CEU Plan has included in this course submittal package, nine courses totaling 10 hours or 1.0 CEUs related to water and wastewater treatment continuing education training. In this course package, you will find the course summary page outlining:

- Course Title and Description
- IACET calculated hours in accordance with the IACET ANSI 2018 Standards
- Instructor's name and bio
- Learning Outcomes
- Course Sectional breakdown

Secondly, you will find the IACET instructional course worksheets illustrating the course assessments and methods broken down by each individual course section, which includes:

- Breakdown on the contact time related to course content with each quiz
- Sectional Course Titles - Learning Outcomes broken down for each course section
- Assessment Methods and Tracking/Monitoring functions
- Instructions and Comments to the student related to the training course

This pdf file has each course included with course summary page followed by the Course Worksheets. The courses included in this course submittal package are:

CEU ID #	Course Category	Course Number	CEU Hrs.	✓	Oregon - Consolidated - DW/WW Course Title	instructor
254	WW only		2		Wastewater Treatment Process Control Tools	Martin
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
306	DW/WW		1		Pipeline Condition Assessment Technologies	Leverette
308	DW/WW		1		Risk Assessment and Emergency Response Planning for Utility Professionals	Hofer
313	DW/WW		1		Drinking Water: Leaded or Unleaded?	Bowers
319	DW/WW		1		Chemistry of Lead Contamination	Daconta

On the IACET website, you will find CEU Plan listed as an accredited training provider. A copy of our Certificate of Accreditation is available, upon request.

Author's Full Name: Russell J. Martin

Experience:

Russ Martin worked at EPA for more 40 years, retiring at the end of 2011. Mr. Martin spent his first years in a field office figuring out that a lot of POTWs were not working right, then spent the next several years in various areas of the Construction Grants Program, awarding grants to help municipalities expand wastewater treatment capabilities. Since 1985, he has worked in wastewater treatment compliance assistance, helping more than 50 plants improve performance and has assisted a National compliance effort, funded under 104g1 of the Clean Water Act, that has improved the performance of thousands of POTWs. POTWs assisted by him have won National and/or Regional EPA operation and maintenance excellence awards in all six states in EPA Region 5. In addition, his most recent activities include: sustainable water infrastructure (especially asset management), security at POTWs and combined sewers.

Category: Operation and Control of a Treatment Plant

Course Title: Wastewater Treatment Process Control Tools

ANSI/IACET CEU Calculations - Required to complete this course: 2 hours

Course Summary:

This course will discuss four wastewater process control tools that can help to operate your wastewater treatment plant. We will also identify four scenarios where these tests can be utilized, supporting each other, to give you more confidence in making decisions in plant operation. The course is targeted mainly for activated sludge wastewater treatment plant operation, although knowledge of these tools can help with operation of other wastewater processes as well.

The course is broken into six sections of illustrations and discussion of the basic tools – including troubleshooting and evaluating your bugs and determining how healthy they are! Toni provides actual step-by-step operation of microscopes and identification of filament growth. Many of the techniques and discussions within this course can serve as an exam-prep course related to process control conditions, or could be used as a great refresher for your day-to-day operations. We recommend viewing the video twice for maximum retention. It is the highest quality online presentation available.

Course Breakdown:

The following course breakdown headlines the individual sections:

- Section 01 - Introduction - Process Control Tools: Phase Contrast Microscope
- Section 02 - Process Control Tools: Settle-o-meter and Secchi Disk
- Section 03 - Process Control Tools: Sludge Core Sampler
- Section 04 - Process Scenario: Operator's dream
- Section 05 - Process Scenario: Old Sludge Age
- Section 06 - Process Scenario: Too Many Filaments and Extracellular Jelly

Learning Outcomes:

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

- Describe the use of microscopes in your process control test
- Illustrate the color and conditions of supernatant found in your sludge core test
- Define the causes and results of a nutrient imbalance in your treatment plant
- Explain the importance of the settle-o-meter in evaluating sludge age
- Describe the depths readings of a Secchi disk, when evaluating sludge age
- List the advantages of using a multiple process control test at your treatment plant

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will be performed in the fall of 2017-18. At the beginning of 2018, student feedback and comments will be reflected in the final beta testing, along with cumulative average of student tracking and monitoring posted during the November 2017 – March 2018 test period.
- The ***Level 1*** and ***Level 2 Beta Testing*** has been completed and complies with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

CEU ID #	Course Title	Instructor	CEU Hours
254	Wastewater Treatment Process Control Tools	Martin	two

CEU Plan – Content & Instructional Course Design Worksheet

activated: 11-2016

CEU Plan # 254 - Wastewater Treatment Process Control Tools

Instructor: Russ Martin

amount of course hours: two

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:** 17.48 Minutes **quiz:** 10 minutes **accumulative: 28** minutes	Introduction to "Tools" used in process control of your wastewater treatment plant	List the advantages by using multiple process control test of your treatment plant Indicate process control test performed in the field and at the lab Describe the use of microscopes in your process control test	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:** 21.13 Minutes **quiz:** 10 minutes **accumulative: 31** minutes	Two More Tools ● Settle-o-Meter ● Secchi disk	Discuss the use of settle-o-meter's Describe the high condition results of your SVI Define the primary role of a secchi disk	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:** 12.27 Minutes **quiz:** 10 minutes **accumulative: 22** Minutes	Sludge Core Samplers Using the Basic Tools to Analyze your situation	Indicate the best location for sampling a clarifier Describe a sludge core sampler Discuss the pro-cons of multiple testing your treatment plant Explain the best solids concentrations maintained in secondary clarifiers	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.

Lesson Name	Time	Content Description	Learning Outcomes	Learning Styles	Assessment	Instructional Materials	Comments
Section 4	**content:** 14.51 Minutes **quiz:** 10 minutes **accumulative: 25** Minutes	Operator's Dream A well performing wastewater treatment plant	Identify quality levels of your SVI in your treatment plant List the differences between dilution and non-dilution settle-o-meter testing Describe the problems associated with too many rotifiers	Streaming Based Online	Written Exam	Required view of streaming clip, 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 5	**content:** 12.28 Minutes **quiz:** 10 minutes **accumulative: 22** Minutes	POTW - choking on too many solids Old Sludge Age	Define sludge age Explain the importance of the settle-o-meter in evaluating sludge age Describe the depths readings of a Secchi disk, when evaluating sludge age	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.

