



EDMUND G. BROWN JR.
GOVERNOR



MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board
Division of Drinking Water

March 24, 2016

System No. 2210510

Mr. Don Neubacher, Superintendent
P.O. Box 577
Yosemite NP, CA 95389

Dear Mr. Neubacher:

RE: Water Supply Permit No. 03-11-15P-010

The purpose of this letter is to inform you that the State Water Resources Control Board – Division of Drinking Water (Division) has issued a revised Domestic Water Supply Permit to the Yosemite National Park for the Wawona (System) water system located in the Yosemite National Park. The Domestic Water Supply Permit, Inspection Photos, Water Quality Monitoring Schedule, Last Taken/Next Due Monitoring Schedule, Guidelines for Completion of the Bacteriological Sample Siting Plan, Cross Connection Control Guidelines, and an Engineering Report are attached to this letter. Please review the engineering report and provide any comments or corrections to the Division in writing.

YNP – Wawona needs to complete the following action items and submit the required documents to the Division by the date specified.

1. The System must submit a plan and time schedule for an update to the current watershed sanitary survey. The plan and time schedule must be submitted to the Division by April 30, 2016, and the next watershed sanitary survey must be completed by December 31, 2016.
2. The source is currently due for general mineral, general physical and inorganic chemical monitoring. The System must monitor the raw water source for all past due general mineral, general physical and inorganic chemical monitoring by April 30, 2016.
3. The raw water intake is currently past due for gross alpha monitoring and the System must monitor the active source for gross alpha by April 30, 2016.

FELICIA MARCUS, CHAIR | THOMAS HOWARD, EXECUTIVE DIRECTOR

265 West Bullard Avenue, Suite 101, Fresno, CA 93704 | www.waterboards.ca.gov

4. The System must submit a Bacteriological Sample Siting Plan to the Division for review and approval by April 30, 2016. Guidelines for the creation of a BSSP can be found in Appendix D.
5. The System should submit the current Drought Contingency Plan including water conservation measures to the Division by April 30, 2016.
6. The System must submit photos of the tops of all tanks to include vent screens and the bottom of hatch lids. Photos must be submitted to the Division by May 31, 2016.
7. The System should submit create and submit a valve exercising to the Division.
8. The second round of monitoring under the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) must be conducted between October 31, 2017 and September 30, 2018. This second round of monitoring must consist of E. coli monitoring once every two weeks for 12 months.
9. The System must submit the lab results from the 2015 lead and copper monitoring conducted. Results must be submitted to the Division by May 31, 2016.

Please acknowledge in writing by April 15, 2016, receipt of this water supply permit, your willingness to comply with the permit provisions and any comments or corrections to the engineering report. This permit contains an all-inclusive list of applicable special permit provisions.

If you have any questions regarding this matter, please contact Christopher Barber at (559) 437-1581.

Sincerely,



Kassy D. Chauhan, P.E.
Senior Sanitary Engineer
Merced District
Central California Section
SOUTHERN CALIFORNIA BRANCH
DRINKING WATER FIELD OPERATIONS

cc: Mariposa County Environmental Health Department
Paul Laymon, Utilities Manager, P.O. Box 700W, El Portal, CA 93740
Jim Allen, Facility Operations Specialist, P.O. Box 700W, El Portal, CA 93740
Rodney Raines, Utilities Supervisor, 4001 Chilnualna Falls Road, Wawona, CA 95318

State Water Resources Control Board
Division of Drinking Water



Certificate of Issuance
OF A

WATER SUPPLY PERMIT

TO
Yosemite National Park
Wawona Water System

This is to certify that a revised water supply permit **03-11-16P-010** has been issued to the Yosemite National Park – Wawona Water System, on **March 24, 2016** to supply water for domestic purposes to the Yosemite National Park – Wawona Water System. The revised permit was issued by the SWRCB - Division of Drinking Water, pursuant to the provisions of Division 104, Part 12, Chapter 4, Article 7, of the California Health and Safety Code. The permit is subject to the requirements of Title 22, California Code of Regulations, and to the conditions provided in the water supply permit.

A copy of the revised water supply permit is on file with the Yosemite National Park – Wawona Water System or may be obtained by contacting the Merced District Office of the SWRCB – Division of Drinking Water, Field Operations Branch, 265 W. Bullard Ave., Ste. 101, Fresno, CA 93704

Kassio D. Chauhan

Kassy D. Chauhan, P.E., Senior Sanitary Engineer



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SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board
Division of Drinking Water

STATE OF CALIFORNIA

REVISED DOMESTIC WATER SUPPLY PERMIT ISSUED TO Yosemite National Park For the Operation of the Yosemite National Park – Wawona Water System Water System No. 2210510

PERMIT NO. 03-11-16P-010

EFFECTIVE DATE: *March 24, 2016*

WHEREAS:

1. The YNP – Wawona water system (System) was operated under a Domestic Water Supply Permit issued by the State Water Resources Control Board – Division of Drinking Water (Division) in 1992 (Permit No. 03-92-022). Due to the age of the permit, the Division is issuing a revised Domestic Water Supply permit to reflect current operations of the System.
2. The public water system is known as the Yosemite National Park – Wawona which is located in and operated by Yosemite National Park.
3. The public water system is described briefly below:

The System's water system serves the Wawona community in Yosemite National Park. The System uses surface water taken from the South Fork of the Merced River at a point upstream of the community. The raw water is treated through direct filtration and continuous chlorination. The System is classified as a community water system and serves a population of at least 150 persons through 150 service connections. The entire system is sewered with a waste water treatment plant treating the waste. The water system is operated year round.

And WHEREAS:

1. The State Water Resources Control Board, Division of Drinking Water has evaluated all of the information submitted by Yosemite National Park and conducted a physical inspection of the System on July 27, 2014.
2. The State Water Resources Control Board, Division of Drinking Water has the authority to issue domestic water supply permits pursuant to Health and Safety Code Section 116540.

FELICIA MARCUS, CHAIR | THOMAS HOWARD, EXECUTIVE DIRECTOR

THEREFORE:

1. The System meets the criteria for and is hereby classified as a community water system.
2. Provided the following conditions are complied with, the System should be capable of providing water to consumers that is pure, wholesome, and potable and in compliance with statutory and regulatory drinking water requirements at all times.

YOSEMITE NATIONAL PARK IS HEREBY ISSUED THIS DOMESTIC WATER SUPPLY PERMIT TO OPERATE THE YOSEMITE NATIONAL PARK – WAWONA WATER SYSTEM.

The System shall comply with the following permit conditions:

1. The only approved source of domestic water supply for use by YNP – Wawona is listed below.

Approved Sources

Source Name	Status	Primary Station Number
YNP-Wawona Intake - Raw	Active	2210510-001

2. The approved treatment facilities for use by YNP – Wawona are the pH adjustment through the addition of soda ash, the direct filtration plant and disinfection through continuous chlorination.

Approved Treatment

Plant Name	Primary Station Number	Treatment
YNP-Wawona - Treated	2210510-002	Coagulation, Direct Filtration, pH Adjustment, Chlorination

3. No additions, changes or modifications to the sources of water supply or water treatment processes outlined in Provisions Nos. 2 and 3 can be made without prior receipt of an amended domestic water supply permit from the Division.
4. Under the operator certification regulation, the water system is classified as a D1 system. The System must have a chief distribution operator who is certified, at a minimum, as a D1 distribution system operator.
5. The water treatment plant is classified as a T2 system. The System must have a chief treatment operator who is certified, at a minimum, as a T2 treatment system operator and conduct site visits to the treatment system on at least a weekly basis.
6. The maximum total flow rate through the filtration plant is 280 gpm.
7. Surface water sources are required to provide 3-log Giardia reduction, 4-log virus reduction, and 2-log cryptosporidium reduction. The direct filtration used by the System is credited with

2-log Giardia reduction, 1-log virus reduction and 2-log Cryptosporidium reduction. Therefore, YNP – Wawona must provide the additional 1-log Giardia and 3-log virus inactivation by disinfection. The $CT_{provided}$ versus the $CT_{required}$ (CT ratio) must be calculated daily and be greater than 1.0 to ensure adequate disinfection is being achieved.

8. The direct filtration treatment plant shall be operated in accordance with the approved Operation Plan.
9. YNP – Wawona must comply with the attached Water Quality Monitoring schedule for the raw water source, Appendix C. All water quality monitoring results obtained in a calendar month must be submitted to the Division via Electronic Data Transfer (EDT) by the tenth (10th) day of the following month.
10. The YNP – Wawona must continue to submit monthly reports to the Division for the effectiveness and efficiency of the surface water treatment facility must be submitted by the 10th of each month for the preceding month.
11. YNP – Wawona shall monitor the raw surface water source, before chlorination, monthly for total coliform and E. coli bacteria. The coliform and E. coli tests shall be performed using a density analytical method and the results reported in units of MPN per 100 mL. The results of the source monitoring shall be submitted to the Merced District Office of the DWFOB by the 10th day of the following month.
12. YNP – Wawona shall increase its monthly raw water bacteriological monitoring from monthly to weekly from the source when the total coliform results exceed 1000 MPN/100 mL and/or the E. coli bacteria results exceed 200 MPN/100mL. The increased monitoring must be conducted for at least four consecutive weeks until at least two consecutive weekly sample results do not exceed 1,000 MPN/100 mL of total coliform and 200 MPN/100 mL of E. coli. If the MMO-MUG method is used, the monitoring will be based on the E. coli levels.
13. YNP – Wawona must achieve a filter effluent turbidity level of less than or equal to 0.3 NTU is at least 95 percent of measurements taken each month and shall not exceed 1 NTU at any time and shall not exceed 1.0 NTU in more than two consecutive samples.
14. YNP - Wawona shall submit an electronic Annual Report to the Drinking Water Program (e-ARDWP) each year, documenting specific water system information for the prior year. The report shall be in the format specified by the Division.

This permit supersedes all previous domestic water supply permits issued for this public water system and shall remain in effect unless and until it is amended, revised, reissued, or declared to be null and void by the State Water Resources Control Board, Division of Drinking Water. This permit is non-transferable. Should the System undergo a change of ownership, the new owner must apply for and receive a new domestic water supply permit.

Any change in the source of water for the water system, any modification of the method of treatment as described in the Engineering Report, or any addition of distribution system storage reservoirs shall not be made unless an application for such change is submitted to the State Water Resources Control Board, Division of Drinking Water.

This permit shall be effective as of the date shown below.

FOR THE STATE WATER RESOURCES CONTROL BOARD, DIVISION OF DRINKING
WATER

3-24-16

Kassy D. Chauhan

Kassy D. Chauhan, P.E.
Senior Sanitary Engineer
Merced District
Central California Section
SOUTHERN CALIFORNIA BRANCH
DRINKING WATER FIELD OPERATIONS

**Engineering Report
For the Consideration of a Permit for
Yosemite National Park - Wawona
System No. 2210510
Mariposa County
March 2016**

**State Water Resources Control Board – Division of Drinking Water
Southern California Branch
Drinking Water Field Operations
Christopher Barber E.I.T., Sanitary Engineer**

I. INTRODUCTION

1.1 PURPOSE OF REPORT

On November 16, 2015, I conducted an inspection of the Yosemite National Park (YNP) Wawona (System) water system. I met with the Jim Allen, Facilities Operations Specialist; Katie Brown, Facilities Operations Specialist; and Rodney Raines, Utilities Supervisor. Because the previous permit was issued in 1992, the State Water Resources Control Board – Division of Drinking Water (Division) has determined that the existing permit does not adequately describe the System as it exists today. The purpose of this permit report is to document the inspection of the System's water supply system, to describe the facilities and operational practices as they exist today as well as make a recommendation regarding the issuance of a revised permit to the System.

1.2 PERMIT COMPLIANCE

The System is currently operating the water system under the Domestic Water Supply Permit No. 03-92-022 issued by the State Water Resources Control Board – Division of Drinking Water (formerly California Department of Public Health - Drinking Water Program) on June 25, 1992. As mentioned above, the Division is issuing a revised permit since the original permit is no longer valid.

1.3 DESCRIPTION OF SYSTEM

The mailing address for the System is P.O. Box 577, Yosemite National Park, CA, 95389. The System is classified as a community water system and serves a permanent population of up to 150 persons through 125 service connections.

