[Type Water System Name Here]

**OPERATION AND MAINTENANCE PLAN**

# CHANGE HISTORY

Please describe the changes made to this plan since its original development, who made the changes and on what date the changes were incorporated into this plan.

| **description of change**  | **NAME/TITLE** | **Date** |
| --- | --- | --- |
| Creation of Plan  |  |  |
|  |  |  |
|  |  |  |
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|  |  |  |

# GOVERNING BOARD APPROVAL STATEMENT

The governing board of [Water System Name] has reviewed this Operations and Maintenance (O&M) plan and hereby certifies that all the information contained within this document is true to the best of our knowledge. This document shall serve as a comprehensive informational reference for water system operations and maintenance knowledge. The [Water System Name] board approves of this O&M and its contents.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Board Member Name (Print) |  | Board Member Position |
|  |  |  |
|  |  |  |
| Board Member Name (Sign) |  | Date |

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# OVERVIEW OF FACILITIES

## Utility Overview

| **Utility overview** |
| --- |
| Please fill in the information below as indicated. |
| PWSID |  |
| Street Address |  |
| City, State Zip Code |  |
| Utility Phone number  |  |
| Population Served |  |
| Prepared by (Utility representative) |  |
| Reviewed by (if applicable) |  |
| Date completed |  |

## Responsible Officials

List all utility team members, their job title, and contact information.

| **Personnel**  |
| --- |
| Name  | Title  | Contact Information  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## Service Area/Source Map(s)

List out the location of service area maps and the date of their last known update.

| **Mapping** |
| --- |
| Map name  | Location  | Last updated on:  |
| Distribution System Map(s) |  |  |
| Source/Intake Map(s) - (indicates raw water transmission lines to plant) |  |  |
|  |  |  |

## Treatment System Schematic

Indicate if the treatment system schematic is included and if so, what is included in the schematic.

| **Treatment System Schematic** |
| --- |
|  |
| Is the Treatment System Schematic Attached? | Yes [ ]  No [ ]  |
| Schematic Indicates:(check all that apply) | [ ]  Sources of Supply [ ]  Master Meters[ ]  Raw Water Taps [ ]  Valves[ ]  Finished Water Taps [ ]  Contacts Tanks[ ]  Chemical Treatment Injection Points [ ]  Entry Points |

## Permit Information

List out water system permit information including date issued, purpose, and location of key documents.

|  **Permit Information** |  |
| --- | --- |
| Permit No.  | Date Issued  | Purpose  | Location of Documents |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# SOURCE INFORMATION

## Well(s)

Complete the table below for each well within the distribution system.

| **Well(s)** |
| --- |
| Well name or identification:  |
| Permit No. |  |
| Date of Permit |  |
| Location |  |
| Date Drilled  |  |
| Diameter (in.) |  | Total Well Depth (ft) |  |
| Casing Diameter (in) |  | Casing Length (ft) |  |
| Pumping Capacity (gpm) |  |
| Static Water Level (ft) |  | Pumping Water Level (ft) |  |

| Well name or identification:  |
| --- |
| Permit No. |  |
| Date of Permit |  |
| Location |  |
| Date Drilled  |  |
| Diameter (in.) |  | Total Well Depth (ft) |  |
| Casing Diameter (in) |  | Casing Length (ft) |  |
| Pumping Capacity (gpm) |  |
| Static Water Level (ft) |  | Pumping Water Level (ft) |  |

### Well Pump(s)

Complete the table below for each well pump within the distribution system.

|  **Well Pump(s)** |  |
| --- | --- |
| Well pump name or identification:  |  |  |  |
| Type of Pump |  |
| Manufacturer/Model |  |
| Capacity (gpm) |  |
| Horsepower (hp) |  |
| Pump Setting (depth) |  |
| Controls  |  |

| Well pump name or identification:  |  |  |  |
| --- | --- | --- | --- |
| Type of Pump |  |
| Manufacturer/Model |  |
| Capacity (gpm) |  |
| Horsepower (hp) |  |
| Pump Setting (depth) |  |
| Controls  |  |

## Spring(s)

Complete the table below for each spring within the distribution system.

|  **Spring(s)** |  |
| --- | --- |
| Spring name or identification:  |  |  |  |
| Permit No. |  |
| Date of Permit  |  |
| Location  |  |
| Capacity (gpm) |  |
| Collection Basin Construction |  |

| Spring name or identification:  |  |  |  |
| --- | --- | --- | --- |
| Permit No. |  |
| Date of Permit  |  |
| Location  |  |
| Capacity (gpm) |  |
| Collection Basin Construction |  |

## Purchased Water

Complete the table below for each interconnection utilized by the water system.

| **Interconnection(s)** |  |
| --- | --- |
| Interconnection Name or identification:  |  |  |  |
| Address  |  |
| Contact information |  |
| Agreement Date |  |
| Max Capacity (gpd) |  |
| Pressure (psi) |  |
| Metered  | Yes [ ]  No [ ]  | Meter size (in) |  |
| Average day (gpd) |  |
| Backflow Preventer | Yes [ ]  No [ ]  |
| Additional Treatment  | Yes [ ]  No [ ]  |
| Treatment includes |  |
| Other information |  |

| Interconnection Name or identification:  |  |  |  |
| --- | --- | --- | --- |
| Address  |  |
| Contact information |  |
| Agreement Date |  |
| Max Capacity (gpd) |  |
| Pressure (psi) |  |
| Metered  | Yes [ ]  No [ ]  | Meter size (in) |  |
| Average day (gpd) |  |
| Backflow Preventer | Yes [ ]  No [ ]  |
| Additional Treatment  | Yes [ ]  No [ ]  |
| Treatment includes |  |
| Other information |  |

