Wastewater "Package" Treatment Plant
Wastewater Sludge Treatment: Complete Course
Wastewater Treatment P & C - Headworks & Influent
Wastewater Treatment P & C - Activated Sludge
Wastewater Treatment P & C - Sludge Age & Secondary Clarifier
Wastewater Treatment P & C - Filtration & Disinfection
Wastewater Treatment P & C - Solids Handling
Wastewater Treatment Process Control Tools
Water Reclamation, Introduction to
Water Storage, Reuse, & Recovery
Watersheds and Riversheds, Introduction to
Wetlands: Study of the Everglades
World of FOG

Laboratory Practices and Safety

- Analytical Instruments used for Water & Wastewater
- Basic Chemistry & Laboratory Techniques
- Basic Drinking Water Quality Tests
- Basic Microscopes for Water & Wastewater
- Drinking Water Bacteriological Procedures
- Jar Testing
- Laboratory Practices: Wastewater Techniques - Complete Course
- LP: Lab Terminology and Apparatus
- LP: Basic Laboratory Terminology and Concepts
- LP: Basic Wastewater Lab Procedures
- LP: Biochemical Oxygen Demand (BOD)
- LP: Solids
- LP: Solids - Analysis TSS, TDS, VSS, and More
- LP: Fecal Coliform Bacteria
- LP: Fecal Coliform Bacteria Determination
- LP: Nitrogen-Ammonia
- Laboratory Practices: Basic Drinking Water Quality
- LP: Water Laboratory Quality Assurance
- Laboratory Safety (LS) - Complete Course
- LS: Overview, Rules, & Regulations
- LS: The Nucleus of a Lab Safety Program
- LS: Guidelines-Chemical & Biosafety
- LS: Electrical, Fire and Radiation Safety
- LS: Labware and Waste Disposal
- Laser Hazards
- Legionnaires Disease
- Respiratory Protection
- Ventilation
- Your Responsibilities with the Regulatory Agency
- Wastewater Microbiology & Process Control - part 1
- Wastewater Microbiology & Process Control - part 2

Basic Chemistry & Biology

- Basic Chemistry - Complete Series
  - Analytical Chemistry
  - Atoms & Molecules
  - Chemical Bonding
  - Chemical Nomenclature
  - Nuclear Decay
  - Analytical Chemistry
  - Solubility
  - States of Matter
  - Water Purification
- Basic Microbiology, Part I
- Basic Microbiology, Part 2
- Drinking Water Bacteriological Procedures
- Ebola - An emerging waterborne pathogen
- Emerging Pathogens within Water and Wastewater
- Emerging Waterborne Pathogens
- Introduction to Basic Microbiology & Parasites
- Parasites, Part I - Helminths
- Parasites, Part 2
- What is Cryptosporidium?

Collection and Distribution

Air Valves
Backflow Prevention, Introduction to
CIPP Point Repair fo Sanitary Sewers
Collection Mathematics
Collection System: Getting to the Root of the Sewer Problem
Collection System: Sewer Line Root Control
Concrete Pressure Pipe, Introduction to
Cross Connection, Introduction to
Cybersecurity for Operators
Distribution Mathematics
Distribution System Monitoring
Emergency Response Series - Introduction
ERS: Generators
Field Testing a DCVA - Double Check Valve
Field Testing a RPZ - Reduced Pressure BPD
Field Testing a PVB - Pressure Vacuum Breaker -BPD
Flow Meters 101
FOG: Fats, Oils, and Grease
Fundamental & Hydraulics of Backflow
Ground Water System Operations
GIS, Introduction to
Lift Station Repair
Mechanical Seals, Introduction to
Mechanical Seal Failures
Nuts, Bolts, and Gaskets – an introduction
PLCs in Water and Wastewater, Introduction to
Pipe, Valves, and Fittings – an introduction
Pump Station Maintenance
SCADA and HMIs, Introduction to
Stormwater: New Orleans - History of Stormwater Pumping
Tracing the Path of Water
Trenchless Technologies: Complete Course
TT: An Introduction
TT: Pipeline & Structure Réhabilitation

Mathematics

Basic Mathematics
Advanced Mathematics
Collection Mathematics
Distribution Mathematics
Wastewater Formulas
Accounting 101
Accounting 102
Manager's Guide to Cost Control
Math for Water Plant & Distribution
Operator Math Made Easy - Area
Operator Math Made Easy - Volume
Operator Math Made Easy - Flow Rates
How to Solve the Word Problem

Maintenance Management

Becoming a First Class Supervisor:
BFCS: Transition from Craftsman to Supervisor
BFCS: Effective Supervisory Communication
BFCS: Leadership/Coaching
BFCS: Delegation/Motivation
Corrective Preventive Maintenance:
CPM: Functions, Failures - Modes & Effects
CPM: Building a PM Program
CPM: Trackling Failures
CPM: Creating SOP's
Cybersecurity for Operators
Personal Data Privacy for Utility Professionals
Information Security for Utility Professionals
Information Security for Utility Managers
Introduction to Management Relations for Operations
Introduction to Supervision for Operators
Leadership
Public Admin I - Introduction to Public Administration
Reasonable Security Measures to Protect your Plant
Supervision & Management Relations for Operators
Treatment Plant Maintenance and Accident Prevention:
TPMAP: Ownership of Equipment
TPMAP: Equipment Failures and Hazards
TPMAP: Checklists Mean More than a Checkmark
TPMAP: Solutions Can be Healthy

General and Workplace Safety

Back Disorders
Basic Computers
Bio-Augmentation
Chemical Clothing/Respiratory Protection
Corrosion Control in Water/Wastewater
Cybersecurity for Operators
Geology
Hazardous Materials Effects to Human Health
Health Concerns of Public Interest
Heat Stress
How to Read Blueprints
Indoor Air Quality
Introduction into the CDC Organization
Laser Hazards
Legionnaires Disease
Oxidation in Water/Wastewater
Personal Sampling
Pipe, Valves, and Fittings
Respiratory Protection
Sampling for Surface Contaminants
Technical Equipment
Toxic & Hazardous Material Handling Procedures
Ventilation
Your Responsibilities with the Regulatory Agency

CEU Plan

A to *Z course listing*

Accounting 101
Accounting 102
Activated Sludge: Complete Course
Activated Sludge I: Introduction and Overview
Activated Sludge II: 2nd Clarifiers and RAS-WAS
Activated Sludge III: Oxygen Demand-Transfer-Uptake
Activated Sludge IV: Process Control & Troubleshooting
Activated Sludge V: Troubleshooting, Part 2
Advanced Mathematics
Air Valves
Analytical Chemistry
Analytical Chemistry Techniques
Analytical Instruments used for Water & Wastewater
Arsenic
Asset Management
Atoms & Molecules
Back Disorders
Backflow Prevention, Introduction to
Basic Chemistry: Complete Course
Basic Chemistry & Laboratory Techniques
Basic Computers
Basic Drinking Water Quality Tests
Basic Mathematics
Basic Microbiology & Parasites, Introduction to
Basic Microbiology, Part I
Basic Microbiology, Part 2

Basic Microscopes for Water & Wastewater
Becoming a First Class Supervisor - Complete
BFCS: Transition from Craftsman to Supervisor
BFCS: Effective Supervisory Communication
BFCS: Leadership/Coaching
BFCS: Delegation/Motivation
Bio-Augmentation
Biological Nutrient Removal, Introduction in
Blueprints: How to Read Blueprints
CDC Organization, Introduction into the
Chemical Bonding
Chemical Clothing
Chemical Clothing/Respiratory - Complete
Chemical Nomenclature
Chloramination
Chloride Dioxide
Chlorinators
Chlorine, Introduction to
Chlorine Procedures
CIPP Point Repair fo Sanitary Sewers
Clarifier Operations
Collection Mathematics
Collection System: Getting to the Root of the Sewer Problem
Collection System: Sewer Line Root Control
Common Pitfalls in Chemical Feed

Components of Chlorine
Concrete Pressure Pipe, Introduction to
Corrective Preventive Maintenance: Complete Course
CPM: Functions, Failures - Mode & Effects
CPM: Building a PM Program
CPM: Trackling Failures
CPM: Creating SOP's
Corrosion Control in Water/Wastewater
Corrosion Management
Cross Connection Control - Introduction to
Cryptosporidium: What is Cryptosporidium?
Cybersecurity for Operators
Cybersecurity - Information Security for Utility Professionals
Cybersecurity - Information Security for Utility Managers
Dechlorination - Gas Application and Usage
Disinfection Alternatives
Disinfection By-Products: Summary of the Rule
Distribution Mathematics
Distribution System Monitoring
Drinking Water Bacteriological Procedures
Dye Tracing the Path of Water
Ebola - An emerging waterborne pathogen
Emergency Response Series, Introduction to
ERS: Generators
Emerging Pathogens within Water and Wastewater
Emerging Waterborne Pathogens
Enhanced Coagulation

Field Testing a Double Check Valve Assembly - BPD
Field Testing a Reduced Pressure Principle - BPD
Field Testing a Pressure Vacuum Breaker - BPD
Filamentious Bacteria & Process Control
Fire Hydrant Inspection, O & M, and Flushing
Flow Meters 101
FOG: Fats, Oils, and Grease
Fundamental & Hydraulics of Backflow
Geology
GIS, Introduction to
Grit Removal
Ground Water System Operations
Hazardous Materials Effects to Human Health
Health Concerns of Public Interest
Heat Stress
History of Ultraviolet Disinfection
HIV in Wastewater: Presence & Risk
How to Solve the Word Problem
Hydrologic Cycle & Aquifers, Introduction to the
Indoor Air
Industrial Wastewater Sludge
Industrial Wastewater Treatment
Jar Testing

CEU Plan

Laboratory Practices: Wastewater Techniques - Complete
LP: Lab Terminology and Apparatus
LP: Basic Laboratory Terminology and Concepts
LP: Basic Wastewater Lab Procedures
LP: Biochemical Oxygen Demand (BOD)
LP: Solids
LP: Solids - Analysis TSS, TDS, VSS, and More
LP: Fecal Coliform Bacteria
LP: Nitrogen-Ammonia
Laboratory Practices: Basic Drinking Water Quality Tests
LP: Water Laboratory Quality Assurance
Laboratory Safety - Complete Course
LS: Overview, Rules, & Regulations
LS: The Nucleus of a Lab Safety Program
LS: Guidelines-Chemical & Biosafety
LS: Electrical, Fire and Radiation Safety
LS: Labware and Waste Disposal
Laser Hazards
Lead and Copper Rule
Leadership
Legionnaires Disease
Lift Station Repair
Lime/Soda Ash Softening for Water Plant Operators
Management Relations for Operators, Introduction to
Manager's Guide to Cost Control
Math for Water Plant and Distribution
Mechanical Seals, Introduction to
Mechanical Seal Failures

Nuclear Decay
Nuts, Bolts, and Gaskets - part one
Nuts, Bolts, and Gaskets - an introduction
On-Site Sodium Hypochlorite Generation
Operator Math Made Easy - Area
Operator Math Made Easy - Volume
Operator Math Made Easy - Flow Rates
ORP–WW Biological Nutrients Removal Process
Oxidation in Water/Wastewater
Parasites, Part I - Helminths
Parasites, Part 2
Personal Sampling
Pipe, Valve, and Fittings
Pipe, Valve, and Fittings - an introduction
PLCs in Water and Wastewater, Introduction to
Primary Treatment
Principles of Chlorination & Dechlorination
Procedures for UV Pilot Testing
Public Admin I
Pump Station Maintenance
Reasonable Security Measures to Protect your Plant
Respiratory Protection
Revised Total Coliform Rule
Reverse Osmosis
Sampling for Surface
SCADA and HMIs, Introduction to
Septage Handling at the Treatment Plant
Sewer Liability - Minimizing Sewer-Back-Up

Sludge Digestion and Solids Handling: Complete Course
SDSH: Introduction to Solids Handling and Stabilization
SDSH: Stabilizations
SDSH: Sludge Conditioning & Dewatering
SDSH: Sludge Digestion and Beneficial Use
Solubility
States of Matter
Stormwater: New Orleans - History of Stormwater Pumping
Supervision & Management Relations for Operators
Supervision for Operators, Introduction to
Technical Equipment
Terrorism Vulnerability Assessment in Community Water
Thermal Controls
Toxic & Hazardous Material Handling Procedures
Treatment Plant Maintenance and Accident Prevention
TPMAP: Ownership of Equipment
TPMAP: Equipment Failures and Hazards
TPMAP: Checklists Mean More than a Checkmark
TPMAP: Solutions Can be Healthy
Trenchless Technologies: Complete Course
TT: An Introduction
TT: Pipeline & Structure Rehabilitation
Trickling Filters
UV Disinfection - Sizing a UV & Factors affecting Operations
UV Technology, Introduction to
Ventilation
Wastewater Formulas
Wastewater Lagoons and Ponds

Wastewater Microbiology & Process Control, Introduction to
WW Microbiology & Process Control - part one
WW Microbiology & Process Control - part two
Wastewater Operational Tools
Wastewater "Package" Treatment Plant
Wastewater Sludge Treatment
Wastewater Treatment P & C - part 1 - Headworks & Influent
Wastewater Treatment P & C - part 2 - Flow Distribution & Activated Sludge
Wastewater Treatment P & C - part 3 - Sludge Age & Secondary Clarifier
Wastewater Treatment P & C - part 4 - Filtration & Disinfection
Wastewater Treatment Process Control Tools
Water Loss
Water Purification
Water Reclamation, Introduction to
Water Storage, Reuse, & Recovery
Water Treatment Techniques - Complete Course
WTT: Filtration
WTT: Settling and Clarification
WTT: Distillation
WTT: Ion Exchange
WTT: Membrane Separation
Watersheds & Riversheds, Introduction to
Wetlands: Study of the Everglades
World of FOG

