



CalWater

TVMMWC Water Quality Monitoring Plan

May 2023

Water Quality Monitoring – Key Elements

- **Trigger for Sampling.** Water quality sampling must be performed for spills that are 50,000 gallons or greater and reach surface water and for spills less than 50,000 gallons as further defined herein.
- **Safety and Access.** Water quality sampling should only be performed if it is safe to do so and access to the surface water is not restricted. Unsafe conditions include, but are not limited to, heavy rains, steep hillsides, and fog/visibility issues. When sampling is not possible, details of the situation will be recorded in the certified Category 1 Spill Report and the Spill Technical Report submitted to the CIWQS Online Spill Database.
- **When to Sample.** Sampling must be performed (when and if it is safe to do so) within 18 hours of CalWater becoming aware of a Category 1 Spill that resulted in 50,000 gallons or greater being spilled to a surface water. Designated water quality sample crew shall collect samples as soon as possible after the discovery and mitigation of the spill event.

Note that “surface waters” includes waters of the State, or any drainage conveyance system if the spill is not fully captured and returned to the sanitary sewer system. The following Waters of the State are in the TVMMWV service area:

1. Madera Canal
 2. San Joaquin River
- **Where to Sample.** Sampling should account for spill travel time in surface water (see Sample Collection Procedure below). The samples shall then be brought to the Water Reclamation Facility.
 - **Required Water Quality Analyses.** At a minimum, analyze for ammonia and appropriate bacterial indicators per the RWQCB Basin Plan (see Sampling Parameters below).
 - **Optional Follow-Up Monitoring.** Additional monitoring by sampling and/or visual inspection may be conducted, depending on the original monitoring results.

Water Quality Sampling - Protocol

Spill Sample Collection Kit Inventory (to be stored at the TVMM WWTP):

- Cooler
- Ice Packs (stored in freezer)
- 6 sample bottles labeled A (1/2 gallon with preservative; for ammonia analyses)
- 6 sample bottles labeled B (120-mL; for bacteria indicator analyses)
- 6 sample bottles labeled C (120-mL; for pH, temperature, and dissolved oxygen analyses)
- 6 secondary containers (250-mL; for transfer of sample to A-labeled sample bottles)
- Safety gloves
- Safety glasses
- Sodium thiosulfate tablets (to be used when collecting bacteria samples)
- Paper towels



- Quart bags
- Gallon bags
- Thermometer / pH meter
- HACH Dissolved Oxygen Meter Product #2968800 (or approved equal)
- Floating object
- Sampling poles
- Tape
- String
- Measuring tape
- Stopwatch
- Standard Analytical Lab Chain-of-Custody Forms specific to the analytical lab used to conduct any required field tests.
- Pen/Pencil

Sampling Parameters:

- Ammonia
- Fecal Coliform
- E. coli
- Dissolved Oxygen
- pH
- Temperature

Sampling Locations (further details on location provided in subsequent sections):

- Upstream of spill
- Immediate vicinity where spill enters water body (“source”)
- Downstream of spill

When to Sample for Spills Less Than 50,000 Gallons:

- CalWater will perform (when and if it is safe to do so) water quality sampling for spills of more than 1,000 gallons and less than 50,000 gallons if occurring directly to one of the Waters of the State listed above if the waterway is not dry at the time. Any spill over 1,000 gallons to a surface water requires notification of Cal OES. Note that the sample results are not required to be uploaded to CIWQS in this case.

Sample Collection Procedure:

- 1) If possible, determine the point that the spill entered the waterway and photograph this location (include a reference point in the photo, i.e. an immovable part of the terrain that would allow someone to easily identify where the spill entrance point is located by looking for the reference point in the photo).
- 2) If sampling is performed after the spill has stopped, estimate spill travel time. This may be done by observing or dropping floatable debris or object in the surface water and timing how long it takes to travel over a measured distance (e.g., 100 feet). Include sections in the surface water where there are bends, bottlenecks, or other characteristics that may slow down the flow. If the first measurement is uncertain, this time estimate may be performed three times, and the values averaged to determine the estimated travel time. The velocity of the water body can then be calculated by dividing the measured distance by the average time.



- 3) Determine the location where the “source” sample collection will take place by accounting for spill travel time.
 - If the spill is occurring, the “source” location is the point where the spill is entering the waterway.
 - If the spill has stopped, calculate the approximate downstream distance from the original spill location by multiplying the time since the spill occurred by the estimated velocity. This is the approximate downstream distance from the spill discharge point to the “source” sampling location.
- 4) Put on safety gloves and safety glasses.
- 5) **Upstream Sample Collection:** Collect the upstream samples first. Move approximately 100 feet upstream of Source location. Label three each of the sample bottles marked “Upstream A”, “Upstream B”, and “Upstream C” with the date and time.
 - a. Take a photo of the sample location, including a reference point in the photo.
 - b. Ensure the sampling location is well away from the bank at a point where water is visibly flowing. Take care to avoid sampling debris or scum layer from the surface.
 - c. Starting with collection of the ammonia sample, remove the lid from one of the unused and clean 250-mL secondary containers. Fill this container against the direction of water flow while following the instructions of Step 5b. *Never dip the “Upstream A” sample bottle into the water.* After carefully opening an unused “Upstream A” ammonia sample bottle containing sulfuric acid, slowly transfer the sample from the secondary container to the sample bottle. *Due to potential contact with sulfuric acid, a highly corrosive compound, safety glasses and gloves must be worn when sampling for ammonia.* Secure the lid of the sample bottle, making sure that no leaking occurs. After drying the outside of the bottle with a paper towel, immediately place it inside a quart bag. Place this quart bag along with two ice packs into a gallon bag. Do not place the ice packs inside of the quart bag that holds the sample bottle. Repeat this process one more time for a total of two “Upstream A” samples. Place each sample in the cooler after collection.
 - d. Moving on to collection of the bacteria sample, remove the lid from an unused “Upstream B” bacteria sample bottle and confirm that a sodium thiosulfate preservative tablet is inside. Fill the bottle against the direction of water flow while following the instructions of Step 5b. Pour off excess sample volume so that the bottle is filled to the 100-mL fill line. Secure the lid of the sample bottle, making sure that no leaking occurs. After drying the outside of the bottle with a paper towel, immediately place it inside a quart bag. Place this quart bag along with two ice packs into a gallon bag. Do not place the ice packs inside of the quart bag that holds the sample bottle. Repeat this process one more time for a total of two “Upstream B” samples. Place each sample in the cooler after collection.
 - e. Moving on to the last set of samples for pH and dissolved oxygen, remove the lid from an unused “Upstream C” sample bottle. Fill the bottle against the direction of water flow while following the instructions of Step 5b. Pour off excess sample volume so that the bottle is filled to the 100-mL fill line. Use the thermometer to