Lesson Name	Time	Content Description	Learning Outcomes	Learning Styles	Assessment	Instructional Materials	Comments
Section 6	**content:** 20.09 Minutes **quiz:** 10 minutes **accumulative:** 30 minutes	Spaghetti - everywhere too many filaments Jelly doughnuts - good. Jelly is sludge - bad.	Describe corrective actions taken from excessive filaments found in your plant Illustrate the color and conditions of supernatant found in your sludge core test Define the causes and results of a nutrient imbalance in your treatment plant	Streaming Based Online	Written Exam Essay Question - listing objectives that they learned from the course and how they apply to their job and workplace Final Course Evaluation form	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course material section Essay – listing 3 things learned and how they apply to their workplace	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 =	28	sec 4 =	25				
sec 2 =	31	sec 5 =	22				
sec 3 =	22	sec 6 =	30				

accumulative time total : 158 minutes = 2 hours = 0.2 CEU

Student Feedback:

- to be inserted, upon course activation and student feedback and final beta testing completed
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-

Author Full Name: Russ Martin

Experience:

Russ Martin worked at USEPA for more 40 years, retiring at the end of 2011. Mr. Martin spent his first years in a field office figuring out that a lot of POTWs were not working right, then spent the next several years in various areas of the Construction Grants Program, awarding grants to help municipalities expand wastewater treatment capabilities. Since 1985, he has worked in wastewater treatment compliance assistance, helping more than 50 plants improve performance and has assisted a National compliance effort, funded under 104g1 of the Clean Water Act, that has improved the performance of thousands of POTWs. POTWs assisted by him have won National and/or Regional EPA operation and maintenance excellence awards in all six states in EPA Region 5. In addition, his most recent activities include: sustainable water infrastructure (especially asset management), security at POTWs and combined sewers.

Category: Operation and Control of a Treatment Plant

Course Title: Wastewater Treatment Performance & Control - part one - Headworks & Influent

ANSI/IACET CEU Calculations - Required to complete this Course: one hour

Course Summary:

Part one - Introduction and the POTW that will be used as the basis for this learning adventure. We start at the beginning, the source of water flow, discussing how one can do an evaluation of influent flow loading and quantities, and then proceed to flow control throughout the plant, emphasizing how important that is for good operation.

Utilizing a Midsized POTW, Russ Martin, the instructor for this series, will explain how one can learn to better control treatment plant performance just by walking around the POTW using one's senses, armed with the knowledge of how things are supposed to work. This enables an operator to better control a facility and to use this knowledge to make a wastewater treatment plant operate more efficiently.

Russ has built this course on the knowledge gained from assisting or evaluating POTWs over the 40 years. He worked for the USEPA in enforcement and compliance assistance and/or evaluation of facilities throughout the upper Midwest of the US. Facilities that he assisted have won Regional & National Operation and Maintenance Excellence Awards, in every State in EPA Region 5. (Buffalo, MN; Reedsburg, WI; Munising, MI; Sandwich, IL; Martinsville, IN; Fredericktown, OH) POTWs he assisted included standard and extended activated sludge, rotating biological contactors, sequencing batch reactors, trickling filters and pond systems.

(POTW – Flagg Creek one of 772 Combined Sewer Communities, 12 MGD but can go to 30 MGD, Influent flows typical (210 mg/l BOD & SS), Facilities include: Influent screening, grit removal, primary clarifiers, activated sludge, secondary clarifiers, final filters, disinfection, anaerobic digestion, centrifuges, and sand drying beds).

Learning Outcomes:

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

- list some of the components of your treatment plant
- define some options to improve the plant performance
- explain influent flows and concentrative analysis
- indicate flow distribution in your plant
- discuss screening devices - bar screens
- explain grit removal
- explain the difference between standard and centrifugal grit removal devices
- indicate safety and hazardous conditions

Course Breakdown:

The following course breakdown headlines the individual sections:

- Section 01 - Introduction and Plant Operation
- Section 02 - Inflow and Infiltration and Flow Measurement and Distribution
- Section 03 - Screening and Grit Removal and the Main Pumping Station

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will be performed in the fall of 2018-19. At the beginning of 2019, student feedback and comments will be reflected in the final beta testing, along with cumulative average of student tracking and monitoring posted during the November 2019 – March 2019 test period.
- The ***Level 1*** and ***Level 2 Beta Testing*** has been completed and complies with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

CEU ID #	Course Title	Instructor	CEU Hours
295	Wastewater Treatment Performance & Control - part one	Russ Martin	one

CEU Plan – Content & Instructional Course Design Worksheet

Activation - 11.30.2017

CEU Plan # 295 - Wastewater Treatment Performance & Control - part one

Instructor: Russ Martin

amount of course hours**:** one hour

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:** 16.07 Minutes **quiz:** 10 minutes **accumulative: 26** minutes	Introduction	● describe the Flagg Creek facility ● list some of the components of your plant ● define some of the options to improve the plant	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:** 16.46 Minutes **quiz:** 10 minutes **accumulative: 27** minutes	Influent Flow Analysis	● describe the flow monitoring ● explain influent flow and concentrative analysis ● indicate the flow distribution within your plant ● compare the influent flow measurement components	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 Final Course Requirements	**content:** 18.29 Minutes **quiz:** 10 minutes **accumulative: 28** Minutes	Screenings and Grit Removal	● discuss screening devices - bar screens ● explain grit removal ● compare the differences between standard and centrifugal grit removal types ● indicate safety and hazardous	Streaming Based Online	Written Exam **Final Course Essay and Evaluation form**	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 download worksheet and proceed to the quiz will be indicated. Complete the essay and evaluation form, prior to course being complete.

Accumulative Time:

sec 1 =	26									
sec 2 =	27									
sec 3 =	28									

accumulative time total : 81 minutes = 1 hours = 0.1 CEU

**** standard beta allows one minute for each question and answer. As this being a wastewater treatment process control course, the student will be spending additional time in the treatment exercise. The essay requirement listing three things that they have learned from the course with a 10-15 word description of each thing is a non-measured time element of the course; it is not included the beta testing.**

Assessment Analysis- Level 3 - CEU Plan Beta Testing will be performed during the fall of 2018. At the beginning of 2018, student feedback and comments will be reflected in the final beta testing results, along with accumulative average of student tracking and monitoring posted during the September - December 2018 test period.

The Level 1 and Level 2 Beta Testing have been completed and comply with the ANSI I IACET 1-2018 Standard, along with the internal review by CEU Plan.