The domestic water supply is obtained from surface water supplied by the South Fork of Merced River. The surface water is treated through a direct filtration followed by disinfection using sodium hypochlorite. The designated operator performs inspections

and collects the required daily monitoring. The System has one clearwell (34,000 gallons) and four storage tanks with a combined capacity of approximately 1.0 million gallons. See Appendix A for photographs of the system facilities.

1.4 Enforcement History

The System has no history of enforcement actions.

1.5 Area Served

The System is located in eastern Mariposa County in Yosemite National Park. The service area is comprised of approximately 150 service connections of which roughly 125 are private residences. Service connections also include a school, hotel, store, campground, service station, government housing and golf course.

II. INVESTIGATION AND FINDINGS

2.1 SOURCES OF SUPPLY

The domestic water supply is obtained from surface water supplied by the South Fork of the Merced River. The watershed contains hiking trails. No campgrounds or sewage systems exist upstream of the intake. Table 1 below summarizes the active raw water source and Primary Station Code (PS Code) for the System.

Table 1: Approved Source

Source Name	Status	PS Code
South Fork Merced River - Raw	Active	2210510-001

Sources

Raw Water

The raw water intake is located in the South Fork of the Merced River. There are no reported facilities or developments upstream of the System's intake.

The intake for the water treatment facility is located within a dammed portion of the South Fork of the Merced River. The intake is located in an area that is a popular swimming hole. There is a sign posted at the intake structure warning people not to swim in the river above the intake. Other potential contamination hazards exist from hikers and backpackers using the hiking trails within the watershed.

The intake is equipped with a welded vee-wire screen to remove larger debris from the water. The intake is floating in that it can be moved or extended as needed. The water flows by gravity through a 10-inch diameter ductile iron pipeline followed by an 8-inch

diameter ductile iron pipeline to the treatment plant. At the plant, the raw water passes through a Y-strainer which is cleaned daily when the raw water has high turbidity. The intake is located approximately 2.4 miles from the SWTP.

Merced River Watershed Sanitary Survey

The Merced River watershed sanitary survey report completed by Yosemite National Park in 2002 found that the highest rated possible contaminating activity is through moderate hiking in the area. The watershed is not exposed to significant recreational activity. In 2010, an updated watershed sanitary survey was submitted to the Division. This update addressed additional water systems that are part of the Merced River watershed in Mariposa County, but are downstream of the System and YNP. By regulations, Watershed Sanitary Surveys are required to be updated every five (5) years. The System should begin considering performing a Watershed Sanitary Survey for the Merced River watershed. The next update to the Watershed Sanitary Survey was due by December 31, 2015. **The System must submit a plan and time schedule for an update to the current watershed sanitary survey. The plan and time schedule must be submitted to the Division by April 30, 2016, and the next watershed sanitary survey must be completed by December 31, 2016.**

2.2 PRODUCTION

Production data from past electronic Annual Reports to the Drinking Water Program (e-ARDWP) submitted to the Division is presented in Table 2.

Table 2: Production data and population served (2010-2014)

Year	Population	Active Service Connections	Annual Production (MG)	Max. Month (MG)	Max. Day (MG)
2014	150	150	16.6	2.13 (May)	0.139
2013	150	150	17.5	2.67 (July)	0.135
2012	150	150	15.8	2.26 (July)	0.196
2011	150	150	18.6	2.98 (August)	0.146
2010	150	150	22.5	5.72 (July)	0.272

2.3 ADEQUACY OF SUPPLY

Table 3 displays the maximum day (MDD) and peak hour demands (PHD) during the last five years for the YNP – Wawona. The PHD was estimated by multiplying the flow rate of the average day of the maximum month by a peaking factor of 1.5. The source of supply, the respective capacities of the direct filtration plant as well as the total system supply capacity for the System is listed in Table 4. Maximum day demand was provided from the System’s water production reporting on the e-ARDWP. Peak hour demand was calculated using the maximum day demand and a peaking factor of 1.5.

Table 3: Maximum Day and Peak Hour Demand

Year	Maximum Day Demand (gpm)	Peak Hour Demand (gpm)
2014	96.5	144.8
2013	93.8	140.7
2012	136.1	204.2
2011	101.4	152.1
2010	188.9	283.4

Table 4: Source Capacity

Source	Capacity (gpm)
Max Flow Through Plant	280
Total	280

The highest year of production from the last five years of data shows the maximum day and peak hour demands are approximately 188.9 and 283.4 gpm (2010 data), respectively. While the surface water treatment plant normally operates at 100 gpm, it is capable of providing water at a rate of 280 gpm. According to the information provided, the System has adequate source and filtration capacity to meet maximum day and has adequate capacity for peak hour demand when the storage is taken in to account. As mentioned, the System has over 1 MG of storage available through four storage tanks installed in the System. The System has not experienced low-pressure problems or received complaints from visitors regarding water outages. The surface water treatment plant is the only source of supply for the System. Due to the remoteness of the System, this could be problematic for the System if the surface water treatment plant goes down.

Distribution System

The distribution system consists of two pressure zones. Normal system pressure is maintained at approximately 7 pounds per square inch (psi). Distribution lines consist mainly of 6-inch to 12-inch diameter ductile iron pipe with some PVC and steel pipes in minimum quantities. New distribution lines are to be installed in conformance with all applicable California Waterworks Standards. Water and sewer line separation in the distribution system is adequate.

The System does not exercise valves on a regular basis. The Division recommends that all isolation valves are exercised on an annual basis to help maintain proper operation. The System should submit create and submit a valve exercising to the Division. The System is primarily looped with a few dead-ends which are typically flushed once per year.

Storage Facilities

The System utilizes four storage tanks. Two 337,000-gallon storage tanks serve the upper pressure zone. The lower zone is supplied by a 250,000-gallon tank and a 100,000-gallon tank. Both pairs of tanks are equipped with a solar powered level monitor that controls the pumps at the plant that supply the respective zone. In addition to the tanks in the upper and lower zones the System also has a 34,000-gallon clearwell that has a minimum fill level of 17,834 gallons. The tanks are a top-in/bottom-out configuration. The tanks were not accessible during the inspection due to a snow storm that occurred a day before the inspection. Any tanks vents and overflows should be properly screened. Any access hatches should have a seal or gasket to prevent animal intrusion. The System checks the top of the tank twice a year for overall condition. **The System must submit photos of the tops of all tanks to include vent screens and the bottom of hatch lids. Photos must be submitted to the Division by May 31, 2016.**

It is unknown when the last time the interior of the tanks were cleaned or inspected. The Division recommends that all storage tanks are cleaned and inspected once every five years.

2.4 TREATMENT

Surface Water

The System provides direct filtration and chlorination. The direct filtration system consists of two identical operations operated in parallel or individually. According to the Operations Plan, the maximum flow rate through the filtration plant is 280 gpm (5.7 gallons per minute per square foot for each train).

Pre-Treatment

The pretreatment process allows the injection of soda ash, alum, and polymer. The injection points are located above the static mixer. A third injection point allows for the injection of chlorine following the static mixer. Only the polymer system was operating during the review. The water is metered and a flow regulator regulates the flow through each of the treatment train.

The polymer feed system consists of a Stanco Polyblend system with a Blue-White peristaltic pump rated at 8.0 gpd at 100 psi. ANSI/NSF Standard 60-Certified Jenfitch JC 1645 polymer is fed neat into the Polyblend system which blends the polymer with treated plant water. There are four rotameters located on this feed system to allow operational flexibility. This was the only coagulation chemical feed system operating for the water treatment plant.

The alum feed system was not operating during the review. However, this system consisted of an injection pump located on a plastic solution barrel. Makeup water is added into the solution tank which has a paddle mixer to keep the solution in suspension. The System did not have alum on hand for use but ensured that any ordered from the vendor would be ANSI/NSF Standard 60-Certified.

The soda ash injection system was also not operating during the review. The injection system is similar to the alum feed system. The System did not have soda ash on hand for use but ensured that any ordered from the vendor would be ANSI/NSF Standard 60-Certified. The System is designed for the use of soda ash in the event the pH of the water need to be adjusted.

ANSI/NSF Standard 60-Certified sodium hypochlorite (12.5%) is injected by two Blue-White peristaltic pumps that feed from a 55-gallon drum. The System pre-chlorinates the raw water prior to entering the flocculator with a target residual of 1.5 mg/L.

Flocculation

Direct filtration is provided at the Wawona Water Treatment Facility. All of the treatment facilities are located in a secured building. The treatment process is split into two separate treatment trains. Each treatment train consists of a flocculation unit and dual media gravity filter.

The flocculator is equipped with a horizontal paddle and a 0.5-hp drive unit. The drive speed can be manually adjusted. The flocculator is equipped with wooden flocculation paddles that are approximately 6 foot long and 4 foot diameter. The theoretical detention time of the unit is approximately 28 minutes at the maximum flow rate. The water exits the flocculation unit at a weir located on the opposite end of the flocculation unit. The inlet into the flocculation unit is also located at the top; however, the paddles operate in a counter current fashion to reduce short circuiting. Polymer can be added in the weir prior to entering the dual media gravity filters.

Filtration

Filtration is provided by dual media gravity filters. Each filter has surface dimensions of approximately 7 feet by 7 feet giving an area of 49 ft². This gives a maximum filtration rate of 5.7 gpm/ft² at the maximum flow rate and one filter out of service. This filtration rate is in compliance with the operational criteria of the Surface Water Treatment Regulations (maximum allowed is 6.0 gpm/ft²). The filters are equipped with surface wash facilities. The media consist of 12 inches of anthracite, 18 inches of sand, and 12 inches of gravel support media. The filter effluent is chlorinated prior to entering the clearwell.

The backwash process can either be activated manually or automatically. The System performs a backwash once per week or every 0.5 MG to prevent biological growth and to prevent media from agglomerating. Filter breakthrough, significant head loss or pressure loss, or a significant rise in turbidity can also trigger a backwash. The operators currently operate the backwash process in the manual mode. Water for the backwash process is obtained from the lower distribution system. The backwash cycle consist of backwashing for 8 minutes, surface wash for 4 minutes during the backwash cycle, and a rinse cycle for 60 minutes following the backwash cycle. The Operation Plan indicates that the System is set to backwash at 280 gpm. As the area of each filter is 50 ft², the backwash rate for one filter is approximately 5.6 gpm/ft². If both filters are backwashed at the same time the flow would be approximately 2.8 gpm/ft². The backwash water enters a 33,400-gallon subsurface concrete basin located outside of the treatment facility. The backwash water is disposed into the sewer or used for other non-potable uses.

Following filtration, the water enters a subsurface concrete clearwell with a capacity of 34,000 gallons. It is noted that the inlet to the clear well is approximately 12 feet from the pump outlets of the clear well. Therefore, short-circuiting in the clearwell can occur and a conservative estimate must be given when considering the CT evaluation. Water is pumped from the clearwell into two pressure zones. The lower pressure zone pumps consist of two 7.5-hp pumps rated at 140 gpm. The upper pressure zone pumps consists of two 20-hp pumps also rated at 140 gpm.

Chlorination

The System injects sodium hypochlorite a second time prior to entering the clearwell with a target residual of 1.5 mg/L. The Park Service tries to maintain a chlorine residual of 0.5 mg/L to 1.5 mg/L in the distribution system. In addition to reporting the chlorine residual with the routine bacteriological monitoring, the System annually checks the residual in every line in the distribution system to ensure a detectable residual as required.

Monitoring and Reliability Equipment

Turbidity: The System uses Hach 1720D turbidimeters to monitor the turbidity of the filter effluents and the clearwell effluent. A tabletop turbidimeter, Hach 2100N, is used to monitor the combined filter effluent turbidity. Grab samples are collected the days the plant is in operation to monitor turbidity, pH and chlorine residual. The primary calibration is performed quarterly. Secondary calibrations are performed daily. Calibrations are performed by the certified operator. Calibration logs are kept with the equipment.

Chlorine Residual: A Hach CL17 chlorine analyzer is used to monitor the chlorine residual of the clearwell effluent.

2.5 SURFACE WATER TREATMENT COMPLIANCE

Contact Time Calculations

Surface water sources are required to provide 3-log Giardia reduction, 4-log virus reduction and 2-log Cryptosporidium reduction. The direct filtration used by the System is credited with 2-log Giardia reduction, 1-log virus reduction and 2-log Cryptosporidium reduction. Historic monitoring values for the finished water turbidity over the last two years indicate that the System has had no instances of the treated water turbidity exceeding 0.3 NTU. Therefore calculations made in this report will reflect the worst case scenario of requiring 1.0 log of Giardia inactivation credit through disinfection. Therefore, the treatment plant must provide the additional 1-log Giardia and 3-log virus inactivation by disinfection.

