



April 2022

Suggested Guidelines for Preparation of Required Reports on PUBLIC HEALTH GOALS (PHGs) to satisfy requirements of California Health and Safety Code Section 116470(b)

Background

Public water systems serving more than 10,000 service connections must prepare a brief, written report in plain language by July 1, 2022 that gives information on the “detection” of any contaminants above the Public Health Goals (PHGs) published by the state’s Office of Environmental Health Hazard Assessment (OEHHA). The report must also list the “detection” of any contaminant above the Maximum Contaminant Level Goals (MCLGs) set by United States Environmental Protection Agency (U.S. EPA) for all other contaminants until such time as OEHHA has published PHGs for those contaminants.

It is emphasized that the report only needs to provide information on the number of contaminants that a water system has found at a level exceeding a PHG or a MCLG.

The purpose of the legislation requiring these reports was to provide consumers with information on levels of contaminants even below the enforceable mandatory Maximum Contaminant Levels (MCLs) so they would be aware of whatever risks might be posed by the presence of these contaminants at levels below the MCLs. Additionally, each water system must provide an estimate of the cost to reduce the contaminant(s) to the PHG (or MCLG if there is no PHG) regardless of how minimal the risk might be.

The following should be considered when preparing the mandated reports:

1. The U.S. EPA and the California State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) establish MCLs at very conservative levels to provide protection to consumers against all but very low to negligible risk. In other words, MCLs are the regulatory definition of what is “safe.” Adopted MCLs are still the criteria for being in compliance, not those proposed or possible in the future, and certainly not MCLGs or PHGs.

2. MCLGs and PHGs are often set at very low levels depending on the established health risk, and in the case of U.S. EPA, MCLGs are also set at zero for some contaminants. Determination of health risk at these low levels is theoretical based on risk assessments with multiple assumptions and mathematical extrapolations. Many contaminants are considered to be carcinogenic and U.S. EPA's policy is to set the applicable MCLGs at zero because they consider no amount of these contaminants to be without risk. It is understood by all that zero is an unattainable goal and cannot be measured by the practically available analytical methods. Note that by regulation, OEHHA cannot set a PHG at zero and must calculate a numerical level to address risk, even though it may be unattainable or impossible to measure.
3. PHGs and MCLGs are not enforceable. The Best Available Technology (BAT) to reach such low levels has not been defined and may not realistically be available. Accurate cost estimates are difficult, if not impossible, and are highly speculative and theoretical. Therefore, they have limited value and may not warrant significant investment of agency time and money.

These reports are unique to California. They are required in addition to the extensive public reporting of water quality information that California water utilities have been doing for many years and in addition to the federally mandated Consumer Confidence Reports (CCRs). Hence, it should be kept in mind that in addition to this required report, each utility will continue reporting annually in great depth on the quality of the water it serves.

The guidance herein is intended to assist water suppliers in completing the required reports.

The DDW is the primary enforcing agency of all provisions of the Health and Safety (H&S) Code relative to drinking water systems. It has the authority to ensure that public water systems comply with the report requirement. DDW requests that utilities report in writing as to how they have complied with the fundamental requirements of this section, which are:

- 1) Prepare a brief written report,
- 2) Hold a public hearing (meeting), and
- 3) Notify DDW that the meeting was held and the report is available.

Detailed Guidelines:

I. Who must prepare a PHG report?

California H&S Code, Section 116470(b) is clear that a system ONLY needs to do a report IF it has at least 10,000 service connections AND IF it exceeds one or more PHG or MCLG. Also, a public hearing is NOT required if a report does not have to be prepared.

Utilities that do NOT have to do the report may choose to submit an information item to their governing board advising them that no report is required.

This report is required every three years.

II. Wholesalers (<10,000 service connections) are NOT required to do a PHG report.

Wholesalers who do not directly serve more than 10,000 service connections are not required to meet the PHG report requirements of California H&S Code, Section 116470(b).

