

## **COST ESTIMATING METHODOLOGY**

The State Administrative Manual, section 6607 contains the standard methodology developed for use in estimating costs in regulations. The main components of that methodology are (I) Statement of the Mandate, (II) Background or Introductory Material, (III) Working Data, Assumptions, and Calculations, and (IV) Conclusions.

This document presents the cost estimating methodology for the proposed rulemaking – 1,2,3-Trichloropropane (1,2,3-TCP) Maximum Contaminant Level (MCL) Regulations.

In summary, there are costs to the regulated community associated with the adoption of this regulation. The evaluation of potential costs incurred by applicable California public water systems (PWS) included the following categories: (1) where the proposed regulation sets forth requirements for 1,2,3-TCP and (2) where the proposed regulation sets forth requirements unrelated to 1,2,3-TCP.

With respect to category 1, the proposed regulation establishes (a) an MCL for 1,2,3-TCP, (b) a detection limit for purposes of reporting (DLR) for 1,2,3-TCP, as well as associated health effects and contaminant origin language, and best available technology (BAT) for treatment of 1,2,3-TCP, and (c) a procedure to substitute existing chemical monitoring results for required initial chemical monitoring when a new MCL becomes effective. The costs associated with the proposed regulation are incurred primarily from the actions that will be necessary to monitor for and treat 1,2,3-TCP where it is found above the MCL.

With respect to category 2, the proposed regulation amends existing regulations for the purpose of making nonsubstantive changes (e.g., punctuation, spacing, etc.). These proposed nonsubstantive changes to existing regulations have no economic or fiscal impact.

A more detailed discussion on the topic of fiscal impact regarding these two categories is provided below.

There are no additional state costs beyond those resulting from complying with the proposed regulations which are estimated at \$0.1 million as described in Form 399; there is no need to provide additional funding for any state costs.

Note that the proposed regulations apply only to PWS, as defined pursuant to Health and Safety Code (HSC) section 116275, which are not businesses or individuals. PWS are water companies providing drinking water to the public and, pursuant to Government Code section 11342.610, are exempt from the definition of a small business. As such, there will be no direct economic impact to businesses or individuals,

although PWS would likely pass on any increased costs related to the regulation to its rate payers, which would include individuals and businesses.

The proposed rulemaking for 1,2,3-TCP has been identified as a potential Major Regulation as defined by Government Code Section 11342.548 and a Standardized Regulatory Impact Assessment (SRIA) has been developed in parallel with this cost estimating methodology document. The SRIA and the cost estimating methodology reach similar but differing conclusions regarding various impacts to the State of California, most notably the estimated annual cost per connection or household. The SRIA estimates a monthly increase of \$14/household for 'Small' systems and \$13/household for 'Medium' systems, translating to annual costs of \$171/household for 'Small' systems and \$160/household for 'Medium' systems, respectively. Conversely, the cost estimating methodology identifies an annual cost of approximately \$609/service connection for 'Small' Water Systems and \$25/service connection for 'Large' Water Systems, respectively.

The SRIA and the cost estimating methodology both used the same data sets and assumptions described in this document during the analysis. The differences in conclusions are primarily due to how impacted demographics are grouped and the use of a more broadly-reaching economic forecasting model for the SRIA. For example, the SRIA uses anticipated treatment design flow rates of less than or greater than 1 million gallons per day to separate water system sizes into 'Small' and 'Medium' systems, while the cost estimating methodology uses 200 service connections as the separator for 'Small' and 'Large' water systems. The difference in definition changes the extent that costs can be spread over the population and results in the estimated small water system per-service connection cost to be significantly different between the two methods. Additional information is provided in the SRIA and Initial Statement of Reasons (ISOR).

## **I. Statement of the Mandate**

The proposed regulation would not impose upon local agencies or school districts a mandate that requires state reimbursement because the requirement to provide drinking water that meets the MCL for 1,2,3-TCP will not be a requirement unique to local government, and will apply equally to public and private water systems.

Local agencies or school districts currently incur costs in their operation of PWS and the regulations will not result in a "new program or higher level of service" that requires reimbursement pursuant to article XIIB, section 6 of the California Constitution because the regulations apply generally to all individuals and entities that operate PWS in California and do not impose unique requirements on local governments. Similarly, PWS can pass on the costs of implementation of the regulation through increasing service fees. Therefore, no state reimbursement of costs is required.