Student Feedback:

- to be inserted, upon course activation and student feedback and final beta testing completed
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Author Full Name: Russ Martin

Experience:

Russ Martin worked at USEPA for more 40 years, retiring at the end of 2011. Mr. Martin spent his first years in a field office figuring out that a lot of POTWs were not working right, then spent the next several years in various areas of the Construction Grants Program, awarding grants to help municipalities expand wastewater treatment capabilities. Since 1985, he has worked in wastewater treatment compliance assistance, helping more than 50 plants improve performance and has assisted a National compliance effort, funded under 104g1 of the Clean Water Act, that has improved the performance of thousands of POTWs. POTWs assisted by him have won National and/or Regional EPA operation and maintenance excellence awards in all six states in EPA Region 5. In addition, his most recent activities include: sustainable water infrastructure (especially asset management), security at POTWs and combined sewers.

Category: Operation and Control of a Treatment Plant

Course Title: Wastewater Treatment Performance & Control - part two - Flow Distribution & Activated Sludge

ANSI/IACET CEU Calculations - Required to complete this Course: one hour

Course Summary:

Part two - Primary Clarifiers, Flow Distribution, and Activated Sludge process are included in this learning adventure. We continue our virtual plant tour and operation with a discussion of flow distribution and primary separation and clarification, followed by a study of the activated sludge process and a walk-through of this portion of the treatment plant operation. With reference to the Primary Clarifiers – discussions include solids level, wasting rate, good flow split efficiency--variable depending on wastewater content (generally up to 50% removal SS & 35% BOD for separate sewers). Finally, the Activated Sludge Process and Operation discussions include color, bubble view, fine bubble vs coarse bubble and good flow split, as well as Aerators -- efficient aeration (new high-efficiency blowers can save big $$).

Utilizing a Midsized POTW, Russ Martin, the instructor for this series, will explain how one can learn to better control treatment plant performance just by walking around the POTW using one's senses, armed with the knowledge of how things are supposed to work. This enables an operator to better control a facility and to use this knowledge to make a wastewater treatment plant operate more efficiently.

Russ has built this course on the knowledge gained from assisting or evaluating POTWs over the 40 years. He worked for the USEPA in enforcement and compliance assistance and/or evaluation of facilities throughout the upper Midwest of the US. Facilities that he assisted have won Regional & National Operation and Maintenance Excellence Awards, in every State in EPA Region 5. (Buffalo, MN; Reedsburg, WI; Munising, MI; Sandwich, IL; Martinsville, IN; Fredericktown, OH) POTWs he assisted included standard and extended activated sludge, rotating biological contactors, sequencing batch reactors, trickling filters and pond systems.

(POTW – Flagg Creek one of 772 Combined Sewer Communities, 12 MGD but can go to 30 MGD, Influent flows typical (210 mg/l BOD & SS), Facilities include: Influent screening, grit removal, primary clarifiers, activated sludge, secondary clarifiers, final filters, disinfection, anaerobic digestion, centrifuges, and sand drying beds).

Course Title: Wastewater Treatment Performance & Control - part two
Flow Distribution & Activated Sludge - (this is a multiple part series)

Learning Objectives:

After completing this course, the student should be able to:

- list types of flow distribution and how they perform
- explain the rates for wasting from your primary clarifier
- describe the characteristics of process control
- compare fine to coarse bubble aeration
- list the typical residence time for various process
- explain SVIs and how their importance
- indicate Residence time through changes in flow
- compare sludge age in your process control strategy

Course Breakdown:

The following course breakdown illustrates the individual sections:

- Section 1 - Flow Distribution and Primary Clarifiers
- Section 2 – Activated Sludge - Aeration, the Walk-Around
- Section 3 – Activated Sludge Process - Aeration Tank Process Control

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will be performed in the fall of 2018-19. At the beginning of 2019, student feedback and comments will be reflected in the final beta testing, along with cumulative average of student tracking and monitoring posted during the November 2019 – March 2019 test period.
- The ***Level 1*** and ***Level 2 Beta Testing*** has been completed and complies with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

CEU ID #	Course Title	Instructor	CEU Hours
296	Wastewater Treatment Performance & Control - part two	Russ Martin	one

CEU Plan – Content & Instructional Course Design Worksheet

Activation - 09.25.2018

CEU Plan # 296 - Wastewater Treatment Performance & Control - part two - Flow Distribution & Activated Sludge

Instructor: Russ Martin

amount of course hours**:** one hour

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 **Section 1 for Course 296**	**content:** 18.11 Minutes **quiz:** 12 minutes **accumulative: 30** Minutes	Flow Distribution and Primary Clarifiers	● list types of flow distribution and how they perform ● Describe the solids levels in a primary ● explain the rates for wasting from your primary clarifier ● discuss split flow efficiency - flow distribution ● determine why you take a solids core sampling	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 download worksheet and proceed to the quiz will be indicated.

Lesson Name	Time	Content Description	Learning Outcomes	Learning Styles	Assessment	Instructional Materials	Comments
Section 2 **Section 2 for Course 296**	**content:** 17.46 Minutes **quiz:** 10 minutes **accumulative: 27** Minutes	Activated Sludge - Aeration, the Walk-Around	● illustrate the process colors ● indicate air bubbles ● compare fine to coarse bubble aeration ● describe good flow characteristics ● list some of the high efficient aspects of blower systems	Streaming Based Online	Written Exam	Required view of streaming clip, 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 **Section 3 for Course 296** **Final Course Requirements**	**content:** 14.48 Minutes **quiz:** 12 minutes **accumulative: 26** Minutes	Activated Sludge Process Aeration Tank Process Control	● describe the characteristics of process control ● define MLSS ● compare sludge age in your process control strategy ● explain SVIs and how their importance ● indicate Residence time through changes in flow ● list the typical residence time for various process	Streaming Based Online	Written Exam Essay Question - listing objectives that they learned from the course and how they apply to their job and workplace Final Course Evaluation form	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course material section Essay – listing 3 things learned and how they apply to their workplace	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 final quiz will be indicated. Complete the essay and evaluation form, prior to course being complete.

Accumulative Time:

sec 1 =	30									
sec 2 =	27									
sec 3 =	26									

accumulative time total : 83 minutes = 1 hours = 0.1 CEU

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will performed during the fall of 2018-19. At the beginning of 2019, student feedback and comments will be reflected in the final beta testing, along with accumulative average of student tracking and monitoring posted during the November – March 2019 test period.
- The ***Level 1*** and ***Level 2 Beta Testing*** have been completed and comply with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

Student Feedback:

- to be inserted, upon course activation and student feedback and final beta testing completed
-
-
-

Author Full Name: Russ Martin

Experience: **Russ Martin** worked at USEPA for more 40 years, retiring at the end of 2011. Mr. Martin spent his first years in a field office figuring out that a lot of POTWs were not working right, then spent the next several years in various areas of the Construction Grants Program, awarding grants to help municipalities expand wastewater treatment capabilities. Since 1985, he has worked in wastewater treatment compliance assistance, helping more than 50 plants improve performance and has assisted a National compliance effort, funded under 104g1 of the Clean Water Act, that has improved the performance of thousands of POTWs. POTWs assisted by him have won National and/or Regional EPA operation and maintenance excellence awards in all six states in EPA Region 5. In addition, his most recent activities include: sustainable water infrastructure (especially asset management), security at POTWs and combined sewers.