## High Service or Booster Pump(s)

Complete the table below for each high service or booster pump within the distribution system.

|  **High Service or Booster Pump(s)** |  |
| --- | --- |
| High Service or Booster Pump name or identification:  |  |  |  |
| Size (in) |  | Capacity (gpm) |  |
| Head (ft) |  | Pump Specs Attached | Yes [ ]  No [ ]   |
| Manufacturer & Model No |  |
| Impeller Diameter (in) |  | Pump Curve |  |
| Suction Pressure (psi) |  | Discharge Pressure (psi) |  |
| Metered  | Yes [ ]  No [ ]   |
| Motor Manufacturer & No. |  |
| Horsepower  |  | RPM |  |
| Volts |  | Amps |  |
| Controls/other information  |  |

| High Service or Booster Pump name or identification:  |  |  |  |
| --- | --- | --- | --- |
| Size (in) |  | Capacity (gpm) |  |
| Head (ft) |  | Pump Specs Attached | Yes [ ]  No [ ]   |
| Manufacturer & Model No |  |
| Impeller Diameter (in) |  | Pump Curve |  |
| Suction Pressure (psi) |  | Discharge Pressure (psi) |  |
| Metered  | Yes [ ]  No [ ]   |
| Motor Manufacturer & No. |  |
| Horsepower  |  | RPM |  |
| Volts |  | Amps |  |
| Controls/other information  |  |

## Master Meter Records

Complete the table below for each Master Meter within the distribution system.

| **Master Meter(s)** |
| --- |
| Master Meter name or identification:  |
| Location |  |
| Size |  | Type |  |
| Units | gpm [ ]  cfm [ ]  | Chart | Yes [ ]  No [ ]  |
| Last Calibration Date |  | Frequency of Calibration |  |

| Master Meter name or identification:  |
| --- |
| Location |  |
| Size |  | Type |  |
| Units | gpm [ ]  cfm [ ]  | Chart | Yes [ ]  No [ ]  |
| Last Calibration Date |  | Frequency of Calibration |  |

| Master Meter name or identification:  |
| --- |
| Location |  |
| Size |  | Type |  |
| Units | gpm [ ]  cfm [ ]  | Chart | Yes [ ]  No [ ]  |
| Last Calibration Date |  | Frequency of Calibration |  |

| Master Meter name or identification:  |
| --- |
| Location |  |
| Size |  | Type |  |
| Units | gpm [ ]  cfm [ ]  | Chart | Yes [ ]  No [ ]  |
| Last Calibration Date |  | Frequency of Calibration |  |

# TREATMENT SYSTEM

## Disinfection

Complete the table below for the disinfection method within the treatment system.

| **Disinfection** |
| --- |
|  |
| Chemical Used |  |
| Strength (%) |  | Size Container (gal/lb) |  |
| Chemical Supplier |  |
| Address of Supplier |  |
| Phone of Supplier |  |
| Type of Chemical Feeder |  |
| Equipment No. |  | Model No. |  |
| Capacity (gpd) |  | Pressure (psi) |  |
| Feeder Specs Attached? | Yes [ ]  No [ ]  |
| Feeder is Equipped With:(check all that apply) |  [ ]  Pressure Relief Valve [ ]  Calibration Chamber [ ]  Anti-siphon Valve [ ]  De-gassing Valve [ ]  Backpressure Valve [ ]  Foot Valve |
| Chlorine Contact Time (mins) |  | At Flow Rate (gpm) |  |
| Contact Tank or Clearwell Volume (gal) |  |
| Transmission Pipe Diameter (in) |  | Transmission Pipe Length (ft) |  |
| Controls (manual, auto, ...) |  |

###  Other Treatment

Complete the table below for any additional treatment methods used within the treatment system.

| **Other Treatment** |
| --- |
|  |
| Purpose |  |
| Chemical Used |  |
| Strength (%) |  | Size Container (gal/lb) |  |
| Chemical Supplier |  |
| Phone of Supplier |  |
| Type of Chemical Feeder |  |
| Manufacturer |  |
| Equipment No. |  | Model No. |  |
| Capacity (gpd) |  | Pressure (psi) |  |
| Feeder Specs Attached? | Yes [ ]  No [ ]  |
| Feeder is Equipped With:(check all that apply) |  [ ]  Pressure Relief Valve [ ]  Calibration Chamber [ ]  Anti-siphon Valve [ ]  De-gassing Valve [ ]  Backpressure Valve [ ]  Foot Valve |
| Method Used for Process Control |  |

# DISTRIBUTION SYSTEM

## Distribution System Overview

Complete the table below for information regarding the distribution system.