Additionally, direct filtration treatment systems may receive an additional 0.5-log Cryptosporidium reduction for any month the individual filter effluent (IFE) is less than 0.15 NTU in at least 95 percent of the measurements. An additional 0.5-log Cryptosporidium reduction can also be awarded if no individual filter has a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart and the IFE turbidity is less than 0.15 NTU in at least 95 percent of the maximum daily values recorded at each filter in each month excluding the 15 minute period following the return to service following a filter backwash.

The System uses disinfection from free chlorine to provide the additional required inactivation of giardia and viruses. The chlorine contact time is provided in the detention time through the one flocculation basin, one filter, the clearwell tank and the transmission pipeline. The low level in the clearwell tank is 17,834 gallons before the surface water treatment plant starts filling the tank. The transmission pipeline (10-inch diameter) distance to the first service connection is approximately 430 feet. The distance equates to a volume of 1,750 gallons. The System reports daily contact time (CT) calculations and provides monthly reports to the Division. The System must ensure that it accurately reports all required monitored for water that is to enter the distribution system. In addition, the System must ensure that raw water samples are monitored and reported for each day plant is in operation. The water system meets CT requirements on a daily basis while the system is in operation. The table below summarizes the operating parameters to be used for the worst case CT calculation.

Table 5: Raw and Finished Water Turbidity

Parameter	Value	Comment
Flow Rate Through Plant	70 gpm	Highest in last 12 months
Flow Rate Leaving Plant	150 gpm	
Floc Basin Capacity	4,125	
Floc Basin Baffling Factor	0.30	
Filter Capacity	1,870	

Parameter	Value	Comment
Filter Baffling Factor	0.70	
Clearwell	17,834 gallons	Minimum volume
Baffling Factor (Clearwell)	0.20	(T ₁₀ /T ratio)
Pipeline Capacity	1,750 gallons	10 in. diameter at 430 ft. long
Baffling Factor (Pipeline)	1.0	(T ₁₀ /T ratio)
Residual - tank	1.03 mg/l	Lowest residual
pH	7.81	High pH for 2014
Temperature (Low)	8.3° C	Low
Log Inactivation	1.0	Required for disinfection

Utilizing the worst case scenario values presented above, the CT ratio is calculated as follows:

$$CT_{\text{Floculation}} = (4,125 \text{ gallons} / 70 \text{ gpm}) \times (0.3) \times (1.03 \text{ mg/L}) = 18 \text{ milligram minute per liter (mg*min/L)}$$

$$CT_{\text{Filter}} = (1,870 \text{ gallons} / 70 \text{ gpm}) \times (0.7) \times (1.03 \text{ mg/L}) = 19 \text{ milligram minute per liter (mg*min/L)}$$

$$CT_{\text{Clearwell}} = (17,834 \text{ gallons} / 150 \text{ gpm}) \times (0.2) \times (1.03 \text{ mg/L}) = 24 \text{ milligram minute per liter (mg*min/L)}$$

$$CT_{\text{pipeline}} = (1,750 \text{ gallons} / 150 \text{ gpm}) \times (1.0) \times (1.03 \text{ mg/L}) = 12 \text{ milligram minute per liter (mg*min/L)}$$

$$CT_{\text{total}} = 18 \text{ mg*min/L} + 19 \text{ mg*min/L} + 24 \text{ mg*min/L} + 12 \text{ mg*min/L} = 73 \text{ mg*min/L}$$

$$CT_{\text{required}} = 0.284 \times \text{pH}^{2.69} \times \text{Cl}^{0.15} \times 0.933^{(T-5^{\circ}\text{C})} = 57 \text{ (mg*min/L)}$$

$$CT_{\text{ratio}} = CT_{\text{provided}} / CT_{\text{required}} = 85 \text{ (mg*min/L)} / 57 \text{ (mg*min/L)} = 1.3$$

Based on the above calculations, the System is able to provide the necessary contact time for disinfection. It is recommended that the chlorine residual is increased to a minimum of 1.3 mg/L to ensure the System is able to maintain a CT_{ratio} greater than 1.0.

Operations Plan

The Division has reviewed the System's 2015 Operations Plan that was submitted for the water treatment facility. The 2015 Operations Plan is considered complete. The System should amend the Operations Plan to include the following addition and correction.

1. The Contact Time calculations in the Operations Plan regarding the Contact Tank use the total volume of the tank. This calculation should be made with the minimum volume of the tank.
2. The calibration of any monitoring equipment should be included in the Operations Plan.

2.6 WATER QUALITY MONITORING

General Mineral, General Physical, and Inorganic Chemical

As a community water system the System is required to sample the raw water from the raw surface water for general mineral, general physical and inorganic chemicals annually. The System last monitored the source in September of 2014. **The source is currently due for general mineral, general physical and inorganic chemical monitoring. The System must monitor the raw water source for all past due general mineral, general physical and inorganic chemical monitoring by April 30, 2016.** All reported levels from 2014 were within acceptable levels. Appendix B contains the Water Quality Monitoring Schedule for the active source. Appendix C contains the Last Taken/Next Due monitoring schedule for the active source.

Nitrate/Nitrite

The System is required to conduct raw water nitrate monitoring annually and nitrite sampling triennially. The last samples, collected on September 9, 2014, for nitrate and nitrite, showed non-detectable concentrations for both constituents. Nitrate monitoring for the source is currently due. Nitrite monitoring is next due in September 2017.

Organic Chemicals

The System must monitor the raw water source for volatile organic chemicals (VOCs) and synthetic organic chemicals (SOCs) once every 72 months as shown on the Water Quality Monitoring Schedule (Appendix B). Monitoring for SOCs has been waived as shown on the monitoring schedule. The System last monitored the source for VOCs in September 2010. The source is next due for VOC monitoring in 2016. The water produced by the System's wells does not have detectable concentrations of any of the applicable VOCs.

Radiological

The California Radionuclide Rule became effective on June 11, 2006. Initial monitoring requirements under the California Radionuclide Rule must have been satisfied by December 31, 2007, for existing sources. The System has completed initial gross alpha and radium-228 monitoring for the raw water obtained from the South Fork of the

Merced River. Based on the most recent monitoring results, the System is currently only required to monitor for gross alpha once every nine years. Division records show that the last round of gross alpha monitoring occurred in February 2006. The source was due for gross alpha monitoring in 2015. **The raw water intake is currently past due for gross alpha monitoring and the System must monitor the active source for gross alpha by April 30, 2016.**

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

The System is classified in Bin 1 under the LT2ESWTR. As such, the Division reviewed historic source monitoring data and determined that no additional source water monitoring was required to meet initial LT2ESWTR requirement. *The second round of monitoring under LT2ESWTR must be conducted between October 31, 2017 and September 30, 2018. This second round of monitoring must consist of E. coli monitoring once every two weeks for 12 months.*

The System is required to continue monitoring the raw water a minimum of one time per month for total coliform and E. coli bacteria and more frequently if directed by the Division.

SWTP Monitoring

Each day the System is in operation, the operator performs routine monitoring of the SWTP. This includes water produced, flow rate from the clearwell, raw water temperature, raw and finished water turbidity, and chlorine residual.

Based on data submitted to the Division over the last two years, the CT_{ratio} has ranged from 1.35 to 6.32. Due to an error in the CT calculations the ratios reported to the Division on the monthly reports have been much higher than actual ratios. There has been no reported incident of the CT_{ratio} dropping below 1.0 in the last two years.

Turbidity

Regulations require that direct filtration treatment plants achieve a filter effluent turbidity level of less than or equal to 0.3 NTU is at least 95 percent of measurements taken each month and shall not exceed 1 NTU at any time and shall not exceed 1.0 NTU in more than two consecutive samples. The table below presents raw and finished water turbidities for the System for the past two years.

Table 6: 2014/2015 Raw and Finished Water Turbidity

Raw Turbidity (NTU) Low/High	95th Percentile Finished Water (NTU) Low/High
0.1/0.3	0.027/0.100

2.7 DISTRIBUTION SYSTEM MONITORING

California Ground Water Rule Triggered Source Monitoring

As per the requirements of the California Groundwater Rule (GWR), public water systems are required to conduct triggered source monitoring whenever a routine distribution system sample is positive for total coliform bacteria. The System must ensure that the active wells will be sampled for total coliform bacteria and E. coli bacteria when a routine distribution system sample shows the presence of total coliform bacteria.

Bacteriological Water Quality

The System serves a permanent population of 150 people through 150 service connections. Based on this population and number of pressure zones, the System is required to collect two samples from the distribution system per month. The System also sees a large transient population through the service station, campgrounds, hotel and golf course. As a result, the System collects eight samples per month. The samples will be analyzed for total coliform bacteria and the results shall be sent to the Division by the 10th day of the month following sampling. A review of the monitoring history since 2010 shows that the System has not had an instance of bacteriological detection in this time period.

The System currently does not have a Bacteriological Sample Siting Plan (BSSP) on file with the Division. **The System must submit a BSSP to the Division for review and approval by March 31, 2016. Guidelines for the creation of a BSSP can be found in Appendix D.**

Lead and Copper Monitoring

The System currently collects 10 samples every three years which is the minimum number of lead and copper samples required under reduced monitoring. A review of the System's lead and copper monitoring history reveals that the System has not had an exceedance in the distribution system. The System submits the 90th percentile results from the sampling on Form 141-AR which includes any changes in the addresses used. For the last two rounds of lead and copper monitoring, the System has not included a copy of the laboratory analysis. Form 141-AR is to be submitted along with all lead and copper monitoring results and is not intended to take the place of the results. **The System must submit the lab results from the 2015 monitoring conducted. Results must be submitted to the Division by May 31, 2016.** The following table summarizes the lead and copper tap monitoring results for the System:

Lead and Copper Monitoring History

Sample Date	Sample Interval	No. Required	No. Sampled	Lead 90 th Percentile (mg/L)	Copper 90 th Percentile (mg/L)
8/9/1993	1 st 6 Month	20	20	0.012	0.074
9/21/1994	2 nd 6 Month	20	20	0.008	0.060
9/5/1995	1 st Annual	20	20	0.014	0.071
8/1/2000	2 nd Annual	10	10	0.015	1.300
10/13/2000	2 nd 6 Month	10	10	0.003	0.057
7/23/2003	1 st Triennial	10	10	0.0025	0.1200
9/13/2006	2 nd Triennial	10	10	0.098	0.72
9/10/2009	3 rd Triennial	10	10	0.0025	0.072
6/1/2012	4 th Triennial	10	10	0.0073	0.0
9/1/2015	5 th Triennial	10	10	0	0.051
7th Triennial due between June 1, 2017 and September 30, 2018					

As noted, the System must conduct another round of lead and copper tap monitoring (10 samples) in 2018 between June 1st and September 30th.

Stage 2 – Disinfection By-Product Rule Monitoring (ST2 DBPR)

The System is considered a Schedule IV system under the United States Environmental Protection Agency (USEPA) Stage 2 Disinfectant and Disinfection By-Products Rule (ST2 DBPR). The ST2DBPR compliance monitoring sites were approved by the Division on June 3, 2013. Monitoring required by the ST2DBPR began during the third quarter of 2014 and will continue on an annual frequency. Compliance with the TTHM/HAA5 MCLs will be determined based on the locational running annual average (LRAA). The most recent disinfectant by-product monitoring results for the last two years are shown in the following table. The System must ensure that all ST2DBPR monitoring results are reported to the Division via EDT using the PS Code 2210510-900.

Date	TTHM	HAA5
September 3, 2014	33	17
August 18, 2015	15	11

2.8 OPERATION AND MAINTENANCE

The Designated Operator, Jerod Raines (D1, T2), is responsible for oversight of the water system. The chief operator of the System must have at least D1 and T2 certification. The System meets the operator certification requirements.

Maintenance of the water system consists of daily visits to the surface water treatment facility and storage tanks where the treatment plant is monitored and production totals are

recorded. Any necessary adjustments or maintenance work is performed during these daily visits.