Category: Operation and Control of a Treatment Plant

Course Title: Wastewater Treatment Performance & Control - part three - Sludge Age & Secondary Clarifiers

ANSI/IACET CEU Calculations - Required to complete this Course: one hour

Course Summary:

Part three - In this section, the discussion of sludge age and how it affects process control will be reviewed, with illustrations--taking a core sample from secondary clarifiers. Russ points out some of the items to consider in your walk-around inspection of clarifiers to include: scum on top, good flow split, even flow around weirs, dye test (visual) 25 ml rhodamine dye/100,000 gal volume for short circuiting, use of baffles--Crosby for circular & standard baffles for rectangular and Clarity – 6 feet, great for standard AS, 4 ft for extended air; solids on bottom should be 1 to 2 feet, RAS MLSS should be ~2 times MLSS.

Utilizing a Midsized POTW, Russ Martin, the instructor for this series, will explain how one can learn to better control treatment plant performance just by walking around the POTW using one's senses, armed with the knowledge of how things are supposed to work. This enables an operator to better control a facility and to use this knowledge to make a wastewater treatment plant operate more efficiently.

Russ has built this course on the knowledge gained from assisting or evaluating POTWs over the 40 years. He worked for the USEPA in enforcement and compliance assistance and/or evaluation of facilities throughout the upper Midwest of the US. Facilities that he assisted have won Regional & National Operation and Maintenance Excellence Awards, in every State in EPA Region 5. (Buffalo, MN; Reedsburg, WI; Munising, MI; Sandwich, IL; Martinsville, IN; Fredericktown, OH) POTWs he assisted included standard and extended activated sludge, rotating biological contactors, sequencing batch reactors, trickling filters and pond systems.

(POTW – Flagg Creek one of 772 Combined Sewer Communities, 12 MGD but can go to 30 MGD, Influent flows typical (210 mg/l BOD & SS), Facilities include: Influent screening, grit removal, primary clarifiers, activated sludge, secondary clarifiers, final filters, disinfection, anaerobic digestion, centrifuges, and sand drying beds).

Learning Objectives

After completing this course, the student should be able to:

- discuss the process control aspects of activated sludge
- indicate the floatable scum on your clarifier tops
- list some of the clarifier conditions observed during walk around inspections
- illustrate dye test for solving short circuiting issues
- explain the process for taking a core sample of your clarifiers

Course Breakdown:

The following course breakdown illustrates the individual sections:

- Section 1 - Activated Sludge - Sludge Age
- Section 2 – Secondary Clarifiers - “walk around”
- Section 3 – continued - Clarifiers

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will be performed in the fall of 2018-19. At the beginning of 2019, student feedback and comments will be reflected in the final beta testing, along with cumulative average of student tracking and monitoring posted during the November 2018 – May 2019 test period.
- The ***Level 1*** and ***Level 2 Beta Testing*** have been completed and comply with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

CEU ID #	Course Title	Instructor	CEU Hours
297	Wastewater Treatment Performance & Control - part three	Russ Martin	one

CEU Plan – Content & Instructional Course Design Worksheet

Activation - 10.08.2018

CEU Plan # 297 - Wastewater Treatment P& C - part three - Sludge Age and Secondary Clarifiers

Instructor: Russ Martin

amount of course hours**:** one hour

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 7 **Section 1 for Course 297**	**content:** 14.41 Minutes **quiz:** 10 minutes **accumulative:** 24 minutes	Activated Sludge Sludge Age	● describe the characteristics of wastewater ● define sludge age ● discuss the process control aspects of activated sludge ● list some of the types of aeration	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.

Lesson Name	Time	Content Description	Learning Outcomes	Learning Styles	Assessment	Instructional Materials	Comments
Section 8 **Section 2 for Course 297**	**content:** 12.27 Minutes **quiz:** 10 minutes **accumulative: 22** minutes	Secondary Clarifiers "walk around"	● indicate the floatable scum on your clarifier tops ● describe effluent weir and their importance ● compare round vs square shaped clarifiers ● list some of the clarifier conditions observed during walk around inspections	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.
Lesson Name	**Time**	**Content Description**	**Learning Outcomes**	**Learning Styles**	**Assessment**	Instructional Materials	**Comments**
Section 9 **Section 3 for Course 297** **Final Course Requirements**	**content:** 15.13 Minutes **quiz:** 12 minutes **accumulative: 27** minutes	Secondary Clarifiers Part 2 - carryover from section 8 or the previous section	● illustrate dye test for solving short circuiting issues ● describe a "Secchi disk" ● explain the process for taking a core sample of your clarifiers ● discuss the readings of your core sample	Streaming Based Online	Written Exam Essay Question - listing objectives that they learned from the course and how they apply to their job and workplace Final Course Evaluation form	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course material section Essay – listing 3 things learned and how they apply to their workplace	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 =	24									
sec 2 =	22									
sec 3 =	27									

accumulative time total : 73 minutes = 1 hours = 0.1 CEU

**** standard beta allows one minute for each question and answer. As this being a process and troubleshooting course, the student will be spending additional time in the calculation and thought thinking (interactive) exercises. The essay requirement listing three things that they have learned from the course with a 10-15 word description of each thing is a non-measured time element of the course; it is not included the beta testing.**

Assessment Analysis- Level 3 - CEU Plan Beta Testing will be performed during the fall of 2018-19. At the beginning of 2019, student feedback and comments will be reflected in the final beta testing results, along with accumulative average of student tracking and monitoring posted during the February- July 2019 test period. The Level 1 and Level 2 Beta Testing have been completed and comply with the ANSI I IACET 1-2018 Standard, along with the internal review by CEU Plan.