Course listing by ID tag number

CEU ID #	Course Category	Course Number	CEU Hrs.	✓	Course Title	Page 1 instructor
6	DW/WW		1		Introduction to Chlorine	Meyer
7	DW/WW		1		Components of Chlorine	Meyer
8	DW/WW		1		Chlorinators	Meyer
9	DW/WW		1		Chlorine Procedures	Meyer
10	DW/WW		1		Chlorine Dioxide	Meyer
11	WW only		2		Wastewater Sludge Treatment: Complete Course	Turovskiy
12	DW/WW		2		Emerging Pathogens within DW/WW	Huffman
13	DW/WW		3		Principles of Chlorination & Dechlorination	Harrington
14	DW/WW		3		Dechlorination - Gas Application and Usage	Meyer
19	DW/WW		4		On-Site Sodium Hypochlorite Generator Conversion	Casson
20	DW/WW		1		Oxidation in Water/Wastewater	Miller
21	DW/WW		1		Bio-Augmentation	Miller
22	DW/WW		1		Geology	Miller
23	DW/WW		1		Introduction to UV technologies	Huffman
24	WW only		1		Activated Sludge I: Introduction and Overview	Johnson
25	WW only		1		Activated Sludge II: 2nd Clarifiers and RAS-WAS	Johnson
26	WW only		1		Activated Sludge III: Oxygen Demand - Transfer - Uptake	Johnson
27	DW only		1		Enhanced Coagulation	Pugh
28	DW/WW		4		Hazardous Materials Effects to Human Health	Farouk
29	DW/WW		3		Emerging Waterborne Pathogens	Huffman
30	DW/WW		1		What is Cryptosporidium?	Huffman
31	DW/WW		1		Health Concerns of Public Interest	CDC
32	DW/WW		1		Introduction into the CDC Organization	CDC
33	DW/WW		1		Laboratory Safety: Overview, Rules, & Regulations	Kaluzniak
34	DW/WW		1		Laboratory Safety: The Nucleus of a Lab Safety Program	Kaluzniak
35	WW only		4		Sludge Digestion and Solids Handling	Kaluzniak
36	WW only		1		Introduction to Solids Handling and Stabilization	Kaluzniak
37	WW only		1		Stabilizations	Kaluzniak

CEU ID #	Course Category	Course Number	CEU Hrs.	✓	Course Title	Page 2 Instructor
38	WW only		1		Sludge Conditioning & Dewatering	Kaluzniak
39	WW only		1		Sludge Digestion and Beneficial Use	Kaluzniak
40	DW/WW		1		Basic Chemistry - Complete Series	Pugh
41	DW/WW		1		Atoms & Molecules	Pugh
42	DW/WW		1		Nuclear Decay	Pugh
43	DW/WW		1		States of Matter	Pugh
44	DW/WW		1		Chemical Bonding	Pugh
45	DW/WW		1		Chemical Nonmenclature	Pugh
46	DW/WW		2		Solubility	Pugh
47	DW/WW		1		Analytical Chemistry	Pugh
48	DW/WW		2		Water Purification	Pugh
49	DW/WW		1		Accounting 101	Edgar
50	DW/WW		1		Accounting 102	Edgar
51	DW/WW		1		Basic Mathematics	Switzer
52	DW/WW		2		Advanced Mathematics	Switzer
53	DW/WW		1		Pipe, Valves, and Fittings	Edgar
54	WW only		1		Lift Station Repair	Edgar
55	DW/WW		8		Corrective Preventive Maintenance: Complete Course	Valiquette
56	DW/WW		2		CPM: Functions, Failures - Modes & Effects	Valiquette
57	DW/WW		2		CPM: Building a PM Program	Valiquette
58	DW/WW		2		CPM: Trackling Failures	Valiquette
60	DW/WW		2		Basic Computers	Labetti
61	DW/WW		1		Blueprints I	Hamar
62	DW/WW		1		Personal Sampling	OSHA
63	DW/WW		1		Sampling for Surface Contaminants	OSHA
64	DW/WW		1		Technical Equipment	OSHA
65	DW/WW		1		Indoor Air Quality	OSHA
66	DW/WW		1		Ventilation	OSHA
67	DW/WW		1		Heat Stress	OSHA
68	DW/WW		1		Laser Hazards	OSHA
69	DW/WW		1		Legionnaires Disease	OSHA
70	DW/WW		1		Back Disorders	OSHA

CEU ID #	Course Category	Course Number	CEU Hrs.	✓	Course Title	Page 3 Instructor
71	DW/WW		3		Chemical Clothing/Respiratory	OSHA
74	DW/WW		2		Respiratory Protection	OSHA
75	WW only		1		Primary Treatment	Switzer
76	WW only		1		Trickling Filters	Switzer
80	DW/WW		1		Your Responsibilities with the Regulatory Agency	Switzer
81	DW only		1		Terrorism Vulnerability Assessmet in Community Water System	Casson
82	DW/WW		2		Disinfection By-Products:Summary of Rule	Pugh
84	DW/WW		1		Trenchless Technologies: An Introduction	Thomas
91	DW/WW		2		CPM: Creating SOP's	Valiquette
92	DW/WW		1		Trenchless Technologies: Pipeline & Structure Rehabilitation	Thomas
93	DW/WW		2		Trenchless Technologies: Complete Course	Thomas
95	DW/WW		2		HIV in Wastewater: Presence and Risk	Casson
96	DW only		10		Water Treatment Techniques - Complete Course	Pugh
97	DW only		2		WTT: Filtration	Pugh
98	DW only		2		WTT: Settling and Clarification	Pugh
99	DW only		2		WTT: Distillation	Pugh
100	DW only		2		WTT: Ion Exchange	Pugh
101	DW only		2		WTT: Membrane Separation	Pugh
102	WW only		1		ORP - Wastewater Biological Nutrients Removal Process	Switzer
103	WW only		2		Wastewater Formulas	Switzer
104	WW only		2		Collection Mathematics	Switzer
105	DW only		2		Distribution Mathematics	Switzer
106	WW only	**retired**	1		Use of an Excel Spreadsheet in a Wastewater Treatment Plant	Cherry
107	WW only		1		Wastewater Operational Tools	J. Meyer
108	WW only		2		Introduction in Biological Nutrient Removal	Oleszkiewicz
109	DW/WW		4		Toxic & Hazardous Material Handling Procedures	El-Shamy
110	DW/WW		1		Basic Microbiology	Kentala
111	DW/WW		1		Parasites, Part I - Helminths	Kentala
112	WW only		1		Activated Sludge IV: Process Control & Troubleshooting	Johnson
113	DW/WW		1		Laboratory Safety: Guidelines-Chemical&Biosafety	Kaluzniak
114	WW only		1		Package - Wastewater Treatment Plant	Edgar
115	DW/WW		1		Procedure for UV Pilot Testing	Edgar

CEU ID #	Course Category	Course Number	CEU Hrs.	✓	Course Title	Page 4 Instructor
116	WW only		1		Activated Sludge V: Troubleshooting Part 2	Johnson
118	WW only		5		Activated Sludge - Complete Course	Johnson
120	DW/WW		1		UV Disinfection - Sizing of UV System using Bioassay	Whitby
122	DW/WW		1		History of Ultraviolet Disinfection	Whitby
123	DW only		1		Lead and Copper Rule	Pugh
124	DW only		1		Arsenic	Pugh
125	DW only		1		Revised Total Coliform Rule	Pugh
126	DW only	development			Chromium	Pugh
127	DW/WW		4		Becoming a First Class Supervisor - Complete Course	Valiquette
128	DW/WW		1		BFCS: Transition from Craftsman to Supervisor	Valiquette
129	DW/WW		1		BFCS: Effective Supervisory Communication	Valiquette
130	DW/WW		1		BFCS: Leadership/Coaching	Valiquette
131	DW/WW		1		BCFS: Delegation/Motivation	Valiquette
132	DW/WW		4		Treatment Plant Maintenance and Accident Prevention	Valiquette
133	DW/WW		1		TPMAP: Ownership of Equipment	Valiquette
134	DW/WW		1		TPMAP: Equipment Failures and Hazards	Valiquette
135	DW/WW		1		TMPAP: Checklists Mean More than a Checkmark	Valiquette
136	DW/WW		1		TMPAP: SolutionsCan be Healthy	Valiquette
137	DW/WW		2		Parasites, Part 2	Kentala
138	DW/WW		6		Introduction to Basic Microbiology and Parasites	Kentala
139	DW/WW		2		Basic Microbiology, Part 2	Kentala
141	WW only		1		Filamentious Bacteria Identification & Process Control	Glymph
142	WW only		1		Introduction to Wastewater Microbiology & Process Control	Glymph
143	WW only		3		Wastewater Microbiology & Process Control - part one	Glymph
144	DW/WW		1		Introduction to Backflow Prevention	Holeva
145	DW only		1		Introduction to the Hydrologic Cycle and Aquifers	Pugh/Karst
146	DW/WW		1		Water Shortage, Reuse, and Resource Management	Johnson
147	DW only		1		Introduction to Watersheds and Riversheds	Pugh/Karst
148	DW/WW		1		Dye Tracing of the Path of Water	Pugh
149	DW/WW		2		Wetlands: Study of the Everglades	Kaluzniak
150	DW/WW		1		Introduction to Reclaimed Water	Kaluzniak

CEU ID #	Course Category	Course Number	CEU Hrs.	ü	Course Title	Page 5 Instructor
153	WW only		2		Wastewater Microbiology & Process Control - part two	Glymph
156	DW/WW		3		Analytical Chemistry Techniques	Pugh
157	DW/WW		1		Ion Exchange Resin Troubleshooting	Pugh
162	DW/WW		1		Reverse Osmosis	Pugh
164	DW/WW		1		Leadership	Allman
166	WW only		1		Septage Handling at the Treatment Plant	Legg
167	DW/WW		1		Corrosion Control	Miller
168	WW only		4		FOG: Fats, Oils, and Grease	El-Shamy
169	DW/WW		1		Laboratory Safety: Electrical, Fire and Radiation Safety	Kaluzniak
170	DW/WW		1		Laboratory Safety: Labware and Waste Disposal	Kaluzniak
171	DW/WW		5		Laboratory Safety: Complete Course	Kaluzniak
172	DW/WW		1		Emergency Response	Kaluzniak
173	WW only		4		Collection System: Sewer Line Root Control	Justin
174	WW only		1		Collection System: Getting to the Root of the Sewer Problem	Monck
175	WW only		1		Industrial Wastewater Sludge	Turovskiy
193	WW only	**deleted**	5		Submersible Sewage Pumping System - Complete Course	SWPA
194	WW only	**deleted**	1		SSPS: Introduction & Design Considerations	SWPA
195	WW only	**deleted**	1		SSPS: Selection of Submersible Pumps	SWPA
196	WW only	**deleted**	1		SSPS: Description of Pumps	SWPA
197	WW only	**deleted**	1		SSPS: Controls	SWPA
198	WW only	**deleted**	1		SSPS: Controls, Start-Up, & Operation	SWPA
199	DW/WW		1		LP: Lab Terminology and Apparatus	Doss
200	DW/WW		1		LP: Basic Wastewater Lab Procedures	Doss
201	DW/WW		1		LP: Biochemical Oxygen Demand (BOD)	Doss
202	DW/WW		1		LP: Solids	Doss
203	DW/WW		1		LP: Fecal Coliform Bacteria	Doss
204	DW/WW		1		LP: Nitrogen-Ammonia	Doss
205	DW/WW		2		LP: Basic Drinking Water Quality Test	Doss
206	DW/WW		1		LP: Drinking Water Bacteriological Procedures	Doss
207	DW/WW		1		Basic Chemistry & Laboratory Techniques	Doss
208	DW/WW		1		LP: Water Laboratory Quality Assurance	Doss
209	DW only	**development**			LP: Drinking Water Techniques - Complete Series	Doss

CEU ID #	Course Category	Course Number	CEU Hrs.	✓	Course Title	Page 6 Instructor
210	WW only		6		Laboratory Practices (LP): Wastewater Techniques - Complete	Doss
211	DW/WW		1		Public Admin I - Introduction into Public Administration	Smith
213	DW/WW		5		Supervision & Management Relations for Operators	Allman
214	DW/WW		3		Introduction to Supervision for Operators	Allman
215	DW/WW		2		Introduction to Management Relations for Operators	Allman
216	DW/WW		2		Manager's Guide to Cost Control	Bode
219	DW/WW		1		New Orleans - History of Stormwater Pumping	Corp.
222	WW only		6		Industrial Wastewater Treatment - streaming series	Bowers
223	DW/WW		2		Air Valves	Leverette
224	WW only		1		Minimizing Sewer Back-Up Liabilities	Leverette
225	DW/DS only		1		Math for Water Plant and Distribution	Habraken
226	DW only		1		Lime/Soda Ash Softening for Water Plant Operators	Habraken
227	DW/WW		1		Flow Meters 101	Leverette
228	WW only		1		Pump Station Maintenance	McKay
229	DW/WW		2		Water Loss Control	Leverette
230	DW/WW		1		Introduction to Concrete Pressure Pipe	Deremiah
231	DW/WW		2		Asset Management	Leverette
232	DW/WW		1		Fire Hydrant Inspection, Maintenance, & Flushing	Leverette
233	WW only		1		Grit Removal	Sinkhorn
234	WW only		1		CIPP Point Repair for Sanitary Sewers	Leverette
235	DW/WW		1		ERS: Generators	Kaluzniak
240	DW/WW		1		Testing a DCVA - Double Check Valve Assembly BPD	Holeva
241	DW/WW		3		Testing a RPZ - Reduced Pressure Principle BPD	Holeva
242	DW/WW		2		Testing a PVB - Pressure Vacuum Breaker BPD	Holeva
244	DW/DS only		4		Ground Water System Operations	Harrington
245	DW/WW		4		Common Pitfalls of Chemical Feed	Harrington
246	DW/WW		4		Corrosion Management	Harrington
247	DW/WW		2		Thermal Controls	Harrington
248	DW/WW		2		Basic Microscopes for Water and Wastewater Operators	Harrington
249	DW/WW		2		Analytical Instruments used for Water & Wastewater	Harrington
250	WW only		2		Clarifier Operation	Martin
251	DW/WW		2		Reasonable Security Measures to Protect your Plant	Martin