Cross-Connection Control Program

Yosemite National Park administers a cross-connection control program coordinated by Mr. Jim Allen. According to the 2014 e-ARDWP, there are 294 backflow prevention assemblies in Yosemite National Park. The e-ARDWP does not identify the number installed in YNP - Wawona. The System must identify the number of backflow assemblies installed in the distribution system on the 2015 e-ARDWP. The 2014 e-ARDWP also states that the last cross-connection control survey was performed in 1999. The Division recommends that such a survey be performed once every five years at a minimum. Due to the small nature of the System and that construction or changes to the distribution system are not frequent, the System is only required to conduct a cross-connection survey in the event of distribution system modifications. Appendix E contains guidelines for cross-connection control surveys including a summary that can be submitted to the Division if and when a cross-connection control survey is performed.

Complaint Program

The System is required to maintain a record of customer complaints. The complaints are investigated and corrections made. As reported in the 2014 e-ARDWP, the System did not receive any complaints in 2014.

Emergency Notification Plan (ENP)

The System submitted an updated ENP on January 15, 2014. The ENP lists Don Neubacher, Paul Laymon, and Jim Allen as the contacts in the event of an emergency. The ENP indicates that larger systems such as the System will have the park personnel post signage around the water system, and providing assistance in relocating customers when necessary. In addition, the System also has access to roadside lighted informational signs, an AM frequency radio in Wawona, reverse 911 notification, posting notification at the park entrance and media release. In the event of an emergency, Mr. Allen will begin the notification process by contacting the necessary personnel. Notification is expected to take under two hours.

Drought Contingency Plan

The System does not currently have a Drought Contingency Plan on file with the Division. **The System should submit the current Drought Contingency Plan including water conservation measures to the Division by April 30, 2016.** Information, guidance documents and templates can be found on the Division website and the Rural Community Assistance Corporation (RCAC) website.

III. APPRAISAL OF SANITARY HAZARDS & PUBLIC HEALTH SAFEGUARDS

The System's source of supply is surface water that receives treatment from direct filtration treatment, pH adjustment and disinfectant using sodium hypochlorite. YNP – Wawona is operated year-round. The active surface water source has sufficient source and storage capacity to meet the average day demand. The water supply facilities consist of surface water supplied by the South Fork of the Merced River located upstream of the System, a direct filtration plant, one clearwell providing approximately 40,000 gallons of storage capacity and 4 storage tanks with a combined capacity of approximately 1.0 MG. The System has not experienced low-pressure problems or received complaints from customers regarding water outages.

IV. CONCLUSIONS AND RECOMMENDATIONS

The Merced District Office of the State Water Resource Control Board – Division of Drinking Water finds that the source, facilities and operation, as described in this report, are capable of producing a safe, wholesome, and potable water supply. The quality of the water served and the YNP – Wawona facilities adequately meets the Division's standards. Issuance of a domestic water supply permit by the State Water Resource Control Board – Division of Drinking Water to the Yosemite National Park for the continued operation of the Wawona water system is recommended, subject to the following provisions:

1. The only approved source of domestic water supply for use by YNP – Wawona is listed below.

Approved Sources

Source Name	Status	Primary Station Number
YNP-Wawona Intake - Raw	Active	2210510-001

2. The approved treatment facilities for use by YNP – Wawona are the pH adjustment through the addition of soda ash, the direct filtration plant and disinfection through continuous chlorination.

Approved Treatment

Plant Name	Primary Station Number	Treatment
YNP-Wawona - Treated	2210510-002	Coagulation, Direct Filtration, pH Adjustment, Chlorination

3. No additions, changes or modifications to the sources of water supply or water treatment processes outlined in Provisions Nos. 2 and 3 can be made without prior receipt of an amended domestic water supply permit from the Division.

4. Under the operator certification regulation, the water system is classified as a D1 system. The System must have a chief distribution operator who is certified, at a minimum, as a D1 distribution system operator.
5. The water treatment plant is classified as a T2 system. The System must have a chief treatment operator who is certified, at a minimum, as a T2 treatment system operator and conduct site visits to the treatment system on at least a weekly basis.
6. The maximum total flow rate through the filtration plant is 280 gpm.
7. Surface water sources are required to provide 3-log Giardia reduction, 4-log virus reduction, and 2-log cryptosporidium reduction. The direct filtration used by the System is credited with 2-log Giardia reduction, 1-log virus reduction and 2-log Cryptosporidium reduction. Therefore, YNP – Wawona must provide the additional 1-log Giardia and 3-log virus inactivation by disinfection. The CT_{provided} versus the CT_{required} (CT ratio) must be calculated daily and be greater than 1.0 to ensure adequate disinfection is being achieved.
8. The direct filtration treatment plant shall be operated in accordance with the approved Operation Plan.
9. YNP – Wawona must comply with the attached Water Quality Monitoring schedule for the raw water source, Appendix C. All water quality monitoring results obtained in a calendar month must be submitted to the Division via Electronic Data Transfer (EDT) by the tenth (10th) day of the following month.
10. The YNP – Wawona must continue to submit monthly reports to the Division for the effectiveness and efficiency of the surface water treatment facility must be submitted by the 10th of each month for the preceding month.
11. YNP – Wawona shall monitor the raw surface water source, before chlorination, monthly for total coliform and E. coli bacteria. The coliform and E. coli tests shall be performed using a density analytical method and the results reported in units of MPN per 100 mL. The results of the source monitoring shall be submitted to the Merced District Office of the DWFOB by the 10th day of the following month.
12. YNP – Wawona shall increase its monthly raw water bacteriological monitoring from monthly to weekly from the source when the total coliform results exceed 1000 MPN/100 mL and/or the E. coli bacteria results exceed 200 MPN/100mL. The increased monitoring must be conducted for at least four consecutive weeks until at least two consecutive weekly sample results do not exceed 1,000 MPN/100 mL of total coliform and 200 MPN/100 mL of E. coli. If the MMO-MUG method is used, the monitoring will be based on the E. coli levels.

13. YNP – Wawona must achieve a filter effluent turbidity level of less than or equal to 0.3 NTU is at least 95 percent of measurements taken each month and shall not exceed 1 NTU at any time and shall not exceed 1.0 NTU in more than two consecutive samples.
14. YNP - Wawona shall submit an electronic Annual Report to the Drinking Water Program (e-ARDWP) each year, documenting specific water system information for the prior year. The report shall be in the format specified by the Division.

- Appendix A: Inspection Photos
- Appendix B: Water Quality Monitoring Schedule
- Appendix C: Last Taken/Next Due Monitoring Schedule
- Appendix D: Guidelines for Completion if the Bacteriological Sample Siting Plan
- Appendix E: Cross Connection Control Guidelines

Appendix A
Inspection Photos

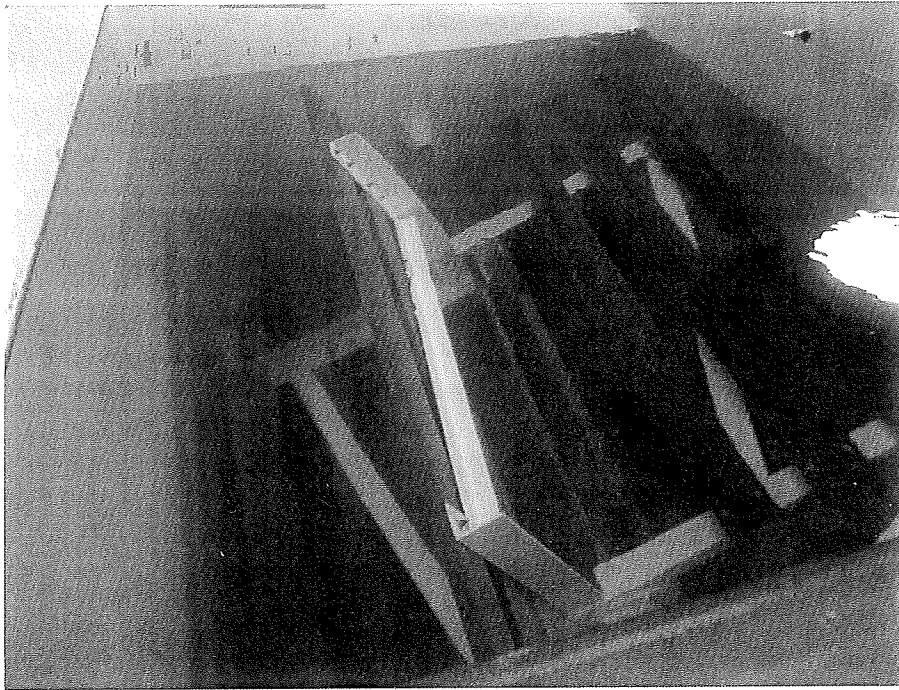


Photo 1; Flocculator

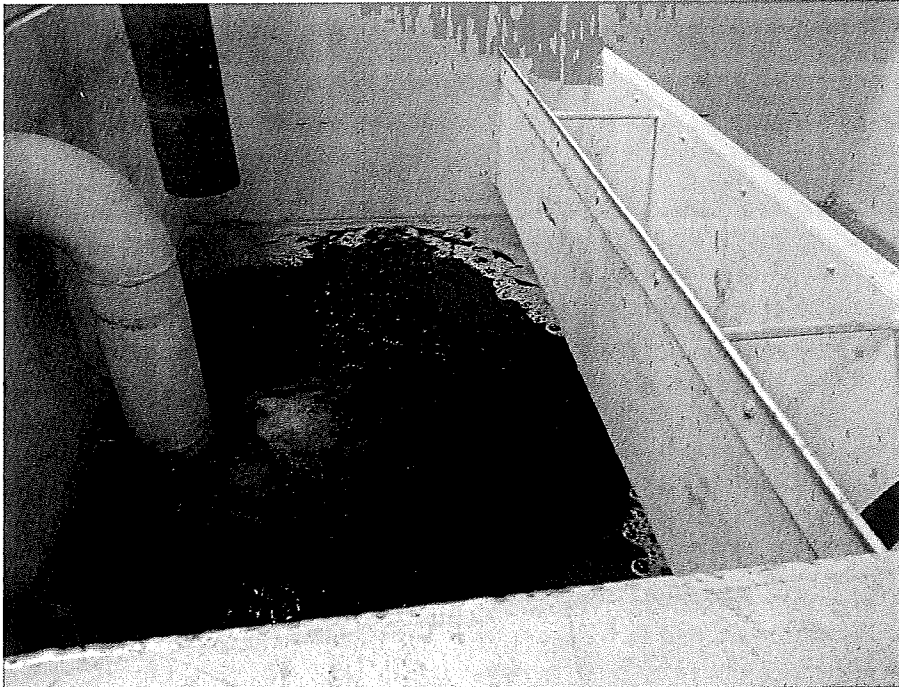


Photo 2; Gravity Filter

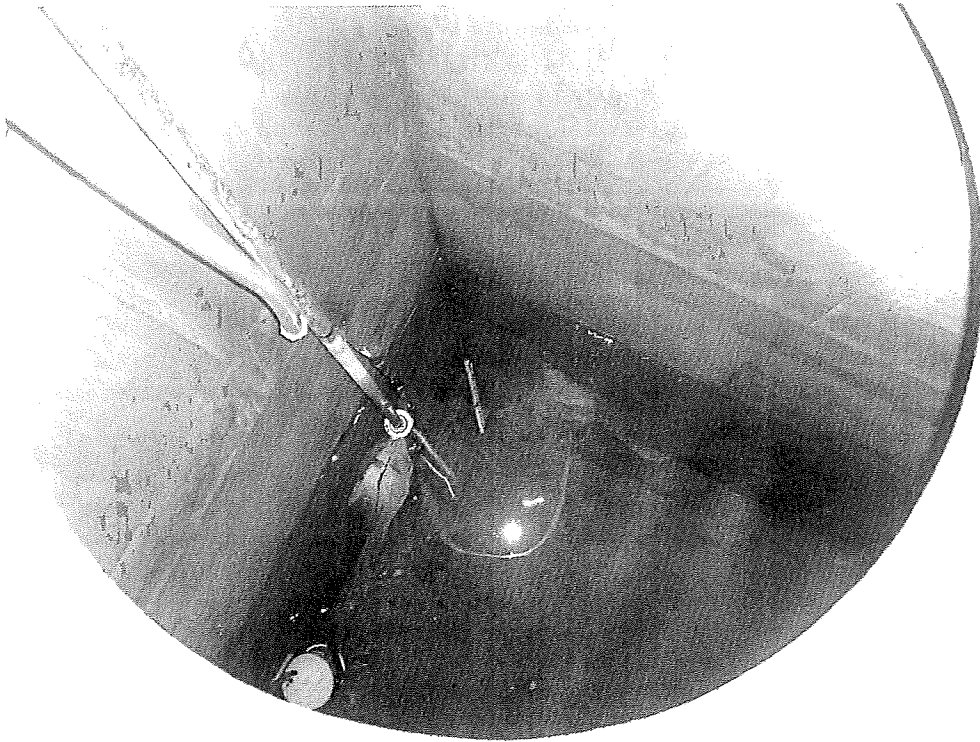


Photo 3; Clearwell



Photo 4; Backwash Basin

Appendix B

Water Quality Monitoring Schedule

WATER QUALITY MONITORING SCHEDULE
 Community System, >150 conn., < 3300 population, surface water pristine (CMSP)
 UPDATED - September 2015