| **Distribution System** |
| --- |
|  |
| Location of Distribution Map |  |
| Distribution Map Indicates:(check all that apply) |  [ ]  Pipe Material [ ]  Pipe Length [ ]  Pipe Diameter [ ]  Valves [ ]  Fire Hydrants [ ]  Dead Ends |
| Valves Open (indicate) |  [ ]  Left [ ]  Right |
| Fire Hydrants Open (indicate) |  [ ]  Left [ ]  Right |
| Pressure Regulating Valve |
| Location |  |
| Manufacturer |  | Size (in) |  |
| Do you maintain records of residential meters? | Yes [ ]  No [ ]  |
| Where are they located? |  |
| Do you maintain an inventory of distribution materials?(i.e. pipes, valves) | Yes [ ]  No [ ]  |
| Where is it located? |  |

## Finished Water Storage

Complete the table below for each finished water storage facility within the distribution system.

| **Finished Water Storage** |
| --- |
|  |
| Type of Storage |  | Capacity (gal) |  |
| Location |  |
| Size |
| If Elevated Tank: | Height (ft) |  | Diameter (ft) |  |
| If Reservoir: | Length (ft) |  | Width (ft) |  | Depth (ft) |  |
| Elevations: | Base (ft) |  | Overflow (ft) |  |
| Pipe Size: | Inlet (in) |  | Outlet (in) |  |
| Year Constructed |  |
| Tank Manufacturer |  |
| Manufacturer Address |  |
| Manufacturer Phone |  |
| Type of Foundation |  | Type of Construction |  |
| Type of Paint System |  |
| Storage Facility is Equipped with:(check all that apply) |  [ ]  Fence [ ]  Float Gauge [ ]  Exterior Ladder [ ]  Drain Pipe [ ]  Pump Controls [ ]  Altitude Valve [ ]  Interior Ladder [ ]  Overflow Pipe [ ]  Water Level Recorder |

Additionally, complete the table below for each pressure tank associated with each storage facility.

| **Pressure Tanks** |
| --- |
|  |
| Location |  |
| Manufacturer |  | Spec Sheet Attached? | Yes [ ]  No [ ]  |
| Manufacturer Address |  |
| Manufacturer Phone |  |
| Size of Tank | Diameter (ft) |  | Height (ft) |  |
| Percent Air (ft) |  |
| Pressure Range (psi) |  | **-** |  |

## Raw Water Storage

Complete the table below for each raw water storage facility within the distribution system.

| **Raw Water Storage** |
| --- |
|  |
| Type of Storage |  | Capacity (gal) |  |
| Location |  |
| Size |
| If Elevated Tank: | Height (ft) |  | Diameter (ft) |  |
| If Reservoir: | Length (ft) |  | Width (ft) |  | Depth (ft) |  |
| Elevations: | Base (ft) |  | Overflow (ft) |  |
| Pipe Size: | Inlet (in) |  | Outlet (in) |  |
| Year Constructed |  |
| Tank Manufacturer |  |
| Manufacturer Address |  |
| Manufacturer Phone |  |
| Type of Foundation |  | Type of Construction |  |
| Type of Paint System |  |
| Storage Facility is Equipped with:(check all that apply) |  [ ]  Fence [ ]  Float Gauge [ ]  Exterior Ladder [ ]  Drain Pipe [ ]  Pump Controls [ ]  Altitude Valve [ ]  Interior Ladder [ ]  Overflow Pipe [ ]  Water Level Recorder |

Additionally, complete the table below for each pressure tank associated with each storage facility.

| **Pressure Tanks** |
| --- |
|  |
| Location |  |
| Manufacturer |  | Spec Sheet Attached? | Yes [ ]  No [ ]  |
| Manufacturer Address |  |
| Manufacturer Phone |  |
| Size of Tank | Diameter (ft) |  | Height (ft) |  |
| Percent Air (ft) |  |
| Pressure Range (psi) |  | **-** |  |

# START-UP AND OPERATIONAL PROCEDURES

## Overall Controls

Complete the questions below for the start-up and operational procedures of the water system.

| **What controls the start-up of your water source?**(Automatic? Manual? If automatic, what activates the pump? Pressure switch? Level controls?) |
| --- |
|  |

| **What controls the shut-down of your water source?**(Automatic? Manual? Pressure drop? At what pressure does the pump shut off?) |
| --- |
|  |

| **What controls water levels in the tank or reservoir?** (Altitudes valve, float, pressure?) |
| --- |
|  |

| **Other controls:** |
| --- |
|  |

## Disinfection Operations

Complete the questions below for the disinfection controls and procedures in the water system.

| ▪ What controls the start-up of the chlorinator? |
| --- |
|  |

| ▪ What controls the shut-down of the chlorinator? |
| --- |
|  |

| ▪ What controls the chlorine dosage? (i.e. automatic, analyzer) |
| --- |
|  |

| ▪ How often are the pumps & controls checked for proper operation? |
| --- |
|  |

| ▪ What chemical is fed? |
| --- |
|  |
| ▪ If liquid, what is the product strength (as delivered)? |  | lbs/gal |
| ▪ Is the solution diluted in a day tank? | Yes [ ]  No [ ]  |
| ▪ **Procedure:**  |  | gallons of liquid chlorine is mixed with |  | gallons of water |
| ▪ What is the product strength of the solution fed? |  | lbs/gal |
| ▪ What is the residual normally retained? |  | mg/L |
| ▪How do you measure the residual? (How often, where, when, etc.) |
|  |