Local regulatory agencies also may currently incur costs for their responsibility to enforce state regulations related to small PWS (fewer than 200 service connections) that they regulate. However, local agencies are authorized to assess fees to pay

reasonable expenses incurred in enforcing statutes and regulations related to small PWS (HSC section 101325). Therefore, no reimbursement of any incidental costs to local agencies in enforcing this regulation would be required (Gov. Code, section 17556(d).)

## **II. Background or Introductory Material**

All suppliers of domestic water to the public are subject to regulations adopted by the United States Environmental Protection Agency (U.S. EPA) under the Safe Drinking Water Act of 1974, as amended (42 U.S.C. 300f et seq.), as well as by the State Water Resources Control Board (State Water Board) under the California Safe Drinking Water Act (HSC, div. 104, pt. 12, ch. 4, sections 116270 et seq.).

California has been granted primary enforcement responsibility (“primacy”) by U.S. EPA for PWS in California. California has no authority to enforce federal regulations, but only state regulations. Federal laws and regulations require that California, in order to receive and maintain primacy, promulgate regulations that are no less stringent than the federal regulations.

The U.S. EPA does not currently have a drinking water standard for 1,2,3-TCP. Pursuant to HSC sections 116271, 116350, 116365, and 116375, the State Water Board has the responsibility and authority to adopt the subject regulations.

California requires PWS to sample their drinking water sources and have the samples analyzed for organic chemicals to determine compliance with drinking water standards, including MCLs. The PWS must notify the State Water Board and the public when drinking water supplied to the public is noncompliant with a primary MCL, and take appropriate action.

HSC section 116365 imposes requirements on the State Water Board for adoption of primary drinking water standards for the protection of public health. One of these requirements is that the State Water Board set primary drinking water standards at a level that is as close as feasible to the corresponding public health goal (PHG), placing primary emphasis on the protection of public health, and that, to the extent technologically and economically feasible, avoids any significant risk to public health.

Public health goals are established by the California Environmental Protection Agency’s Office of Environmental Health Hazard Assessment (OEHHA). In August 2009, OEHHA established the PHG for 1,2,3-TCP at 0.0007 micrograms per liter ( $\mu\text{g/L}$ ), equivalent to 0.000007 milligrams per liter ( $\text{mg/L}$ ). The State Water Board proposes an MCL for 1,2,3-TCP of 0.000005  $\text{mg/L}$ , finding it is as close to the PHG as is technologically and economically feasible.

Monitoring and treating for 1,2,3-TCP to meet the MCL will have economic impacts, and those impacts were analyzed.

Furthermore, additions to existing regulations to identify the Best Available Technology (BAT), the Detection Limit for Purposes of Reporting (DLR), language to describe potential health effects, and the typical origins of 1,2,3-TCP were added to reflect the new MCL.

The State Water Board also proposes a number of non-substantive changes which will correct spacing, use of plural and upper/lower case, references to paragraphs, and delete redundant text and unnecessary punctuation and text. Changes were also made to allow PWS to substitute some sampling data obtained within two years prior to the effective date of a new MCL, partially satisfying the initial monitoring requirements of section 64445 of title 22 of the California Code of Regulations.

The proposed changes to existing regulations that are not specific to the 1,2,3-TCP MCL will have no fiscal impact.

### **III. Working Data, Assumptions, and Calculations**

The evaluation of potential costs incurred by applicable California PWS is provided for the following categories: (1) where the proposed regulation sets forth requirements for a 1,2,3-TCP MCL and (2) where the proposed regulation sets forth requirements unrelated to a 1,2,3-TCP MCL.

#### Category 1 (1,2,3-TCP MCL)

With respect to Category 1, the proposed regulation establishes (a) an MCL for 1,2,3-TCP and (b) a DLR for 1,2,3-TCP, as well as associated health effects language, contaminant origin language, and a BAT. In short, the costs associated with the proposed regulation are incurred primarily from subcategory (a) and, as such, are described in detail below. Subcategory (b) has no significant costs in that defining a BAT and setting forth specific language to be used for public notifications and Consumer Confidence Reports have no associated costs.

The proposed regulations will primarily apply to two categories of PWS:

- Category 1 - Community Water Systems (CWS)
- Category 2 - Nontransient-Noncommunity Water Systems (NTNCWS)

The two primary types of costs to PWS to implement the proposed regulations are:

- Monitoring costs
- Treatment costs

To estimate these costs, the State Water Board used the working data, tools, assumptions, and calculations described below. The estimated costs were rounded for ease in review and are summarized in Tables 2 through 4, which were included with the Initial Statement of Reasons and are attached to this document.

