



A Non-Profit Educational Corporation

OCT WATER QUALITY ACADEMY
A US Government Funded Education Contractor
An ANSI/IACET Accredited School Nationwide
Class Description Submittal to OESAC

Title: Water Plant Equipment Evaluation & Maintenance Job Tasks

A Certification Preparation Workshop for ABC Water Plant Operators.
 New Class , or **Class Renewal**

CEU Award requested: **1.4 CEUs/day**

ABC Preview Information for OESAC Members:

This is a two (2) day *Water Plant Equipment Evaluation, Inspection & Maintenance Job Tasks* certification review class that is designed to help all Grade 1 – 4 water plant operators successfully respond to the July 2017 ABC Need-to-Know criteria found on each level examination.



The subject matter topics listed in workbook **W -162** respond to every topic listed by ABC in their Need-to-Know criteria outline. However, there is no implied claim that this certification preparation review class will cover every possible point that a water plant operator will be tested on during an ABC examination. Nevertheless, our intention has been to include as much essential basic information as possible that will be useful for all water plant operators in this category. See addendum.

CLASS OVERVIEW:

Upon completion of the class, learner will be able to:

- Understand preventative, predictive, and deferred maintenance, run to failure mode. How maintenance fits into and affects asset management plans, emergency response, compliance, staffing, and budgeting.
- Learn about Calibrating meters; Flow, level and pressure sensors and SCADA. Know Safety rules and guidelines when working with chemicals PPE and storage, as well as safety rules and guidelines when working with mechanical equipment.
- Learn about water pressure concepts; static, dynamic, and water system total pressure. Solve typical hydraulic math problems.
- Learn about Maintenance Management and methods.
- Learn about chemical feed pump math.
- Learn about disinfection equipment (e.g., Chemical Feeders, UV, Ozone equipment, pH adjustment equipment and Dechlorination).

- Review Pumps Inspect and Maintain, Pumps - centrifugal, positive displacement, etc. Chemical feed pumps.

CLASS DESCRIPTION:

DETAILED SUPPORTING DESCRIPTION:

Glossary of Maintenance Words and Terms.

Chapter 1. Maintenance and Inspection concepts - Expanded overview.

- **Preventative, predictive, and deferred maintenance, run to failure mode.**
- How maintenance fits into and affects asset management plans, emergency response, compliance, staffing, and budgeting.
- Condition assessment - how it is used to establish priorities and establish action plans.
- Maintenance planning software, operator records/logs.



Chapter 2. Monitoring Equipment

- Calibrate meters.
- Flow, level and pressure sensors.
- SCADA.
- Weirs.
- Ultrasonic sensors.
- Chemical feed, influent/effluent, recording devices.
- Composite sampling devices.
- Analyzers (e.g., DO, pH, H₂S, ORP).



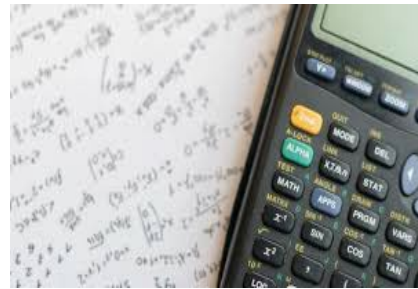
Chapter 3. Safety.

- Safety rules and guidelines when working with chemicals PPE and storage.
- Safety rules and guidelines when working with mechanical equipment.
- Electrical, traffic, trench, fall protection.
- Chlorine gas.
- Blood borne disease.
- Confined space.



Chapter 4. Maintenance Management.

- Control Costs and Budget
- Comply with Regulations
- Plan Maintenance Work
- Extend Useful Machine Life
- Develop Improved Policies, Procedures, and Standards



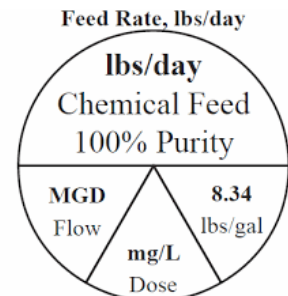
Chapter 5. Chemical Feed Pump Equipment.

- Feed System Components
- Delivery Systems
- Chemical Feed Systems
- Chemical control Systems
- Water Treatment Polymer Feed Systems



Chapter 6. Chemical Feed Pump Math.

- Learn the basic chemical feed pump sizing formula.
- “Flow rate” is normally used to describe the raw water flow or the treatment water flow. Typically, it will be expressed in terms of millions of gallons per day (MGD) or gallons per minute (GPM).
- The terms “mg/L” and “ppm” are used to describe a weight or volume - based dosages.
- The calculation of how much chemical to add to the water is based on the ratios of those chemicals dosed to the water.