## Operating Procedures

### Start-up Operating Procedure

A step-by-step procedure on how to start-up the facility

|  |
| --- |
| **STEP 1:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 2:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 3:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 4:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 5:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 6:** |  |
| Procedure: |  |

### Standard Operating Procedure: Disinfection

A step-by-step procedure on the disinfection process for the facility

|  |
| --- |
| **STEP 1:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 2:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 3:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 4:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 5:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 6:** |  |
| Procedure: |  |

### Emergency Operating Procedure:

Define a step-by-step procedure on the disinfection process for the facility

|  |
| --- |
| **STEP 1:** |  |
| Procedure: |  |
| **STEP 2:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 3:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 4:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 5:** |  |
| Procedure: |  |

|  |  |
| --- | --- |
| **STEP 6:** |  |
| Procedure: |  |

## Operating Conditions

### Normal Operating Conditions

These are the normal operating procedures/checkpoints for the facility

|  |
| --- |
| ▪ Normal quantity of water produced per day | Average |  | Maximum |  |
| ▪ Normal quantity of water produced (GPM) | Average |  | Maximum |  |
| ▪ Normal total operating hours per day | Average |  | Maximum |  |
| ▪ Plant pressures (psi) | Minimum |  | Maximum |  |
| ▪ Entry Point chlorine residuals: |
|  Entry Point (ppm) | Minimum |  | ppm | Maximum |  | ppm |

 ▪ Distribution system chlorine residuals (ppm):

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Location | Minimum-free | / | Total | Maximum-free | / | Total |
|  |  | / |  |  | / |  |
|  |  | / |  |  | / |  |
|  |  | / |  |  | / |  |
|  |  | / |  |  | / |  |
|  |  | / |  |  | / |  |

 ▪ Distribution system pressures:

|  |  |  |
| --- | --- | --- |
| Location | Minimum (psi) | Maximum (psi) |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| ▪ What is the maximum flow that can leave the plant and still maintain 20 minutes chlorine contact time? |  | GPM |

|  |  |  |
| --- | --- | --- |
| ▪ What is the maximum flow that can leave the plant and still maintain 20 minutes chlorine contact time? |  | ppm |

|  |  |  |
| --- | --- | --- |
| ▪ What is the maximum flow that can leave the plant and still maintain 20 minutes chlorine contact time? |  | psi |

## Emergency Operating Conditions

An emergency exists when the following conditions are true.

|  |
| --- |
| The flow leaving the plant exceeds: |  | GPM |

|  |  |  |
| --- | --- | --- |
| The entry point chlorine residual is less than: |  | ppm |

|  |  |  |
| --- | --- | --- |
| The water pressure falls below: |  | psi |

|  |
| --- |
| Other condition(s): |
|  |

# MAINTENANCE/REPAIR PRACTICES

## Maintenance/Repair Contacts

List the name, title, company (if applicable), and the contact information for all persons relevant to maintenance and repairs. This should include the water systems own employees as well as any vendors who are contracted to perform repairs.

| **Personnel Contacts** |
| --- |
| Name  | Title/Company | Contact Information  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## Comprehensive Equipment Log

See Appendix B for a list of the primary equipment associated with the water facility as well as Equipment Record Cards for each equipment that outline equipment identification, origin, maintenance, and spare parts.

## Preventative Maintenance

Create a comprehensive list of daily, weekly, monthly, quarterly, and/or annual maintenance tasks needed to be performed to keep the system running reliably and properly. Maintain a record of all actual maintenance performed in the “Preventative Maintenance Log” in Appendix C (Form A). For maintenance procedures, refer to the “Maintenance Procedure Forms” located in Appendix C (Form B).

Routine preventative maintenance should include flushing, exercising of emergency backup equipment, maintenance of safety equipment, etc. See this O&M resource from the EPA for assistance in developing the below lists: [Operation & Maintenance Checklist and Tasks (epa.gov)](https://www.epa.gov/sites/default/files/documents/om_checklisttasks.pdf)

| **Preventative Maintenance** |
| --- |

#### Daily Maintenance

| Equipment # | Equipment Name | Maintenance Required |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

#### Weekly Maintenance

| Equipment # | Equipment Name | Maintenance Required |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

#### Monthly Maintenance

| Equipment # | Equipment Name | Maintenance Required |
| --- | --- | --- |
|  |  |  |
|  |  |  |
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#### Quarterly Maintenance

| Equipment # | Equipment Name | Maintenance Required |
| --- | --- | --- |
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#### Annual Maintenance

| Equipment # | Equipment Name | Maintenance Required |
| --- | --- | --- |
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### Meter Calibration

To have an accurate measure of performance at the facility, meters must be calibrated on a routine basis. Below is a table outlining the calibration frequency for every major meter at the facility.

| Manufacturer | Type | Asset/Serial # | Location | Calibration Frequency | Calibration Standard |
| --- | --- | --- | --- | --- | --- |
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Meter calibration records shall be retained and maintained either in this O&M, or in another designated location. If in another location, it is noted here:

A summary of calibrations completed is contained in the table below.

| **Meter Calibration Log** |
| --- |
| Manufacturer | Asset/Serial # | Date | Completed by (name) | Date of Next Calibration |
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### Flushing

Dead ends should be flushed every 90 days. A schedule of flushing is provided below to ensure flushing activities are being performed on a routine basis. The responsible official(s) for flushing are also established below and are updated as needed. If there are automatic flush hydrants in the system, note them in the schedule as automatic flushing and note the general schedule they are on.

| **Flushing Responsibility** |
| --- |
| Responsible Party/Name | Phone Contact | Email Contact | As of (date) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
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| **Flushing Schedule** |
| --- |
| Valve ID | Date to be Flushed | Date Flushed | Flushed by (Initials) | Next Flush Date |
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### Regular Valve Exercising

Following a regular valve exercising program, documenting discovered issues, and making timely required repairs will help ensure that isolation and main valves work when you need them. It is important to exercise all mainline valves in the system at least once a year to ensure that you can locate them and that they can be opened and closed properly during emergency shut-down periods. Keep a record of valve exercises for each valve in the “Valve Record” located in Appendix C (Form C). Included information such as the physical condition of the valve (rusted/new, leaking, failing, etc.), number and direction of turns to open and closure, any maintenance conducted, and any other observations. Any valves needing repair should have a work order placed on them.

## Repairs and Work Orders

If a component associated with the water facility needs a repair, then a work order for the needed repair shall be issued and completed. A blank Work Order Form can be found in Appendix C (Form E). All completed work orders should be maintained in Appendix C (or another designated location) after completion so there is a historic record of all repairs made on the system. If completed work orders are to be maintained in a different location than this O&M, note the location below:

| Location of Completed Work Orders | As of Date |
| --- | --- |
|  |  |
|  |  |

## Water Main and Service Line Repairs

Water distribution line repairs should be documented, especially when there are repairs/clamps, etc., placed on the line. These types of repairs are not normally intended for long-term/permanent repairs but are often performed with that intent. A thorough record of line replacements may help identify areas of the distribution line that are more prone to failure due to age, vibration, or other causes. Every repair of a water main or service line should be recorded in a repair report (Appendix C: Form F).

## Safety Equipment Maintenance/Repairs

Chemicals used in water treatment, such as chlorine, can be dangerous, and it is therefore imperative that your safety equipment be carefully maintained, and that maintenance be documented. All safety equipment needs to be inventoried and a log of the maintenance and repairs should be kept. Make sure to update the log throughout the year as repairs are made.

| **Safety Equipment Maintenance Log** |
| --- |
| Equipment Type | Location | Maintenance/Repair Performed | Performed by (Initials) | Date |
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# Active Inventory Records

## Chemical Inventory

Below is a comprehensive list of all the chemicals kept on site at the water facility.

| **Chemical Inventory** |
| --- |
| Chemical Name | Use | Quantity | Location | Safety Measures (containment, etc.) |
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## Piping Inventory

Below is a comprehensive list of all the piping kept on site at the water facility.

| **Available Piping** |
| --- |
| Pipe Type | Size | Quantity | Location |
|  |  |  |  |
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## Inventory of Repair Equipment and Maintenance Materials

Below is a comprehensive list of all the available repair equipment and maintenance materials kept on site at the water facility. This should include all essential **spare parts** and **back-up** equipment such as back up pump(s) and backup power source(s).

| **Available Repair/Maintenance Equipment** |
| --- |
| Equipment/Material Type | Use | Quantity | Location |
|  |  |  |  |
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# Sampling, Monitoring, and Reporting

The process control tests being performed at this facility are dependent on the treatment process, chemicals added, type of source, etc. Check with your DEQ enforcement officer and/or DEQ Water Quality Department to confirm all sampling, monitoring, and reporting requirements, or refer to SDWIS Drinking Water Watch ([Drinking Water Branch (state.ok.us)](http://sdwis.deq.state.ok.us/DWW/)).

A blank version of the most current utilized Monthly Operating Report (MOR) should be attached to this O&M (an example is included in Appendix A).

## Sampling, Monitoring, Reporting Checklist

Below are items that should be completed to maintain data integrity and quality when sampling, monitoring, and recording of data occurs at this facility.

### Continuous Meters

* Ensure necessary flow is going through all meters.
* Ensure meters are set for the correct day and time.
* Ensure the least amount of tubing connecting the sampling point to the continuous meter is being utilized.
* Ensure sample tap is installed correctly.
* Verify that the meter is reading properly by comparing to grab samples (at least once a week).
* Calibrate meters on the frequency designated by the manufacturer recommendations (usually every 3 months – once a year).
* Designate where instruction manuals for all meters, instrumentation, and control systems (SCADAs) are maintained (and maintain them).
* Develop written operating procedures on how to navigate the control system.
	+ How to set meter read caps (and be sure that all caps are high enough to have accurate readings).
	+ How to set alarms
	+ How to pull historical files

### Grab Sampling

* Have detailed written operating procedures on how to collect and run each type of grab sample.
	+ Designate the exact location(s) of where grab samples are pulled.
	+ Designate frequency based on requirements and facility best practices.
* Have several staff trained on how to sample.
* Have several staff trained on how to use testing instrumentation.
	+ Develop written operating procedures for utilizing instrumentation.
* Designate where instruction manuals for all meters and instrumentation are maintained (and maintain them).
* Calibrate instrumentation regularly.
	+ Ensure that all calibration reagents are not expired.

