



# NTL ALASKA, INC.

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## INTRODUCTION TO SMALL WATER SYSTEMS

**COURSE TEXT:** *Introduction to Small Water Systems, ADEC, 2008 (3.0 CEU)*

**INSTRUCTOR:** Michael R. Pollen, President, NTL Alaska, Inc.

### **5-Day Course Outline:**

*Water Systems Course: Four 8-Hour Days with 1-Hour Lunch Breaks*

*ADEC Exams: Administered on Day 5 by a Separate ADEC Exam Proctor*

#### **1) Class Introduction**

- a) ADEC Operator Certification Regulations
- b) ABC Certification Exams
  - i) ABC Formulas and Conversion Factors
  - ii) Exam Preparation and Strategy
- c) Math Lesson Discussion
  - i) TI30XA Calculator
  - ii) Solving Math Problems
  - iii) Eight Math Exercises over 4 Days presented in 30 – 60 minute sessions

#### **2) Introduction to Drinking Water Systems**

- a) The Role of the Water System Operator
- b) What is Water?
- c) Distribution of Water on Earth
- d) Hydrologic Cycle
- e) Uses of Water
- f) History and Classifications of Water Systems
- g) Practice Quiz

#### **3) Basic Science Concepts**

- a) Chemical Characteristics of Water
- b) Chemical Characteristics Practice Quiz
- c) Biological Characteristics of Water
- d) Biological Characteristics Practice Quiz

#### **4) Introduction to Water Sources**

- a) Surface Water
- b) Raw Water Storage

*“Understanding Water”*

- c) Flow Measurement
- d) Groundwater
- e) Wells, Transmission Lines, and Flow Meters
- f) Groundwater Under the Direct Influence of Surface Water (GUDISW)
- g) Introduction to Water Sources Quiz

**5) Introduction to Water Treatment**

- a) Basic Water Treatment Unit Processes
- b) Surface Water Treatment Systems
- c) Groundwater Treatment Systems
- d) Specialized Water Treatment Processes
- e) Testing and Reporting
- f) Introduction to Water Treatment Quiz

**6) Introduction to Water Distribution Systems**

- a) System Types
- b) Pipe Installation
- c) Valves
- d) Fire Hydrants
- e) Customer Service Materials
- f) Finished Water Storage
- g) Cold Climate Operations
- h) Water Distribution System O&M
- i) Cross Connection Control
- j) Water Distribution Systems Quiz

**7) Introduction to Pumping Systems**

- a) Pump Stations
- b) Centrifugal Pump Theory
- c) Positive Displacement Pumps
- d) Basic Hydraulic terms and Concepts
- e) Pumping Hydraulics
- f) Introduction to Pumping Systems Quiz

**8) Basic Electricity and Motor Controls**

- a) Electrical Basics
- b) Pumping Electrical Systems
- c) Basic Electricity and Motor Controls Quiz

**9) Introduction to Water System Safety**

- a) Injury and Illness Prevention

- b) Major Safety Concerns
- c) Introduction to Water System Safety Quiz

#### **10) Regulations and Monitoring**

- a) Introduction
  - i) Why Compliance is Important
- b) The Safe Drinking Water Act
- c) National Drinking Water Standards & Health Effects
- d) Drinking Water Contaminants
- e) Classification of Water Systems
- f) Current Regulations to Control Microbial Contaminants
- g) Current Regulations to Control Chemical Contaminants
- h) Other Regulations
- i) Regulations and Monitoring Quiz

#### **11) Testing Your Drinking Water**

- a) Introduction
- b) Equipment
- c) Basic Laboratory Techniques
- d) Laboratory Safety
- e) Sampling Procedures
- f) Types of Samples
- g) Required Lab Testing
- h) Quality Assurance/Quality Control
- i) Recordkeeping

#### **12) Management Considerations**

- a) Water Systems Organization
- b) Emergency Response Plans
- c) Management Considerations Quiz

#### **13) Final Exams on Day 5**

- a) ADEC Provisional Level 1 Water Treatment and/or Provisional Level 1 Water Distribution Systems Exams