[Company name]

Plant Operations and Maintenance Manual Template

[PWS ID]

[RN and CN]

[Date]

1. **Raw Water Sources**

Describe the water source information (aquifer, surface water body, source of purchased water) PWS Well Name, TCEQ Well ID #, well depth, location of the well, date the well was drilled, and well pump capacity. This process should be somewhat standard for groundwater facilities, with a few variations in the equipment size and control settings. Include a well log if you have it available.

*Example: This is a groundwater production plant only that utilizes water from one well in the Edwards Aquifer as its source. G1234567A is located at 123 Street in Here, Texas. This well was drilled in 1996 and has a current pumping capacity rated at 24 gallons per minute (GPM).*

1. **Treatment Plant Description & Design**

Describe the treatment process (all equipment included) and type of chemicals used, how they are injected, and what residual goal you attempt to achieve. List any emergency interconnections or backup water sources if available.

*Example: The plant design includes: 1 well that pumps into 1 ground storage tank (5000 gallons), then suction by 2 booster pumps that pump into the distribution system under a pressure tank (220 gallons). All of this can be controlled by a pressure switch located above the control panel. This plant utilizes chlorination (a sodium hypochlorite blend). Liquid chlorine is added with a chlorine regulator and water injector at the treatment plant. A free chlorine residual is to be maintained between 1 and 1.5 mg/L at the plant, to allow for required residuals in the distribution lines. This system has no emergency interconnections or backup water sources. The systems actively serves 18 connections and 32 people.*

1. **Plant Design Criteria & Capacities**

A distribution map of the system is available at the end of the Plant O&M. The plant capacities are as follows:

WELL:

*Example: 1 submersible pump rated at 12 GPM*

GROUND STORAGE TANK:

*Example: 1 AWWA storage tank at 3,300 gallons*

BOOSTER PUMP:

*Example: 2 hp rated at 40 GPM each*

PRESSURE TANK:

*Example: 1 220-gallon hydropneumatic tank*

CHLORINE FEED:

*Example: 6 gal per day (GPD) Rotometer (Rotometer setting: 0.6 GPD)*

*Normal uses: 0.6 gal both winter and summer*

1. **Major Components & Processes**
2. **WELL**

*Example: The float switch in the Ground Storage Tank controls the well. The well comes on automatically when the level in the Ground Storage Tank drops below a pre-determined level. The well can also be turned on manually at the tank. The manual switch is needed to check the well during monthly routine checks. If the well does not operate with the manual switch on, then a check of the breaker, telephone relay connections, and/or starter resets, at the well location, should be done. If the well still does not operate, then an electrician should be called to test pump motors.*

1. **GROUND STOARGE TANK**

*Example: The ground storage tank is equipped with a float switch, which controls the whole plant depending upon the water level in the ground storage tank. The float turns the well off and on at a pre-determined level.*

1. **BOOSTER PUMPS**

*Example: The pressure switch at the pressure tank controls the booster pumps. They operate automatically depending upon the water level in the pressure tanks. The pump can be manually operated at the control switch.*

1. **PRESSURE TANK**

*Example: The 220-gallon pressure tank has a pressure relief valve, a pressure gauge, and a drain valve.*

1. **ELECTRICAL & CONTROLS**

*Example: The central breaker panel contains a main breaker, which turns off all the power inside the plant, and several smaller breakers to turn off individual pumps, air compressor, lights, and other electrical outlets. The motor starters are to each individual pump motor and contain motor protection in each. All pumps, motors, and chemical feed pumps can be manually or automatically turned on and off at the main panel. It contains relays, alternator, and manual-off-auto switches.*

1. **CHLORINE FEED EQUIPMENT**

*Example: There is a water injector to feed liquid chlorine. Once the water level in the storage tank reaches the top, the controller will stop the well motor and chlorine feed. The only way the chlorine feed can be turned don manually is to turn the ell on manual at the control switch. This is done to prevent the chlorine feed from injecting chlorine into the system if the well is not running.*

1. **Start Up Procedures**

If for any reason the system has been offline or down, the steps for startup of the plant are as follows:

*Example:*

1. *Turn all switches on the main control panel to the OFF position.*
2. *Check the main power source from the electrical company.*
3. *Check all the breakers to be properly reset to ON position.*
4. *Check and reset all monitor starter resets.*
5. *At the main control panel turn the well switch to ON. The well and chemical feed pumps should start at this time.*
6. *At the main control panel turn either of the Booster Pump Switches to the ON position. The pump that was turned to the ON position should start as the storage tank level is above the suction line. Starting the pump will cause the water level and pressure to build in the pressure tank. If the tank does not have enough level, then wait until it does, and the Booster Pump will start.*
7. *When the Booster Pump builds enough pressure in the pressure tank it will shut off.*
8. *At this time all switches should be in the ON position on the main control panel, and the plant should be back to complete automatic operation.*
9. *All flush valves to be opened one or two at a time. They should be run until all air is removed from the distribution system, and a free chlorine residual of at least 0.2 mg/L is obtained at the farthest reaches in the distribution system.*

**Weekly**

1. Read water meter once a week and note usage.
2. Record chemical usage and note it weekly.
3. Collect and record disinfectant residual in distribution using the sites noted on the Monitoring Plan and Sample Siting Plan.

**Monthly**

1. Collect *one (1)* microbiological sample from the Monitoring Plan and Sample Siting Plan for analysis and deliver to NELAP approved laboratory with a completed MRF form.
	1. Be sure that the sample was collected properly and follow coliform sample collection SOP. If there was a problem, collect repeats according to TCEQ rules.
2. Mow and clean the outside of the plant building which includes but is not limited to, clearing the fence of any undergrowth and any other general facility cleanup.
3. Prepare the monthly operation report form the daily log sheet information and file accordingly.
4. Flush any dead ends in the distribution system and record them in the flushing log.
5. Check chlorine feed pump and injector, well, flow meter, pumps, pressure tanks, storage tanks and ensure all are operating properly.

**Quarterly**

1. Complete the 90-day disinfectant residual analyzers verification, use appropriate log.

**Annually**

1. Complete the annual tank inspections and inspection form.

1. Check the wellhead and the well sealing clock for any cracks and/or needed caulking.
2. Check and replace the screen opens, i.e. the well vent, tank vents, etc.

**Every 3 Years**

1. Calibrate or replace the well meter.

**Emergency Response**

1. Water well service company (address and phone number)
	1. *Example: Aqua Man, 32545 IH 10 West, Boerne, TX 78006*
		1. *Kelley Parks- 830-816-2290*
2. Volunteer Fire Department (if applicable- address and phone number)
	1. *Example: Bergheim Volunteer Fire Department, Old Curry Creek Rd. Bergheim, TX 830-336-2590*
3. Local Fire Department (address and phone number)
	1. *Example: Boerne Fire Department, 726 N. Main, Boerne, TX 830-249-8645*
4. Local Sheriff’s Department (address and phone number)
	1. *Example: Kendall County Sheriff Department, 6 Staudt St., Boerne, TX 78006 830-249-9721 or 911 Emergency*

**Records**

Record including monthly logs, operation reports, drawings, etc. are kept at the water treatment plant located at *(address).*