Chemical - Title 22	MCL (mg/L)	EPA Method	Frequency (1)
Primary Inorganics - Section 64432			
Aluminum	1		Annually
Antimony	0.006		Annually
Arsenic	0.010		Annually
Barium	1		Annually
Beryllium	0.004		Annually
Cadmium	0.005		Annually
Chromium (Total Chromium)	0.05		Annually (2)
Hexavalent Chromium (Chrome 6)	0.010	218.6 or 218.7	1 sample (2)(3)
Cyanide	0.15		Waived
Fluoride	2.0		Annually
Mercury	0.002		Annually
Nickel	0.1		Annually
Perchlorate	0.006		Annually (4)
Selenium	0.05		Annually
Thallium	0.002		Annually
Asbestos - Section 64432.2			
Asbestos - Source Water	7 MFL		Every 9 years
Asbestos - Distribution System sampling if Asbestos-Cement pipe used	7 MFL		Every 9 years if Aggressive Index < 11.5
Nitrate/Nitrite - Section 64432.1			
Nitrate (as N)	10		Annually if ≤ 5 mg/L (5)
Nitrite (as nitrogen)	1		Every 3 years if ≤ 0.5 mg/L (6)
Nitrate + Nitrite (sum as nitrogen)	10		N/A
Secondary Standards - Table 64449-A			
Aluminum	0.2		Annually
Color	15		Annually
Copper	1.0		Annually
Foaming Agents	0.5		Annually
Iron	0.3		Annually
Manganese	0.05		Annually
Methyl-tert-butyl ether (MTBE)	0.005	502.2, 524.2	See MTBE frequency on page 2
Odor	3		Annually
Silver	0.1		Annually
Thiobencarb	0.001		Waived
Turbidity	5		Annually
Zinc	5		Annually
General Minerals - Section 64449			
Bicarbonate	N/A		Annually
Carbonate	N/A		Annually
Hydroxide Alkalinity	N/A		Annually
Calcium	N/A		Annually
Magnesium	N/A		Annually
Sodium	N/A		Annually
Hardness	N/A		Annually
pH	N/A		Annually
Secondary Standards - Table 64449-B			
TDS	500-1000;1500		Annually
Specific Conductance	900-1600; 2200		Annually
Chloride	250-500;600		Annually
Sulfate	250-500;600		Annually

MCL = Maximum Contaminant Level

Contact your district office with any questions.

- (1) Sampling shall be increased to quarterly following any result > MCL.
- (2) After initial hexavalent chromium monitoring, total chromium may be used if total chromium results are < 0.010 mg/L.
If total chromium result is ≥ 0.010 mg/L, monitoring for hexavalent chromium will be required.
- (3) Hexavalent chromium shall be increased to quarterly sampling following any result > 0.010 mg/L.
- (4) Perchlorate: This frequency applies if there were no detections in the initial monitoring.
- (5) Nitrate (as N) replaces Nitrate (as NO₃). Reduction to an annual frequency may be requested after 4 quarters of initial monitoring are completed. However, a system using approved surface water shall return to quarterly monitoring if any one sample is greater than or equal to 50 percent of the MCL. Beginning with Jan. 1, 2016, water systems shall comply with the Nitrate (as N) requirement.
- (6) Nitrite sampling shall be increased to quarterly following any result ≥ 0.5 mg/L. Upon request, this may be reduced to an annual frequency after 4 quarters of monitoring.

WATER QUALITY MONITORING SCHEDULE
 Community System, >150 conn., < 3300 population, surface water pristine (CMSP)
 UPDATED - September 2015

Chemical - Title 22	MCL (mg/L)	EPA Method	Frequency (1)
VOCs - Table 64444-A (a)			
Benzene	0.001	502.2, 524.2	Every 6 years
Carbon Tetrachloride	0.0005	502.2, 524.2	Every 6 years
1,2-Dichlorobenzene	0.6	502.2, 524.2	Every 6 years
1,4-Dichlorobenzene	0.005	502.2, 524.2	Every 6 years
1,1-Dichloroethane	0.005	502.2, 524.2	Every 6 years
1,2-Dichloroethane	0.0005	502.2, 524.2	Every 6 years
1,1-Dichloroethylene	0.006	502.2, 524.2	Every 6 years
cis-1,2-Dichloroethylene	0.006	502.2, 524.2	Every 6 years
trans-1,2-Dichloroethylene	0.01	502.2, 524.2	Every 6 years
Dichloromethane	0.005	502.2, 524.2	Every 6 years
1,2-Dichloropropane	0.005	502.2, 524.2	Every 6 years
1,3-Dichloropropene	0.0005	502.2, 524.2	Every 6 years
Ethylbenzene	0.3	502.2, 524.2	Every 6 years
Methyl- <i>tert</i> -butyl ether (MTBE)	0.013	502.2, 524.2	Every 6 years
Monochlorobenzene	0.07	502.2, 524.2	Every 6 years
Styrene	0.1	502.2, 524.2	Every 6 years
1,1,2,2-Tetrachloroethane	0.001	502.2, 524.2	Every 6 years
Tetrachloroethylene (PCE)	0.005	502.2, 524.2	Every 6 years
Toluene	0.15	502.2, 524.2	Every 6 years
1,2,4-Trichlorobenzene	0.005	502.2, 524.2	Every 6 years
1,1,1-Trichloroethane	0.200	502.2, 524.2	Every 6 years
1,1,2-Trichloroethane	0.005	502.2, 524.2	Every 6 years
Trichloroethylene (TCE)	0.005	502.2, 524.2	Every 6 years
Trichlorofluoromethane	0.15	502.2, 524.2	Every 6 years
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.2	502.2, 524.2	Every 6 years
Vinyl Chloride	0.0005	502.2, 524.2	Every 6 years
Xylenes (total)	1.750	502.2, 524.2	Every 6 years
SOCs - Table 64444-A (b)			
Alachlor	0.002	505, 507, 508.1, 525.2	Waived
Atrazine	0.001	505, 507, 508.1, 525.2	Waived
Bentazon	0.018		Waived
Benzo(a)pyrene	0.0002		Waived
Carbofuran	0.018		Waived
Chlordane	0.0001		Waived
2,4-D	0.07		Waived
Dalapon	0.2		Waived
Dibromochloropropane (DBCP)	0.0002	504.1, 551.1	Waived
Di(2-ethylhexyl)adipate	0.4		Waived
Di(2-ethylhexyl)phthalate	0.004		Waived
Dinoseb	0.007		Waived
Diquat	0.02		Waived
Endothall	0.1		Waived
Endrin	0.002		Waived
Ethylene Dibromide (EDB)	0.00005	504.1, 551.1	Waived
Glyphosate	0.7		Waived
Heptachlor	0.00001		Waived
Heptachlor Epoxide	0.00001		Waived
Hexachlorobenzene	0.001		Waived
Hexachlorocyclopentadiene	0.05		Waived
Lindane	0.0002		Waived
Methoxychlor	0.03		Waived
Molinate	0.02		Waived
Oxamyl	0.05		Waived
Pentachlorophenol	0.001		Waived
Picloram	0.5		Waived
Polychlorinated Biphenyls	0.0005		Waived
Simazine	0.004	505, 507, 508.1, 525.2	Waived
Thiobencarb	0.07		Waived
Toxaphene	0.003		Waived
2,3,7,8-TCDD (Dioxin)	0.00000003		Waived
2,4,5-TP (Silvex)	0.05		Waived

(1) This frequency applies only to chemicals for which previous results have shown no detectable results (ND).

Contact your district office for a special monitoring schedule when detectable results are found.

WATER QUALITY MONITORING SCHEDULE
 Community System, >150 conn., < 3300 population, surface water pristine (CMSP)
 UPDATED - September 2015

Radiological Monitoring

Radioactivity - Section 64442	MCL	EPA Method	Frequency
Gross Alpha	15 pCi/L		Based on result of last sample (1)
Radium-226	5 pCi/L Combined		When (GA-Uranium) > 5 pCi/L (2)
Radium-228	Radium-226 + 228		Waived (1)
Uranium	20 pCi/L		When GA > 5 pCi/L (2)
Man Made Radioactivity - Section 64443			
Tritium	20000 pCi/L		Not Required
Strontium	8 pCi/L		Not Required
Gross Beta	50 pCi/L		Not Required

1. Routine Monitoring

a) Routine monitoring frequency for Gross Alpha is based on last sample collected.

Gross Alpha	Monitoring Frequency
Less than 3 pCi/L	1 sample every 9 years
≥ 3 and ≤ 7.5 pCi/L	1 sample every 6 years
> 7.5 and ≤ 15 pCi/L	1 sample every 3 years

b) Routine monitoring frequency for Radium-228 will be waived if there is no MCL exceedance.

2. Triggered Monitoring

A frequency is generally not assigned to radium-226 or uranium as the monitoring for these constituents is dependent on the gross alpha results.

- a) If the Gross Alpha particle activity is less than or equal to 5 pCi/L, analysis for Uranium is not required.
- b) If the Gross Alpha particle activity for any single sample is greater than 5 pCi/L, analysis for Uranium in that same sample is required. If any single sample for Uranium is greater than 20 pCi/L, monitor at least 4 quarters for Uranium.
- c) If the Gross Alpha particle activity is > 5 pCi/L, analysis for uranium may be used to obtain the radium-226 activity (GA - Uranium = Radium-226). If GA - Uranium > 0, contact your district office. If GA - Uranium < 0, report only the GA and Uranium results.

Contact your district office if the MCL is exceeded, or for clarification on monitoring frequencies.

Appendix C

Last Taken/Next Due Monitoring Schedule

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210510 NAME: YOSEMITE NATIONAL PARK - WAWONA

COUNTY: MARIPOSA

SOURCE NO: 001 NAME: SOUTH FORK MERCED RIVER - RAW

CLASS: CMSP

STATUS: Active

PSCODE	GROUP/CONSTITUENT IDENTIFICATION	LAST SAMPLE	COUNT	FREQ	MODIFIED SCHEDULE	NEXT SAMPLE DUE
2210510001	2210510 YOSEMITE NATIONAL PARK - WAWONA 001					SOUTH FORK MERCED RIVER - RAW
	GP SECONDARY/GP					
	00440 BICARBONATE ALKALINITY	2015/11/20	27	12		2016/11
	00916 CALCIUM	2015/11/20	27	12		2016/11
	00445 CARBONATE ALKALINITY	2015/11/20	27	12		2016/11
	00940 CHLORIDE	2015/11/20	27	12		2016/11
	00081 COLOR	2015/11/20	27	12		2016/11
	01042 COPPER	2015/11/20	28	12		2016/11
	38260 FOAMING AGENTS (MBAS)	2015/11/20	26	12		2016/11
	00900 HARDNESS (TOTAL) AS CaCO3	2015/11/20	27	12		2016/11
	71830 HYDROXIDE ALKALINITY	2015/11/20	27	12		2016/11
	01045 IRON	2015/11/20	27	12		2016/11
	00927 MAGNESIUM	2015/11/20	27	12		2016/11
	01055 MANGANESE	2015/11/20	27	12		2016/11
	00086 ODOR THRESHOLD @ 60 C	2015/11/20	27	12		2016/11
	00403 PH, LABORATORY	2015/11/20	27	12		2016/11
	01077 SILVER	2015/11/20	27	12		2016/11
	00929 SODIUM	2015/11/20	27	12		2016/11
	00095 SPECIFIC CONDUCTANCE	2015/11/20	29	12		2016/11
	00945 SULFATE	2015/11/20	27	12		2016/11
	70300 TOTAL DISSOLVED SOLIDS	2015/11/20	27	12		2016/11
	82079 TURBIDITY, LABORATORY	2015/11/20	27	12		2016/11
	01092 ZINC	2015/11/20	27	12		2016/11
	IO INORGANIC					
	01105 ALUMINUM	2015/11/20	25	12		2016/11
	01097 ANTIMONY	2015/11/20	23	12		2016/11
	01002 ARSENIC	2015/11/20	27	12		2016/11
	81855 ASBESTOS	2013/11/04	2	108		2022/11
	01007 BARIUM	2015/11/20	27	12		2016/11
	01012 BERYLLIUM	2015/11/20	23	12		2016/11
	01027 CADMIUM	2015/11/20	27	12		2016/11
	01034 CHROMIUM (TOTAL)	2015/11/20	27	12		2016/11

