Industrial Waste Treatment, Volume 2
C—Anaerobic Treatment and Residual Solids Management
California State University, Sacramento
(3.5 Continuing Education Units)

COURSE DESCRIPTION

This course is designed to train operators in the practical aspects of operating and maintaining industrial wastewater treatment facilities emphasizing safe practices and procedures. Information is presented on anaerobic wastewater treatment processes, their design and construction, and their operation and maintenance as well as solids handling and disposal, preliminary sludge processing, sludge thickening, sludge stabilization, and dewatering and volume reduction.

COURSE OUTLINE

This course trains industrial waste treatment operators to safely and effectively operate and maintain anaerobic treatment processes and to safely handle, treat, and dispose of residual solids and sludge from industrial waste treatment facilities.

Chapter 5, Anaerobic Treatment

Learning Objectives

1. Explain the basic principles of anaerobic treatment processes and their safe operation.
2. Describe various types of anaerobic reactors and treatment configurations.
3. Discuss the parameters that influence anaerobic treatment's process performance and identify symptoms of process upset.
4. Recognize the steps to start up, operate, and shut down an anaerobic treatment unit safely.
5. Explain how the basic laboratory tests are used to monitor and evaluate anaerobic treatment process performance.

The main purpose of this chapter is to train operators in the basic operation and maintenance of anaerobic treatment processes at industrial wastewater treatment facilities, including reactors, process parameters, and configurations.

Chapter 6, Residual Solids Management

Learning Objectives

1. Understand sludge types, characteristics, processing needs and pumping processes, and the regulatory framework through which these materials can be treated and disposed of.
2. Explain the startup, operation, shutdown, and maintenance requirements for sludge treatment processes. Develop operating procedures and strategies for all operating conditions, including process performance troubleshooting.
3. Identify potential safety hazards and conduct operation and maintenance duties using safe procedures.
4. Describe the solids or sludge disposal options and how each option is performed within federal, state, and local regulations and guidelines.

The main purpose of this chapter is to train operators in the handling, discharge, and disposal of solids and sludge generated during industrial wastewater treatment processes.

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TIME ASSIGNMENT

Text pages: The content from the training manual used in this course, *Industrial Waste Treatment*, Volume 2, includes 334 pages. The average word count on a page from the training manual is 525 words. The training manual used for this course contains text, tables, graphs, illustrations, math example problems, section questions, and chapter review questions to enhance the presentation of information and the student learning experience. The course is designed for students to spend the same amount of time reading the tables, graphs, and illustrations as they spend reading the equivalent amount of related chapter text. Therefore, each page is assumed to contain the equivalent of 525 words. The average reading speed is 130 words per minute; therefore, each page is projected to require 4 minutes of student time for each reading.

Math example problems: The course contains 51 math example problems. The projected average time to solve each math problem is 3 minutes.

Section questions: The course contains 136 section questions, located in the "Check Your Understanding" sections integrated throughout the chapter text. These questions enable students to self-assess their understanding of a section's material before proceeding to the next section. The projected average response time is 2 minutes per question.

Chapter review questions: The course contains 85 review questions, located in the "Chapter Review" at the end of each chapter. Question types include fill-in, multiple choice, and matching. The projected average response time is 2 minutes per question.

Objective test questions: The course contains 90 test questions. There is 1 objective test per chapter. The projected average response time is 2 minutes per question.

Course component	Number of component units		Minutes required to complete component unit		Total time assignment for component
Text pages	334	×	4	=	1,336
Math example problems	51	×	3	=	153
Section questions	136	×	2	=	272
Chapter review questions	85	×	2	=	170
Objective test questions	90	×	2	=	180
					2,111 minutes
					35.2 or 35 hours

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