Drinking Water Revolving Loan Fund Program ● Guidance for Submitting the

COMPREHENSIVE SYSTEM-WIDE
OPERATION AND MAINTENANCE MANUAL

LOUISIANA DEPARTMENT OF HEALTH ● OFFICE OF PUBLIC HEALTH

The DWRLF Program requires for every loan that a ***Comprehensive System-Wide Operation and Maintenance Manual*** be submitted and approved to LDH. A draft must be submitted between 50-60% physical completion of the project. An approvable Operation and Maintenance Manual must be submitted to OPH prior to 90% completion of the project. If the Operation and Maintenance Manual is not received by this time, then all payment requests submitted to OPH after 90% will not be processed until the Operation and Maintenance Manual is received.

OBJECTIVE

A Comprehensive System-Wide 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 safely and successfully operate the water plant and distribution system. When put together properly, water system staff should be able to utilize the O&M Manual as a quick reference guide for anything from trouble-shooting to emergency procedures regarding any part of the water system. The manual must also summarize the actions necessary and identify those steps required for cost effective, efficient, safe, and reliable system operation.

CONTENT

The Comprehensive System-Wide Operation and Maintenance Manual should contain the following:

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**
   Every 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 is the manual's user guide. It should state the purpose of the manual and relay to the operator how to best obtain pertinent information.

4. **Responsibilities of Personnel**
   A description of the decision-making chain of command should be provided in this section. It should define the responsibilities and staffing requirements for each position (Owners, Board Members, Managers, Operators, etc.) and should 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. Please also include a list of available trainings (including groups or agencies that provide valuable training for system personnel), 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 (i.e. LA State Sanitary Code LAC 51:XII).

6. **General System Description**
   A general system description should include the source of water and type of treatment described, principal design criteria, a flow diagram, an analysis of hydraulic capacity, pumping, storage, and distribution systems. 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

It is important to fully understand how the water system operates. 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* 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. For samples taken by the State, or taken by the system and analyzed by a State laboratory:

(a) Type of sample
(b) Sampling locations
(c) Monitoring schedule
(d) How are sample results data used to improve operation of the system

For tests to be performed by outside laboratories:

(a) Name of the laboratory
(b) Louisiana's certification number
(c) Contact person
(d) Telephone number
(e) Type of sample
(f) Sampling locations
(g) Monitoring schedule
(h) How are sample results data used to improve operation of the system.

9. 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) A general explanation of the importance of records & reports
(b) The system should maintain a list of complaints and identify responses made
(c) Daily logs, maintenance records, laboratory records, monthly reports, monitoring reports, annual reports, operating cost reports, accident reports, and sanitary surveys. Examples and sample reports of each should be included
(d) A listing of records that are on file (permits and standards, consumption)
(e) Location of records on file
(f) Procedures for reporting records to appropriate agencies
(g) Specify how long records should be kept on file

10. Maintenance

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

(a) Purpose of doing maintenance
(b) General maintenance information
(c) Preventative maintenance schedule and sample worksheets and instructions for completion
(d) Specifications for fuels, lubricants, filters, etc. for equipment
(e) Trouble shooting charts or guides which references pages in O&M manual and manufactures O&M manual
(f) Record system for each type of equipment, this should include; numbering system, catalog, nameplate data cards, maintenance record cards
(g) Manufacturer's maintenance schedule for routine adjustments. A summary with references to page number in

manufacturer's O&M manual needs to be provided
(h) A work order system for maintenance of equipment with sample forms.

11. Storeroom and Inventory System

Equipment owned by the system should be maintained in good working order and should be available for use at all times. 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 specific items of moveable equipment to individual employees (e.g. vehicles, tools, etc.)
(c) A mechanism for tracking specific items of moveable equipment by location (e.g. furniture, office equipment, etc.)
(d) A mechanism for storage and checking out of specialized items of equipment needed infrequently.
(e) Brief operation instructions for each item of equipment with reference to the manufacturer's technical specifications for major system components
(f) List of warranted equipment and the warranty provisions
(g) List of outside contract maintenance tasks
(h) List of equipment manufacturers
(i) Special tools list

Stocks of spare parts, supplies, chemicals, and other consumable items should be maintained in a secure storage location with limited access. 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 for chemical spills or exposure CHEMTECH 800 424-9300. 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 LDH of noticeable water quality problems.

C. *Safety procedures* should identify work space 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) Recommended references;
(n) Drinking Water Ordinance;
(o) User Charge System