## A. Working Data

The State Water Board used the 1,2,3-TCP detections for active sources from the State Water Board's Water Quality Information Replacement (WQIr) database for the period of January 1, 2001 through November 6, 2015. 1,2,3-TCP sampling data from January 3, 2001 through December 31, 2003 came from required monitoring of vulnerable sources under the California Unregulated Chemical Monitoring Regulations, which were repealed in October, 2007. Some water systems have continued to monitor their sources and submit their findings to the State Water Board.

The source monitoring results in the downloaded WQIr data were evaluated to obtain an estimated average level of contamination for each affected active source. The average levels were then compared to the proposed MCL (5 ppt), and the five alternative MCL's (7, 15, 35, 70 and 150 ppt), to estimate the number of sources that would be in violation of that MCL. The number of affected water systems was also estimated. The water systems and their associated sources were grouped on the basis of water system size:

- Small Water Systems are water systems with less than 200 service connections
- Large Water Systems are water systems with 200 or more service connections

The use of 200 service connections to represent the division between water system sizes in this document is reflected in some statutes and regulations, including statutes regarding the delegation of certain regulatory authority to local primacy agencies (e.g., counties) and the eligibility of water systems to install point-of-entry treatment. Other regulations and statutes use different thresholds, such as population, to separate water systems into small, medium, and large categories. This cost estimating methodology is not intended to convey that one method of categorizing water system size is more appropriate than another. The numbers of sources, categorized by groundwater or surface water and by service connections, are shown in Table 1.

The population served by each source was estimated using information obtained from the State Water Board's Safe Drinking Water Information System (SDWIS) database. The number of groundwater and surface water sources used, by water system size, was also obtained from the SDWIS database.

## B. Tools

The tools used for estimating monitoring and treatment costs are discussed below.

**Monitoring Costs:** To obtain sample analysis costs, the State Water Board in September, 2015 surveyed 13 commercial laboratories accredited by the State Water Board's Environmental Laboratory Accreditation Program for analyzing 1,2,3-TCP in drinking water using a detection limit for purposes of reporting at 0.000005 mg/L or 5ppt. Eleven laboratories provided sample analysis cost information. The average cost per sample was \$132, with the

sample cost ranging from \$60 to \$200 per sample. The average value of \$132 per sample was used to estimate monitoring costs.

**Treatment Costs:** A water system with a drinking water source in violation of the 1,2,3-TCP MCL would be required to either remove the source from service or treat the source to come into compliance and would incur both capital and operation and maintenance (O&M) costs if treatment was provided. The State Water Board assumed that all sources in violation of the proposed 1,2,3-TCP MCL would require treatment, and that water systems would treat those sources by using granular activated carbon (GAC), which is identified as the BAT. To estimate capital and O&M costs, the State Water Board used a cost estimate model developed by the U.S. EPA for the removal of assorted organic chemicals, including 1,2,3-TCP, using GAC (U.S. EPA, Office of Water, Office of Groundwater & Drinking Water, "Work Breakdown Structure Model for Granular Activated Carbon Treatment", August 12, 2014<sup>1</sup>). General assumptions used to generate costs from the 2014 U.S. EPA cost model are summarized as follows:

1. Small treatment systems ( $\leq 1.0$  million gallons per day (MGD) design flow) use a GAC system with carbon disposal. Large treatment systems ( $> 1.0$  MGD design flow) use a GAC system with offsite carbon regeneration. Carbon regeneration is assumed to be non-hazardous.
2. GAC contactors are arranged in parallel and operated with a staggered reactivation pattern.
3. Empty bed contact time is 10 minutes.
4. GAC replacement or reactivation occurs every 8 months.
5. Spent GAC is transferred from the vessels using eductors.
6. GAC contactors receive pressurized flow rather than gravity flow.
7. Small treatment systems are manually operated. Large treatment systems are fully automated.
8. The component quality level is mid-cost.
9. Backwashing of the GAC media occurs every 16 weeks.
10. Treatment systems with a design flow rate of less than 1 MGD do not have a backwash holding tank before discharging to sewers. Treatment

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<sup>1</sup> <https://www.epa.gov/dwregdev/drinking-water-treatment-technology-unit-cost-models-and-overview-technologies>

systems with a design flow rate equal to or greater than 1 MGD do have a backwash holding tank.