III. Timing, Notification, Meetings

- A. **Timing and Meeting:** The report must be prepared by July 1, 2022. A public hearing, which can be held as part of any regularly scheduled meeting, should be held sometime after July 1 and prior to reporting to DDW. The public hearing “should be held within a reasonable time after the report’s completion” so the information is current. The purpose of the hearing is to “accept and respond to” public comment. The governing board or council of public water agencies would also likely approve the staff report at that time. This would represent endorsement by the board of the part of the report where any action (or no action) would be proposed regarding reduction of contaminants to levels lower than required for compliance with MCLs.

Notification: There is no requirement to send a copy of the report to the public. Public agencies must “notice” public hearings so this hearing would be subject to the normal notice requirements (i.e., number of days advance, publishing in appropriate newspaper, etc.) The notice would appropriately indicate the report is the subject of the hearing and indicate it is available for the public to review or to get a copy upon request.

(NOTE: Investor-owned utilities will likely have to schedule a special “meeting” since they are not subject to the same meeting notice requirements and may not have any authority to hold a “public hearing” per se. Their notification of the public could however be similar to public agencies (e.g., publication of legal notice in newspaper of general circulation.)

- B. **Submission of Reports:** DDW does not specifically require that a copy of the report be submitted to them.

IV. Interpretations

- A. What contaminants must be covered?

A table of relevant current PHGs, MCLGs, MCLs, and Detection Limits for purposes of Reporting (DLRs) is attached to this guidance as Attachment No. 1.

1. Only contaminants that **have an existing MCL AND** were “detected” at a level that “exceeds” the PHG or, where there is no PHG, the Federal MCLG, need to be included in the report. (See guidance below on “detected” and “exceed”)
2. All contaminants that, **as of December 31, 2021**, have Primary Drinking Water Standards (PDWS) set by California **AND** have an equivalent PHG or a MCLG. This includes chemical, microbiological and radiological constituents. PDWS may be either MCLs or Treatment Techniques (TT). For example, the Surface Water Treatment Rule (SWTR) is a TT for the following contaminants: *Giardia lamblia*, viruses, *Cryptosporidium*, *Legionella* and heterotrophic bacteria (HPC). A TT is set when it is not possible to reliably analyze for the contaminant of concern (the SWTR) or when it is not feasible or appropriate to set a numerical standard (e.g., the Lead & Copper Rule).
3. It does NOT include contaminants, such as radon, for which U.S. EPA has considered adopting an MCL, nor does it include any contaminants DDW plans to regulate in the future.

It does NOT include contaminants for which there is no final PHG or MCLG as of December 31, 2021, nor does it include any secondary MCLs (e.g., TDS, SO₄, Na, etc).

B. What data are to be used for the report due by July 1, 2022?

1. It is recommended that the data used should be from the 3 consecutive calendar years prior to the year the report is prepared. For example, the 2022 report would be based on the analytical data from samples taken in 2019, 2020, and 2021. The data should be the same as that used by the drinking water system in determining compliance with DDW requirements. In most cases, this would be after blending or treatment. Individual well data would only be used if the well feeds directly to the distribution system.
2. For utilities that purchase water from another agency or from a wholesaler, it is suggested that the same guidance or ground rules be followed as for the CCRs. If the only source for a retail system is treated water from a wholesaler and that water contains a constituent above a PHG or MCLG, the retailer should use its own distribution system monitoring data. For systems with both its own sources of water and purchased water, the retailer should evaluate its own distribution system compliance monitoring and compare the annual average value with the PHG or MCLG.