Student Feedback:

- to be inserted, upon course activation and student feedback and final beta testing completed
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Author Full Name: Russ Martin

Experience: **Russ Martin** worked at USEPA for more 40 years, retiring at the end of 2011. Mr. Martin spent his first years in a field office figuring out that a lot of POTWs were not working right, then spent the next several years in various areas of the Construction Grants Program, awarding grants to help municipalities expand wastewater treatment capabilities. Since 1985, he has worked in wastewater treatment compliance assistance, helping more than 50 plants improve performance and has assisted a National compliance effort, funded under 104g1 of the Clean Water Act, that has improved the performance of thousands of POTWs. POTWs assisted by him have won National and/or Regional EPA operation and maintenance excellence awards in all six states in EPA Region 5. In addition, his most recent activities include: sustainable water infrastructure (especially asset management), security at POTWs and combined sewers.

Category: Operation and Control of a Treatment Plant

Course Title: Wastewater Treatment Performance & Control - part four - Final Filtration and Disinfection

ANSI/IACET CEU Calculations - Required to complete this Course: one hour

Course Summary:

Part four - In this course, the discussion of filtration and how it affects effluent process control will be reviewed with virtual tour of fabric filters in operation. Russ points out some of the items to consider in your walk-around inspection of sand, multi-media, or fabric filter devices, troubleshooting and taking care of feed by low SS. The advantages of fabric filters over sand filters will be discussed, along with comparative discussions of various types of chlorine and the proper dose & mixing, cautions to avoid short circuiting as it effects contact time (old clarifiers need baffling), examinations to make sure no solids are on the bottom, understanding the Sodium Thiosulfate reaction fairly instantaneously (needs proper mixing), and discussion of the benefits for POTWs of less than 15 mgd to consider UV for new facilities.

Utilizing a Midsized POTW, Russ Martin, the instructor for this series, will explain how one can learn to better control treatment plant performance just by walking around the POTW using one's senses, armed with the knowledge of how things are supposed to work. This enables an operator to better control a facility and to use this knowledge to make a wastewater treatment plant operate more efficiently.

Russ has built this course on the knowledge gained from assisting or evaluating POTWs over the 40 years. He worked for the USEPA in enforcement and compliance assistance and/or evaluation of facilities throughout the upper Midwest of the US. Facilities that he assisted have won Regional & National Operation and Maintenance Excellence Awards, in every State in EPA Region 5. (Buffalo, MN; Reedsburg, WI; Munising, MI; Sandwich, IL; Martinsville, IN; Fredericktown, OH) POTWs he assisted included standard and extended activated sludge, rotating biological contactors, sequencing batch reactors, trickling filters and pond systems.

(POTW – Flagg Creek one of 772 Combined Sewer Communities, 12 MGD but can go to 30 MGD, Influent flows typical (210 mg/l BOD & SS), Facilities include: Influent screening, grit removal, primary clarifiers, activated sludge, secondary clarifiers, final filters, disinfection, anaerobic digestion, centrifuges, and sand drying beds).

Learning Objectives

After completing this course, the student should be able to:

- illustrate some of the operational aspects to filters
- describe final filtration and the various types of filters
- explain the mixing aspect to disinfection
- define contact time for disinfection
- describe the proper dosage for your treatment plant
- compare chlorine to ultraviolet disinfection systems

Course Breakdown:

The following course breakdown illustrates the individual sections:

- Section 1 - Filtration - Final Filters
- Section 2 – Disinfection
- Section 3 – Chlorine and UV Disinfection

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will be performed in the fall of 2018-19. At the beginning of 2019, student feedback and comments will be reflected in the final beta testing, along with cumulative average of student tracking and monitoring posted during the November 2019 – March 2019 test period.
- The ***Level 1*** and ***Level 2 Beta Testing*** has been completed and complies with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

CEU ID #	Course Title	Instructor	CEU Hours
298	Wastewater Treatment Performance & Control - part four	Russ Martin	one

CEU Plan – Content & Instructional Course Design Worksheet

Activation - 11.8.2018

CEU Plan # 298 - Wastewater Treatment P & C - part four - Filtration and Disinfection

Instructor: Russ Martin

amount of course hours: one hour

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 10 **Section 1 for Course 298**	**content:** 13.42 Minutes **quiz:** 12 minutes **accumulative: 25** minutes	Filtration Final Filters	● describe final filtration and the various types of filters ● compare sand to fabric for filter material ● illustrate some of the operational aspects to filters	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.

Section 11 **Section 2 for Course 298**	**content:** 17.33 Minutes **quiz:** 11 minutes **Accumulative: 28** minutes	Disinfection	● compare gas to dry chemical feed systems ● describe the proper dosage for your treatment plant ● explain the mixing aspect to disinfection ● define contact time for disinfection	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.
Lesson Name Section 12 **Section 3 for Course 298** **Final Course Requirements**	**Time** **content:** 12.43 Minutes **quiz:** 11 minutes **accumulative: 23** minutes	**Content Description** Disinfection (continued) Chlorine and UV Disinfection	**Learning Outcomes** ● compare chlorine to ultraviolet disinfection systems ● describe the proper application for your treatment plant ● explain the mixing aspect to disinfection ● define contact time for UV disinfection	**Learning Styles** Streaming Based Online	**Assessment** Written Exam Essay Question - listing objectives that they learned from the course and how they apply to their job and workplace Final Course Evaluation form	Instructional Materials 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	**Comments** 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 =	25		sec 2 =	28		sec 3 =	23

accumulative time total : 76 minutes = one hours = 0.1 CEU

**** standard beta allows one minute for each question and answer. As this being a process control course, the student will be spending additional time in the exercise. The essay requirement listing three things that they have learned from the course with a 10-15 word description of each thing is a non-measured time element of the course; it is not included the beta testing.**

Assessment Analysis- Level 3 - CEU Plan Beta Testing will be performed during the fall of 2018-19. At the beginning of 2019, student feedback and comments will be reflected in the final beta testing results, along with accumulative average of student tracking and monitoring posted during the February - July 2019 test period. The Level 1 and Level 2 Beta Testing have been completed and comply with the ANSI I IACET 1-2018 Standard, along with the internal review by CEU Plan.

Student Feedback:

- to be inserted, upon course activation and student feedback and final beta testing completed
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Author's Full Name: Joey Leverette

Experience:

Joey Leverette has 21 years' experience in the Water & Wastewater industry, and has served in several management positions with municipal utilities and contract operations. He is a state certificated operator in Water Treatment, Water Distribution, and Water Collections in the State of Georgia. Likewise, Joey is a member of the Georgia Association of Water Professionals (GAWP) and American Water Works Association (AWWA). He has served on various committees with these associations and has authored and presented at state conferences. Mr. Leverette holds a Bachelor of Arts (BA) from the University of Georgia and a Master of Public Administration (MPA) from Georgia College and State University.