11. Land costs were excluded.
12. Sources identified as having existing GAC treatment for other contaminants are assumed to have a complete carbon change-out following initial monitoring to install GAC more capable of treating 1,2,3-TCP. The change-out cost is considered a capital cost but is not amortized due to similarities to O&M costs.
13. Sources identified as having existing GAC treatment for 1,2,3-TCP solely or in combination with other contaminants are not considered to have capital costs and only have monitoring and O&M costs. Monitoring and O&M costs for these sources, while possibly existing prior to the adoption of this regulation, will be considered new costs for purposes of estimating costs of this regulation.

The cost model outputs were assumed to be adequate approximate costs for the installation and operation of a variety of GAC treatment systems at different flow rates. The State Water Board did not include adjustments for local economies, site-specific conditions, or other unique costs or savings that may be available to some PWS.

### **C. Assumptions**

The assumptions used by the State Water Board to develop estimated costs were reviewed by State Water Board technical staff, were developed relying on information from existing California water systems using GAC to treat for 1,2,3-TCP, and are similar to assumptions used in the 2005 U.S. EPA document for total organic carbon removal using GAC (Technologies and Costs Document for the Final Long Term 2 Enhanced Surface Water Treatment Rule and Final Stage 2 Disinfectants and Disinfection Byproducts Rule, EPA 815-R-05-013, U.S. EPA, Office of Water, December 2005). The treatment costs are capital and O&M costs. The State Water Board's assumptions used to estimate treatment costs are provided in Part B of this document. Additional assumptions the State Water Board relied upon in developing estimated costs are as follows:

1. Water quality data from the State Water Board's WQI database provides a sufficient basis for a cost analysis for the proposed regulations.
2. Any source exceeding a proposed MCL will treat the source to come into compliance.
3. Each affected source requiring treatment will have its own treatment plant and may incur capital, O&M, and monitoring costs.

4. All affected sources are disinfected and water systems are monitoring in accordance with the California Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rule.
5. Average day demand is 150 gallons/person/day, which is a rounded value based on water usage data provided to the State Water Board by 386 California urban water suppliers during June, 2014, and increased by 10 percent.
6. The peaking factor for maximum day demand is 1.5, which is consistent with the peaking factor used to determine source capacity in California Code of Regulations, title 22, division 4, chapter 16, section 64554.
7. 1,2,3-TCP concentration in the treated water is less than the detection limit.
8. All sources are vulnerable to 1,2,3-TCP.
9. Prior 1,2,3-TCP monitoring results are not “grandfathered” under section 64445(f) or proposed section 64445(i), and all sources will perform initial monitoring.
10. 1,2,3-TCP will not be detected in any additional sources during initial monitoring. Only the sources with existing data indicating the presence of 1,2,3-TCP were considered in the evaluation of costs for treatment.
11. Risk for a carcinogen is linear.
12. The population exposed to 1,2,3-TCP is equal to the system population divided by the number of active sources.
13. Operator cost adjustments specifically due to changes in water treatment facility class were not considered as a specific cost.

#### **D. Calculations**

The calculations for monitoring and treatment costs are discussed below.

**Monitoring Costs:** There are four types of monitoring costs under the existing organic chemical regulations. The number of water systems needing to conduct each type will differ.

*Initial.* A water system with drinking water sources, excluding purchased, treated sources, would be required to monitor those sources quarterly for one year, unless the system applies for and receives a use or susceptibility monitoring waiver. As previously discussed in *Part C - Assumptions*, all sources, including standby sources, are assumed to be



vulnerable to 1,2,3-TCP, so initial monitoring is required. Standby sources are required to be sampled once during the first three years after the effective date of the MCL, but for simplicity, standby sources are assumed to be sampled during the first year.

*Routine.* A water system with drinking water sources that do not show a detectable level of 1,2,3-TCP during initial monitoring would be required to monitor those sources as follows, unless the system applies for and receives a use or susceptibility monitoring waiver:

1. For a system serving 3,300 persons or less, the required sampling is once during the year designated by the State Water Board of each subsequent compliance period (compliance periods are three-year calendar year periods).
2. For a system serving more than 3,300 persons, the required sampling is two quarterly samples in one year during the year designated by the State Water Board of each subsequent compliance period.

As previously discussed in *Part C – Assumptions*, all sources are assumed to be vulnerable to 1,2,3-TCP and require routine monitoring. Also, 1,2,3-TCP was assumed to not be detected during initial monitoring in any sources that did not have existing data indicating the presence of 1,2,3-TCP. Therefore, the number of sources subject to initial and routine monitoring is, excluding standby sources, identical.