- C. What do the terms “detect” and “exceed” mean in the context of the required report?
1. Keep in mind that there are no regulations that relate to “meeting” or “complying with” PHGs. The logical approach would be to use the same procedures and requirements that Title 22 of the California Code of Regulations specify for determining compliance with MCLs. For example, if Title 22 or DDW guidance specifies that the average of a group of samples be compared to the MCL for compliance purposes, the same averaging should be used to compare to the PHG or MCLG. For most constituents (coliform is an exception), compliance with MCLs is measured at the “point of entry” to the distribution system. This means that, for the most part, the analytical results for each well must be evaluated separately and compared to the MCLG or PHG. If wells are blended or treated before delivery to the system, the judgment as to whether there was a “detection exceeding the MCLG or PHG” should be based on the “point of entry” data just as for compliance with MCLs.
 2. Be sure to report the PHG (or MCLG) as a number equal to or greater than 1.0 as specified in the State Consumer Confidence Report Guidance for Water Suppliers. It is recommended that all data be converted to match CCR data. Attachment No. 1 concentration numbers are given as mg/L, unless otherwise noted.
 3. Keep in mind that if a utility determines that a constituent has been found at a level exceeding the PHG or MCLG, a cost estimate is mandated. A utility would ordinarily be required to perform a cost estimate only if it is clear that the MCL has been clearly exceeded, not just momentarily, or on one sample. In the same way, only when the PHG/MCLG level is clearly exceeded should a cost estimate be calculated and reported.
 4. Significant figures, analytical detection limits, reporting limits, and different methods of determining compliance, all affect the assessment of which constituents were “detected” above the PHG or the MCLG.
 5. Results that are reported below the state regulatory Detection Limit for Purposes of Reporting (DLR - See California Code of Regulations Title 22, Sections 64432 & 64445.1 and other DDW guidance on compliance reporting) should be treated as 0 (zero) which is accepted DDW practice. U.S. EPA also recommends treating non-detection (ND) as zero.

6. As in all cases of reporting results to the state, the results of analyses should be rounded to reflect the appropriate number of significant figures. (EXAMPLE: For E. coli bacteria, the MCLG is 0% samples positive per month which indicates one significant figure. So, if during 2021, a system had a positive sample but the percentage of samples positive for the month was <0.49%, this could be rounded to one significant figure, as the MCLG is expressed, so it would be rounded to 0%.) (SECOND EXAMPLE: For a constituent like PCBs where the MCL is 0.5ppb and the DLR is 0.5 ppb, how do you determine if you exceeded the MCLG of “zero”? Webster defines “zero” as “having no measurable or otherwise determinable value,” which, in effect, is the DLR. So for PCBs, if the average of results for a given well is less than the DLR, the value would be reported as “zero.” Note that by regulation, OEHHA cannot set a PHG at zero and must calculate a numerical level to address risk.)
 7. In averaging the results for a constituent over a specified period during which some of the data is less than the DLR, the average value obtained should be rounded to the appropriate significant figure before comparing to the PHG or MCLG. (EXAMPLE: If a well were sampled for PCE and 0.6 ppb was found and the resample showed 0.6 ppb, it would constitute a confirmed positive detection. But if 3 additional compliance samples were taken from the well and all had less than 0.5 ppb, which is the DLR, then averaging the 5 samples would give an average of 0.24 ppb, which would be rounded to zero. The average from the well does not exceed the PHG of 0.06 ppb, and no cost estimate would be needed for this well.)
- D. What does the term “best available technology” (BAT) mean as used in this portion of the law?
1. While a specific definition of the term is not in the California H&S Code, the accepted meaning in all other sections is that it refers to a technology to achieve compliance with MCLs. In fact, where “best available technology” is listed or explained (Sections 64447, 64447.2 & 64447.4), the usage is “for achieving compliance with the MCLs.” This is also true for BAT specified in federal regulations.
 2. However, in Section 116470(b)(4), the term refers to “BAT,” if any is available on a commercial basis, to remove or reduce the concentration of the contaminant. Specifically, subdivision (b)(5) requires cost estimates of using the technology described in subdivision (b)(4) to “reduce the contaminant...to a level at or below the” PHG (or MCLG).

3. Obviously, where MCLGs are set at zero, there may not be commercially available technology to reach a non-detectable level. This should be clearly stated in the report. Since there is little data readily available to “estimate” cost of treatment to achieve absolute zero levels, rough estimates of “BAT” as defined in law might be used with a clearly written caveat that use of this “BAT” may still not achieve the PHG or MCLG and the costs may be significantly higher to do so.