CEU ID #	Course Category	Course Number	CEU Hrs.	✓	Course Title	Page 7 Instructor
252	WW only		1		World of FOG	Martin
253	DW/WW		1		Cybersecurity for Operators	Martin
254	WW only		2		Wastewater Treatment Process Control Tools	Martin
255	DW/WW		1		Introduction to Mechanical Seals	Stockslager
256	DW/WW		1		Mechanical Seal Failures	Stockslager
258	DW/WW		1		Introduction to Cross Connection	Holeva
259	DW/WW		1		Fundamental & Hydraulics of Backflow	Holeva
264	WW only		1		LP: Biochemical Oxygen Demand (BOD)	Doss
265	WW only		1		LP: Solids Analysis TSS, TDS, VSS, and more	Doss
266	WW only		1		LP: Fecal Coliform Bacteria Determination	Doss
270	DW/WW		2		LP: Basic Laboratory Terminology and Concepts	Doss
274	DW/WW		1		Nuts, Bolts, and Gaskets - part one	Varalla
275	DW/WW		1		Nuts, Bolts, and Gaskets - an introduction	Edgar
276	DW/WW		1		Introduction to GIS	Brown
280	DW/WW		1		Ebola - An emerging waterborne pathogen	Huffman
281	DW/WW		1		Jar Testing	Harrington
282	DW/WW		4		Disinfection Alternatives	Harrington
283	DW/WW		2		Chloramination	Harrington
284	DW/WW		1		Distribution System Monitoring	Harrington
287	DW/WW		2		Introduction to PLCs in Municipal Water and Wastewater	Heald
288	DW/WW		3		Introduction to SCADA and HMIs	Heald
290	WW only		2		Wastewater Ponds and Lagoons	Curtin
291	DW/WW		1		Operator Math Made Easy - Area	Krauth
292	DW/WW		1		Operator Math Made Easy - Volume	Krauth
293	DW/WW		1		Operator Math Made Easy - Flow Rates	Krauth
294	DW/WW		2		How to Solve a Word Problem	Elliot
295	WW only		1		Wastewater Treatment P & C - part 1 - Headworks & Influent	Martin
296	WW only		1		Wastewater Treatment P & C - part 2 - Flow Distribution & Activated Sludge	Martin
297	WW only		1		Wastewater Treatment P & C - part 3 - Sludge Age & Secondary Clarifier	Martin
298	WW only		1		Wastewater Treatment P & C - part 4 - Filtration & Disinfection	Martin
300	DW/WW		4		Pipe, Valves & Fittings - an introduction	Edgar
301	DW/WW		1		EU Privacy Act	Hofer
302	DW/WW		1		Cybersecurity - Information Security for Utility Professionals	Hofer
303	DW/WW		1		Cybersecurity - Information Security for Utility Managers	Hofer

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- Laboratory Safety
- Laboratory Practices
- Mathematics
- Microbiology
- Parasites
- Pipe, Valves, & Fittings
- Public Administration
- Sewage Pumping Stations
  - submersible -

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Introduction to

- Activated Sludge
- Analytical Instruments
- Backflow Prevention
- Biological Nutrient Removal
- CDC Organization
- Chlorine
- Solids Handling & Stabilization
- Trenchless Technologies
- Ultraviolet Technology
- Wastewater Microbiology and Process Control
- Water Treatment Techniques Microbiology and Process Control

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Cybersecurity & Terrorist issues facing Operators
is a continual expanding series of training
cyber security

Information Security for Utility Professionals is the first one hour course in a series of courses based on Information Security issues focused on waste/water treatment facilities. The instructor, Tom Hofer, has spent his career involved in security and indication of threats presented to the United States Government via the CIA - FBI - Homeland Security. Tom shares his experience in military security with case studies to inform you of actual conditions and known activities. The course is broken into three sections within this one hour course with the following detail description:

- Section 01 - This section provides an overview of the important cyber issues; the costs of criminal cyber-attacks and focuses on the specific problems confronting the utility operator in keeping information safe in the workplace.

- Section 02 - This section describes the nature of external threats to information security, focusing on the attack methods used by hackers, concluding with two recent case studies involving cybercriminals and attacks on governmental organizations. The three main defense mechanisms against cyber-attack: defense-detection-deterrence are stressed and examples given.

- Section 03 - This section deals with the insider threat and the damage such attacks can cause. The role of the disaffected or disgruntled employee is explained along with indicators to detect this behavior in the workplace, Training and awareness are emphasized as key factors in stopping attackers; emphasizing the detection and neutralization of phishing schemes. Several case studies will illustrate these points.

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Information Security for Utility Managers

Information Security for Utility Managers is the second one hour course in a series of courses based on Information Security issues focused on waste/water treatment facilities. This one hour course is divided into three sections, with the following detailed description:

Section 01 - an overview of the course includes details about the vulnerabilities and threats that you face as the manager of a utility operation. Tom divides the threats into two categories: outsider threats and insider threats. In the first section, we will discuss the nature of the threats you face and the methods that the attackers use to damage, destroy or control your system.

Section 02 - we will show you how to evaluate the risks you face in a logical and orderly manner. Understand how you will counter those threats through training of your people and awareness of the nature of the threats. Since the events of September 11, we know that all of our infrastructure organizations are vulnerable to attack. We know that our country has enemies who are dedicated to destroying our way of life. They are working day and night to penetrate our infrastructure organizations and bring down our infrastructure.

Section 03 - In the final section of the course, Tom will discuss in detail how to raise security awareness in your employees and training methods you can use as well as give you some examples of management techniques that he used to convince people to do dangerous jobs. In comparison your job is much simpler but the task is the same. Unmotivated employees are a potential vulnerability and it makes your job harder if your people are not dedicated to the mission and do not share the company's goals. Understanding human nature and treating our people with respect is not simply a moral idea reserved for Sunday church sermons, but it also pays off in increased productivity and keeps our organization safe and secure.

Information Security for Utility Professionals & Managers series

CEU Plan is pleased to announce a new course series in cybersecurity and threats to us. The instructor has spent many years in security and monitoring, to provide an in-depth view of identifying and addressing penetration into our automated control Systems – SCADA, along with fundamental precautions to include in your checklist.

2019 Releases include Data Protection and Privacy, cybercrime related to utilities, and security measures

www.ceuplan.com

Operator Math made Easy

with ***Paul Krauth***

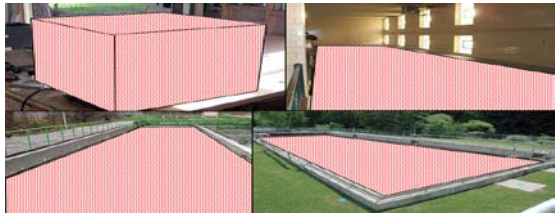
A treatment plant operator is expected to be able to solve a number of mathematical equations to determine that the plant is running correctly and efficiently, to order chemicals and supplies, or as a prerequisite to a licensing exam. Math is not generally a popular subject. The "Power Circle" or "Blair Witch" method is a shortcut that can be used to solve almost *any* equation. This short course shows how these methods can be used to find areas. Several downloadable formula sheets using these techniques are included in the course, along with a downloadable worksheet for calculation practice of the section quizzes.

Operator Math Made Easy is a three part series, including: Area, Volume and Flow Rates. These basic and fundamental procedures are illustrated by Paul in terms of pipe and tanks, so you will understand how much water is in a tank or flowing through a pipeline, and be able to calculate area - volume of various tanks within your treatment facility. Yes, it may be boring, but it is very important to master the basics, in order to determine dosage and feed rates, re-order chemicals, and double check the engineer -- to make sure your tankage is sized to maintain the correct amount of storage.

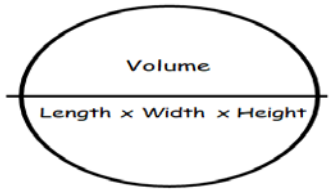
This is a self-study online course, allowing you adequate time to understand these basic formulas and calculation requirements. Take-your-time; no one is looking over your shoulder, so relax and absorb all of Paul's humorous examples and easy-to-grasp methods. If you have problems, repeat the course section as many times as you like! Should you have trouble understanding the formulas or calculations, go over them again, until they becomes clear. The bottom line is your proficient understanding of these formulas and calculations, in preparation for a certification exam; this course is designed as a true simulation of material presented in most certification exams. You have unlimited exposure to each course section, with the opportunity to re-read and review, up until you "Record the Results." ….. DO NOT click the "Record Results" button until you are comfortable with your understanding of that course section.

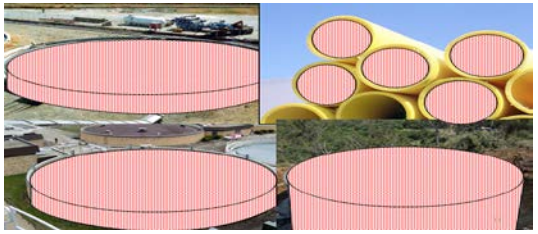
By the end of this training course, you will have the ability to:

- Demonstrate and calculate the surface area of a tank
- Illustrate the "Power Circle" method for calculating area
- Estimate the base and height areas of a tank
- Define the basics for calculating volume
- Calculate the volume of a circular tank
- Describe the volume measurements of a cylinder
- Illustrate the flow measurements through an open channel
- Describe the common conversion used in flow rate equations
- Explain the conversion of cubic feet formula



Volume = Length x Width x Height





Wastewater Treatment Process Control

with Russ Martin and Toni Glymph-Martin

How's your bugs?

Step-by-step through a treatment plant and a smooth operator approach to process control …. a complete series of training in process control and using your Microscope to check your performance …….

Explore the World of Wastewater with Russ Martin, as he walks throughout a Midwestern Wastewater Treatment Plant from the headworks to the effluent discharge. The virtual tour with Russ includes his plant inspection and discussion -- from the influent screens and head works, across to the aeration zones, and following through the process to settling, filtration, disinfection, and finally, effluent discharge.

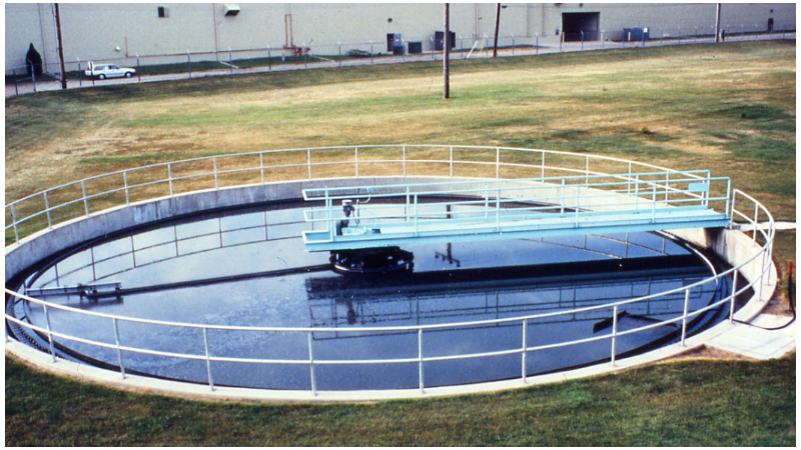
In this unique ten hour course package, you will observe video footage of the waste water treatment plant where Russ will discuss the working components of the process, show illustrations, and provide plant observations that may be helpful to you at your plant. As Russ explains, to make you -- "a smooth operator" – from the course's process components, we will enter the World of FOG: a neat discourse on fats, oils, and grease issues in a small tourist community without any pre-treatment requirements, where all of the grease and oil from the 2nd and 3rd largest chicken restaurants goes right into the sewer system. You'll learn how the operator deals with it on a daily basis. Next, we will observe Clarifier Operations in a two hour discussion of clarifier applications, operations, troubleshooting, and process control.

At the conclusion of this course, Russ continues by reviewing various operating techniques and process control tools available for wastewater treatment. This ten hour series concludes with a brief and basic review of Cybersecurity for Operators. As he began his retirement a few years ago, Russ was working at the USEPA - Chicago Regional Office and was involved in monitoring aspects for small and large facilities -- his hands-on approaches have been utilized in treatment plants for many years.

This 10 hour course package series includes:

- Wastewater Treatment Performance & Control - part 1 - Headworks & Influent
- Wastewater Treatment P & C - part 2 - Flow Distribution & Activated Sludge
- Wastewater Treatment P & C - part 3 - Sludge Age & Secondary Clarifier
- Wastewater Treatment P & C - part 4 - Filtration & Disinfection
- World of FOG
- Clarifier Operation
- Wastewater Treatment Process Control Tools
- Cybersecurity for Operators

In this course package, there is a wealth of knowledge and experience available to apply to the operation of your treatment plant and many helpful suggestions for you….. Please take your time and enjoy this beautiful arrangement of courses as you prepare to renew your license or refresh your operating techniques. It also makes a great entry level introduction. Feel free to repeat any lesson plan or course section, watch an extra time or more, to reinforce the techniques; no rush, as his series of courses has been specially developed to help you progress in your field.