## On-site Lab Equipment

This facility shall maintain an inventory of all on-site lab equipment and an agreement with an equipment supplier so any faulty or needed equipment can be maintenanced, replaced, or obtained.

The inventory of lab equipment is located:

|  |
| --- |
|  |

| **Lab Equipment Supplier** |
| --- |
|  |  |
| Name |  |
| Address |  |
| Contact Name |  |
| Contact Phone |  |
| Account No. |  |

## External Testing Services

An external laboratory conducts the following services:

| **External Services** |
| --- |
|  |  |
| Lab Name |  |
| Address |  |
| Contact |  |
| Certified Lab No. |  |
| Phone No. |  |
| The duties of the outside lab include: |
|  [ ]  Sample Collection |  [ ]  Reporting to DEP |
|  [ ]  Sample Analyses |  [ ]  Other: |
|  [ ]  Reporting to System |  |
| Outside laboratory analyses include (check those that apply): |
|  [ ]  Coliform Bacteria |  [ ]  SOCs |
|  [ ]  IOCs |  [ ]  Radiological |
|  [ ]  VOCs |  [ ]  Other: |
|  [ ]  TTHMs |  |

# Public Notification Requirements

## Notification Levels

Under the Public Notification Rule of the Safe Drinking Water Act, public water supplies must notify customers if there is a risk to public health with the drinking water, within designated time frames based on the health risk. These notices must be provided to all persons served, and not just billed customers.

|  |  |
| --- | --- |
| **TIER 1** | Immediate Notice - Within 24 hours of violation/situation |
| **Notification Method:** Radio, TV, hand delivery, posting, or other method specified by the primacy agency. PWSs must also initiate consultation with the primacy agency within 24 hours.  |
| * Distribution system sample violation when fecal coliform or E. coli are present; failure to test for fecal coliform or E. coli after initial total coliform distribution system sample tests positive.
* Nitrate, nitrite, or total nitrate and nitrite maximum contaminant level (MCL) violation; failure to take confirmation sample.
* Special notice for noncommunity water systems (NCWSs) with nitrate exceedances between 10 mg/L and 20 mg/L, where system is allowed to exceed 10 mg/L by primacy agency.
* Chlorine dioxide maximum residual disinfectant level (MRDL) violation when one or more of the samples taken in the distribution system exceeds the MRDL on the day after a chlorine dioxide measurement taken at the entrance to the distribution system exceeds the MRDL, or when required samples are not taken in the distribution system.
* Exceedance of maximum allowable turbidity level, if elevated to a Tier 1 notice by agency.
* Waterborne disease outbreak or other waterborne emergency.
* Detection of E. coli, enterococci, or coliphage in a ground water source sample.
 |
| **TIER 2** | Notice as Soon as Practical – Within 30 Days |
| **Notification Method:** Mail or other direct delivery, and any other method as needed to reach others. |
| * All MCL, MRDL, and treatment technique violations, except where Tier 1 notice is required.
* Monitoring violations, if elevated to Tier 2 notice by primacy agency.
* Failure to comply with variance and exemption conditions.
* For ground water systems providing 4-log treatment and conducting Ground Water Rule (GWR) compliance monitoring, failure to maintain required treatment for more than 4 hours.
* Failure to take any required corrective action or be in compliance with a corrective action plan for a fecal indicator-positive ground water source sample.
* Failure to take any required corrective action or be in compliance with a corrective action plan for a significant deficiency under the GWR.
* Special public notice for repeated failure to conduct monitoring for Cryptosporidium
 |
| **TIER 3** | Notice within 12 month – Annual Notice |
| **Notification Method:** Mail or other direct delivery, and any other method as needed to reach others. |
| * All monitoring or testing procedure violations, unless primacy agency elevates to Tier 2, including failure to conduct benchmarking and profiling (surface water systems) and failure to develop a monitoring plan (disinfecting systems).
* Operating under a variance and exemption.
* Special public notice for availability of unregulated contaminant monitoring results.
* Special public notice for fluoride secondary maximum contaminant level (SMCL) exceedance.
 |

## Required Elements of a Public Notice

Unless otherwise specified in the regulations, each notice must contain:

1. Description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s).
2. When the violation or situation occurred (i.e., date the sample was collected or was supposed to be collected).
3. Any potential adverse health effects from drinking the water and standard language regarding the violation or situation. (For monitoring and testing procedure violations, use the example standard monitoring language below.)
4. The population at risk, including subpopulations that may be particularly vulnerable if exposed to the contaminant in their drinking water.
5. Whether alternate water supplies should be used.
6. Actions consumers should take, including when they should seek medical help, if known.
7. What the PWS is doing to correct the violation or situation.
8. When the PWS expects to return to compliance or resolve the situation.
9. The name, business address, and phone number or those of a designee of the PWS as a source of additional information concerning the notice.
10. A statement encouraging notice recipients to distribute the notice to others, where applicable.

