

**AVTEC Operator Training**  
**Water Distribution May 12-14,**  
**Energy and Heating Systems May 15-17**  
**Water Treatment May 19-23, 2014**  
**Seward, Alaska**

Course Reference and Instructional Materials for Instructors as recommended by ABC  
AWWA:

Water Sources

Water Treatment (WT) (and Workbook)

Water Transmission and Distribution (WT&D) (and Workbook)

Water Quality (and Workbook)

Basic Science Concepts and Applications (and Workbook)

Water Quality and Treatment

Water Treatment Operators Training Handbook

Water Distribution Operators Training Handbook

Water Operator Certification Study Guide

Water Distribution System Operation and Maintenance

Water Treatment Plant Operation

Math for Distribution System Operators

Math for Water Treatment Operators

ABC Practice tests (3 each)

4 sets math problem sets (2 WT and 2 WT&D) (TBD Questions and Answers)

AWWA Instruction Videos (list attached)

27 Power Point presentations used for WT and WT&D Chapters per text/workbooks

Power Point Presentation for Regulations

Power Point Presentation for Safety

Power Point Presentation for Iron Removal with Green Sand Filters

Power Point Presentation Cross Connection Control

Power Point Presentation for Water Storage Tanks

Power Point Presentation for Distribution Systems

Power Point Presentation for Valves

8 Labs for "Hands On" instruction at shop (attached)

Materials for Students:

Text; Water Treatment and Student Workbook on hand

Text; Water Transmission and Distribution and Student Workbook on hand

Water Treatment Operator Training Handbook (classroom only) on order

Water Distribution Operator Training Handbook (classroom only) on order

Water Operator Certification Study Guide on order

## Monday May 12<sup>th</sup>

<u>Time</u>	<u>Subject</u>	<u>Chapters</u>	<u>Instructor</u>
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8:00 (Ed Lohr) Introduction to Course, Handout of ABC Math crib sheet, conduct ABC #1 Pretest, (15 minutes, 15 minutes to review answers), homework assignments (student workbooks day before classroom review) expectations of students; behavior in class and on AVTEC Property, Zero Tolerance Policy, transportation, cell phone use (must be turned off while class is in session, ok on breaks and lunch).

Watch AWWA video (Secrets to Success: How to Prepare for Operator Certification).

Classroom texts, tutoring classes, certificates of completion, and ABC test emphasis subjects, glossary review, review calculator use

**Each Chapter Module for WT and WT&D requires a classroom review of the workbook questions and answers for that Module. There is a Power Point outline or presentation for each chapter!**

9:00	Introduction to Water Distribution Systems Video: Distribution Systems PP Presentation Distribution systems	Chapter 1	Ronimus
10:00	Break		
10:20	Pipe Systems and Piping Material DVD: HDPE, DI, PVC Pipe Profile series:	Chapter 2	Ronimus
11:00	Water Storage PP, ANTHC Presentation	Chapter 3	Lohr
12:00	Lunch		
1:15	Water and Hydraulics Fundamentals Lab (see handout)		Staff
3:00	Break		
3:15	Pumps and Pumping Stations Video Pumps and Motors, PP	Chapter 4	Lohr
4:00	Hydraulics of Water Distribution Systems PP Video Centrifugal Pumps	Chapter 5	Ronimus
4:30	Valves Video Valve Operation and Maintenance, ANTHC PP	Chapter 6	Lohr

## Tuesday, May 13<sup>th</sup>

8:00 ABC Pretest #2, review answers, each student does WT&D #1 ( simple math volume and area, see attached math exercise #1 from Books)

9:00	Fire Hydrants Video Hydrants, PP	Chapter 7	Shearer
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9:30	Motors and Engines PP	Chapter 8	Ronimus
10:00	Break		
10:20	Instrumentation and Control Video SCADA and Instrumentation, PP	Chapter 9	Logan
11:00	Water Meters Video Services and Meters, PP	Chapter 10	Ronimus
12:00	Lunch		
1:15	Lab: Pipes, Valves, and WTP hardware		Wortman
3:00	Break		
3:15	Backflow Prevention and Cross Connection Control Video, PP Presentation	Chapter 11	Shearer/Ronimus
4:00	Videos on Water Loss Control, Hydrostatic Testing		
5:00	adjourn		

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### **Wednesday May 14<sup>th</sup>**

8:00	ABC Pretest #3, WD Math Problem set		
9:00	Water Main Installation Video Water Mains, PP	Chapter 12	Lohr/Wortman
9:30	Backfilling, Main Testing, and Installation Safety Video Safety First Trenching and Excavation, PP	Chapter 13	Wortman
10:00	Break		
10:20	Systems Operation Video Flushing and Cleaning, Water Main Distribution and Disinfection, PP Video Reliable Coliform Sampling	Chapter 14	Wortman
11:30	Water Services - PP	Chapter 15	Wortman
	Lunch		
1:15	Lab Pipe connecting copper HDPE (split class half HDPE/half copper)		Shearer/Wortman
5:00	Adjourn		

**Thursday May 15<sup>th</sup>**

<b>Time</b>	<b>Subject</b>	<b>Chapters</b>	<b>Instructor</b>
8:00	Information Management ARUC Data, As-builts, well logs, water quality analysis, Computer data Record Keeping and Logs, Graphing – understanding what the graphs mean PP	Chapter 16	Lohr
8:30	Systems Security and Emergency Response Video Water System Security, PP	Chapter 17	Ronimus
9:00	Public Relations - PP	Chapter 18	Ronimus
10:00	ABC Test for Water Distribution		AVTEC
12:00	Lunch		
1:00	Basic Electricity/Lock out Tag out Electrical Safety Electrical Fundamentals Ohm's Law		Shearer
1:45	Multimeter use and safety Video-Digital Multimeter Principles		Shearer
2:30	Multimeter lab Resistance Volts Amps		Shearer
3:15	Boiler Electrical Line voltage Low Voltage controls, zone valves, thermostats, relays etc.		Shearer
4:00	Boiler Electrical Lab Wire zone valve, thermostat, relay, etc.		Shearer
5:00	Review/Discussion/Adjourn/Homework assignment-Electrical		Shearer