measure the temperature of the “Upstream C” sample three times and record the results. Use the dissolved oxygen meter to measure the concentration of dissolved oxygen in the “Upstream C” sample and record the results. Secure the lid of the sample bottle, making sure that no leaking occurs. After drying the outside of the bottle with a paper towel, immediately place it inside a quart bag. Place this quart bag along with two ice packs into a gallon bag. Do not place the ice packs inside of the quart bag that holds the sample bottle. Repeat this process one more time for a total of two “Upstream C” samples. Place each sample in the cooler after collection.

- 6) **Source Sample Collection:** Collect the “source” samples next. Move approximately ten feet downstream of the Source location. Label each of the sample bottles marked “Source A”, “Source B”, and “Source C” with the date and time. Follow steps 5a-e for sampling at the Source location, using appropriately marked bottles “Source A”, “Source B”, and “Source C”.
- 7) **Downstream Sample Collection:** Lastly, collect the downstream sample. Move one 100 feet downstream of the source location. Label each of the sample bottles marked “Downstream A”, “Downstream B”, and “Downstream C” with the date and time. Follow steps 5a-e for sampling at the Downstream location, using appropriately marked bottles “Downstream A”, “Downstream B”, and “Downstream C”.
- 8) Complete the Lab Chain of Custody form included in spill sample collection kit.
- 9) Transport the cooler containing the samples and the completed Lab Chain of Custody form to the WWTP Lab as soon as possible after first sample collection. The parameter with the shortest holding time is bacteria at 6 hours (from sample collection to beginning of analysis), but sample analysis should begin as soon as possible after sample collection. Samples will not be analyzed if the holding time has been exceeded. The Lab staff will coordinate with an outside lab if required.
- 10) Ammonia samples have a regulatory holding time of 28 days. Maintain these samples at less than or equal to 6°C (on ice or refrigerated) from time of collection until receipt by the analytical laboratory.
- 11) Restock the Spill Sample Collection Kit with the items listed on pages 1 and 2.
- 12) After the analyses have been performed (see “Water Quality Analyses Protocols” below) and the results have been reviewed and finalized, check if any of the following conditions are satisfied:
 - Both the ammonia and bacteria levels downstream are approximately equal to or less than the upstream levels.
 - The concentration of un-ionized ammonia is below 0.4 mg/L as Nitrogen.
 - The E.Coli and fecal coliform are below their respective limits from the below table.



Bacteriological Water Quality Objectives

Beneficial Use	Fecal Coliform (MPN/100mL)	E. Coli Bacteria (colonies/100mL)
Water Contact Recreation	Median < 200 ¹	298 ²

1. Central Valley Region Water Quality Control Plan (2018)

2. The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986 / 8012-8016, for a "moderately used" area.

As soon as one of the above conditions is satisfied, monitoring for this spill may stop. If neither are satisfied, repeat the Sample Collection Procedure steps until any or all of the conditions are satisfied, or other information is available to suggest the spill is no longer causing a potentially adverse effect on the waterbody.

Warnings for Sample Collection:

- **Avoid Contamination.** Make every effort not to touch the sample contents, because the sample containers may contain hazardous chemicals and the sample results may be easily affected by human contamination.
- **Deliver Sample to Lab.** All samples need to be delivered to the laboratory as soon as possible due to the limited holding time required for maintaining sample integrity.

Water Quality Analyses – Protocols

Laboratory Analyses:

Specific methods used for laboratory analyses are expected to be as follows:

Parameter	Method
Total Coliform, Fecal, & E. Coli	Colilert
pH	pH

Maintenance and Calibration of Monitoring Instruments and Devices:

The Spill Sample Collection Kit is checked by the Laboratory Technician at least quarterly to verify its contents, and the Plant Operator replaces sample bottles as needed according to their shelf life.

Reporting Requirements

CalWater staff is responsible for submitting water quality monitoring information with the certified Category 1 Spill report in the CIWQS Online Spill Database, which must be submitted within 15 calendar days of the spill end date.

CalWater staff is responsible for submitting information related to the Technical Report in the CIWQS Online Spill Database, which must be done within 45 calendar days of the Spill end date. The Spill Technical Report must include the following water quality monitoring information.

- Description of all water quality sampling activities conducted
- Analytical results and evaluation of the results
- Detailed location map showing all water quality sampling points