Category: Distribution and Collection Systems

Course Title: Pipeline Condition Assessment Technologies

ANSI/IACET CEU Calculations - Required to complete this Course: one hour – streaming

Course Summary:

Pipeline condition assessments are integral to optimizing the performance and analyzing risks related to any water distribution system. Aging and deteriorating water infrastructure has forced utilities to focus on the overall health and condition of their pipeline systems. Assessment technologies provide utilities with essential information to improve capital and operational planning, provide resilience of critical systems, and to facilitate regulatory compliance.

In this course, the student will learn about the traditional conditional assessments such as tabletop analysis, integrity field-testing, and corrosive soil testing. In addition, the course explores emerging technologies such as acoustical, visual, electromagnetic, and transient wave analysis technology. Detailed examples of the products currently available in the water industry are discussed in this course. The course includes a host photographs, videos, case studies, and graphics to engage the student in learning about this fascinating topic.

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

- explain the current pipeline conditions of our piping systems and materials
- compare tethered and non-tethered visual assessments – inspections
- describe the procedure and results of performing an acoustic ball test
- discuss the use of transient wave technologies for pipeline assessments
- identify some of the applications related to acoustic technologies

Course Breakdown:

The following course breakdown lists the individual sections:

- Section 1 - Introduction to Pipeline Condition Assessment
- Section 2 - Internal Acoustic & Visual Assessment Technologies
- Section 3 - Electromagnetics & Transient Analysis Pipeline Condition Assessments

CEU ID #	Course Title	Instructor	CEU Hours
306	Pipeline Condition Assessment Technologies	Joey Leverette	1 hr.

CEU Plan – Content & Instructional Course Design Worksheet

CEU Plan # 306 - Pipeline Condition Assessment Technologies

Activation - 08.18.2020

Instructor: Joey Leverette

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:** 16.25 Minutes **quiz:** 10 minutes **accumulative: 26** minutes	Introduction to Pipeline Condition Assessment	● explain the current pipeline conditions of our piping systems and materials ● describe the type of corrosive soil testing ● compare the benefits of pipeline condition assessment ● perform a pipe-wall thickness test (Integrity Testing)	Video Clip illustrating content within this section	Computer Based Exam	Required view of streaming clip, via streaming – take quiz upon completion of course material section View table, Charts, and Photograph Images View the video clip	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:** 16.51 Minutes **quiz:** 10 minutes **accumulative: 27** minutes	Internal Acoustic & Visual Assessment Technologies	● compare tethered and non-tethered visual assessments - inspections ● identify some of the applications related to acoustic technologies ● describe the procedure and results of performing an acoustic ball test	Streaming Based Online	Computer Based 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 **1 Hour Courses** Final Course Requirements	**content:** 12.22 Minutes **quiz:** 10 minutes **accumulative: 22** Minutes	Electromagnetics and Transient Analysis Pipeline Condition Assessments	● explain electro-magnetic devices used in conditional assessments ● define what a pipe diver measures ● discuss the use of transient wave technologies for pipeline assessments	Streaming Based Online	Computer Based Exam **Final Course Essay and Evaluation form**	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.-plus-At the conclusion of the course section, instructions to download worksheet and proceed to the quiz will be indicated. Complete the essay and evaluation form, prior to course being complete.

Accumulative Time:

sec 1 =	26									
sec 2 =	27									
sec 3 =	22									

accumulative time total : 75 minutes = 1 hours = 0.1 CEU

**** standard beta allows one minute for each question and answer. The essay requirement listing three things that they have learned from the course with a 10-15 word description of each thing is a non-measured time element of the course; it is not included the beta testing.**

Assessment Analysis- Level 3 - CEU Plan Beta Testing will be performed during the fall of 2020-21. At the beginning of 2021, student feedback and comments will be reflected in the final beta testing results, along with accumulative average of student tracking and monitoring posted during the February - July 2021 test period. The Level 1 and Level 2 Beta Testing have been completed and comply with the ANSI I IACET 1-2018 Standard, along with the internal review by CEU Plan.

Student Feedback:

- to be inserted, upon course activation and student feedback and final beta testing completed
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Author Full Name: Tom Hofer

Experience:

Thomas Hofer is a retired U.S. Army Warrant Officer and Military Intelligence (MI) professional with nearly 30 years of service. Thomas had enlisted time as a Prisoner of War (IPW) interrogator followed by 25 years as an Army Warrant Officer, reaching the most senior warrant officer rank - Chief Warrant Officer 5 (CW5). In his final military assignment, Thomas served as an instructor with the Central Intelligence Agency's clandestine operations course. Following his 2003 military retirement, Thomas embarked on a second career as a clandestine operations officer with the Central Intelligence Agency until his retirement in 2014. Thomas was named an Exceptional Intelligence Collector by the Intelligence Community Staff in 1985. His military awards include multiple awards of the Legion of Merit and Defense Meritorious Service medal.

Category: Supervision and Management

Course Title: Risk Assessment & Emergency Response Planning for Utility Professionals

ANSI/IACET CEU Calculations - Required to complete this Course: one hour

Course Summary:

This one-hour short course focuses on preparing the risk assessment and emergency response plan required by the 2018 America's Water Infrastructure Act for water utility professionals. The following course breakdown illustrates the individual sections:

Section 01 – *Requirements of the 2018 America's Water Infrastructure Act* - An overview of the provisions of the 2018 America's Water Infrastructure Act which requires utility operators to conduct a risk assessment of the vulnerabilities, threats and consequences in the event of a natural disaster or malevolent act. The act is explained in detailed and provides an orientation of the issues involved in creating and updating a risk assessment.

Section 02 – *Conducting the Water Utility Risk Assessment* – explaining the basic principles in creating a risk assessment; discussion of terminology and a systematic treatment of the risk management process, using the international standards for risk management. Assisting the utility operator in the preparation of the required risk assessment for water utility organizations.

Section 03 - *Implementing a Resiliency Assessment – Emergency Response Plan* – Creating an Emergency Response Plan in response to the legal requirements of Section 2013, America's Water Infrastructure Act, using an international standard – ISO 22301 – Business Continuity Management as a guide; how to set up your utility's emergency response team.