E. Must the report deal with total coliforms?

No. No PHG or MCLG for total coliforms existed during the period covered by the 2022 report. For reports on PHGs prepared in 2019 and prior years, results for total coliforms needed to be evaluated because the U.S. EPA established a MCLG of zero (0) for total coliforms that remained applicable until March 31, 2016. In 2013, U.S. EPA revised the 1989 Total Coliform Rule (TCR) and one of the provisions of the revised Total Coliform Rule (RTCR) eliminated the MCLG for total coliforms effective April 1, 2016.

F. How should the report deal with *E. coli*?

The federal RTCR included a MCL and MCLG for *E. coli* effective April 1, 2016. The MCLG for *E. coli* is zero (0). DDW adopted a MCL for *E. coli* which became effective July 1, 2021. Even though there is no PHG, *E. coli* is subject to PHG report requirements because there is a MCLG and a MCL.

1. The *E. coli* MCL is based on either an *E. coli* positive repeat sample following a total coliform (TC) positive routine sample, a TC-positive repeat sample following an *E. coli* -positive routine sample, failure to collect all required repeat samples following a *E. coli* positive routine sample, or failure to test for *E. coli* when any repeat sample is TC-positive. The PWS should report the number of *E. coli* detections that occurred during the three-year period (2019, 2020, and 2021 for this report). The MCLG of zero is therefore appropriately interpreted as zero samples positive.
2. If it is determined that the system has exceeded the MCLG of zero for *E. coli*, the following factors are pertinent for deciding what action, if any, is appropriate to consider and for estimating costs:
 - a. Exceeding zero *E. coli* bacteria at any one time, in and of itself, would not normally constitute the need for any treatment or action.
 - b. There is no action that could be taken with absolute certainty that could ensure that the system would always have zero-percent *E. coli* every single time.

- c. The “best available technology” (to meet the MCL, not the MCLG) that is specified for total coliform by DDW in California Code of Regulations Title 22, Section 64447 would also apply to *E. coli* and for the most part is already followed by many systems.
 - d. The one single action that would most likely decrease the possibility of positive *E. coli* detection would be to significantly increase the disinfectant residual. This would likely result in increased disinfection byproducts (DBPs). While disinfection protects against acute health risks, such as *E. coli* and *Giardia*, DBPs can have potentially adverse chronic health risks. The limits to the amount of disinfectant residual allowed in the distribution system are the maximum residual disinfectant levels (MRDLs) as established by the Disinfectants and Disinfection Byproducts Rule (DBPR).
 - e. Utilities should point out the positive, proactive steps they take to prevent *E. coli* contamination in the distribution system, including preventive maintenance, main flushing, special monitoring, residual maintenance and testing, cross-connection control, etc.
- G. How should the report handle the MCLGs of zero for *Giardia lamblia*, *Cryptosporidium*, *Legionella* and viruses?
1. The MCL for pathogenic micro-organisms is a TT (i.e., the SWTR). No monitoring is mandated for the organisms because there are no standardized methods for testing or the analyses are not timely (like virus testing – 30 days) to provide public health protection.
 2. For these reasons, since the intent of the TT (SWTR) is to protect against these pathogens, it can properly be assumed that if the SWTR is met, that the utility has met the MCLG because there is no uniform way to assess possible pathogen levels.
 3. For utilities doing voluntary monitoring of pathogens (such as *Giardia* and *Cryptosporidium*), the results are appropriately considered research or for operational purposes and not for compliance purposes.
- H. How should the report deal with Lead and Copper?
1. Any lead or copper values below the respective DLR should be reported as zero.
 2. For monitoring lead at the tap, if the 90 percentile lead value is ND, or <0.005 mg/l, then you should assume you do not exceed the lead PHG of 0.2 ppb.

3. For monitoring copper at the tap, if the 90 percentile copper value is not above 300 ppb, then you have not exceeded the copper PHG.
 4. While not precisely stated in the regulations, best available technology for Lead and Copper compliance is a TT (in lieu of MCLs) of “optimized corrosion control.” For larger systems with >10,000 service connections, this depends on a series of steps involving sampling, reports, studies, etc. If a system meets the requirements of having optimized corrosion control but still has a 90 percentile lead or copper value above the PHGs, it is not clear what additional steps could be considered, particularly without causing other potential water quality problems. It may be appropriate to explain this in a straight-forward manner rather than putting in “hypothetical” cost figures.
- I. Must the report deal with Total Trihalomethanes (TTHMs) or Haloacetic Acids (HAAS)?