Laboratory Practices for Wastewater

Highly experienced instructors with proven techniques and procedures to make your life easier in the lab and dealing with your process control

■ **Learn from the Experts** ■

Laboratory Practices for Wastewater is a ten (10) hour course package presented by some renown experts in this field. Dr. Deb Huffman is known for her involvement in the Cryptosporidium Studies in the Milwaukee Outbreak and her advanced research in water reuse applications; Toni Glymph-Martin offers insight from her international presentations on wastewater microbiology and process control and Margaret Doss shares her background in the development in laboratory procedures and certification need-to-know criteria. These three subject-matter experts in the Laboratory Practices field provide an unique exposure to "bugs", pathogen indication, sampling and chain-of-custody procedures, providing reliable data and results in your wastewater lab.

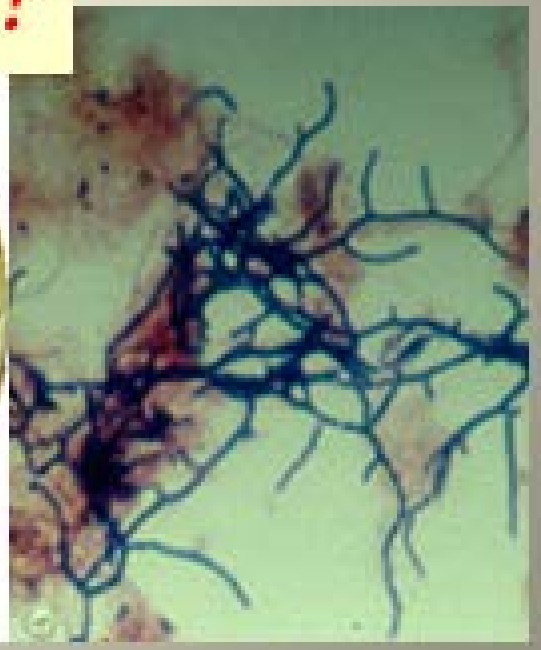
By popular demand, we have combined a series of their courses into a package designed to provide you with an overview for identifying and sampling pathogens for process control, exam prep, review of current laboratory techniques, as well as an excellent guide in developing or updating your Lab Procedures and Policies.

Should you need a study guide or exam prep, this unique online course package allows you to view the various courses and REPEAT any course section - as many times as you wish, until you are comfortable with the techniques, terminology, procedures, and microorganism indications needed.... to pass the exam.... Each course section has a ten question summary to test your knowledge of the content and topics, similar to a computer-based licensing exam, leaving you more relaxed and fully prepared for the real deal and exam.



Name that Bug?





Emerging Pathogens within water and wastewater

by Deb Huffman, PhD.

In this two hour course, a discussion of emerging pathogens and their impact to human health is presented in this streaming format course. In the conclusion, a side by side imagery of various microorganism are illustrated and discussed. Some other topics include:

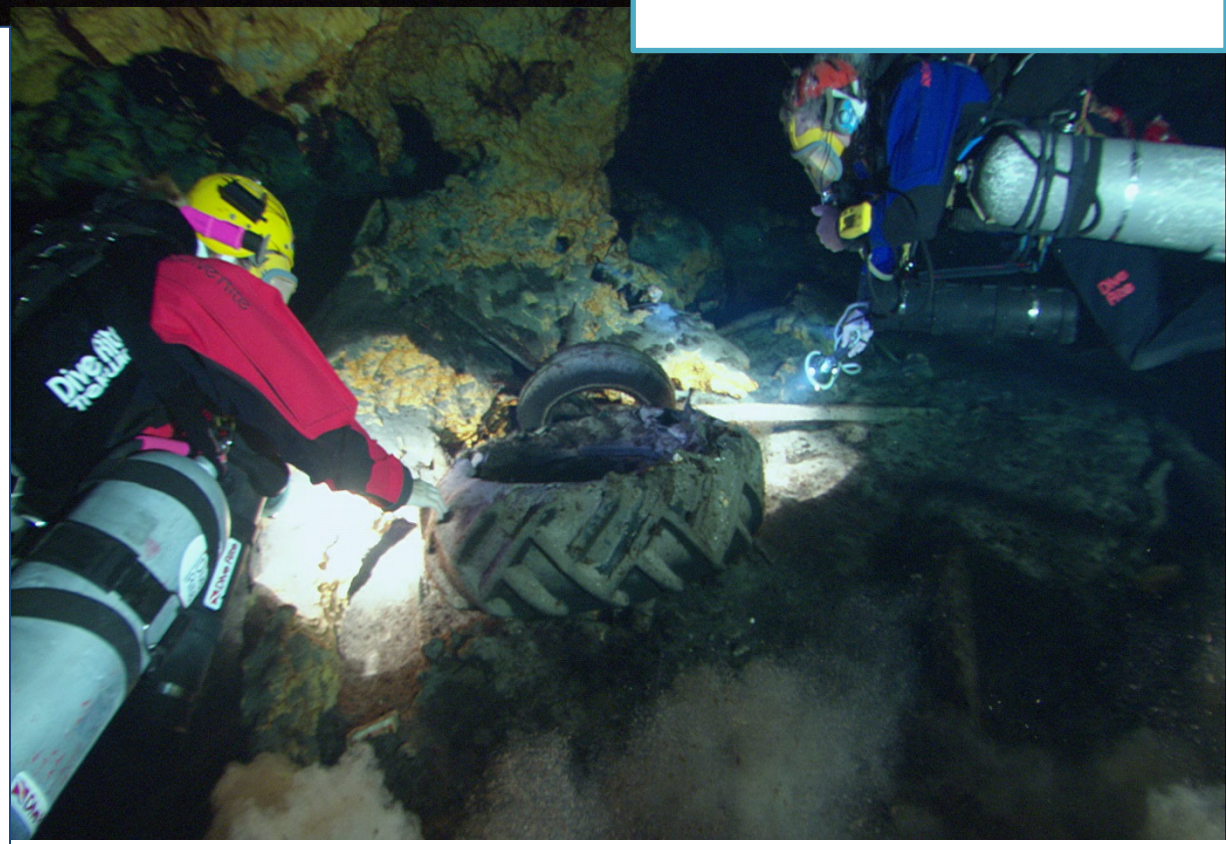
- indicate effects to human health associated with waterborne diseases
- explain waterborne outbreaks
- illustrate the pathogenic aspects of E Coli
- describe the various detection methods and future concerns

Dr. Deb Huffman received her Ph.D. in Public Health from the University of South Florida in 1994 specializing in Environmental and Occupational Health and Safety. She remained at USF as a faculty Research Associate with the focus of her research on the development of novel methods for the detection and inactivation of waterborne pathogens. She has participated in numerous local, state and national research projects involving the study of water and wastewater treatment, distribution and health effects from known as well as emerging microorganisms. Her research has resulted in a number of peer reviewed journal publications, book chapters and interviews with major news outlets including Dateline NBC and Tampa Bay Fox13. She retired from the University in 2010 to join Claro Scientific LLC as their Principal Research Scientist while retaining a Courtesy Faculty appointment at the USF College of Public Health.

- Want to learn about the Aquifers?
- Interested in what our water supplies look like below?
- Let's look at the Hydrological Cycle!
- Imagine finding a couple of tires, down inside an Aquifer……..

All living things depend on the natural cycle of water. It is the essence that gives us life. One of the greatest mysteries of our planet is the magical cycle of rain water pours down from the skies nourishing parched vegetation, evaporation drives water skyward, springs convey great volumes of water to earth's magnificent rivers, and mankind is intertwined in this complex and endless renewal of water. Perhaps the most amazing wonder about this great cycle is water's secret journey under-ground, where it can travel for hundreds of years before revealing itself on the surface again. Vast reserves of clean water are held within the rock in the earth's aquifers.

Introduction to the Hydrologic Cycle and Aquifers



Wastewater Microbiology & Process Control for Operators

Wastewater Microbiology & Process Control: Bacteria, Protozoa, and Metazoa is an excellent review of microorganisms found in activated sludge and Identified using the microscope .

Toni Glymph-Martin, instructor of this course, has over 35 years of experience in identification of bacteria, protozoa, metazoa, ciliates, and many more organisms present in today's wastewater systems.

This two or three hour course (part one – part two) is a taped version of her presentation at an annual operator conference presented in early 2011. The video clips illustrate these microorganisms in high definition allowing the student to better understand their characteristics, movement, and interface with these organisms; as they swim through wastewater samples. The instructor will discuss each one and provide a better understanding of their function in the treatment system and how to identify them using your microscope; ….. this is better than an instructor, who reads the book without the experience. Plan to view the course sections twice, to get a better understanding.

Process Control is an important aspect of wastewater treatment. Toni will provide troubleshooting solutions to various treatment process issues such as bulking and foaming, improper floc formation, as well as adjustments needed for process control. The course is an easy overview of the role of organisms found in a wastewater treatment plant.

Jar Test

By Popular Demand

Instructed by Mike Harrington

In this popular one hour course, you will learn:

- How to list equipment used in developing your Jar Test
- Compare testing kits used for alkalinity
- List the fundamental steps in performing - Jar Test
- Illustrate your settling dosage schedule
- Explain Flash Mixing through Plug Flow or Complete Mixing techniques

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Type of Valves

- Globe
- Gate
- Plug
- Check
- Needle
- Ball
- Butterfly

Pipe, Valve, & Fittings - An Introduction is a four (4) hour course for all water and wastewater treatment operators, distribution and collection staff, and anyone interested in piping systems. In a brief historical review, we will investigate where piping systems began and how they have improved, progressing to the world of plastics in the piping systems of today. We will explore the development of valve assemblies used in water and wastewater, in addition to the fittings utilized in breakaways for valves and joint connections throughout the piping system.

The materials of construction for pipe and fittings, along with the ratings and standards that regulate them, are illustrated in the ASME Standards Reference, ABC Need-to-Know criteria, and industry benchmarks. Understanding the codes and markings on pipe and schedule of pipe and fittings, as well as the sizing of gaskets is important for new installations, preventive maintenance and repair of all types of pipe systems. Knowledge of welding methods is also essential for efficient operation. We discuss the proper procedure for solvent welding or gluing a PVC connection.

In the last half of the series, we discuss valves and their applications in water and wastewater. We offer some cut-away or sectional views that expose the internal components and working parts, so they can be identified in the emergency repair that you may encounter one day. As the old saying goes, it is best to know how it was put together by the factory, before you try to repair it yourself. In addition, some helpful tips and interactive exercises are included in the final sections of the course, providing some nice resources for troubleshooting and repairs.

By the end of this training course, you will have the ability to:

- describe the various types of piping systems and materials
- compare the difference between thermoplastic and thermoset piping systems
- indicate the difference between globe and gate valves
- compare the various types of isolating valves
- explain the standards for piping systems
- discuss problems in your pipelines associated with hypochlorite - chlorine usage
- illustrate the importance for testing equipment and piping, prior to start-up and training
- discuss the importance of color codes and signage for piping systems

Supervision and Management Relations for Operators

In July of 1955, William P. Bill Allman began his wastewater career at the City of Kissimmee Sewage Treatment Plant. He received his Class C Wastewater Certification in 1956. After years of studying, working, and managing all areas of a wastewater treatment system, Bill received his Class A Wastewater License in 1962. Currently, Bill maintains the sixth oldest wastewater operating license and the eleventh oldest drinking water license within the State of Florida.

From the early 1980s through the mid-1990s, he was the Plant Manager of the Ironbridge Water Pollution Control Facility in Orlando, Florida and was involved in the rapid growth of Central Florida . He managed the personnel to handle the rapid expansion of the Disney World and the Central Florida area. His achievements and awards are many, including the L.H.Scott Award, William D. Hatfield Award, Honorary Life Membership of Florida Water & Pollution Control Operators Association, along with serving as the past president of FW&PCOA, FSSSSS, and FWEA.

Bill has been recognized statewide as well as nationally for his leadership and management courses, his involvement in operator short schools, adult vocational training, and certification exams review. He donated a copy of his course to Ken Kerri for the initial Management for Success - Sacramento manual . Bill has been a true leader in the wastewater field for over sixty-one years.

By the end of this training course, you will have the ability to:

- Explain the need for Supervisors and the skill set necessary to supervise
- Discuss the various job functions a Supervisor must undertake
- Identify the intricacies of handling different employee personality types
- Describe the different styles of leadership and when to use them
- Evaluate how to resolve conflict
- Illustrate how to motivate employees
- Establish supervisor-subordinate relationship boundaries that will be understood and respected
- Demonstrate constructive criticism that won't be taken personally
- Identify difficult employees and handle them easily, swiftly, and appropriately
- Discuss measures to control absenteeism and tardiness
- Unify employees into a smooth-running operation--a productive team--despite differences in personalities, background and age
- Develop a procedure for corrective action or firing an employee

Water Loss Control

by Joey Leverette

This course will introduce you to the vast topic of Water Loss Control include why controlling water loss is such an important focus for all water utilities. The course will provide detailed references to the different type of losses, real and apparent, that utilities should be closely monitoring as part of their daily operations.

The information contained in the course will give the student a better understanding of how to formulate a plan to reduce water loss and provide information on leak detection programs and equipment.

Cross Connection Control Program

Who should take this training! This training is for public water system operators, waste water operators, plumbers, code officials, fire sprinkler installers, government environmental officials, consumers of water, building or facility owners or any individuals who would like to be educated or have more knowledge of cross-connections control and the hazards that they present.

