

**WATER SYSTEMS OPERATION SPECIALIST  
(Time-Based)**

**APPENDIX A**

O\*NET CODE 51-8031.00

This training outline is a minimum standard for Work Processes and Related Instruction. Changes in technology and regulations may result in the need for additional on-the-job or classroom training.

**WORK PROCESSES**

**Approximate Hours**

- |   |            |
|---|------------|
| <b>A. Tools, Equipment and Workplace Safety</b>   | <b>240</b> |
| <ul style="list-style-type: none"><li>1. Become familiar with tools, pipe and other materials used on the job.</li><li>2. Understand and use Personal Protective Equipment (PPE) and safety procedures.</li><li>3. Demonstrate general plant safety and security operations.</li><li>4. Plan and set up work area for safety of crew and public.</li><li>5. Ability to monitor confined spaces and traffic control zones.</li><li>6. Perform all work in conformance with the Occupational Safety and Health Administration (OSHA) guidelines for General Industry.</li><li>7. Perform all work in conformance with the Public Employees Safety and Health Act (PESH) guidelines for General Industry (where applicable).</li></ul>             |            |
| <b>B. Vehicles and Heavy Equipment (Excluding Operation)</b>  | <b>400</b> |
| <ul style="list-style-type: none"><li>1. Develop a working knowledge of pre-trip inspection which includes ensuring lights and warning lights are operational, inspecting safety chains on dump truck tailgates, ensuring audible alarms are operational, making sure pins on excavators/backhoes/tailgates are securely fastened.</li><li>2. Gain the ability to identify swing paths for excavation equipment – for both ground level and overhead (utility poles, overhead wires, oncoming vehicle or foot traffic within excavation area), understand hand signals between equipment operators and ground staff while properly setting up a work zone (signs, cones, barrels) ensuring employee, vehicle and foot traffic safety.</li></ul> |            |

3. Use necessary safety procedures while working in proximity to heavy equipment, such as: excavators, backhoes, front loaders, dump trucks, service trucks, pumps, air compressors & generators;
4. Demonstrate understanding of different excavation techniques for water and wastewater such as; excavation around natural gas lines and buried electric lines, swabbing new fitting with disinfectant to prevent any contamination before excavation, and mitigating any potential health hazards such as de-watering a water main before it is excavated;
5. Understand proper equipment placement (i.e., dump trucks next to excavation), proper materials placement and assisting the heavy equipment operator with identifying other utilities (gas & electric) in an excavation;
6. Master the overhead crane operation: safety and operation in using overhead cranes for pump and motor repairs and replacements.

### **C. System Operations & Maintenance**

**1920**

1. Develop a working knowledge of the operation, methods, and procedures of a water treatment & distribution system.
2. Perform inspection of new water lines and services.
3. Understand customer metering and billing procedures.
4. Perform leak detection and understand water loss control.
5. Read water meters, perform testing & proper sizing.
6. Demonstrate ability to read and interpret maps and drawings of the water system, locate valves, and water mains.
7. Assist with the maintenance and repair of the treatment plant, storage tanks, and the distribution system.
8. Develop a working knowledge of preventive maintenance, troubleshooting & repair of mechanical equipment.

### **D. Quality Control**

**960**

1. Learn to perform all aspects of sampling, monitoring and testing required to maintain compliance with Federal, State, and Local regulations.
2. Identify normal and out-of-range values.
3. Maintain open communication & report results to supervisors.
4. Learn emergency response procedures.

**E. Logistics, Reports and Supervision** **480**

1. Complete work order forms.
2. Order equipment and supplies as needed.
3. Document routine maintenance.
4. Visit other facilities to learn about new technology.

**Approximate Total Hours** **4000**

*Apprenticeship work processes are applicable only to training curricula for apprentices in approved programs. Apprenticeship work processes have no impact on classification determinations under Article 8 or 9 of the Labor Law. For guidance regarding classification for purposes of Article 8 or 9 of the Labor Law, please refer to <https://dol.ny.gov/public-work-and-prevailing-wage>*

# WATER SYSTEMS OPERATION SPECIALIST

## APPENDIX B

### RELATED INSTRUCTION

#### **Safety, Health, and the Workplace**

1. Safety rules & practices
2. Personal Protective Equipment (PPE)
3. OSHA Standards & state guidelines
4. First Aid & CPR (minimum 6.5 hours)
5. Safety Data Sheets (SDS)
6. 811 Call Before You Dig
7. Excavation, trenching & shoring
8. Confined space: identifying, entry & hazardous gases
9. Fire & Electrical Safety
10. Traffic control
11. Chlorine and chemical safety
12. Apprenticeship Program Overview
13. Circuit Rider training assistance
14. The National Rural Water Association (NRWA) University
15. Sexual Harassment Prevention-MUST comply with Section 201-g of the Labor Law

#### **Professional Requirements**

1. Responsibilities of a Water System Operations Specialist
2. Ethics of a public health & environmental professional
3. Customer service & community outreach
4. Professional Organizations

#### **Operations & Maintenance**

1. Pumps & Motors
2. Energy efficiency
3. Groundwater & Wells
4. Storage tanks, Valves
5. Automatic Meter Reading (AMR)

6. Advanced Metering Infrastructure (AMI)
7. Hydrants
8. Distribution systems
9. Hot tapping & service connections
10. Leak detection & repair
11. System Hydraulics
12. Disinfection
13. Chemical feed pump maintenance & calibration
14. Maintaining a residual
15. Shock chlorination
16. Chlorination & alternative disinfection methods
17. Treatment Techniques
18. Supervisory Control and Data Acquisition (SCADA)
19. Preventative maintenance
20. Cross Connection Control
21. Backflow Prevention

### **Operator Mathematics**

1. Problem solving strategies
2. Calculating chemical dosage & detention time
3. Flow & rate problems
4. Horsepower calculations

### **Security & Emergency Response**

1. Critical Infrastructure Sector designation
2. National Incident Management System
3. ISC-100: Introduction to the Incident Command System Certificate (FEMA)
4. Emergency response plans & procedures

### **Laws & Regulations**

1. Safe Drinking Water Act basics
2. Working with regulators, state laws & regulations
3. Regulatory compliance
4. Sampling procedures, compliance plans
5. Sanitary surveys
6. National Primary Drinking Water Regulations

7. Secondary Drinking Water Standards
8. Emerging contaminants

### **Introduction to Utility Management**

1. Capacity development & sustainable utility management
2. Source water protection
3. Finances, rates & billing
4. Water loss audits
5. Water University-Utility Management Certification
6. Understanding budgets, geographic information systems
7. Working with boards and elected officials

### **Overview of Construction Projects**

1. Assessment of existing facilities
2. Working with engineers & consultants
3. Preliminary design & alternatives
4. Funding sources & requirements
5. Construction design process
6. Interpreting and understanding construction plans and specifications
7. Bid process & contract signing
8. Change order & as-builts
9. Inspections
10. Resident inspector
11. Substantial completion
12. Final inspection & certification
13. Operations & maintenance manuals
14. Ongoing grant & loan requirements

### **Other Related Courses as Necessary**

A Minimum of 288 hours of Related Instruction is Required for Each Apprentice.

Appendix B topics are approved by New York State Education Department.