**Friday, May 16<sup>th</sup>**

8:00	Homework Review		Shearer
8:30	Quiz--Ohm's law/electrical fundamentals		Shearer
9:00	Combustion Principles		
10:00	Draft Systems Types Operation Problems and Maintenance		Shearer

<b>Time</b>	<b>Subject</b>	<b>Chapters</b>	<b>Instructor</b>
11:00	Burner fundamentals Sequence of Operation Wiring ...Video Burners/Nozzles/Tune-up		Shearer
12:00	Lunch		
1:00	Oil Fired Burner Lab ...Tear down burners, Wire Primary Control  Bleed fuel system Test Fire Burner-Repair if necessary ...Instructor "Bug" burners with common problems.		Shearer
4:15	Discussion & Review. Homework assignment "Oil Fired Heating Systems"		Shearer
5:00	Adjourn		

**Saturday, May 17<sup>th</sup>**

8:00	Homework check/Review		Shearer
8:30	Quiz-"Oil Fired Heating Systems"		Shearer
9:00	Combustion Testing Draft Smoke Test Stack Temperature ...CO2 Efficiency		Shearer
10:30	Lab-combustion testing Or sat manual test kit Electronic test equipment		Shearer
12:00	Lunch		
1:00	Boiler Fundamentals		Shearer
2:00	Boiler Maintenance Daily/Weekly/Monthly/Annual		
2:45	Boiler Maintenance Lab ...Cleaning Heat exchanger, Combustion Chamber ...Testing Glycol ...Pressure/Temperature guage Relief Valves ...Filters Fuel System		
3:45	Heat Exchangers/Heat Recovery Field Trip Heat Recovery Systems		Shearer

4:45 Review Discussion Adjourn Shearer

**Time Subject Chapters Instructor**

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**Monday, May 19<sup>th</sup>**

8:00	Pre Test		Ronimus
9:00	Water Treatment Processes PP, Video Water Sources	Chapter 1	Ronimus
10:00	Break		
10:15	Treatment of Water at the Source PP, Video Source Water Protection	Chapter 2	Ronimus
11:30	Preliminary Treatment PP	Chapter 3	Ronimus
12:00	Lunch		
1:15	Jar Testing Lab (see attached Lab Narrative)		Staff
3:00	Coagulation and Flocculation PP, Video Coagulation, Flocculation, and Sedimentation	Chapter 4	Ronimus
4:00	Sedimentation Basins and Clarifiers	Chapter 5	Ronimus
4:30	Filtration PP, Video Filtration, Turbidity Measurements and Particle Counting	Chapter 6	Ronimus
5:00	Adjourn		

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**Tuesday May 20<sup>th</sup>**

8:00	Math Exercise WT see attached		
9:00	Filtration Cont; Jar testing Video Jar Testing (only to XX minutes per Bernard),		Ronimus/Walker
10:00	Break		
10:15	Disinfection PP, Video Disinfection Strategies, Ozone and UV	Chapter 7	Ronimus
11:00	Fluoridation PP	Chapter 8	Ronimus/Walker
11:30	Control Of Corrosion and Scaling PP	Chapter 9	Ronimus

<b>Time</b>	<b>Subject</b>	<b>Chapters</b>	<b>Instructor</b>
12:00	Lunch		
1:15	Filtration Lab (see attached Lab Narrative) Filter Operations Backwashing - Air Scouring - Turbidimeter readings		Walker
3:00	Break		
3:15	Iron and Manganese Control  PP, ANTHC PP	Chapter 10	Walker
3:45	Lime Softening PP	Chapter 11	Ronimus
4:15	Ion Exchange PP,	Chapter 12	Ronimus
4:45	Adsorption PP	Chapter 13	Ronimus
5:00	Adjourn		

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**Wednesday May 21<sup>st</sup>**

8:00	Math Exercise #4 Disinfection, dosing, target concentrations (see attached #4)		
9:00	Aeration PP	Chapter 14	Ronimus
10:00	Break		
10:15	Membrane Processes PP, Membrane Technologies	Chapter 15	Ronimus
12:00	Lunch		
1:15	Instrumentation Lab (see Lab Narrative)	AVTEC (Logan)	
3:00	Water Treatment Plant Residuals PP	Chapter 16	Ronimus
3:30	Regulations PP, ANTHC DEC reporting forms, Data logging, monitoring Summary, SNC significance		Ronimus
5:00	Adjourn		

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**Thursday May 22<sup>nd</sup>**

8:00	Math exercise #5 (see Attached)		
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<b>Time</b>	<b>Subject</b>	<b>Chapters</b>	<b>Instructor</b>
9:00	Safety PP, Videos Confined Space, Personal Protection Equipment, Safe Handling of Water Treatment Chemicals, Hazard Communication, ANTHC PP	ANTHC/AVTEC	Staff
10:15	BREAK		
10:30	Safety Cont.	ANTHC/AVTEC	
11:30	Help Agencies: ARUC, VSW, AWWMA, ARWA, EPA, ANTHC, RMW, AWWA  Math Problems		Ronimus
12:00	Lunch		
1:15	Power lab (see narrative)		AVTEC (Logan)
3:15	Review, ABC test techniques		Ronimus
5:00	Adjourn		

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**Friday May 23<sup>d</sup>**

8:00	ABC Test for Water Treatment		AVTEC
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