*Increased.* A water system with any drinking water sources found to have a detectable level of 1,2,3-TCP would be required to monitor those sources quarterly. A water system serving more than 3,300 persons with sources exceeding the proposed MCL would be required to monitor those sources monthly during the first 6 months. For the purposes of this cost estimate, sources on increased monitoring are assumed to be in compliance with the MCL, not require treatment following the six months of sampling and will therefore continue monitoring on a quarterly basis. Stand-by sources identified as having a detectable 1,2,3-TCP result in their historical monitoring data were not included in this portion of monitoring costs.

*Treated.* A water system treating a drinking water source for 1,2,3-TCP for compliance with the proposed MCL would be required to monitor the treated water (i.e., treatment effluent) monthly and the source water quarterly.

The estimated monitoring costs, by water system size, are shown in Table 2. The initial monitoring costs are a one-time cost that starts during year one. Routine monitoring costs start during year two and are expected to continue in year three and beyond. Increased monitoring costs for sources not requiring treatment start in year one and continue in year two and beyond. Increased monitoring costs for sources expected to install treatment are a one-time cost that starts during year one and is then combined

with treated monitoring costs in year two. The treated monitoring costs start during year two and are expected to continue in year three and beyond.

**Treatment Costs (Capital and O&M):** To amortize the estimated total capital costs and determine the estimated annualized capital costs to install treatment, the State Water Board used the capital recovery method with an interest rate ( $i$  in decimal format) of 7 percent (i.e., 0.07) and an amortization period ( $n$ ) of 20 years. The equation used for each estimated source is as follows:

*Annualized capital cost = initial capital cost x amortization factor*

$$\text{Amortization factor} = \frac{i \times (1 + i)^n}{[(1 + i)^n - 1]} = 0.0944$$

The per-source costs were then combined for each type of cost. The estimated total capital, annualized capital, and annual O&M costs, by water system size, are shown in Table 3. The treatment costs start during year two and are expected to continue in years three and beyond.

**Estimated Total Annualized Costs (Monitoring and Treatment):** The estimated total annualized costs associated with the proposed 1,2,3-TCP MCL and monitoring regulations, by water system size, are shown in Table 4.

**Estimated Total Annualized Costs by Type of Water System Ownership at the Proposed MCL:** CWS and NTNCWS ownership falls into four categories: Federal, state, local government agencies, and private owners. The estimated total annualized ongoing monitoring and treatment costs for the proposed regulations are presented by system ownership in Table 5.

#### Category 2 (Unrelated to 1,2,3-TCP)

With respect to Category 2, the proposed regulation amends existing regulations for the purpose of making nonsubstantive changes (e.g., punctuation, spacing, etc.), and allows changes to initial monitoring requirements to allow use of some sampling that has occurred within two years of the effective date of a new MCL.

The Initial Statement of Reasons provides further details regarding these proposed changes, which were found to have no fiscal impact, and therefore, there are no working data, assumptions, or calculations to be presented.

#### **IV. Conclusion**

The State Water Board is promulgating regulations for a 1,2,3-TCP MCL. Adopting a drinking water MCL for 1,2,3-TCP of 0.000005 mg/L is consistent with statutory requirements because the MCL is as close to the PHG as feasible, is technologically feasible for the PWS to comply with, and provides increased public health protection by

reducing the potential risk of adverse health effects associated with 1,2,3-TCP. The primary costs to the regulated community are for compliance with the 1,2,3-TCP MCL. The portions of the proposed regulation unrelated to the 1,2,3-TCP MCL have no fiscal impact on the regulated community.

The proposed regulation would not impose upon local agencies or school districts a mandate that requires state reimbursement because the requirement to provide drinking water that meets the MCL for 1,2,3-TCP will not be a requirement unique to local government, and will apply equally to public and private water systems (County of Los Angeles v. State of California, et al., 43 Cal.App. 3d 46 (1987).)

State costs of treatment, operation, and monitoring are anticipated to be \$0.10 million annually, which is anticipated to be absorbable by State agencies within their existing budgets. The State Water Board estimates that there will be no change to the Division of Drinking Water's Safe Drinking Water Account fees and caps. The fees, caps, and annual adjustments are specified in statute under sections 116565, 116577, 116585, and 116590, California Health and Safety Code. The proposed regulations apply only to PWS, as defined pursuant to Health and Safety Code section 116275, which are not businesses or individuals. PWS are water companies providing drinking water to the public and, pursuant to Government Code Section 11342.610, are exempt from the definition of a small business. Therefore, the regulation will not have a direct economic impact on private persons or businesses. Indirect economic impact will likely occur due to PWS passing on the costs of compliance to their customers, which may include private persons or businesses.