Some of the topics covered by the instructor in this first course will be:

- Cross-Connection Definitions
- The Essential Factors of a Cross-Connection
- The Causes of Backflow
- Cross-Connection case studies
- Why Cross-Connections need to be controlled
- The Resultant Forces
- Why Cross-connections exists

"Introduction to Cross-connection Control" is the first of a four part cross-connection control training series that is offered by CEU Plan. Instructor James Holeva defines cross-connection, explains why cross-connections need to be controlled, reviews the essential factors of cross-connections, how resultant forces affect cross-connection incidences, what causes backflow, why cross-connections exists, and, by the review of case-studies, how cross-connection incidences can cause harm.

By the end of this training course, you will have the ability to:

- explain what is a cross-connection
- identify the impacts that cross-connections have to the public health
- indicate the causes of backflow and why cross-connections exists
- discuss the hazardous resulting from cross-connections
- illustrate the Essential Factors of a Cross-Connection
- describe why Cross-Connections need to be controlled

Nuts, Bolts, and Gaskets

an introduction

"Nuts, Bolts, and Gaskets - an introduction is a fast-paced one hour course providing everyone in the water and wastewater treatment industry with an insight into which grade bolt should be used in connecting pipes, fittings, and equipment. Learn the proper type of fastener required for corrosion-resistant service, along with structural and tensile strengths required to maintain a tight and secure fitting.

Process Equipment need to be secured to foundations and platforms in the proper matter. It is vital for equipment (pumps) to be aligned, leveled, and anchored properly for the continued service requirements that it endures. This course provides the breakdown of fasteners - bolts and nuts, to include manufacturing procedures, tensile strength test and standards, threads per inch for compatible connections, the difference in fastener standards, and materials of construction.

The Gaskets section covers the various types of gaskets, flanged type, materials of construction, and fabrication aspects of gasket material. A review of gasket standards will illustrate some of the options available for renovations of process equipment connections.

And finally, the course provides a historical timetable of nuts and bolts to orient you with the progress and troubleshooting aspects of the past. Many misconceptions of fasteners and lack of proper type exist; this course will discuss these basic standards and specifications providing you with the knowledge to apply the proper fastener to meet the application and installation requirements for your process equipment and piping systems.

Mechanical Seals

by Gary Stockslager

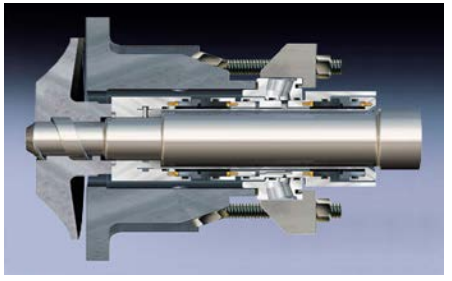
Introduction

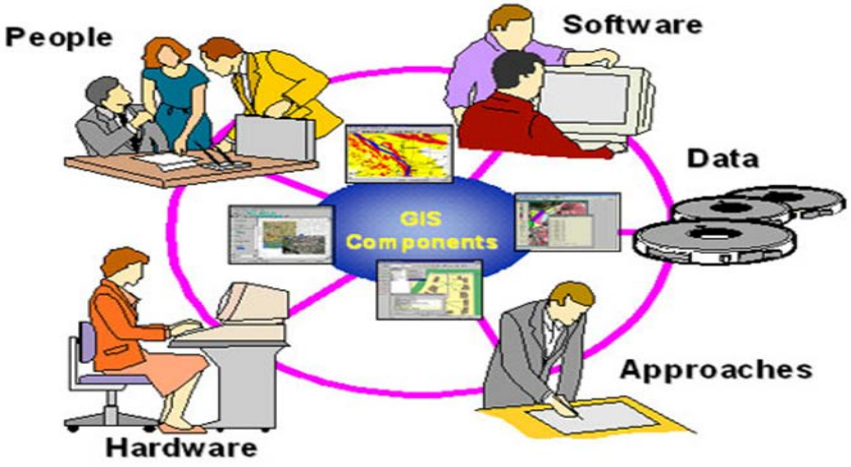
Seal Failures

This course is designed to give the student a reasonably understanding of what Mechanical Seals are, what makes them function along with some of the issues/problems/concerns associated with them. It explains the features and benefits of using a Mechanical Seal vs. Packing. The course explains the lapping process and why it is necessary to maintain face flatness. It shows and explains how and why a Mechanical Seal functions and why the Seal Interface is important to the life of a seal and why it is important to keep the seals cool, clean and lubricated. The course gives a brief discussion about the Balance Ratios and how they are calculated for a Balanced and Un-Balanced Seal. The course will explain in detail the various components of a Mechanical Seal and the function of each component. It touches briefly on the various Classifications and Arrangement possibilities of a seal and how they differ. It explains some of the auxiliary equipment used with Mechanical Seals such as "Seal Support Systems" or piping plans. And it touches on a few of the more common failure analysis. Overall, the course is designed to give the student a better understanding concerning Mechanical Seals so they can obtain longer service life and less problems from their Mechanical Seals and thus keep our environment clean and safe from contaminants. This is a two part course: Introduction, followed by Mechanical Seal Failures.

By the end of this training course, you will have the ability to:

- describe the differences between packing and mechanical seal applications
- identify and discuss the primary and mating rings of a mechanical seal
- investigate worn components of your drive units
- identify the general causes on abrasive surface of a mechanical seal





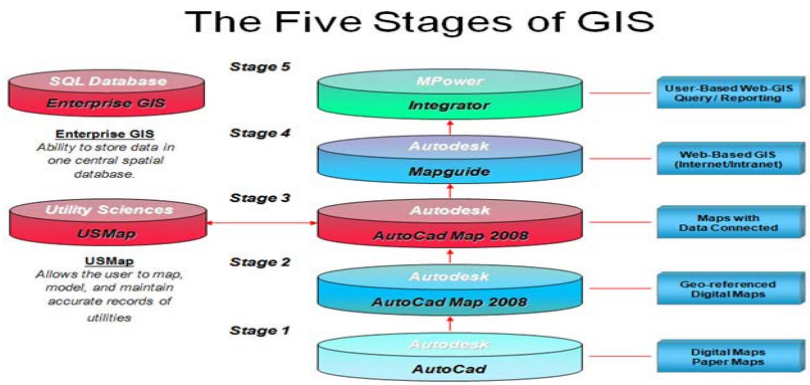
"**Introduction to GIS**" is the first of a four part series offered by CEU Plan covering Geographic Information Systems. Instructor Jason Brown is an expert of GIS technology and interface. He explains GIS, shows what information is incorporated in GIS, and explains how it benefits its users.

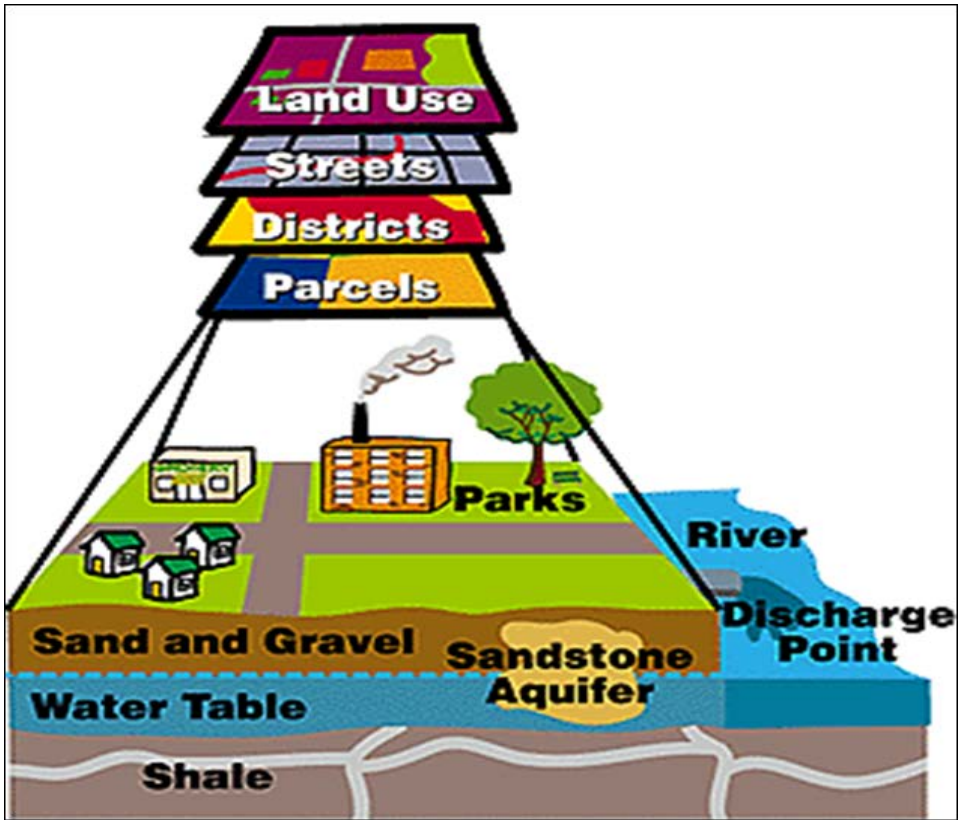
n the second and third course sections, Jason is joined by Ben Glerum, a GIS technician at Ferris State University. They provide some case studies of some GIS systems and illustrates some of the need-to-know criteria related to establishing a digital mapping program.

The other courses in this series will detail the various stages of GIS development. These step-by-step will provide procedures and tips in improving your system, as well as, important aspects to consider in engineering your GIS program from the start.

The GIS course series include:

- GIS Readiness – Performing a Self-Assessment
- Mapping Your System
- Maintaining Your Maps/Geodatabase
- along with this Introduction

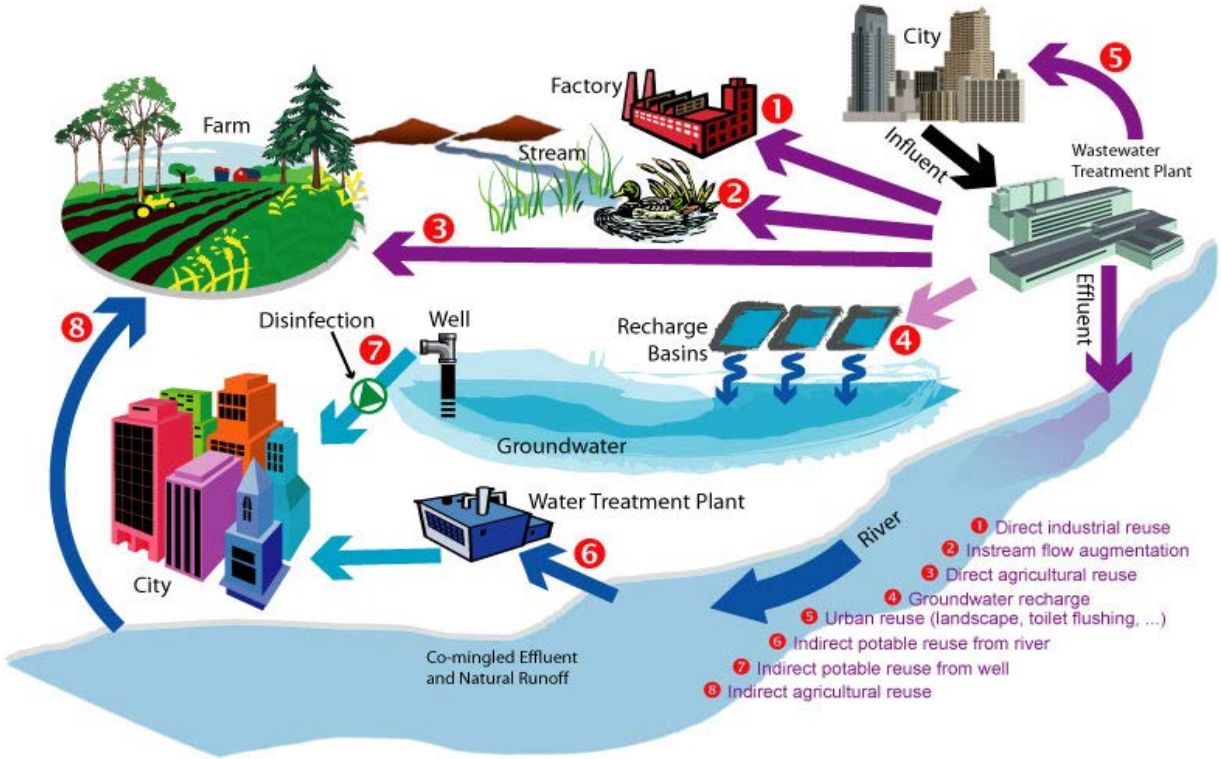




Introduction to Water Reclamation

by Donna Kaluzniak

This one hour course is a basic introduction to Water Reuse which includes examples and case studies from around the United States – Arizona, California, Florida, Texas, and many other applications. With the current droughts and wildfires associated with Western USA, Water Reclamation, as a beneficial resources of a wastewater plant is vitally important.



Course Packages available for you!