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210510 NAME: YOSEMITE NATIONAL PARK - WAWONA

COUNTY: MARIPOSA

SOURCE NO: 001 NAME: SOUTH FORK MERCED RIVER - RAW

CLASS: CMSP

STATUS: Active

PSCODE	GROUP/CONSTITUENT IDENTIFICATION	LAST SAMPLE	COUNT	FREQ	MODIFIED SCHEDULE	NEXT SAMPLE DUE	
2210510001	IO INORGANIC						
	00951 FLUORIDE (F) (NATURAL-SOURCE)	2015/11/20	25	12		2016/11	
	71900 MERCURY	2015/11/20	27	12		2016/11	
	01067 NICKEL	2015/11/20	23	12		2016/11	
	A-031 PERCHLORATE	2014/09/09	6	36		2017/09	
	01147 SELENIUM	2015/11/20	27	12		2016/11	
	01059 THALLIUM	2015/11/20	23	12		2016/11	
	NI NITRATE/NITRITE						
	00618 NITRATE (as N)	2014/09/09	31	12		2015/09	DUE NOW
	00620 NITRITE (AS N)	2015/11/20	24	36		2018/11	
	RA RADIOLOGICAL						
	01501 GROSS ALPHA	2015/12/28	18	108	M	2024/12	
	S1 REGULATED VOC						
	34506 1,1,1-TRICHLOROETHANE	2015/11/20	12	72		2021/11	
	34516 1,1,2,2-TETRACHLOROETHANE	2015/11/20	12	72		2021/11	
	34511 1,1,2-TRICHLOROETHANE	2015/11/20	12	72		2021/11	
	34496 1,1-DICHLOROETHANE	2015/11/20	12	72		2021/11	
	34501 1,1-DICHLOROETHYLENE	2015/11/20	12	72		2021/11	
	34551 1,2,4-TRICHLOROBENZENE	2015/11/20	12	72		2021/11	
	34536 1,2-DICHLOROBENZENE	2015/11/20	12	72		2021/11	
	34531 1,2-DICHLOROETHANE	2015/11/20	12	72		2021/11	
	34541 1,2-DICHLOROPROPANE	2015/11/20	12	72		2021/11	
	34561 1,3-DICHLOROPROPENE (TOTAL)	2015/11/20	12	72		2021/11	
	34571 1,4-DICHLOROBENZENE	2015/11/20	12	72		2021/11	
	34030 BENZENE	2015/11/20	12	72		2021/11	
	32102 CARBON TETRACHLORIDE	2015/11/20	12	72		2021/11	
	77093 CIS-1,2-DICHLOROETHYLENE	2015/11/20	12	72		2021/11	
	34423 DICHLOROMETHANE	2015/11/20	12	72		2021/11	
	34371 ETHYLBENZENE	2015/11/20	12	72		2021/11	
	46491 METHYL-TERT-BUTYL-ETHER (MTBE)	2015/11/20	10	72		2021/11	
	34301 MONOCHLOROBENZENE	2015/11/20	12	72		2021/11	
	77128 STYRENE	2015/11/20	12	72		2021/11	

LAST SAMPLE DATE AND MONITORING SCHEDULE

SYSTEM NO: 2210510 NAME: YOSEMITE NATIONAL PARK - WAWONA COUNTY: MARIPOSA
 SOURCE NO: 900 NAME: ST2DBP - UPPER ZONE SAMPLING STATION CLASS: DBPA STATUS: Active

PSCODE	GROUP/CONSTITUENT IDENTIFICATION	LAST SAMPLE	COUNT	FREQ	MODIFIED SCHEDULE	NEXT SAMPLE DUE
2210510900	2210510 YOSEMITE NATIONAL PARK - WAWONA 900 (UNIDENTIFIED GROUP)		ST2DBP - UPPER ZONE SAMPLING STATION			
	82721 DIBROMOACETIC ACID (DBAA)	2015/08/18	2	12		2016/08
	77288 DICHLOROACETIC ACID (DCAA)	2015/08/18	2	12		2016/08
	A-041 MONOBROMOACETIC ACID (MBAA)	2015/08/18	2	12		2016/08
	A-042 MONOCHLOROACETIC ACID (MCAA)	2015/08/18	2	12		2016/08
	82723 TRICHLOROACETIC ACID (TCAA)	2015/08/18	2	12		2016/08
	TH Disinfection Byproducts					
	A-049 HALOACETIC ACIDS (5) (HAA5)	2015/08/18	2	12		2016/08
	82080 TOTAL TRIHALOMETHANES	2015/08/18	2	12		2016/08
	UA STATE UCMR					
	32101 BROMODICHLOROMETHANE (THM)	2015/08/18	2	12		2016/08
	32104 BROMOFORM (THM)	2015/08/18	2	12		2016/08
	32106 CHLOROFORM (THM)	2015/08/18	2	12		2016/08
	32105 DIBROMOCHLOROMETHANE (THM)	2015/08/18	2	12		2016/08

Appendix D

Guidelines for Completion of the Bacteriological Sample Siting Plan

State Water Resources Control Board
Division of Drinking Water

DRINKING WATER FIELD OPERATIONS BRANCH – MERCED DISTRICT

**GUIDELINES FOR COMPLETION OF THE BACTERIOLOGICAL
SAMPLE SITING PLAN**

(For systems collecting four or fewer routine samples per month)

The total coliform regulation requires the water supplier to submit a bacteriological sample siting plan to the Division for review and approval. The locations where samples are to be collected must be written down and formally approved by the Division. These guidelines and Attachments B and C, “Bacteriological Sample Siting Plan” forms, are to assist you in complying with these requirements.

To comply with the requirements for submitting a Bacteriological Sample Siting Plan, two (2) items must be submitted to the Division at this time.

1. A system map, street map, or system schematic showing all sampling locations must be submitted. The map can be prepared by any system representative. It does not have to be prepared by an engineer. The following are to be shown on the map:
 - Water Sources (i.e., well or spring)
 - Treatment Facilities (i.e., chlorination)
 - Storage Tanks
 - Pressure Reducing Stations
 - Booster Stations
 - Pressure Zones
 - Dead Ends
 - Service Area Boundaries
 - Routine Sample Sites
 - Repeat Sample Sites
 - Special Sample Sites

2. Complete either Attachment B or C, the “Bacteriological Sample Siting Plan” form, and return the system map and form to the Division for review and approval. The use of either Attachment B or C depends on the number of repeat samples required. Refer to pages 2 and 3 below in “*How many repeat sampling sites are required?*”

3. Once the Bacteriological Sample Siting Plan has been approved by the Division, copies should be provided to the person responsible for sample collection, the laboratory and the person responsible for reporting coliform-positive samples to the Division.

Selection of Sampling Sites

The routine sampling sites chosen must be representative of the water distribution system including all pressure zones, areas supplied by each water source and distribution reservoir.

Looped Systems: If your entire water distribution system is looped, then one routine sample point may be representative of your system, assuming valves are open.

Pressure Zones: You should only be concerned about sampling in different pressure zones if your water system serves different areas of varying elevations, for example in mountainous areas.

How many routine sampling sites are required?

A minimum of five (5) routine sampling sites must be selected and indicated on your map and sampling plan form. If your water system is required to collect less than 5 routine samples a month, then 5 routine samples must be collected the month following any coliform positive sample. This is the reason for identifying 5 routine sites in your plan.

If the water system is not adequately represented by 5 routine sample locations, you may identify additional locations and collect more than one sample per month. Each site identified should be rotated for sampling at least every three months.

How many repeat sampling sites are required?

Either complete **Attachment B** if your system collects **one or fewer** samples per month, a repeat sample set is consists of four samples to be collected from the following locations:

- One repeat sample from the same routine location.
- One repeat sample from an *upstream location*.
(within 5 connections of the routine site)
- One repeat sample from a *downstream location*.
(within 5 connections of the routine site)
- One sample from *some other location*.
(within 5 connections upstream or downstream of the routine site or a well site[see Attachment A])

or complete **Attachment C** if your system collects **more than one** routine sample per month, a repeat sample set consists of three samples from the following locations:

- One repeat sample from the same routine location.
- One repeat sample from an upstream location.
(within 5 connections of the routine site)
- One repeat sample from a downstream location.
(within 5 connections of the routine site)

What if the water system does not have enough locations to select the required number of routine and repeat sample sites?

If the water system does not have enough sample locations to identify 5 routine sites and 3 to 4 repeat sites per routine, you may either (1) identify fewer than 5 routine sites as long as the sampling adequately reflects water quality in the distribution system, or (2) use some of the routine sites as repeat sites for other routines (i.e., double up on use of available sites).

Pointers for Sample Site Selection

- When selecting a routine sample site you should be able to select a site upstream and a site downstream for repeat sampling.
- Select a site where the water is used continuously all year round.
- Pick a site that is easily accessible, i.e., a fenced yard with a locked gate and vicious dog is not a good selection.
- When choosing a sampling tap you should consider these factors:

The sampling tap should be located in as clean an environment as possible. It should be protected from contamination by humans, animals, airborne materials or other sources of contamination.

If you choose an outside private tap, it should be one that is in frequent use, clean, and at least 1½ feet (18 inches) above the ground. The sample tap should discharge downward.

If you choose an inside tap, be sure that you are not sampling from drinking fountains, taps which have aerators or strainers, or swivel faucets, or taps off of individual homeowner treatment units.

Do not choose a fire hydrant as sampling tap.

Avoid taps that are surrounded by excessive foliage or taps that are dirty or corroded.

Avoid taps that leak, have fittings with packing, or have permanent hoses or attachments fastened to the tap (Never collect a sample from a hose).

Avoid the use of dead ends for routine sample collection, and use for repeat samples only if no other sample sites are available and if there is continuous water use from a service off the dead-end.

**Instructions for Completing the
Bacteriological Sample Siting Plan Form**

This form has been designed to include all the requirements for the Bacteriological Sample Siting Plan.

- **PWS Classification**

The public water system (PWS) classification for your water system is either community, nontransient noncommunity or transient noncommunity. This classification determines the type and frequency of all water quality testing. If you are uncertain of your classification, contact the Division.

- **Month/Daily Users**

The monthly population determines the frequency of bacteriological sample collection for community water systems. The daily population determines the frequency of sample collection for transient and nontransient noncommunity systems.

- **Active Service Connections (Community water systems only)**

This is the number of active hook-ups served by the system. If your system has a hook-up to a vacant lot, do not count this as an active connection. If a vacant lot has a right to a future connection, do not count this as an active connection. If a residence is connected to the system, but the residence is vacant, count this as an active hook-up.

- **Distribution Sampling Frequency**

This is the minimum number of routine bacteriological samples required at the frequency specified. If any routine sample is positive for coliform bacteria, additional repeat samples will be required. Repeat samples are in addition to the required routine samples. If you are uncertain of the routine sampling frequency for your water system, contact the Division. Attachment A provides the minimum frequency based on type of water system. This will be increased if more than 1,000 people have been served on a daily basis.

A coliform-positive sample will increase the routine monitoring for a small system the following month. A system normally collecting less than 5 routine samples per month which has a coliform positive sample must collect a minimum of five (5) routine samples the following month.

- **Source Sampling Frequency**

This is the amount of bacteriological sampling that the water system is going to collect from each source (well, surface water-raw, spring, etc.) per month or

quarter. Source sampling is required at a specified frequency when the water system continuously treats (i.e. chlorination) the water or has a surface water treatment plant.

- **Water Treatment**

This is the type of water treatment that the water system applies to the water that is entering the distribution system. If your water system does not provide water treatment, then write N/A.

- **Trained Sampler**

The person collecting samples must be trained.

Sampling Service: Water systems utilizing a certified laboratory or other sampling service for water sample collection will be considered to have trained samplers. Enter the name of the laboratory or sampling service collecting your samples. A copy of the approved Bacteriological Sample Siting Plan should be provided to the laboratory or sampling service, if one is used.