### Standard Language Examples

**Standard Monitoring Language:** We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. During [period] we [did not monitor or test/did not complete all monitoring or testing] for [contaminant(s)], and therefore cannot be sure of the quality of the drinking water during that time.

**Standard Distribution Language:** Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

# Appendix A. Start-Up Checklist and Monthly Operation Reports

1. Start-Up Checklist
2. Monthly Operating Report
3. Statistical Report
4. Electrical Power Use Summary
5. Bacteriological Testing-Compliance Record

|  |
| --- |
| Start-Up Checklist: |
| [ ]  Well pump is operational.  |
| [ ]  Disinfection solution tank is full.  | @ Product Strength |  | lbs/gal |
|  | OR |
| [ ]  Chlorine cylinder is not empty. |
| [ ]  Chlorinator feed pump setting | Speed |  | Stroke |  | % |
| * Physical inspection: (i.e. feed pump, tubing, poppits, injection assembly)

Observations: |
|  |
| * Mechanical inspection (i.e. valve positions, piping, motors)

Observations: |
|  |
| * The following valves are open
 |
|  |  |  |  |
|  |  |  |  |
| * The following valves are closed
 |
|  |  |  |  |
|  |  |  |  |
| * Electrical inspection (i.e. wiring, fuses, interlocks)
 |
|  |
| * Other:
 |
|  |

|  |
| --- |
| Monthly Operations |
| **Name** |  | **Location** |  |
| **Operator** |  | **Month of** |  |
| **Day** | **Operations** | **Chemicals** | **Quality** |
| Pump Hours | Water FlowGPM | Water StorageMG | Change ±MG | System DemandMGD | Chlorine |  | Cl2 | pH | Alk | Hard- | WaterTemp |
| lbs./gal | mg/L | lbs./gal | mg/L |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 13 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 31 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Total |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| Monthly Water Treatment Plant Operational Report |
| Permit Name |  | Month |  | Year |  |
| Permit Address |  |
| Permit Phone No. - Home |  | Business |  |
| Location of Plant-Municipality |  | County |  |
|  |
| **Plant Operator’s Name** | **Phone Number** | **Certification Number, Type, and Class** |
|  |  |  |
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**Name of Each Source of Water Supply Used**

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1:  |  | 3:  |
|  | 2:  |  | 4:  |

Maintenance performed during the month, (i.e., flushing, cleaning storage equipment and pumps, repairs, etc.).

|  |
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|  |

Explanations of any operational water supply problems (i.e. complaints, boil water notices, lightning-created failures, problems causing unusually high water usage, pressure problems, etc.).

|  |
| --- |
|  |

**Monthly Water Treatment Plant Operational Report (Continued):**

Instructions for this Report: In the table below, source is to be indicated by the number opposite the source of water supply shown on the previous page of this report. If more than seven sources of supply are used or if different sources are used to serve separate parts of the system, additional reporting forms can be completed to show concentrations and chemicals added.

|  |  |
| --- | --- |
|  |  |
|  | Signature of Person Completing Form |
| **Date** | **Water Pumped** **(1,000 gal) + Source** | **Source of Supply + Conc. In Distribution System** | **Other Chemicals Added (lbs.)** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 30 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 31 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Statistical Report |
| Month |  | Year |  |
| Unaccounted-for Water | Current | 12 Mos. To Date |
| 1 | Total water produced or purchased |  |  |
| 2 | Total plant uses |  |  |
| 3 | Total water to distribution system |  |  |
| 4 | Water used in distribution system |  |  |
| 5 | Water available for metered sales |  |  |
| 6 | Water billed |  |  |
| 7 | Adjustments made |  |  |
| 8 | Net water sold |  |  |
| 9 | Unaccounted for |  |  |
| 10 | % unaccounted for |  |  |

**Customer Statistics:**

|  |  |  |
| --- | --- | --- |
|  | No. Water Customers | Net Water Sold (this month) |
| Type | Metered | Unmetered | Metered | Unmetered |
| Residential |  |  |  |  |
| Commercial |  |  |  |  |
| Industrial |  |  |  |  |
| Fire Protection |  |  |  |  |
| Other |  |  |  |  |
| Total |  |  |  |  |

**Customer Communications:**

|  |  |  |
| --- | --- | --- |
|  | Month | Year To Date |
| Category | Complaint | Inquiry | Complaint  | Inquiry |
| Pressure |  |  |  |  |
| Water Quality |  |  |  |  |
| Leaks |  |  |  |  |
| Billing |  |  |  |  |
| Meter Reading |  |  |  |  |
| Service Requests |  |  |  |  |
| Construction |  |  |  |  |

**Precipitation: Production:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Amount (in) | Rain Days |  | Max Day |  | TGD |  |
| Mo. | ytd. | Mo.  | ytd. |  | Min Day |  | TGD |  |
| Current |  |  |  |  |
| Previous |  |  |  |  |
| Normal |  |  |

|  |
| --- |
| Electrical Power Use Summary |
| **Water Supplier:** |  |
| **Month** | **Location** |
|  |  |  |  |  |
| **Jan** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Feb** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Mar** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Apr** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **May** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **June** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Jul** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Aug** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Sep** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Oct** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Nov** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Dec** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |
| **Total** kwh |  |  |  |  |  |
| Kwh/MG |  |  |  |  |  |

|  |
| --- |
| **Bacteriological Testing-Compliance Record** |
| **Month/Year** |  | **Total Monthly** |  | **Samples Required** |  |
| **Sample Number** | **Date** | **Time** | **Sample Collection Point (Address or Location)** | **Sample collected by (Initials)** | **Free Cl2 Residual** | **Type Sample**  | **Test Results** |
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# Appendix B. Equipment Log

