



American Water Works Association
Pacific Northwest Section
Northwest Washington Subsection

Course Description & Outline

Math for Operators Segment – 3 hours (see schedule)

Water and Wastewater Operator Certification tests continue to show one of the weaker skills in operators is math. Competent math skills are required for operators in setting pumping rates, chemical feed and maintenance activities. This presentation will start with the basics of arithmetic, algebra, and trigonometry, and spend a significant amount of time in developing the important skills of tracking and changing units.

A wide range of relevant problems will be worked through step-by-step to show and reinforce the process. The session will conclude with operators working through several problems on their own and then checking the answers and process against the instructor's in a step-by-step review so attendees can see errors or alternative approaches to getting to the correct result.

Problems used have been taken from example tests and actual facility needs.

Each attendee will be given a copy of the ABC Professional Operator Formula/Conversion Table. A segment of the workshop is set aside to review this tool and discuss other references available to the operator in their daily routine.

The material presented is applicable for both water and wastewater operators. Examples and problems from each will be used in the presentations and the attendee problem solving.

Reading Process and Instrumentation Diagrams Segment – 3 hours (see schedule)

Process & Instrumentation Diagrams, or P&IDs, are the picture book that tells the operator how their treatment process or conveyance system works, how equipment is controlled and what the process feedback and alarms mean. To understand a P&ID diagram, operators should know how to find what each of the symbols, identification letters, and line types on a drawing signify so that the drawing can be understood and interpreted properly. The objective of this presentation is for the attendee to understand how to read a PID and to understand the story it is telling.

Specific topics are:

- What are P&IDs and why are they useful?
- What do all the symbols and notations mean?
- How do P&IDs interface with other system drawings?
- How to develop P&IDs

Discussion will also include how a local large utility uses PID drawings during project development, for project specifications, development of Standard Operating Procedures, operator training, and use of as-built drawings for maintenance and operator training.

Attendees will be given drawing examples to follow along with the presenter and learn by doing.

P&IDs are common to all treatment processes, water and wastewater. Chemical feed, mixing, pump flow control, tank level control are just a few examples of the multiple processes an operator needs to manage. Understanding the PIDs also allows the operator to be an integral part of the design of treatment facilities. It is critical for operators to understand how the processes at a treatment or pumping facility are controlled. Understanding the PIDs allows the operator to gain that understanding to provide accurate and efficient control to optimize the process and the finish product.

The classwork will include hands on review of actual P&IDs, and provide attendees an opportunity to develop a P&ID for part of one of their treatment or conveyance processes.