CEU Plan has developed a number of course packages to provide you with combinations of related training courses at a discounted price, for you to study and use in renewing your operator's license. These course packages are available in many states, however, please understand that state agencies and Course Review Boards must approve our courses for certification in those states. These limitations will determine the variety of course packages available in your state. If CEU Plan has not received an approval from your State Agency, that course may not be available. Should the course or package (six or ten pack) not be listed In the Course Offerings for your state, then we have not yet received approval. We will not mislead anyone to enroll in a course that is not accredited in their state. Here is a listing of our Course Packages:

Drinking Water - Basic level - 6 hours - # 10001

- Water Purification from the Basic Chemistry series
- Introduction to the Hydrologic Cycle and Aquifers
- Dye Tracing of the Path of Water
- Basic Chemistry & Laboratory Techniques
- Math for Water Plant and Distribution

Wastewater - Medium level - 10 hours - # 10002

- Principles of Chlorination and Dechlorination
- Basic Chemistry & Laboratory Techniques
- Common Pitfalls of Chemical Feed
- Thermal Controls

Distribution - Advanced level - 10 hours - # 10003

- Treatment Plant Maintenance and Accident Prevention
- Wetlands: Study of the Everglades
- Basic Chemistry & Laboratory Techniques
- Water Loss Control
- Fire Hydrant Inspection, O &M, and Flushing

Wastewater - Basic level - 6 hours - # 10004

- Activated Sludge - Introduction and Overview
- Introduction to Solids Handling and Stabilization
- Primary Treatment
- Wastewater Operational Tools
- TPMAP: Equipment Failures and Hazards
- Filamentous Bacteria & Process Control

Distribution - Basic level - 6 hours - # 10005

- Introduction to the Hydrologic Cycle and Aquifers
- Dye Tracing of the Path of Water
- Math for Water Plant and Distribution
- Introduction to Mechanical Seals
- Mechanical Seal Failures
- Introduction to Cross Connection

Distribution - Medium level - 6 hours - # 10006

- Introduction to Concrete Pressure Pipe
- Testing a DCVA - Double Check Valve Assembly
- Common Pitfalls of Chemical Feed

Collection - Basic level - 6 hours - # 10007

- Pipe, Valves, and Fittings
- Lift Station Repair
- Collection System: Getting to the Root of the Sewer Problem
- Pump Station Maintenance
- Introduction to GIS
- Introduction to Mechanical Seals

Collection - Medium level - 6 hours - # 10008

- Wastewater Microbiology & Process Control - part two
- Common Pitfalls of Chemical Feed

Collection - Advanced level - 6 hours - # 10009

- Dye Tracing of the Path of Water
- Basic Chemistry & Laboratory Techniques
- Corrosion Management

Drinking Water - Medium level - 6 hours - # 10010

- Common Pitfalls of Chemical Feed
- Thermal Controls

Wastewater - Basic level - 6 hours - # 10011

- Wastewater Microbiology & Process Control - part two
- Basic Chemistry & Laboratory Techniques
- Grit Removal
- Clarifier Operations

Wastewater - Medium - part 2 - 10 hours - # 10012

- Solubility
- Activated Sludge - Troubleshooting
- Wastewater Microbiology & Process Control
- Water Shortage, Reuse, and Resource Management
- Dye Tracing of the Path of Water
- Basic Microscopes for Water and Wastewater

Economy - Basic DW Training - # 10013 for DW / # 10014 for WW

This five hour - text base package includes basic and fundamental courses to:

- Oxidation in Water and Wastewater
- Laboratory Safety - Overview, Rules, and Regulations
- Basic Mathematics
- Pipe, Valves, and Fittings
- Blueprints

Cybersecurity & Terrorist Issues facing Operators - # 10015 for DW / # 10016 for WW

This seven hour course package includes basic cybersecurity monitoring:

- Reasonable Security Measures to Protect your Plant
- Cybersecurity for Operators
- Distribution System Monitoring
- Introduction to SCADA and HMIs

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Basic Math Issues facing Operators - # 10017 for DW / # 10018 for WW

This five hour course package includes some awesome concepts to use

- Operator Math Made Easy - Area
- Operator Math Made Easy - Volume
- Operator Math Made Easy – Flow Rates
- How to Solve a Word Problem

repeat the math exercises until you feel comfortable

Cross Connection and Backflow Prevention

- # 10019 for DW / # 10020 for WW

This eight hour course package is an unique summary of cross connection and backflow prevention training in preparation of your exam or renewal, procedures for potable water supplies at either DW or WW facilities:

- Introduction to Cross Connection
- Fundamentals & Hydraulics of Backflow
- Testing a DCVA – Double Check Valve Assembly
- Testing a RPZ – Reduced Pressure Principle Backflow Prevention Device
- Testing a PVB – Pressure Vacuum Breaker Backflow Prevention Device

Laboratory Practices for Wastewater - # 10021 for WW

Ten hour course package is a nice variety of laboratory practice topics for wastewater. From a review of emerging to waterborne pathogens within the stream, actual footage and identification of variety types, along with the standard methods and procedures within the lab. These courses provide an overview of laboratory techniques and process control tips:

- **Emerging Pathogens in Water and Wastewater**
- **Wastewater Microbiology & Process Control – part two**
- **LP: Biochemical Oxygen Demand (BOD)**
- **LP: Solids – Analysis TSS, TDS, VSS, and More**
- **LP: Fecal Coliform Bacteria Determination**
- **LP: Basic Laboratory Terminology and Concepts**
- **Jar Testing**

This is an awesome course arrangement allowing you to repeat the various videos, as many times as you would like …… until you feel comfortable with the procedures…. Allow this concept to assist you in better understanding... ……Tips to help you at your plant…..

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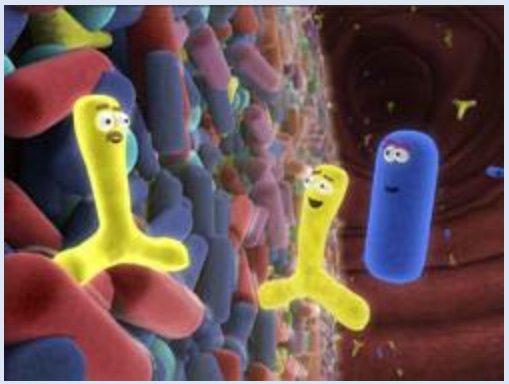
Laboratory Practices for Drinking Water - # 10022 for DW

Laboratory Practices for Drinking Water **is a ten (10) hour course package presented by some renown experts in this field. Dr. Deb Huffman is known for her involvement in the Cryptosporidium Studies in the Milwaukee Outbreak and her advanced research in water reuse applications, along with Margaret Doss shares her background in the development in laboratory procedures and certification need-to-know criteria. These subject-matter experts in the Laboratory Practices field provide an unique exposure to "bugs", pathogen indication, sampling and chain-of-custody procedures, providing reliable data and results in your water lab. By popular demand, we have combined a series of their courses into a package designed to provide you with an overview for identifying and sampling pathogens for process control, exam prep, review of current laboratory techniques, as well as an excellent guide in developing or updating your Lab Procedures and Policies. These courses provide an overview of laboratory techniques and process control tips:**

- **Emerging Pathogens in Water and Wastewater**
- **Drinking Water Bacteriological Procedures**
- **Water Laboratory Quality Assurance**
- **Basic Microscopes for Water/Wastewater Operators**
- **Basic Laboratory Terminology and Concepts**
- **Ebola – An emerging waterborne pathogen**
- **Jar Testing**



This is an awesome course arrangement allowing you to repeat the various videos, as many times as you would like …… until you feel comfortable with the procedures…. Allow this concept to assist you in better understanding... Tips to help you at your plant…..

Wastewater Treatment Process Control with Russ Martin - # 10023 for WW

Explore the World of Wastewater with Russ Martin, as he walks throughout a Midwestern Wastewater Treatment Plant from the headworks to the effluent discharge. The virtual tour with Russ includes his plant inspection and discussion -- from the influent screens and head works, across to the aeration zones, and following through the process to settling, filtration, disinfection, and finally, effluent discharge.

In this unique ten hour course package, you will observe video footage of the waste water treatment plant where Russ will discuss the working components of the process, show illustrations, and provide plant observations that may be helpful to you at your plant. As Russ explains, to make you -- "a smooth operator" from the course's process components, we will enter the World of FOG: a neat discourse on fats, oils, and grease issues in a small tourist community without any pre-treatment requirements, where all of the grease and oil from the 2nd and 3rd largest chicken restaurants goes right into the sewer system. You'll learn how the operator deals with it on a daily basis. Next, we will observe Clarifier Operations in a two hour discussion of clarifier applications, operations, troubleshooting, and process control. At the conclusion of this course, Russ continues by reviewing various operating techniques - process control tools available for wastewater treatment. This ten hour series concludes with a brief and basic review of Cybersecurity for Operators. As he began his retirement a few years ago, Russ was working at the USEPA - Chicago Regional Office and was involved in monitoring aspects for small and large facilities -- his hands-on approaches have been utilized in treatment plants for many years.

This course arrangement allows you to repeat the various videos, as many times as you would like …… until you feel comfortable with the procedures…. Allow this concept to assist you in better understanding...

……Tips to help you at your plant…..

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- ✓ Starting at $9.95
- ✓ Over 150 courses
- ✓ Approved for DW
- ✓ Approved for WW
- ✓ Approved for PE
- ✓ Largest nationwide
- ✓ Ease of navigation
- ✓ custom student page
- ✓ Over 600 years of combined experience
- ✓ State approved for water and wastewater
- ✓ Printable certificates upon completion
- ✓ Water and wastewater related courses

TESTIMONIALS

Thank you for responding so quickly.....I would like to mention; the web site is excellent particularly for those that have a difficult time getting to day time classes. I have already recommended the site to a co-worker.
Thanks again.
Charlie Grace, California Water

I like the barebones aspect of the data given.....
Clear and to the Point! ..... *Michael Drawdy*

I'm currently working on a treatment plant project in China and internet connection available to me is very slow, great program and helps me renew my Operators License, while overseas..... *Omar in Guangdong, China*

I plan on utilizing the site in the future, have recommended it to others, as it was recommend to me..... *James Scyphers*

Thank You. I think your program is quite excellent and a great learning tool for the operator. This program allows me to do it a home. I have a family and it is very hard to schedule around them and work, if I were to go to a facility.
James Walker

The Florida Board of Professional Engineers showed you on it's a list of CEU suppliers, I am now stationed in Iraq... Great program to renew my PE license.
Roy - Halliburton

the ability to take at home at my pace, i thought all material were useful and valid, since this was my first course, I really couldn't say other than keep it available! Also I feel the simple ability of paying on-line is really the way to go.....
Bob Boone, City of Daytona Beach

.....again, I just want to say this site is awesome and convenient.....*Army Guardsman in North Carolina*

Links And References

Association of Boards of Certification

American Water Works Association
The Authoritative Resource on Safe Water™

Water • Source for Life

CDC Department of Health and Human Services
Centers for Disease Control and Prevention

FLORIDA'S SPRINGS
PROTECTING NATURE'S GEMS
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

FUSE

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

neshta
National Environmental, Safety & Health Training Association

OSHA

The Utility Connection

Water Environment Federation
Preserving & Enhancing the Global Water Environment

A Regulatory Guide to Maintaining the Integrity of Continuing Education Programs

Contents

Preface

This report paints with a broad brush. Trends and issues identified herein may not correspond to every regulatory agency across the globe. Regulatory agencies are notoriously different between jurisdictions and often have special processes for addressing unique issues. It is, however, the goal of this report to provide a general overview of major issues regulators face in administering a professional continuing education regimen for their industry. While some issues identified herein may have almost certainly been addressed by agencies, this report should also provide new insights for regulators. In addition, professional education regimens normally include: pre-license education (courses required prior to licensure and testing), post-license education (focused education required within some period after licensing), and continuing education (education required periodically after licensure). While references may be made to these three categories of professional education, the focus of the report is on continuing education.

Finally, the terms *occupation* and *profession* shall be combined into a single term called *industry.* For example*,* architecture is considered a *profession* while construction work may be classified as an *occupation*. Continuing education can be applied to both professions and occupations so we shall equate both with the term *industry*.

Introduction

The goal of this report is to provide regulatory staff and agents with an introduction to the issues inherent in regulating continuing education programs. A cornerstone of regulating any profession is ensuring licensees meet minimum standards for earning and maintaining their professional license. Minimum standards are usually met by completing an education and testing regimen. After licensure, professionals usually embark into a process of career-long learning with mandatory continuing education programs. The integrity of these education programs are vital to maintaining a well-trained licensee base and protecting public interest.

Almost every profession changes. Laws, regulations, technology, competition, and globalization are all major drivers of 21st century advancements. Change affects all industries and one way regulatory agents protect the public is to ensure their licensees keep up with evolution through mandatory continuing education (CE).

Philosophy of Regulating Continuing Education

When patients go to a doctor, how do they know the doctor is competent to practice medicine? When consumers purchase a home, often the biggest purchase of a lifetime, how do they know the real estate agents are competent and won't violate the trust placed in them? When a group of construction workers install scaffolding above a busy walkway, how is the public assured those individuals are competent to take on such a risky task?

Licensure and mandatory professional education is the answer to those questions. Almost every major trade group from accountants, doctors, lawyers, real estate agents, engineers, etc. have some type of regulatory framework governing them. A part of that framework involves mandatory pre-license education and requires periodic mandatory CE to ensure licensees meet minimal standards to practice their profession. Those individuals charged with establishing and/or enforcing those education standards we shall call *regulators*. It is understood that many industries have their education standards set by legislators. Regulators then extrapolate and administer policy that best implements the desire of the legislature. However, legislators often have limited experience in the industries they are affecting and depend on practitioners to guide and counsel them in decision making. For purposes of this paper, we will define *regulators* has a group that may operate separately and under the authority of a federal, state or provincial legislature. Regulatory groups manifest themselves in different jurisdictions as professional boards, councils, and/or commissions.

Regulators are hired, elected, and/or appointed to serve in a regulatory capacity for an industry. Typically, highly qualified industry practitioners are chosen for esteemed positions on regulatory boards, councils, and commissions. With the honor of holding a position on a regulatory body also comes great responsibility. The task of protecting an industry or profession is no small task. Regulators define minimum standards for their profession and grant or deny individuals the ability to practice their trade.

Regulators normally require licensees to complete a certain amount of education each licensing period to meet minimum standards. For example, across the United States, on average, real estate licensees have to complete 12 hours of CE annually to maintain their professional license. Some jurisdictions require more, while others less. The amount of CE also varies from industry to industry. Industries like accounting, on average, require more CE of their licensees when compared with others.