No. MCLG/PHG exceedances must be reported only for those contaminants that have a primary drinking water standard in place and an associated MCLG/PHG. Although U.S. EPA has adopted MCLGs for some individual THMs and HAAs (such as dibromochloromethane or dichloroacetic acid), there are no MCLs in effect for these individual constituents. Likewise, U.S. EPA has adopted standards for the cumulative byproduct groups, but there are no MCLGs or PHGs established for the groups. In California, DDW has adopted an MCL for both cumulative byproduct groups, but there are no associated PHGs. (Note: OEHHA published a draft PHG of 0.8 ppb for total trihalomethanes in September 2010, but it had not been finalized as of December 31, 2021).

On February 7, 2020, OEHHA published PHGs of 0.4 ppb for chloroform, 0.5 ppb for bromoform, 0.06 ppb for bromodichloromethane, and 0.1 ppb for dibromochloromethane but there are no MCLs for individual trihalomethanes so these constituents do not need to be included in the report.

However, individual MCLs and MCLGs for bromate and chlorite exist, so they must be included in the report if detected.

- J. How should water utilities handle gross alpha and uranium?

When looking at the results of any radionuclide monitoring done in the 3-year period to be covered by the report, there are several things to keep in mind:

As indicated in C.1 of this Guidance, where averaging is done to determine compliance with MCLs, it should also be done in considering PHGs. This is important for radionuclides because compliance is often based on averaging.

Unlike most other constituents, laboratories doing radionuclides report some results that are LOWER than the state DLR. Title 22, 64442 (h)(3)(c) states: “If a sample result is LESS than the DLR in Table 64442, ZERO shall be used to calculate the annual average.....” Also, it says for Gross Alpha: “.....1/2 of the DLR shall be used to calculate the annual average.”

Where Gross Alpha analyses are used in lieu of analyzing for uranium, Radium 226 or 228, the procedure outlined in Title 22, 64442(f) should be followed. (Note: The 95% confidence limit is often reported by labs as MDA95.)

K. Do utilities have to report detections of hexavalent chromium?

Water systems do NOT have to report anything on hexavalent chromium because there is no MCL. While there is an MCL and an MCLG for TOTAL chromium, systems will not have to report on it either since the MCLG (100 ppb) is much higher than the California MCL (50 ppb).

V. Disclosure of Numerical Public Health Risk Associated with PHGs/MCLs and Identification of Category of Risk

H&S Code, Section 116470(b)(2) requires the report to disclose the numerical public health risk associated with both the maximum contaminant level and public health goal for each contaminant detected in drinking water that exceeds the public health goal, and Section 116470(b)(3) requires an identification of the category of risk to public health associated with exposure to the contaminant. In February 2022, OEHHA prepared and published an updated “Health Risk Information for Public Health Goal Exceedance Reports” document. It is included as Attachment No. 2, and can be accessed at <https://oehha.ca.gov/water/public-health-goal-report/health-risk-information-public-health-goal-exceedance-reports-2022>.

V. Cost Estimates

The most difficult aspect of the required report is estimating the cost of treatment. Agencies are urged to keep in mind that because of the advisory nature of the report, the non-enforceable aspect of PHGs and MCLGs, and the highly speculative applicability of technology to achieve “zero” levels, only very preliminary cost estimating is appropriate and necessary.

Remember that a cost estimate is only required for a constituent if you determine that it was “detected” above the PHG or MCLG. If the MCLG is zero and the result (after approximation, averaging, rounding) is less than the DLR, no cost estimate is needed. (Remember that many DLRs are LOWER than the PHG, so “detection” above the DLR does not necessarily mean that it is above the PHG.)

The cost estimates should not be low estimates because that would give a mistaken impression that achieving “zero” levels would have a lower price tag when the amount of uncertainty and unknowns would be very high. Given the uncertainties, it might be appropriate to consider reporting a range of costs.

For the 2022 guidance, ACWA is providing a revision of its previous treatment cost information.