1. Equipment List
2. Equipment Record Cards

Equipment List:

|  |  |  |
| --- | --- | --- |
| **Equipment Number** | **Equipment Name/Description** | **Equipment Location** |
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Equipment Record Card:

|  |
| --- |
| **Equipment Registration** |
| Equipment Name:  | Number:  |
| Location:  |
| Manufacturer:  | Telephone:  |
| Address:  |
| Sales Representative:  | Telephone:  |
| Manufacturer’s Manual Number:  |
| Name Plate Data:  | Motor Data:  |
|  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Spare Parts** | **Manufacturer** | **Part #** | **Phone** | **# In Stock** |
|  |  |  |  |  |
|  |  |  |  |  |
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|  |  |  |
| --- | --- | --- |
| **Contracted Labor** | **Address** | **Phone** |
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| --- | --- | --- |
| **Maintenance Required** | **Maintenance Type** | **Frequency** |
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|  |  |  |
|  |  |  |
|  |  |  |
| Drawing No.: |

# Appendix C. Maintenance Forms

1. Preventative Maintenance Log
2. Maintenance Procedure Form
3. Valve Record
4. Fire Hydrant Record
5. Repair Work Order
6. Repair Log

Preventive Maintenance Log:

|  |
| --- |
| Month/Week:  |
| **Equip. #** | **Equip. Name** | **Maintenance Performed** | **Initials** | **Date** |
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Maintenance Procedure Form:

|  |
| --- |
| **Maintenance Procedure Title:**  |
| Equipment Name:  | Equipment #:  |
| Location:  |
| Maintenance Description:  |
| Safety Precautions:  |
| List of Tools, Parts, Materials, Test Equipment Required: |
|  |
| **Procedure:** |
|  |

|  |
| --- |
| Valve Record |
| Water Supplier: |  | Location: |  |
| Valve # |  | Make |  | Size |  | Direction to Open |  [ ]  R [ ]  L |
| Date installed |  | Installed By |  |
| **Date Inspected** | **Condition** | **Turns to Open** | **Turns to Close** | **Maintenance and Remarks** | **Done By:** |
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| --- |
| Fire Hydrant Record |
| Water Supplier: |  | Location: |  |
| Hydrant # |  | Make |  | # of outlets |  | Hose |  |
| Streamer |  | Size |  | Size valve opening |  | Lateral Size |  |
| Lateral Valve Size |  | Direction to Open |  [ ]  R [ ]  L |
| Date installed |  | Installed By |  |
| **Date Inspected** | **Condition** | **Turns to Open** | **Turns to Close** | **Maintenance and Remarks** | **Done By:** |
|  |  |  |  |  |  |
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| --- |
| Repair Work Order |
| Date of Work Order | Date Due | Priority | Plant Area |
|  |  |  |  |
| Equipment # | Equipment Name | Location |
|  |  |  |
| Requested By | Phone Number | Email |
|  |  |  |
| Nature of Problem: |
|  |
| Job Started |  |  |  | Job Completed |  |  |  |
| Mon. | Day | Time |  Mon. |  Day |  Time |
| **Materials** | **Labor Equipment** |
| Stock No. | Item | Qty. | Unit Price | Total | Name | Reg. Hours | O.T. Hours | Rate | Total |
|  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |
|  Total | Total  |  |  |  |
| Outside Contractor Required:  |  [ ]  Yes [ ]  No | If yes, Contractor Cost: |  |
| What was the issue?  |  |
| How was It fixed?  |  |
| Apparent cause of the issue? |  |
| Additional Remarks: |
| Work Completed By:  | Date  |
| Work Accepted By:  | Date  |
| Repair Log: |
| **Date Discovered** | **Time Discovered** | **Location** | **Population Affected** | **Date Repair Completed** | **Disinfection Method** | **Date Residual Detected** | **Coliform Sampling Waived** |
|  |  |  |  |  |  |  |  |
| **Description****of Repair** | **Coliform Sampling Date** | **Coliform Results Date** | **Coliform Results** | ***E. coli* Results** |
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| --- |
| Repair Log: |
| **Date Discovered** | **Time Discovered** | **Location** | **Population Affected** | **Date Repair Completed** | **Disinfection Method** | **Date Residual Detected** | **Coliform Sampling Waived** |
|  |  |  |  |  |  |  |  |
| **Description****of Repair** | **Coliform Sampling Date** | **Coliform Results Date** | **Coliform Results** | ***E. coli* Results** |
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# Appendix D. Emergency Response Plan (ERP)

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| --- |
| **Do you have a written Emergency Response Plan?** |
| [ ]  **Yes** [ ]  **No** |
| If yes, attach your Emergency Response Plan here |