STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Drinking Water Operation and Maintenance Manual Outline

An Operation and Maintenance (O&M) Manual is an essential part of any water supply system. The O&M Manual serves as an important tool for existing and new employees to operate the water system safely and successfully. Water system staff should be able to utilize the O&M Manual as a quick reference guide for anything from troubleshooting to emergency procedures regarding any part of the water system. The manual identifies those steps required for cost effective, efficient, safe, and reliable system operation.

This checklist is intended to assist water systems in the development of an O&M Manual.

Content

1. Water System Identification
The O&M Manual should include the name and address of the water system, along with the physical street address, mailing address, PWS ID No., phone/fax/email contact information.

2. Table of Contents
The O&M Manual should have a Table of Contents for easy reference to important tabbed sections and information within those tabbed sections including figures, tables, appendices, etc. All pages should be numbered.

3. Introduction and Overview
This section should state the purpose of the manual and how to use it to obtain pertinent information.

4. Responsibilities of Personnel
A description of the decision-making chain of command. It should define the responsibilities and staffing requirements for each position (Owners, Board Members, Managers, Operators, etc.) and clearly define which activities require qualified and licensed/certified personnel, as well as what Operator licenses and certifications are required for operating the water system. Include a link to the Public Water System switchboard training calendar, recommended publications, and the publications furnished by the facility.

5. Permits and Standards
Provide a list of any permits, rules, and/or regulations that are applicable to the water system.

6. General System Description

A general system description includes the source of water and description of any type of treatment, principal design criteria, a flow diagram, an analysis of hydraulic capacity, pumping, storage, and distribution systems. It should include backflow prevention program and ordinance information. A system map should show the locations of all wells, intake structures, etc., pumping stations, storage tanks, and the distribution system.

7. System Operation and Control

This section should include:

A. Identification of Major System Components: Include a description of the normal operation of the component. Show the relationship of each component with other system components and relate any possible alternative operation modes and circumstances under which they would be used. Include schematic diagrams of each unit and discuss any special features that may be of importance.

B. Preventative Maintenance Program: Describe for each major component the preventative maintenance tasks (if any) that are performed. This should include types of preventative maintenance or inspection required; frequency of maintenance or inspection; and any extra ordinary changes to operations that would occur when a facility is off-line.

C. Common operating problems and emergency operations should be discussed along with methods of bypassing units and the importance of and how to use laboratory tests for unit control.

D. Routine System Operation (for each major system component): Describe the routine operational tasks that are performed and controlled. This should include start-up and shut down procedures, safety procedures, meter reading and how system performance is evaluated.

8. Laboratory Testing

This should include any samples and tests needed for compliance as well as for process control. Routine samples are collected analyzed according to an approved sample site plan and should include:

(a) Type of sample
(b) Sampling locations
(c) Name of laboratory
(d) Contact person
(e) Telephone number
(f) Monitoring schedule

Additional sampling may include:

- Disinfection residual monitoring
- Special samples for new installations or repair

9. Maintenance

General maintenance is imperative in keeping a water system in working condition. The following items should be included:

(a) General maintenance information.

(b) Preventative maintenance schedule and sample worksheets and instructions for completion.

(c) Specifications for fuels, lubricants, filters, etc. for equipment.

(d) Trouble shooting guides which references pages in the O&M manual and equipment manufacture's manuals.

(e) Record system for each type of equipment, this should include numbering system, catalog, nameplate data cards, and maintenance records.

(f) Manufacturer's maintenance schedule for routine adjustments.

(g) A work order system for maintenance of equipment with sample forms.

10. Records and Reports

Keeping and compiling records is a valuable part of an efficient water system. The following should be included in the manual:

(a) The system should maintain a list of complaints and identify responses made.

(b) Daily logs, maintenance records, laboratory records, monthly reports, monitoring reports, annual reports, operating cost reports, accident reports, and sanitary surveys. Templates with examples of each type of record and report should be included.

(c) A listing of records that are on file (permits and standards, consumption) and location of these records.

(d) Procedures for reporting records to appropriate agencies.

(e) Specify how long records should be kept on file.

11. Inventory and Storeroom

An inventory tracking system for equipment should include:

(a) An inventory of all property and equipment, both moveable and non-moveable, owned by the system.

(b) A mechanism for assigning and tracking specific items of moveable equipment to individual employees (e.g., vehicles, tools, etc.).

(c) A mechanism for storage and checking out of specialized items of equipment needed infrequently.

(d) Brief operation instructions for each item of equipment with reference to the manufacturer's technical specifications for major system components.

(e) List of warranted equipment and the warranty provisions.

(f) List of outside contract maintenance tasks.

(g) List of equipment manufacturers.

(h) List of special tools required for specific equipment.

A storeroom inventory system should include:

(a) Lists of chemicals, supplies, and spare parts kept permanently available.
(b) Recommended stock levels of supplies and chemicals and method of reordering when stock on hand drops below recommended levels.
(c) List of major suppliers with telephone numbers and contact persons.
(d) A system of requisitions and/or work orders used to distribute parts, supplies, chemicals, etc. to employees. Lists of equipment and spare parts should clearly indicate those items of equipment and parts that are essential to the operation of the system.

12. Emergency Response Program

A. An operating plan for emergencies and the procedures to be followed until normal operation can be resumed. This plan should include personnel assignments, emergency equipment inventory, and emergency numbers. Phone numbers to keep readily accessible should be police and fire departments, and the local emergency management agency. The emergency call up list should identify, in ranked order, water system personnel responsible for making decisions in specific situations. This list should include the job title, home, and work phone number (beeper/car phone number if available) for all personnel.

B. A contingency plan should also be made to insure proper treatment of water even in adverse conditions. This plan should describe conditions and procedures for putting standby and emergency sources into active service. Procedures for notifying customers, the local health jurisdiction, and IDEQ of water quality problems.

C. Safety procedures should identify workspace hazards for the water system. Potential hazards include asbestos-coated pipes, mechanical equipment, electrical, explosion and fire, health, chlorine, oxygen deficiency, laboratory and any chemicals used by the plant.

13. Utilities

List all the utilities serving the system, including phone numbers and contact persons.

14. Appendix

The appendix should contain documents and other information that cannot be easily incorporated into the main body of the manual. Large documents such as copies of plans and specifications may be stored separately from the main manual. Examples of items that might be included in appendices are:

(a) Detailed design criteria
(b) Approved shop drawings
(c) As built drawings
(d) Schematics
(e) Manufacturer's manuals
(f) Warranties
(g) Valve indices or schedule
(h) Piping color codes
(i) Sample forms
(j) List of lab chemicals
(k) Copies of any permits applicable to the system
(l) Drinking water rules
(m) Troubleshooting guides