Attachment No. 3 to this guidance includes several tables which provide "ranges" of costs for installing and operating several treatment technologies. These data have been gathered from a variety of sources and represent estimates for different size systems, different sources, and different constituents targeted for reduction by the treatment.

Table 1 represents the results of a 2012 ACWA Survey of its member agencies. This has been revised using the average 2021 ENR Cost Index.

Table 2 includes data from several agencies that was gathered separately from the 2012 ACWA survey. This has been revised using the average 2021 ENR Cost Index.

Table 3 is treatment cost data from previous ACWA Guidance documents with the costs updated to 2021. This has been revised using the average 2021 ENR Cost Index.

The law specifies that the report should only “estimate the aggregate cost and the cost per customer of utilizing the technology” to reduce the level down to the PHG. There is no specification of what is to be estimated: initial construction cost, annualized costs of construction and O&M, or another way of expressing cost. It is suggested that each utility may do it the way they report other costs. (EXAMPLES: 1. Initial Cost of Construction, including % increases for each of design, planning, CEQA, permitting, contingency, etc. = \$10 million, or \$1000 per customer, plus an ongoing O&M cost of \$1 million, or \$100 per customer, forever; 2. Annualized Cost of Construction plus O&M = \$2 million, or \$200 per customer.)

All possible technologies do not have to be evaluated for each constituent to compare costs. For example, if granular activated carbon (GAC) and reverse osmosis (RO) are both possible treatment technologies to try to lower the level of a particular contaminant to the “zero” PHG/MCLG level, it is appropriate to specify and estimate costs for the technology that would likely be used, keeping in mind there are significant uncertainties based on a variety of factors. If the utility has multiple contaminants to address in the report, one technology (i.e., RO) may address them all, so a cost estimate for RO only could suffice.

General “order of magnitude” estimates are adequate. It is assumed that ALL costs including capital, land, construction, engineering, planning, environmental, contingency and operations and maintenance (O&M) costs should be included but general assumptions can be made for most of these items.

If a system chooses to do its own cost estimating rather than use the costs in Attachment No. 3, it is recommended that generally available cost estimating guides be used such as from U.S. EPA, WRF, AWWA, ASCE, or textbooks, manuals, journals.

The following is a list of references that might be used:

- (1) Implementation of Arsenic Treatment Systems, Part 1. Process Selection; AWWA Research Foundation and U.S.E.P.A, Published by AWWA RF and AWWA, 2002,
- (2) Implementation of Arsenic Treatment Systems, Part 2: Design Considerations, Operation and Maintenance, AWWA Research Foundation, Published by AWWA RF and AWWA, 2002,
- (3) State-of-Science on Perchlorate Treatment Technologies, Final Report for Water Research Foundation project #4359, 2011,
- (4) An Assessment of the State of Nitrate Treatment Alternatives, AWWA, June 2011, Chad Siedel and Craig Gorman, Jacobs Engineering Group, Inc.,
- (5) Performance and Cost Analysis of Arsenic Treatment in California, October, 2009, JAWRA, UC Davis, Hilkert, Young, Green and Darby.

U.S. EPA includes cost data in the Federal Register for each regulation when it is proposed or adopted. (NOTE: U.S. EPA estimates generally do not consider state-specific concerns and some costs have been known to be underestimated in the past so costs should be increased appropriately and based on utility experience.) The experience of other utilities in your area that have installed treatment to meet MCLs or data reported in journals is valuable as well.

Utilities may also choose to have their engineering consultants prepare these very general cost estimates.

VI. Sample Hypothetical Report

Attachment No. 4 is a comparable attempt to show what a PHG-required report might look like for a "hypothetical" water system that serves more than 10,000 service connections and had one or more PHG/MCLG exceedances in the three-year period ending December 31, 2015, as an example. It is NOT the only way the report might be done. The sample is based on these guidelines. If there appears to be a conflict between the sample and the guidelines, the guidelines should be followed.

If you have any questions about these guidelines or any of the attachments, contact Nick Blair of ACWA at NickB@acwa.com or 916-669-2377.