Learning Outcomes:

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

- understanding of your utility's obligation to conduct a risk assessment and an emergency response plan (resiliency assessment) mandated by the America's Water Infrastructure Act
- create and use a risk management system
- explain an emergency response plan to deal with natural disasters or malevolent acts
- describe in detail and provide an orientation of the issues involved in creating and updating a risk assessment
- define the terminology of the risk management process
- compare emergency preparedness and how it applies to the ISO Standards

Course Breakdown:

The following course breakdown illustrates the individual sections:

- Section 1 – An Overview of the 2018 American Water Infrastructure Act (AWIA)
- Section 2 – Conducting the Water Utility Risk Assessment
- Section 3 – Implementing a Resiliency Assessment - Emergency Response Plan

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will be performed in the fall of 2019-20. At the beginning of 2020, student feedback and comments will be reflected in the final beta testing, along with cumulative average of student tracking and monitoring posted during the November 2019 – May 2020 test period.
- The ***Level 1*** and ***Level 2 Beta Testing*** has been completed and complies with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

CEU ID #	Course Title	Instructor	CEU Hours
308	Risk Assessment & Emergency Response Planning	Hofer	one

CEU Plan – Content & Instructional Course Design Worksheet

Activation - 10.14.2019

CEU Plan # 308 - Risk Assessment and Emergency Response Planning for Utility Professionals

Instructor: Tom Hofer

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:** 16.40 Minutes **quiz:** 10 minutes **accumulative: 26** minutes	An Overview of the 2018 American Water Infrastructure Act (AWIA)	● explain the basic concepts involved in planning a risk assessment ● describe the provisions of the 2018 American Water Infrastructure Act (AWIA) ● indicate your vulnerabilities and threats associated with your utility	Text with Streaming Online monitor of student's progress measured in elapsed time (in minutes) Reinforcement Techniques: utilize images and illustrations for double Reinforcement of Need-to-Know criteria	Take quiz Online monitor of student's progress measured in score Percent (70% min) pass/fail	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course content 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

Author's Full Name: Alan Bowers, PhD.

Experience:

Dr. Bowers is an Associate Professor of Civil and Environmental Engineering at Vanderbilt University in Nashville, Tennessee where he has been on the faculty for 28 years. He teaches courses related to environmental engineering, including Introduction to Environmental Engineering, Environmental Chemistry, Biological Unit Processes, and Physical Chemical Unit Processes. He has been a consultant to a variety of federal agencies (DOE, USAF, US Navy), state and local entities, and industries, and has been involved in research related to modeling and operation of biological wastewater treatment processes, transport of metals in soils and groundwater, dehalogenation of chlorinated organics, and chemical oxidation of toxic and refractory organic compounds. Dr. Bowers has numerous publications appearing as edited books, book chapters, conference proceedings and articles in refereed journals.

Category: Government Rules & Regulations - Distribution and Collection Systems

Course Title: Drinking Water: Leaded or Unleaded?

ANSI/IACET CEU Calculations - Required to complete this Course: one hour – streaming

Course Summary:

Drinking Water: Leaded or Unleaded? Is a one-hour course based around the history of Lead and how it was used in the early days for water transmission. The course provides a timetable of the historical limitations put on Lead and finally the elimination of the Lead Service Lines. The instructor describes the chemical reactions in the Flint, MI water supply case and provides some insights of the contamination with some potential solutions conducted. This course is included in the Lead and Copper course package series available to drinking water and distribution systems.

Learning Outcomes:

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

- describe the health risks associated with Lead Service Lines (LSL)
- indicate the timeline of regulatory updates to lead limitation limits
- describe the specific actions taken to implement Corrosion Control and removal of Lead pipes
- compare the scale formation and potential solutions
- define the "Langelier Index" use for corrosion determination of LSLs
- explain the chemical reaction in LSLs

Course Breakdown:

The following course breakdown lists the individual sections:

- Section 1 - History of Lead in Drinking Water origin current Issues Health Matters
- Section 2 - Drinking Water Standards & Legislative Efforts related to Lead
- Section 3 - Corrosion and Corrosion Control Treatment and What Happened in Flint, MI

CEU ID #	Course Title	Instructor	CEU Hours
313	Drinking Water: Leaded or Unleaded?	Alan Bowers	1 hr.

CEU Plan – Content & Instructional Course Design Worksheet

Preparing for Activation - 09.00.2020

CEU Plan # 313 - Drinking Water: Leaded or Unleaded?

Instructor: Alan Bowers

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:** 9.03 Minutes **quiz:** 10 minutes **accumulative: 19** minutes	History of Lead in Drinking Water origin current Issues Health Matters	● explain the history of lead pipes ● describe the health risks associated with Lead Service Lines (LSL) ● indicate locations for human exposure to lead	Text with Streaming Online monitor of student's progress measured in elapsed time (in minutes) Reinforcement Techniques: utilize images and illustrations for double Reinforcement of Need-to-Know criteria	**Computed based exam** Online monitor of student's progress measured in score Percent (70% min) pass/fail	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course content 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:** 11.10 Minutes **quiz:** 10 minutes **accumulative:** **21** minutes	Drinking Water Standards & Legislative Efforts related to Lead	● discuss the development of the USEPA Lead and Copper Rule ● indicate the timeline of regulatory updates to lead limitation limits ● describe the specific actions taken to implement Corrosion Control and removal of Lead pipes	Text with Streaming Online monitor of student's progress measured in elapsed time (in minutes) Reinforcement Techniques: utilize images and illustrations for double Reinforcement of Need-to-Know criteria	**Computed based exam** Online monitor of student's progress measured in score Percent (70% min) pass/fail	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course content 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 Final Course Requirements	**content:** 19.47 Minutes **quiz:** 10 minutes **accumulative:** **29** Minutes	Corrosion and Corrosion Control Treatment and What Happened in Flint, MI	● explain the chemical reaction in LSLs ● compare the scale formation and potential solutions ● define the "Langelier Index" use for corrosion determination of LSLs	Text with Streaming Online monitor of student's progress measured in elapsed time (in minutes) Reinforcement Techniques: utilize images and illustrations for double Reinforcement of Need-to-Know criteria	**Final Exam** Essay – listing 3 things learned and how they apply to their workplace Online monitor of student's progress measured in score Percent (70% min) pass/fail	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 Complete Evaluation form	Inform students of the required assignments in the header of the last section At the conclusion of this section, instructions to proceed to the final quiz will be indicated. Followed by the Evaluation form and essay requirement

Accumulative Time:

sec 1 =	19									
sec 2 =	21									
sec 3 =	29									

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

**** standard beta allows one minute for each question and answer. The essay requirement listing three things that they have learned from the course with a 10-15 word description of each thing is a non-measured time element of the course; it is not included the beta testing.**

Assessment Analysis- Level 3 - CEU Plan Beta Testing will be performed during the fall of 2020-21. At the beginning of 2021, student feedback and comments will be reflected in the final beta testing results, along with accumulative average of student tracking and monitoring posted during the February - July 2021 test period. The Level 1 and Level 2 Beta Testing have been completed and comply with the ANSI I IACET 1-2018 Standard, along with the internal review by CEU Plan.