Other Trained Samplers: Any person receiving a certificate from AWWA for attendance of the Water Sampling Training should submit a copy of their certificate along with the completed form. Any other samplers should submit a statement of their experience and training to this Division for approval.

- **Analyzing Lab**

Enter the state certified laboratory which will be analyzing your water samples.

- **Person Responsible to Report Coliform-Positive Samples to DHS**

This should be the person that the laboratory is required to contact when a sample is total or fecal coliform positive. This person must notify the Division within 24 hours of a violation of the total coliform standard (more than one positive sample in a month) or when any sample is fecal or *E. coli* positive. This person should have the authority to take corrective action as required by regulation and the Division. This should be the same person listed on your Emergency Notification Plan. Refer to Attachment A for additional instructions related to follow-up to positive samples. Please note: Regulation now requires the water supplier to require the laboratory immediately notify the Division of any positive bacteriological result if the laboratory cannot make direct contact with water system's designated contact person within 24 hours. We recommend you provide a copy of your emergency notification plan to your laboratory.

- **Day/Evening Phone Number**

The Division requires that the water system provide the phone numbers of the person listed above so that they can be contacted by the laboratory or the Division at any time during the day or evening in the event of a bacteriological emergency.

- **Signature and Date**

The person preparing the Sample Siting Plan should sign and date the plan. If the Division has questions regarding the sampling plan, this is the person to be contacted.

- **Sample ID**

This should be entered on the laboratory slip when the sample is turned into the laboratory. This is the unique identifier for the water sample location or the location address may also be used.

For systems collecting one or fewer routine samples per month, a minimum of five (5) routine sampling sites with three (3) repeat sampling sites for each routine sample locations must be listed. Use the **Attachment B** plan form.

For systems collecting more than one routine sample per month, a minimum of five (5) routine sampling sites with two (2) repeat sampling sites for each routine sample location must be listed. Repeat sample sites are to be located within five (5) service connections upstream and downstream of the routine sample site. Use the **Attachment C** plan form.

All sample locations should be marked in some way with the Sample ID or location address, i.e., the code painted on the sampling location or tagged with a water proof tag so the person collecting the water sample is sure to collect the water from the correct sample locations.

- **Sample Type**

This describes what type of sample (routine or repeat) is to be collected at this location.

- **Sample Point**

This is the type of the sample location. Use the following abbreviations, when appropriate.

HB	Hose Bib (exterior)
SF	Sink Faucet
PC	Goose Neck Type Copper Tube with Pet Cock

- **Location of Sample Point**

This is the description of the area in the distribution that the sample site is located. Routine sample sites shall not be located at dead ends.

DE	Dead End (Not Recommended)
PZ	Pressure Zone
RD	Representative Distribution

- **Location Address**

This is the actual physical location where the water sample is to be collected. If possible use a street address, i.e., 103 Good Street. If the location does not have a street address use the nearest crossroads or use the last name of the resident, i.e., "Brown Residence." If the location is a business, please list the business name and address.

When describing the location, keep in mind that the person collecting water samples must be able to locate the sample site from your description.

- **Months Sample Collected at This Location**

This is the schedule for routine samples to be collected. For example, suppose two (2) sites are representative of your systems. Site No. 1 will be sampled in January, March, May, July, September, and November. Site No. 2 will be sampled in February, April, June, August, October, and December. All routine sites identified should be rotated to allow sampling at least every 3 months.

ATTACHMENT A

BACTERIOLOGICAL MONITORING REQUIREMENTS
For Water Systems collecting 4 or fewer routine samples

1. Minimum Monitoring Frequency

<u>Monthly Population Served</u>			<u>Service Connections</u>			<u>Minimum Frequency</u>
25	to	1,000	15	to	400	1 per month
1,001	to	2,500	401	to	890	2 per month
2,501	to	3,300	891	to	1,180	3 per month
3,301	to	4,100	1,181	to	1,460	4 per month

Increased monitoring frequency may be required if there is more than one pressure zone in the distribution system or multiple sources or storage reservoirs. If your system is providing continuous chlorination treatment, closely review Item 6 below.

2. Routine and Repeat Sampling

All **routine samples** should be collected from the distribution system (not from the well) at locations specified in an approved Bacteriological Sample Siting Plan. If such a plan has not been prepared for your water system, contact the Division for assistance.

3. Repeat Monitoring After a Coliform-Positive Sample

Notification of a Coliform-Positive Sample - The water system shall require the laboratory to notify the system within 24 hours if any sample is coliform-positive. The water system must collect a repeat sample set within 24 hours of notification of the coliform-positive sample. **If the sample is fecal coliform or E. Coli positive, the water system should contact the Division immediately.**

Please note: Regulation now requires the water supplier to require the laboratory immediately notify the Division of any positive bacteriological result if the laboratory cannot make direct contact with the water system's designated contact person within 24 hours. We recommend you provide a copy of your emergency notification plan to your laboratory.

Repeat Sampling - For systems collecting **only one (1) sample per month or quarter**, a repeat sample set shall consist of four (4) samples as follows: one (1) from the routine sample site at which the positive occurred, one (1) from the upstream repeat sample site, one (1) from the downstream repeat sample site and one (1) from the operating well or another location within the system that would best help to identify the source or area of contamination.

For systems collecting **more than one (1) sample per month**, a repeat sample set shall consist of three (3) samples as follows: one from the routine sample site at which the positive occurred and two from the upstream and downstream repeat sample sites.

The repeat sample sites shall be located within five service connections upstream and downstream of the routine site as identified in the Bacteriological Sample Siting Plan. At least one repeat sample shall be collected from upstream and one from downstream unless there is no upstream or downstream service connection.

Contact the Division as soon as the results of the repeat samples are obtained.

The following criteria should be considered when determining where to collect the fourth repeat sample:

- For systems with only one active well and do not provide continuous chlorination, the sample may be collected at the wellhead.
- For systems with more than one active well, it may not be possible to determine which well was serving the area where the positive routine sample was collected. For these systems, the fourth repeat sample should be collected at a storage tank or another point in the distribution system.
- For systems providing continuous chlorination, the system should already be conducting raw-water bacteriological monitoring at a point ahead of chlorination on at least a quarterly basis. These samples should be used to determine if the source of bacteriological contamination is from the well itself. For these systems, the fourth repeat sample should be collected at a storage tank or another point in the distribution system.
- Contact the Division for assistance.

If any of the above criteria would result in a change or revision to your existing bacteriological sample-siting plan, you must first submit a revised plan to our office for review and approval before implementing any such change or revision.

Any additional samples collected from the well(s) for investigative purposes (*not part of the repeat sample set*) should be labeled as "special" samples (or "other" samples), and will not be counted towards compliance with the monthly total coliform water quality standards.

Sampling the Month Following a Coliform-Positive Sample - If a public water system for which fewer than five routine samples/month are collected has one or more total coliform-positive samples, the water supplier shall collect at least five

routine samples the following month. These samples can be collected on the same day from five different routine sites or from the same routine sites at 15 minute intervals (if fewer than five sites are available). If all five samples are negative for total coliform, the water system may return to the normal sampling frequency during the next sampling period.

4. Determining Compliance with the Coliform Standard

A public water system will fail the coliform maximum contaminant level (MCL) if: For a public water which collects fewer than 40 samples per month, at least two samples collected in the same month are coliform-positive. When this occurs, the water system representative shall contact the Division immediately (within 24-hours or the next business day if the office is closed). The water system will be required to conduct public notification and will be provided with an approved notification to be used. Public notification shall be conducted by direct mail, hand delivery or posting (where approved).

5. Monthly Reporting of Coliform Monitoring Results

The analytical results of all coliform monitoring shall be reported to the Division by the 10th day of the month following sample collection. The water system can request the laboratory to provide the results to the Division; however, the water system is ultimately responsible to ensure that the sample results were received. If the water delivered to your water system is provided with a disinfection treatment, the chlorine residual should be measured and reported at the same time and location(s) that the bacteriological sample(s) are collected. This residual must be provided to the Division on the laboratory analysis report at this time. Beginning January 1, 2004, EPA's Disinfectant/Disinfection By-Product (D/DBP) Rule will require this reporting to our Division.

6. Bacteriological Monitoring of Wells (for systems chlorinating)

Water systems that are routinely chlorinating the water supply are required to sample the raw well water for coliform bacteria. Initially, a minimum of six consecutive monthly samples must be collected from the well discharge. The samples must be collected at a location ahead of chlorination. After six consecutive monthly samples do not show the presence of coliform bacteria, the water system may request a reduction in sampling to one sample per quarter. The laboratory should be instructed to determine the most probable number of coliform (MPN) for well samples. The results of all samples shall be submitted to the Division.

**ATTACHMENT B (see p. 6 of instructions)
BACTERIOLOGICAL SAMPLE SITING PLAN**

System No.:		System Name:	
PWS Classification:		No. Monthly Users:	Daily Users:
No. Active Service Connections:		Distribution Sampling Frequency:	
Source Sampling Frequency:		Continuous Water Treatment:	
Name of Trained Sampler:		Analyzing Lab:	
Person responsible to report coliform-positive samples to DDW:		Day/Evening Phone No.:	
Signature of Water System Representative:		Date:	

Sample ID	Sample Type	Sample Point	Location of Sample Point	Address of Sample Point	Months Sample Collection at this Location
1-ROU	Routine				
1-REP1	Repeat				Repeat Sample Only
1-REP2	Repeat				Repeat Sample Only
1-REP3	Repeat				Repeat Sample Only
2-ROU	Routine				
2-REP1	Repeat				Repeat Sample Only
2-REP2	Repeat				Repeat Sample Only
2-REP3	Repeat				Repeat Sample Only
3-ROU	Routine				
3-REP1	Repeat				Repeat Sample Only
3-REP2	Repeat				Repeat Sample Only
3-REP3	Repeat				Repeat Sample Only
4-ROU	Routine				
4-REP1	Repeat				Repeat Sample Only
4-REP2	Repeat				Repeat Sample Only
4-REP3	Repeat				Repeat Sample Only
5-ROU	Routine				
5-REP1	Repeat				Repeat Sample Only
5-REP2	Repeat				Repeat Sample Only
5-REP3	Repeat				Repeat Sample Only

If the water system has one or more total coliform-positive samples, at least five routine samples will be collected the following month.

**ATTACHMENT C (see p. 6 of instructions)
BACTERIOLOGICAL SAMPLE SITING PLAN**

System No.:		System Name:			
PWS Classification:		No. Monthly Users:	Daily Users:		
No. Active Service Connections:		Distribution Sampling Frequency:			
Source Sampling Frequency:		Continuous Water Treatment:			
Name of Trained Sampler:		Analyzing Lab:			
Person responsible to report coliform-positive samples to DDW:		Day/Evening Phone No.:			
Signature of Water System Representative: _____ Date: _____					
Sample ID	Sample Type	Sample Point	Location of Sample Point	Address of Sample Point	Months Sample Collection at this Location
1-ROU	Routine				
1-REP1	Repeat				Repeat Sample Only
1-REP2	Repeat				Repeat Sample Only
2-ROU	Routine				
2-REP1	Repeat				Repeat Sample Only
2-REP2	Repeat				Repeat Sample Only
3-ROU	Routine				
3-REP1	Repeat				Repeat Sample Only
3-REP2	Repeat				Repeat Sample Only
4-ROU	Routine				
4-REP1	Repeat				Repeat Sample Only
4-REP2	Repeat				Repeat Sample Only
5-ROU	Routine				
5-REP1	Repeat				Repeat Sample Only
5-REP2	Repeat				Repeat Sample Only

If the water system has one or more total coliform-positive samples, at least five routine samples will be collected the following month.

Appendix E

Cross Connection Control Guidelines

Cross-Connection Control for Small Community Water Systems SWRCB-DDW Merced District

Purpose of Cross-Connection Control Program: Water provided by a public water system may be contaminated via cross-connections within the distribution system. The purpose of the cross-connection control program is to reduce the hazard of contamination of the public water system by identifying actual and potential cross-connections and taking action to protect the system from these hazards. This is accomplished by installing backflow prevention assemblies where hazards are identified; or ensuring that water-using equipment on the premises is installed in accordance with plumbing code requirements and good practice.

What are cross-connections?