Factors Influencing CE Requirements

The amount of CE required in an industry is based upon a number of factors including:

- **Political influence of trade groups.** Trade groups want to defend the integrity and reputation of its members. In industries like law, and real estate, a few bad actors can tarnish the industry as a whole. Trade groups, in turn, defend and promote their professional brand among consumers. Promoting a professional brand increases consumer confidence, commerce and opportunity for the whole. However, it can also be in a trade group's interest to limit the number of people entering their profession. Anti-trust laws are in place to address issues of trade groups who inappropriately leverage their power to limit the number of practitioners in an industry. Another way trade groups, through their associations, often wield their power is through the use of political action committees (PACs). PACs are used to collect and donate money to political candidates that support the association's causes. PACs are used strategically to help ensure policy is implemented that is favorable to the trade group. It is no coincidence the most effective trade groups in establishing policy are often the ones that have the most robust PAC. This is not to say politicians or trade groups are all corrupt. Numerous interest groups, often with the best of intentions, compete for policy makers' attention and money is one way to get it. Politicians only have so much time to spend with constituents. Out of necessity for time management, politicians will often choose to focus his or her time on the most organized and/or the most significant financial contributors.

  Trade groups want to defend the integrity and reputation of its members.

  Interestingly, to get more CE implemented in a jurisdiction, some trade groups will insist on "grandfathering" existing licensees from having to do additional CE while requiring only new licensees to bear the extra burden. On occasion, there is no other political avenue than to pass legislation requiring more CE with a grandfather clause because the long time industry practitioners do not believe they need the education. Often, industry veterans have close relationships with key policy makers who can kill policy proposals that may inconvenience them.

- **Public complaints and violations of license law.** Public outcry of sub-standard professional practice and/or misconduct can also affect regulatory policy and the education that is required in an industry. For example, in 2002 the owner of a crematory in Georgia was found to have been disposing of bodies inappropriately on the grounds of his facility. The news of the horror went national and numerous groups regulating crematories reassessed their license laws and how compliance could better be assured in light of such a tragedy. The best regulatory agencies have mandatory CE courses that proactively cover the most frequent violations of license

  The best regulatory agencies have mandatory CE courses that proactively cover the most frequent violations of license law.

law that affect public trust.

- **Cost.** Regulatory agencies should evaluate the costs of mandatory education. The evaluation of expense should include costs for the education itself and opportunity costs for the time the practitioner is away from their trade. Opponents of additional CE requirements may suggest that increasing the amount of education required for a profession may drive some practitioners out of business. From the author's experience, a moderate increase in educational requirements does not result in an immediate mass exodus of practitioners from the industry, although there may be some limited instances of it happening. Most ethical regulators and industry practitioners want high yet reasonable standards. One of the best ways to determine what is a reasonable education regimen is to examine the requirements of neighboring jurisdictions. If the national average is sixteen hours of CE for a particular industry and the regulatory agency in question requires six, chances are that the regulatory agency may want to consider raising their requirements. Often trade groups balk at the notion of doing something because another jurisdiction is doing it, but comparative analysis should not be overlooked as a component of decision making. Another excellent way to ensure a jurisdiction is requiring the appropriate amount of CE is to do a job analysis and develop the education regimen around the needs identified. This can often be expensive but very worthwhile. The alternative is to gather a group of practitioners and/or regulators and make antidotal decisions about what should be required based on the group's collective recommendation. Regulators should be cautious about imposing requirements on the mass based upon the limited experience of a few.

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  Regulators should also understand the big financial picture of the education market in their jurisdiction. For example, regulators can sample the cost of CE offerings from various education providers and calculate the average price per clock hour of instruction for the continuing education. Then multiply the average cost per clock hour by the number of mandatory hours per licensee. After that, multiply the cost per licensee by the total number of number of active licensees. Using analysis like this can help frame and determine costs associated with continuing education changes. Prior to changing any continuing education requirement, regulators and legislators will always want to know the financial impact.

- **Perception of need.** While far from a scientific approach, many regulatory education regimens are based upon an arbitrary amount of hours set by industry regulators and practitioners. Exceptional regulatory agencies will form taskforces and/or other workgroups to examine curricular needs to maintain a healthy industry. After the needs are identified, the recommendations will be placed into a curriculum and recommended for approval. It is important for regulators to ask, if our agency is going to require X hours of CE every year, how did we arrive at X hours? In the course of advocating for new laws regarding continuing

education, the author has been asked this question by numerous legislators trying to decide how to vote for whether CE hours in an industry should be raised.

Why the Marketplace Does Not Always Promote the Best Education

Some assume that CE and training markets work the same way as other free markets in that learners will seek the highest quality for the lowest dollar. Poor quality providers will then, as a matter of course, be driven out of business because learners will not take courses that are weak or low quality. If the free market will regulate the quality of the CE provider, why is government needed at all?

That approach seems logical, but the premise is flawed for one major reason. Education is one of the only things people are willing to pay for and not receive. If the government dictated that each person would have to buy a certain number of groceries every week, regardless of whether he or she needed them, where would the consumer go for their groceries? The answer is the place that cost them the least time and money. Quality is secondary or forsaken altogether. Professional education is not much different. Professionals are often busy and the opportunity costs of taking CE they do not believe they need are high. Learners therefore often opt for the easiest way to comply. The commodity becomes compliance, not education. If not regulated, education providers have a commercial interest in making their education as fast and easy to complete as possible. The best education providers typically struggle with the unleveled playing field. Quality providers want to offer great education that has integrity, but are undercut by competitors who offer a faster, cheaper, lower quality, and less rigorous alternative while still providing the most coveted commodity which is compliance. If not wisely regulated, the quality of CE programs can spiral toward the lowest common quality denominator.

> Education is one of the only things people are willing to pay for and not receive.

What is Professional Education's Lowest Common Denominator?

One of the frustrating facets of being an education provider is that quality and rigor are not always appreciated or marketable. Often simple and fast courses requiring little of the learner are the most marketable. If regulation is not in place to ensure a minimal standard for quality and rigor, a jurisdiction's required CE regimen will degrade toward the lowest standard. For example, one regulatory agency allows its licensees to complete their mandatory CE by ordering a small workbook that contains a ten question quiz on the rear cover. Learners receive the book, complete an over simplified quiz, and send it back to the provider for three hours of CE. In reality, most learners spent less far less than three hours working in the course. Essentially, the course was designed for compliance, not quality education. If learners can buy and obtain compliance that easy, what about the course developer that spent tens of thousands of dollars developing a rigorous quality program that actually requires three hours to finish? The author has interviewed numerous major professional education providers who intentionally reduce the rigor of their courses in order to compete with other providers doing the same. The result is that education markets resort to the lowest common denominator for quality and rigor unless regulation is in place to level the playing field and keep the standard meaningful.

Imposing meaningful education standards can help ensure CE regimens do not degrade to the lowest common denominator. For our purposes, education standards have three components:

1.) **Content standards** ensure the course content aligns with the relevance to industry. Quality content standards also align the rigor of the course with the appropriate audience. In other words, gauging whether content is too easy for experienced professionals is also a component of content evaluation.
2.) **Instructional design standards** ensure courses are designed to meet the objectives. While instructional design is a topic unto itself, it involves things like, objective writing, assessment design, remediation strategies and course evaluation.
3.) **Delivery standards** encompass how the course is delivered to the learner**.** Delivery standards can encompass things like technical requirements for the course, facility requirements, differentiated instructional methods, cognitive challenge, learner engagement strategies, ensuring relevance to the audience, and strategies for teaching to preexisting knowledge. Obviously some of these items may also coincide with instructional design standards.

Regulatory imposition of instructional design and delivery standards can be onerous for a regulatory agency with limited resources. This is why organizations like the International Association for Continuing Education and Training (IACET) exists. Regulators can impose a well-researched education standard for instructional design and delivery through a third party like IACET and then focus their regulatory review on the course content. Essentially, a provider earns an accreditation for instructional design and delivery before ever submitting a course to a regulatory agency. Once the course arrives at the regulatory agency, regulators can have confidence the course already meets a minimum standard for instructional design and delivery. Course content is where the regulator has unique expertise. No one is as qualified to review course content as the regulator. Regulators should approve courses that have the appropriate content and the rigor necessary to fulfill objectives. Ensuring appropriate rigor in CE courses means being able to distinguish between basic, intermediate and advanced content levels and prescribing the appropriate level for its practitioners. When addressing the difficulty level of content that is contained within a CE course, the "competency vs. seat time" debate will inevitably arise and is a topic for which the regulators should be prepared to address.

Regulatory imposition of instructional design and delivery standards can be onerous for a regulatory agency with limited resources.

Competency Verses Seat-Time

Measuring the competency of a practitioner to perform a task is the ideal way to assess learning in CE programs. If the objective is to weld in a straight line, the learner should be able to demonstrate welding in a straight line. However, proving competency in dynamic topics like contract negotiation, ethics or financial investment instruments can be difficult and costly.

To better assess competency, almost all industry regulators require "pre-license" education and testing so the candidate for licensure can demonstrate a minimal level of competency through high stakes testing and in some cases some experiential requirements. Pre-license is the initial hurdle a licensee has to overcome in order to earn a license. Often the pre-license test and experiential requirements are designed by professional testing companies that perform a work analysis within the profession and design tasks that are meant to assess competency. In order to provide a greater emphasis on measuring

competency, some regulators and testing companies have moved away from instruments like multiple choice tests and are using more practical competency-based testing instruments such as simulation-based tests. Unfortunately, pre-license education only helps ensure competency of the practitioners on the front-end of licensure and affects a minority of current licensees.

After a practitioner receives a license, all too often the jurisdiction's CE regimen reverts to seat-time requirements. Accountants may take 80 hours of CE cycle while real estate agents have to take 12. A worthwhile question to ask is how are these hours justified? The answer varies between regulatory agencies and jurisdictions. As a result, legislatures pass laws requiring "hours of CE" for licensees. In turn, regulatory agencies enforce the statute using clock hours and competency becomes secondary. Realistically, a person can be incompetent in the topic but pass the open book exam at the end of a course. This is perhaps one of the biggest weaknesses of any CE regimen based on seat time. Quality regimens are built on a well-designed and implemented needs analysis.

So why wouldn't regulatory agencies simply measure competency for CE programs? That is easier said than done, and here are a few reasons why. First, what is competency? Regulators would have to define competency for what are often numerous and complex industry issues. Defining competency would be expensive and impractical. Second, regulators often do not have the resources to develop a competency-based education system. Expertise beyond that of typical regulatory staff is required and along with that comes extra expense. Third, regulators will often leave it to the education providers to measure competency with the topics they teach. However, when an education provider decides what competency is, the bar can fall far below what is needed. Education providers are all too often pressured to sell compliance which means allowing learners to complete objectives that are far less rigorous than what should be expected from an experienced practitioner.

Regardless, measuring competency when possible is still ideal. Some academic environments are rethinking the competency versus seat time debate.

> "A recent policy scan from the Carnegie Foundation explored the course credit policies for all 50 states and the District of Columbia in an effort to understand the distribution of seat-time requirement versus credit flexibility. The report notes a shift in policy away from the historically preferred Carnegie Unit and toward a broader definition of what may constitute course credit. While 10 states (Arkansas, California, Illinois, Massachusetts, Nebraska, Nevada, North Dakota, Texas, Virginia, and Wyoming) and the District of Columbia were still requiring the use of seat-time as the only definition of credit, the remaining 40 states allowed for some degree of flexibility. The report finds 29 of these states define credit by a combination of seat-time and/or additional measures such as competency-based education" (Pate, 2013)

Making strides toward a greater competency-based education regimen is an uphill climb in most regulatory circles. Countless statutes governing numerous industries specify clock hours of education for CE. In a need to enforce the law, regulators will continue to require clock hours of CE regardless of how practical competency sounds.

Classroom and Distance Learning

Classroom Education

Regulators generally tend to let their guard down when it comes to classroom education. When in a classroom, learners sit with an instructor for a specific time period which seems to make regulators

more comfortable with the learning environment. Occasionally, regulatory agencies will require exams at the end of a classroom course but not always. There are often assumptions about classroom education that regulators generally make like:

1. instructors will engage the learner with the appropriate course content.
2. instructors will assess learners periodically to ensure concepts connect and are clarified.
3. meaningful interaction in the course will be facilitated.
4. good instructional practice will be used by teaching to different learning styles, teaching to preexisting knowledge, and incorporating Bloom's taxonomy into the course objectives and assessments to ensure learners are engaged at the appropriate cognitive level.
5. Regarding learner identity, learners are who they say they are. If the "learner" is physically in the class, they must be the licensee.

The best regulatory agencies audit classroom courses.

The best regulatory agencies audit classroom courses to ensure the assumptions listed above are happening. Feedback is then given from the regulators to the education provider and, if necessary, improvements made or approval to teach is revoked for non-compliance. Unfortunately, a majority of regulatory agencies do not have the time, money or professional resources to audit education.

Distance Learning

Distance education has been around for centuries via mail correspondence. However, a 21st century definition usually involves online learning using the Internet. Perhaps no other medium in the world, beside Gutenberg's printing press, has generated so much potential for learning and yet so much concern for integrity.

In the late 1990's as distance learning used for CE programs started to more heavily leverage technology, regulators were faced with an increasing number of decisions about ensuring educational standards were maintained without the benefit of the learner appearing before a live instructor. During this period, numerous industries reacted by limiting distance learning, or banning it altogether for the purposes of continuing education. In many cases, there were huge gaps between what learners experienced in a classroom and what they experienced through their computer. As regulators considered distance learning courses for CE they had to wrestle with the following distance education issues:

- Limited or no access to an instructor.
- The learner primarily accountable for their own learning with little or substandard accountability provided by the learning systems.
- How is seat time maintained and subsequently a statute enforced?
- What would prevent a learner from clicking through a 3-hour online course in 10 minutes?
- How do regulators know the person taking the course is the licensee getting credit?