Student Feedback:

- to be inserted, upon course activation and student feedback and final beta testing completed
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Author's Full Name: Lisa Daconta

Experience:

Lisa Daconta received her Masters of Education from the University of Arizona with Honors and received the 2017 Outstanding Teach Arizona Student Teacher Award. Her passion for Chemistry and Biology during her studies led to various opportunities to demonstrate her knowledge and interest in the chemical aspects of drinking water and water reuse programs. Lisa spent a couple of years as a Lab Tech in preparation, organization and maintenance, while utilizing this experience to assist students from Community Colleges and Science Centers. Her remarkable investigation of incorporating jojoba oil into biodiesel fuels was published in the Journal of Chemical Education, while she was involved with the Mesa Community College in AZ.

Lisa married her fifth-grade sweetheart, who is serving our country in the US Navy. They are currently stationed in Virginia and recently brought a nice addition to their family. Lisa has developed an excellent selection of training courses applicable to the drinking water and wastewater treatment field. She has created a unique and timely course: **Chemistry of Lead Contamination in Drinking Water**. This has been included in the **Lead and Copper** course package series.

Category: Government Rules & Procedures for Water & Wastewater Treatment

Course Title: Chemistry of Lead Contamination in Drinking Water

ANSI/IACET CEU Calculations - Required to complete this Course: one hour

Course Summary:

This one-hour course provides a basic understanding of chemistry, as it applies to Lead and Lead Contamination. How we got there, what to understand about the corrosiveness, and a couple case studies of two cities involved in Lead Contamination in their Drinking Water. The instructor begins with the discussion of solutes, solvents, and solutions and how they relate to the concentrations of lead found in the drinking water supplies. This course is designed for everyone involved in drinking water and distribution systems.

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

- indicate the difference between Lead and Copper in drinking water
- describe the chemical reaction when lead ions are present in the water where sodium hydroxide is ADD in the test tube
- explain some chemical terms used in water treatment
- compare some of the Lead levels between Newark, NJ and Flint, MI case studies
- explain the use of ortho-phosphate in the water supply
- indicate the concentration of the liquid
- what is a precipitate?

Course Breakdown: The following course breakdown highlights the individual sections:

- **Section 1 –** Solutes, Solvents, Solutions, and Concentrations
- **Section 2 –** Precipitation
- **Section 3 –** Oxidation and Corrosion Inhibitors

Learning Outcomes – Assessment Analysis:

- ***Assessment Analysis – Level 3 - CEU Plan Beta Testing*** will be performed in the fall of 2020-21. At the beginning of 2021, student feedback and comments will be reflected in the final beta testing, along with cumulative average of student tracking and monitoring posted during the February – July 2021 test period. The ***Level 1*** and ***Level 2 Beta Testing*** has been completed and complies with the ANSI / IACET 1-2018 Standard, along with the internal review by CEU Plan.

CEU ID #	Course Title	Instructor	CEU Hours
319	Chemistry of Lead Contamination in Drinking Water	Daconta	one

CEU Plan – Content & Instructional Course Design Worksheet

activated: 9.XX.2020

CEU Plan # 319 - Chemistry of Lead Contamination in Drinking Water **Instructor: Lisa Daconta**

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
1st Section	**content:** 11.36 Minutes **quiz:** 10 minutes **accumulative: 21** minutes	**Solutes, Solvents, Solutions, and Concentrations**	● explain some chemical terms used in water treatment ● compare the different solution terms ● indicate the concentration of the liquid	Text with Streaming Online monitor of student's progress measured in elapsed time (in minutes) Reinforcement Techniques: utilize images and illustrations for double Reinforcement of Need-to-Know criteria	**Computed based exam** Online monitor of student's progress measured in score Percent (70% min) pass/fail	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course content 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:** 13.36 Minutes **quiz:** 10 minutes **accumulative:** **23** minutes	**Precipitation**	● describe the chemical reaction when lead ions are present in the water where sodium hydroxide is ADD in the test tube ● what is a precipitate? ● explain the agent that entered the Flint MI water supply	Text with Streaming Online monitor of student's progress measured in elapsed time (in minutes) Reinforcement Techniques: utilize images and illustrations for double Reinforcement of Need-to-Know criteria	Computed based exam Online monitor of student's progress measured in score Percent (70% min) pass/fail	Required view of streaming clip, listen to audio presentation via streaming – take quiz upon completion of course content 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 **FINAL SECTION**	**content:** 17.08 Minutes **quiz:** 10 minutes **accumulative:** 27 minutes	**Oxidation and Corrosion Inhibitors**	● compare some of the Lead levels between Newark, NJ and Flint, MI case studies ● explain the use of ortho-phosphate to the water supply ● indicate the difference between Lead and Copper	Text with Streaming Online monitor of student's progress measured in elapsed time (in minutes) Reinforcement Techniques: utilize images and illustrations for double Reinforcement of Need-to-Know criteria	**Final Exam** Essay – listing 3 things learned and how they apply to their workplace Online monitor of student's progress measured in score Percent (70% min) pass/fail	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 Complete Evaluation form	Inform students of the required assignments in the header of the last section At the conclusion of this section, instructions to proceed to the final quiz will be indicated. Followed by the Evaluation form and essay requirement

Accumulative Time:

sec 1 =	21	sec 2 =	23	sec 3 =	27

accumulative time total : 71 minutes = 1 hours = 0.1 CEU

**** standard beta allows one minute for each question and answer. The essay requirement listing three things that they have learned fro a 10 - 15-word description of each thing is a non-measured time element of the course; it is not included the beta testing.**

Assessment Analysis- Level 3 - CEU Plan Beta Testing will be performed during the fall of 2020-21. At the beginning of 2021, student feedback and comments will be reflected in the final beta testing results, along with accumulative average of student tracking and monitoring posted during the February - July 2021 test period. The Level 1 and Level 2 Beta Testing have been completed and comply with the ANSI I IACET 1-2018 Standard, along with the internal review by CEU Plan.

Student Feedback:

CEU Plan

Accreditation through

AUTHORIZED IACET PROVIDER

ANSI Accredited Certification Program

www.ceuplan.com

System includes:

ANSI American National Standards Institute

Adobe PDF Adobe

Adobe Photoshop 7.0

Cisco Systems

Cloud Power Microsoft

Microsoft

Microsoft Office

.mac

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