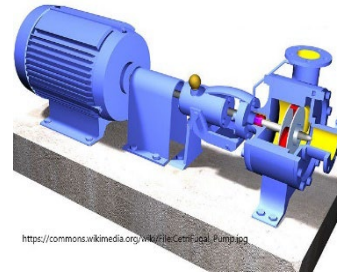
Chapter 7. Disinfection equipment Inspect and Maintain (disinfection and dechlorination)

- Disinfection equipment (e.g., Chemical Feeders, UV, and ozone).
- Ozone equipment.
- pH adjustment equipment.
- Dechlorination –
 - a. Sulfur based, sodium bisulfite - feed, monitoring and calibration
 - b. Non-sulfur based, Vitamin C, Ascorbic acid.
- Residual measurement equipment and receiving water issues.
- Chemical handling and safety equipment related- storage issues, SCBA, PPE , sensors, and ventilation.



Chapter 8. Pumps Inspect and Maintain (pumps, electrical and generators)

- Pumps - centrifugal, positive displacement.
- Lift pumps.
- Foot valves, throttling valves.
- Impeller clearance.
- Cavitation.
- Pressure testing,
- Amperage measurement imbalance, common problems, etc.
- On-off and control settings.
- Sludge pumping, return and waste.



OBJECTIVES:

- Students will learn the detailed information presented in above eight (8) chapter workbook, chapter-by-chapter.
- Students will gain a basic fundamental knowledge of all topics listed in the outline above.
- Students will have the opportunity to interact with an experienced instructor to clarify information on problems where they lack knowledge and understanding.
- Students will be prepared for state operations examinations to increase licensure in their state of residence.

TIME PRESENTATION OUTLINE:

Day 1:

Start Time	End Time	Instructional Time	Allotted Break Time	Chapter/Discussion/Quiz
8:00am	8:50am	50 minutes	8:50am–9:00am	Maintenance and Inspection concepts.
9:00am	9:50am	50 minutes	9:50am–10:00am	Maintenance and Inspection concepts.
10:00am	10:50am	50 minutes	10:50am-11:00am	Monitoring Equipment.
11:00am	12:00pm	60 minutes	12:00pm-12:30pm	Monitoring Equipment.
12:30pm	1:20pm	50 minutes	1:20pm-1:30pm	Safety.
1:30pm	2:20pm	50 minutes	2:20pm-2:30pm	Safety.
2:30pm	3:20pm	50 minutes	3:20pm-3:30pm	Maintenance Management.
3:30pm	4:30pm	60 minutes		Maintenance Management.
		420 minutes		

6 sessions of 50 minutes of instruction and 2 sessions of 60 minutes of instruction equals 420 minutes. 420 minutes equates to 7 hours of instruction divided by 10 which is 0.7 CEUs.

Day 2:

Start Time	End Time	Instructional Time	Allotted Break Time	Chapter/Discussion/Quiz
8:00am	8:50am	50 minutes	8:50am–9:00am	Chemical Feed Pump Equipment.
9:00am	9:50am	50 minutes	9:50am–10:00am	Chemical Feed Pump Equipment.
10:00am	10:50am	50 minutes	10:50am-11:00am	Chemical Feed Pump Math.
11:00am	12:00pm	60 minutes	12:00pm-12:30pm	Chemical Feed Pump Math.
12:30pm	1:20pm	50 minutes	1:20pm-1:30pm	Disinfection Equipment Operations, Inspection and Maintenance, Disinfection and Dechlorination
1:30pm	2:20pm	50 minutes	2:20pm-2:30pm	Disinfection Equipment Operations, Inspection and Maintenance, Disinfection and Dechlorination
2:30pm	3:20pm	50 minutes	3:20pm-3:30pm	Pump Inspection and Maintenance.
3:30pm	4:30pm	60 minutes		Pump Inspection and Maintenance.
		420 minutes		

6 sessions of 50 minutes of instruction and 2 sessions of 60 minutes of instruction equals 420 minutes. 420 minutes equates to 7 hours of instruction divided by 10 which is 0.7 CEUs.

ADDENDUM

ABC Need to know topics, as of June, 2017

ABC - Water Treatment Grade 1

Exam Content Outline

Number of Questions	Content Area	Job Task Complexity Levels
30	Treatment Process	12 18 0
13	Laboratory Analysis	5 8 0
27	Equipment Operation & Maintenance	11 16 0
10	Source Water Characteristics	4 6 0
20	Security, Safety, Compliance, & Administrative Procedures	9 11 0
100*	Total	41 59 0

This exam includes **8** calculation questions

*Your exam may contain up to 10 extra unscored pre-test questions (see *Before You Dive In* for more details).

ABC - Water Treatment Grade 2

Exam Content Outline

Number of Questions	Content Area	Job Task Complexity Levels
31	Treatment Process	8 17 6
14	Laboratory Analysis	5 8 1
24	Equipment Operation & Maintenance	7 15 2
11	Source Water Characteristics	2 7 2
20	Security, Safety, Compliance, & Administrative Procedures	9 11 0
100*	Total	31 58 11

This exam includes **10** calculation questions

*Your exam may contain up to 10 extra unscored pre-test questions (see *Before You Dive In* for more details).

END