Asynchronous distance learning courses can be the most problematic distance learning format for regulators trying to uphold quality. Asynchronous courses can be taken at any time from any location offering busy learners an attractive convenience for meeting their education requirements. Often asynchronous courses seek to minimize or eliminate the role of the instructor in the educational process. This leaves the weight of ensuring quality education on the instructional design process. Consider the things an instructor typically does in a classroom course: presents content, responds dynamically to learners' questions, provides remediation, reassesses as necessary, teaches to different learning styles, and modifies the objectives and/or assessments via Bloom's Taxonomy to ensure maximum learning occurs. To remove or minimize the roll of the instructor is to potentially leave a major gap in the educational process that technology and instructional design will have to fill. One major gap that asynchronous courses can have when compared to classroom courses is how course time is mandated to ensure compliance with statute.

The two biggest concerns regulators have with distance education courses are typically: 1.) learner identity 2.) ensuring clock hours in the course. Other issues certainly exist, but these most frequently top of the list.

Learner Identity

Technology is rapidly solving the learner identity issue but regulators in many industries are still not persuaded to mandate learner identification procedures due to cost. Usually, regulatory agencies at minimum will require some type of affirmation to an identity statement. For example, a learner may be asked to check a box in a course that says they hereby affirm they are the person getting credit for the course. It is understood that this procedure does not verify learner identity but gives some legal basis to the regulator to take action should they find out the learner did not perform the work as stated. Regulators should also ask not only what are learner identification procedures in the online environment but for the classroom as well. Often regulators will have big concerns over what happens online but not in a classroom.

Essentially, when it comes to verification of learner identity, regulators do not desire to inconvenience the masses for the impropriety of a few learners who would cheat. However, as technology improves, learner identity is, in general, becoming more cost effective and easier to accomplish.

Methods for Establishing Course Completion Time

The second issue, involving how regulators ensure seat time in a distance learning course, is another major regulatory concern. Consider *Figure 1* below listing the methods for establishing time spent in an asynchronous (anytime, anyplace) distance learning course along with the advantages and disadvantages.

Figure 1. **Asynchronous Course Time Evaluation Mechanisms**	**Advantages**	**Disadvantages**
Mandatory time requirement for each page of instruction enforced by technology.	- The course mandates a certain amount of time on every page of instruction and the seat time will be enforced.	- How is it known if whether the learner has walked away from the computer? - Learners with higher reading rates and better comprehension are punished by not being able move through the course at their most effective rate. - Does not consider the competency of the learner.
Mandatory time requirement enforced with technology at the course level (not page-by-page).	- Time is mandated and learners are forced to be engaged until time expires. - Allows learners to navigate freely until then end of the course.	- When the learner reaches the end of the course additional instructional design is required to inform the learner of how they must fulfill the remaining time if necessary. - Does not consider the competency of the learner.
Course time studies by third party analysts.	- Time studies by a third party are a great way to road test a course and get a sample for how learners may perform from a professional capable of making such an estimate.	- Time study participants must be of the appropriate sample audience and experience level. - Time studies do not mandate seat time. They suggest to the regulator how long the course might take the typical learner. - Time study analysts have to be experts within the field or risk over or under estimating the difficulty of content.
Course time analysis by sample learners	- Time studies are a great way to road test a course and get a sample of how learners will perform based upon actual results from learners from the appropriate sample audience.	- More than one learner needs to complete the course and, therefore, cannot be included in the sample as every learner is different.

Figure 1. **Asynchronous Course Time Evaluation Mechanisms**	**Advantages**	**Disadvantages**
Word count	-Provides an equitable and quantitative benchmark for establishing the amount of content needed. The average adult reads at 250-300 words per minute. (Ziefle, 1998)	-Disregards consideration for difficulty of the content. -Does not consider non-prose content such as math problems. -Encourages instructional designers to use superfluous language to meet word count requirements.
Playing audio recorded reading of written content to ensure an appropriate time.	-Provides some objective measure and enforcement of course time.	-Educational research suggests reading written content to a learner while that same written prose appears on the page in front of them is counterproductive to learning (Clark & Mayer, 2008). -Learners cannot read at their own rate but must listen at the speed of the narrator.
Audit time logs in learning management system.	-Provides a quantitative and unambiguous report of the time learners spend in a course. -if not required for every course and every learner, the time logs can be examined on an as needed or audit basis.	-reports can be manipulated by unscrupulous providers. -the methodology is based upon hindsight. If courses are short in time, some learners will get credit and not spend the time necessary. -Learning management systems must be properly equipped and programmed to track the time a learner spends in the class. - course providers must agree to provide the time reports.

There is no perfect way to evaluate the time learners spend in a course when they can complete it at their own pace. Perhaps the best method for enforcing time is requiring a strategic combination of these methods. The methods required for evaluating course time will depend on the philosophy of the regulatory agency in fulfilling their statues. For example, in a three-hour CE course, some regulators are comfortable verifying time with a sample of learners, who may be academically exceptional, finishing

the course in faster time than the allotted time. These learners may have experience with the content and/or a faster reading rate than other average learners. However, providers can still make the case that the "average learner" takes three hours to complete the course. Some learners will take longer than three hours and some will take less, but the average is three.

In a more conservative regulatory agency, basing hours on how the average learner performs may not work. Statutes will mandate learners' complete x hours in a course regardless of individual competency. If this regulatory philosophy is in place, the regulatory agency must implement a delivery policy that mandates seat-time regardless of performance or competency.

Synchronous online courses are held at a certain time and can be taken any place with the technology. Synchronous courses make it easy for regulators to establish time since the course is designed to mirror the classroom experience. Learners login at a specific time and interact with an instructor and/or classmates in a cohort. Course time is mandated and engagement can be tracked using a variety of technologies on the market today. Perhaps the biggest regulatory concern regarding synchronous courses is ensuring instructors include enough interaction to ensure learners do not walk away from the course for an extended time and still get credit.

Education providers and learners are usually less excited about synchronous courses because the design mandates learners appear at a certain time online. Another disadvantage of synchronous courses is that instructors can only facilitate a maximum number of learners in one teaching session. Inevitably the loss of flexibility leaves a lot to be desired for the busy learner and makes other asynchronous online learning alternatives more attractive.

Online academic cohort based online courses are held asynchronously and over a period of weeks or months. Periodically, an instructor leading the course opens new content modules, makes assignments and gives feedback. This methodology represents a small minority of CE programs for professional licensure as it is not practical to have a cohort for a class that spans a few hours or less. In addition, the cost of having an instructor facilitate the education process (making assignments, monitoring progress, giving feedback etc.) is an expensive proposition. Education providers usually prefer to build their CE courses, and then offer them at any time with minimal human involvement.

Summary on distance education

As time has passed and concerns have been addressed with quality standards and instructional design, restrictions on distance education have been eased. Distance learning opens numerous opportunities for professional education. However, the online environment is still ripe for abuse if not carefully and thoughtfully regulated. Regulatory strategies intended to address concerns with online courses include:

The world doesn't stop changing after professionals obtain a license nor should the education they receive.

- Limiting the number of hours of CE a learner in can earn via online education.
- Imposing a strong audit system for ensuring courses are taught as approved.
- Require formative assessment in the instructional design. Incremental learning quizzes help ensure mastery of content on a unit by unit basis.
- Require summative assessments including but not limited to final exams for online courses.
- Require or recognize a third party accreditation process like IACET for education providers that help ensure integrity of providers and courses before they ever get to the regulators desk for approval. Requiring an accreditation helps ensure courses meet a high standard prior to submission to the regulator for approval.

Summary

Regulating professional education is a necessary part of ensuring professionalism and protecting the public. Standards exist that help regulators navigate the educational research and implement a fair and attainable standard that benefit all the industry stakeholders. Organizations like IACET help ensure regulators do not have to recreate the wheel of education standards for professional education. The need to implement high standards seems obvious but in doing so, as with almost any worthwhile endeavor, will not come without opposition. In every industry, there are licensees and educators who are satisfied with the status quo. Licensees and educators will often adopt paradigms about education that are below what should be required to maintain a competent licensee base. The regulators job is to parse the difference between paradigms and implement research based standards that serve to improve their industry. Finally, there is one component of a CE regimen that is almost universal in its application across industries. In a society that is growing in complexity, regulators should advocate for policy that encourages, if not mandates, a lifelong approach learning. The world doesn't stop changing after professionals obtain a license nor should the education they receive.

Checklist to Avoid Pitfalls in CE Regulation

Regulating a professional education program is no easy task. However, here are some good ways to avoid common pitfalls regulator face:

- ❑ **Never treat one education provider different from another**. This should go without saying but it is one of the most common pitfalls regulators can unintentionally make. Often, education standards can be interpreted in different ways. If one provider interprets a standard different from another and it causes one provider to have a competitive disadvantage, providers will often appeal to the regulator for an equitable interpretation. Such exercises raise stress and could affect the reputation of the regulatory agency.
- ❑ **Know the scope of what the agency regulates and stick to it**. Statutes and regulations will specify what is to be regulated. Lean on those policies and do not vary from them. Any requirement placed on a CE provider should unambiguously be associated with the policy.
- ❑ **Focus on quality content review.** No one else can do as good of a job evaluating course content as a regulator. Regulators should require sufficient course material to ensure the quality of the content. Regulators should also evaluate whether a course is too easy for typical practitioners.
- ❑ **Leverage instructional design and delivery accreditations to take a load off of the regulatory staff.** Many regulators get tied up in instructional design and delivery standards and are often not qualified to determine such policy. For example, one regulator decided that since he used a particular common web browser that all providers should create courses that could be taken through that web browser. A provider that had a custom web browser build into their custom software was not eligible for approval. The provider appealed the case to the full regulatory body and won. Instructional design and delivery standards should be based upon research and developed by qualified people. Staff should never be able to arbitrarily impose standards in a manner that are not consistent with agency's policies and/or education research. It is very easy for a regulator to be placed in a position to approve course designs that he or she likes. However, this is not a good way to regulate as quality course design is driven by research, not someone's feeling about a delivery strategy.
- ❑ **Consider requiring or recognizing an instructional design and delivery accreditation, like IACET's, as a prerequisite to the provider submitting the course to the regulator for approval.** This allows the regulator to know that the course they are receiving has already met rigorous standards without the burden of developing and maintaining those standards themselves. In a day when regulators are always expected to do more with less, having a third party vet incoming providers and courses can be a substantial time and money saver.
- ❑ **Evaluate content rigor to assure applicability to the appropriate audience.** This is one of the most frequent pitfalls. Regulators approve courses that are far too easy for experienced professionals and word quickly spreads of the lack of rigor in the mandatory education process. The usefulness and relevance of the CE programs are then called into question.
- ❑ **Base the number of CE hours on a defensible curricular requirement developed along with industry stakeholders.** There is nothing worse that regulators appearing to develop policy arbitrarily. Include stakeholders in the decision making process and document clearly who was involved.
- ❑ **Have at least a portion of the required CE hours cover mandatory topics that includes common license law violations.** This strategy will increase relevancy of the education and theoretically reduce violations.

- **Audit courses for compliance**. Classroom as well as distance learning courses should be occasionally audited for compliance with content, instructional design and delivery standards. If the regulatory agency has limited staff for auditing providers, consider a third party accreditation, like IACETs, that audits providers for compliance at no cost to the regulatory agency.
- **Provide periodic training for education providers on the expectations and developments in your industry**. The best regulatory agencies develop a community of educators that compete and hold each other accountable. These communities can also be very useful in fostering expectations for quality and professionalism.

About the Author

Joe McClary, Ed.S, CAE, is the Chief Executive Officer of the International Association of Continuing Education and Training (IACET). Prior to his work with IACET McClary was the CEO of the Kentucky Association of Realtors, Kentucky's largest trade association. He was influential in writing and passing some of the most important professional education legislation in the past two decades that expanded and improved mandatory continuing education requirements for the state's real estate licensees. From 2001 to 2012, McClary served as the first Executive Director of the International Distance Education Certification Center (IDECC) which is an organization that develops internationally recognized distance learning standards. In his role with IDECC, McClary worked with more than 400 professional education providers and numerous regulatory agencies located across the globe. McClary has earned the Certified Association Executive designation from the American Society of Association Executives and is experienced as a college instructor, high school teacher, and adult educator. He has earned multiple graduate level degrees in the field of education. Within his role at IACET, Joe is available for speaking engagements on educational best practices, distance education, accreditation and other topics related to professional education. He can be reached at jmcclary@iacet.org.

About IACET

IACET's mission is to advance the global workforce by providing the standard framework for quality learning and development through accreditation. IACET's history includes development of the original Continuing Education Unit (CEU) as well as the creation and maintenance of the ANSI/IACET Standard for Continuing Education and Training. More about IACET can be found at www.IACET.org.

References

Clark, R., & Mayer, R. (2008). *E-learning and the science of instruction: proven guidelines for consumers and designers of multimedia learning.* San Francisco: Pfeiffer.

Pate, A. (2013, August 29). *Trends in Seat-Time vs. Competency-Based Policy*. Retrieved from College & Career Readiness & Success Center at American Intitutes of Research: http://www.ccrscenter.org/products-resources/blog/trends-seat-time-vs-competency-based-policy

Ziefle, M. (1998, December). Effects of display resolution on visual performance. *Human factors , 40*(4), 554-68.

Program Summary

2019

CEU Plan

Accreditation through

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