Cross-connections are actual and potential unprotected connections between a potable water system and any source or system containing unapproved water or a substance which is not safe. Examples of cross-connections include:

1. Improperly installed irrigation systems that may allow backsiphonage of stagnant, bacteriologically unsafe water into the piping system.
2. Improperly plumbed water-using devices such as hot-tubs, boilers or commercial dishwashers which may allow unsafe water back into the domestic piping system.
3. Irrigation systems served by an auxiliary source, such as a private well or creek. Such systems create a potential for major contamination of the public water system via interties with the domestic piping system.
4. Interconnections between the potable system and a non-potable system.

What the Regulations Require

Section 7584 of the California Code of Regulations requires that each public water system have a cross connection control program that includes these elements:

1. The adoption of operating rules or ordinances to implement the cross-connection program.
2. The conducting of surveys to identify water user premises where cross connections exist or are likely to occur.
3. The provisions of backflow protection by the water user at all connections where a cross connection hazard has been identified.
4. The provision of at least one person trained in cross connection control to carry out the program.
5. The establishment of a procedure or system for testing backflow prevention assemblies.
6. The maintenance of records of locations, tests, and repairs of backflow prevention assemblies within each water supplier's distribution system.

Getting Started

For small community water systems, the initial elements of the program consist of the following:

1. Adopting an ordinance or set of rules to implement the cross-connection control program. A copy of a sample ordinance for small systems is attached. The ordinance is important since it establishes the legal authority to carry out the program.
2. Conducting a system survey to identify actual and potential cross-connection hazards.
3. Ensuring that hazards are abated by the installation of backflow prevention assemblies at the meter, eliminating the hazard in conjunction with the owner of the property or providing internal cross-connection protection.

System Survey

The system survey consists of a preliminary survey and, if necessary, a more detailed second survey. For most small systems, the initial survey may consist of a questionnaire sent to each customer asking whether the customer has specific potential hazards. Documentation of the system survey is to be submitted to the Division. Attached is a summary form for documentation of the system survey.

Residential areas

Customers should be asked if any of the following are located on-site:

1. Auxiliary water supply (i.e. either a well or a creek pump) - backflow prevention device is mandatory.
2. Irrigation systems - backflow prevention device not required if system is installed in accordance with plumbing codes with appropriate vacuum breakers.
3. Swimming pool, hot tub or spa - backflow prevention device not required if system is installed in accordance with plumbing codes.
4. Solar hot water heating panels - backflow prevention device not required if system is installed in accordance with plumbing codes.
5. Graywater systems - backflow prevention assemblies may not be required if the system is installed in accordance with the Uniform Plumbing Code.

If these or other potential hazards are located on site, the water system is to determine whether the equipment has been installed in accordance with plumbing codes and/or good practice in order to minimize the risk of backflow.

Commercial customers: A more detailed questionnaire and survey is necessary. Small community systems, which also serve commercial customers, should review the Department of Health Service's "Manual of Cross-Connection Control - Procedures and Practices". A system survey of commercial users as specified in the Manual is to be performed. As an alternative, the system may decide to require backflow prevention assemblies at all commercial service connections where hazards are likely to exist.

Wastewater and Hazardous Wastes: A service connection which handles wastewater or dangerous chemicals requires special evaluation and protection from cross-connection hazards. For additional information on evaluating this type of facility, please contact the appropriate regulatory agency and a cross-connection control specialist.

ELEMENTS OF A CROSS-CONNECTION CONTROL PROGRAM CDPH Merced District

When implementing a Cross-Connection Control Program, the water supplier or health agency should follow an organized plan. The following items should be included as a minimum. The items **explain the Division's policy regarding the regulations.**

7584. Responsibility and Scope of Program

The water supplier shall protect the public water supply from contamination by implementation of a cross-connection control program. The program, or any portion thereof, may be implemented directly by the water supplier or by means of a contract with the local health agency, or with another agency approved by the health agency. The water supplier's cross-connection control program shall for the purpose of addressing the requirements of Sections 7585 through 7605 include, but not limited to, the following elements:

(1) *The adoption of operating rules or ordinances to implement the cross-connection program.*

A public water supplier shall enact an ordinance or rule of service outlining the cross-connection control program and providing enforcement authority.

(2) *The conducting of surveys to identify places where cross-connections are likely to occur.*

Water utilities do not have any responsibility for controlling or abating cross-connections on a user's premises. All existing facilities where potential cross-connections are suspected, however, shall be listed and inspected or reinspected on a priority basis, where feasible. All applications for new services or for enlarging existing services or changing of occupant shall be reviewed or screened for cross-connections hazards

(3) *The provision of backflow protection at the user's connection or within the user's premises or both.*

Adequate provisions for implementation and enforcement of backflow protection where needed including the shutting off service when necessary

4) *The provision of at least one person trained in cross-connection control to carry out the cross-connection program.*

Specific units of the health agency and/or water supplier should be designated to organize and carry out the cross-connection control program. The personnel in those units should be trained as to the causes and hazards of unprotected cross-connections.

(5) *The establishment of a procedure or system for testing backflow preventers.*

A list of approved backflow preventers and list of certified testers should be made available to each water user required to provide backflow protection.

The list may include backflow devices approved by University of Southern California, Foundation for Cross-Connection Control and IAPMO, which may be found on the CDPH website at the following address:

<http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Publications.aspx>

The List of certified testers may be lists developed by the American Water Works Association and local county health agencies.

Backflow preventers should be tested at least yearly or more often as required by the health agency or water supplier.

(6) *The maintenance of records of locations, tests and repairs of backflow preventers*

Adequate records should be kept and filed for reference. These records should include, in addition to the name of the owner of the premises, the:

- a) Date of inspection
- b) Results of inspection
- c) Required protection
- d) List of all backflow preventer devices in the system
- e) Test and maintenance reports
- f) All correspondence between the water supplier, the local health authority, and the consumer
- g) Records must be maintained for a minimum of three years

Records of inspection and testing should be evaluated to determine if:

- a) Devices are frequently or sufficiently reviewed to detect failure.
- b) There are unusual feature of a particular model of device or component.
- c) Cause of failure can be eliminated.

A program should be established to notify the water user when his backflow preventer must be tested. (A minimum of once each year is required.) After installation or repair, a backflow preventer should be tested and approved before it is accepted.

7605. Testing and Maintenance of Backflow Preventers

Regulations require the following regarding testing and maintenance of backflow prevention devices:

- (a) The water supplier shall assure that adequate maintenance and periodic testing are provided by the water user to ensure their proper operation.
- (b) Backflow preventers shall be tested by persons who have demonstrated their competency in testing of these devices to the water supplier or health agency.
- (c) Backflow preventers shall be tested at least annually or more frequently if determined to be necessary by the health agency or water supplier. When devices are found to be defective, they shall be repaired or replaced in accordance with the provisions of this Chapter.
- (d) Backflow preventers shall be tested immediately after they are installed, relocated or repaired and not placed in service unless they are functioning as required.
- (e) The water supplier shall notify the water user when testing of backflow preventers is needed. The notice shall contain the date when the test must be completed.
- (f) Reports of testing and maintenance shall be maintained by the water supplier for a minimum of three years.

Cross-Connection Survey Summary Form-Small Community Water Systems

Name of System _____ System Number _____

Description of Survey Procedures-How survey was conducted, (include copy of survey form):
 Person conducting survey (List name and qualifications):

Procedures for Residential Connections:

Procedures for Commercial Connections:

Total number of service connections _____ Number of service connections surveyed _____
 Number of connections with auxiliary sources (i.e. wells or creek pumps) _____
 Number of connections with other hazards _____
 Total number of backflow prevention devices _____

Type of Hazard Identified(i.e. private well, hot tub, irrigation system, swimming pool, etc)	Number of connections with hazard	Number of devices installed	Number where device not necessary

Describe follow-up for service connections that did not respond to the survey:

Long-term (Describe on-going cross-connection protection & testing of backflow prevention assemblies)

Submitted by (signature) _____ Date _____

**MODEL ORDINANCE NO.2 - "SHORT" VERSION
AN ORDINANCE OF THE {Water Supplier's Name}
INSTITUTING A CROSS-CONNECTION CONTROL PROGRAM TO
PROTECT THE PUBLIC WATER SYSTEM**

THE {Water Supplier} DOES ORDAIN AS FOLLOWS:

SECTION I – PURPOSE

The purpose of this ordinance is to protect the public water supply system from contamination due to potential and actual cross-connections. This shall be accomplished by the establishment of a cross-connection control program as required by State regulations. This ordinance is adopted pursuant to Title 17, Section 7583 - 7605, inclusive, of the California Code of Regulations, entitled "Regulations Relating to Cross-Connections".

SECTION II – RESPONSIBILITY

The {General Manager/cross-connection control specialist} shall be responsible for implementing and enforcing the cross-connection control program. An appropriate backflow prevention assembly shall be installed by and at the expense of the water user at each user connection where required to prevent backflow from the water user's premises to the domestic water system. It shall be the water user's responsibility to comply with the {Water Supplier}'s requirements.

SECTION III - CROSS-CONNECTION PROTECTION REQUIREMENTS

The type of protection that shall be provided to prevent backflow into the public water supply system shall be commensurate with the degree of hazard, actual or potential, that exists on the water user's premises. Unprotected cross-connections with the public water supply are prohibited. The type of backflow prevention assembly that may be required (listed in decreasing level of protection) includes: Air-gap separation (AG), Reduced Pressure

Principle Backflow Prevention Assembly (RP), and a Double Check Valve Assembly (DC). The water user may choose a higher level of protection than required by the water supplier. The minimum types of backflow protection required to protect the approved water supply at the user's water connection to premises with varying degrees of hazard are listed in Table 1 of Section 7604, Title 17. Situations which are not covered in Table 1 shall be evaluated on a case-by-case basis and the appropriate backflow protection shall be determined by the water supplier or health agency.

SECTION IV - BACKFLOW PREVENTION ASSEMBLIES

Only backflow prevention assemblies, which have been approved by the {Water Supplier} shall be acceptable for installation by a water user. A list of approved backflow prevention assemblies Will be provided upon request to any affected customer. Backflow prevention assemblies shall be Installed in a manner prescribed in Section 7603, Title 17. Location of the assemblies shall be as close as practical to the user's connection. The {Water Supplier} shall have the final authority in determining the required location of a backflow prevention assembly.

Testing of backflow assemblies shall be conducted only by qualified testers and testing will be the responsibility of the water user. Backflow prevention assemblies must be tested at least annually and immediately after installation, relocation or repair. More frequent testing may be required if deemed necessary by the {Water Supplier}. No assembly shall be placed back in

service unless it is functioning as required. These assemblies shall be serviced, overhauled, or replaced whenever they are found to be defective and all costs of testing, repair, and maintenance shall be borne by the water user. Approval must be obtained from the {Water Supplier} prior to removing, relocating or replacing a backflow prevention assembly.

SECTION VI – ADMINISTRATION

The cross-connection control program shall be administered by the {General Manager/ cross-connection control specialist}. The {Water Supplier} will establish and maintain a list of approved backflow prevention assemblies as well as a list of approved backflow prevention assembly testers. The {Water Supplier} shall conduct necessary surveys of water user premises to evaluate the degree of potential health hazards. The {Water Supplier} shall notify users when an assembly needs to be tested. The notice shall contain the date when the test must be completed.

SECTION VII - WATER SERVICE TERMINATION

When the {Water Supplier} encounters water uses that represent a clear and immediate hazard to the potable water supply that cannot be immediately abated, the procedure for terminating water service shall be instituted. Conditions or water uses that create a basis for water service termination shall include, but are not limited to, the following:

1. Refusal to install or to test a backflow prevention assembly, or to repair or replace a faulty backflow prevention assembly.
2. Direct or indirect connection between the public water system and a sewer line.
3. Unprotected direct or indirect connection between the public water system and a system or equipment containing contaminants.
4. Unprotected direct or indirect connection between the public water system and an auxiliary water system.

For condition 1, the {Water Supplier} will terminate service to a water user's premises after proper notification has been sent. If no action is taken within the allowed time period water service shall be terminated.

For conditions 2, 3, or 4, the {Water Supplier} shall take the following steps:

1. Make reasonable effort to advise the water user of intent to terminate water service;
2. Terminate water service and lock service valve. The water service shall remain inactive until correction of violations has been approved by the {Water Supplier}.

SECTION VII - EFFECTIVE DATE

This Ordinance shall supersede all previous cross-connection control ordinances and shall take effect thirty (30) days from the date of its adoption. Before the expiration of fifteen (15) days after its adoption this Ordinance shall be published in the _____, a newspaper of general circulation, printed and published in _____.

