ATTACHMENT A

PUBLIC HEALTH GOALS
REPORT ON WATER QUALITY
2025

Background

Provisions of the California Health and Safety Code (HSC §116470(b)) specify that public water systems with greater than 10,000 service connections prepare a special report every three years if their water quality measurements exceed any Public Health Goals (PHGs). The purpose of this report is to provide consumer access to information regarding the levels of various contaminants, even if they are below enforceable mandatory maximum contaminant levels (MCLs), and to provide an estimate of cost to either reduce the constituent level or eliminate any trace of it from drinking water, regardless of how minimal the risk might be.

This report is for calendar years 2022, 2023, and 2024. PHGs are non-enforceable goals established by the California Environmental Protection Agency (Cal-EPA) Office of Environment Health Hazard Assessment (OEHHA). The statute also requires that water suppliers use the Maximum Contaminant Level Goals (MCLGs) adopted by U.S. Environmental Protection Agency (USEPA) for constituents for which OEHHA has not adopted a PHG. Only constituents which have a California primary drinking water standard and for which either a PHG or MCLG has been set are to be addressed.

In accordance with the Health and Safety Code, if a constituent was detected in the Mission Springs Water District's (MSWD or District) water supply between 2022 and 2024 at a level exceeding an applicable PHG or MCLG, it will have to be identified in this report. Included is the numerical public health risk (if applicable) associated with the MCL and the PHG or MCLG, the category or type of risk to health that could be associated with each constituent, the best treatment technology available that could be used to eliminate or reduce the constituent level, and an estimate of the cost to install that treatment if it is appropriate and feasible.

What are PHGs/MCLs/MCLGs

Public health goals are based solely on public health risk assessments and are generally lower than the enforceable maximum contaminant levels of the primary drinking water standards. MCLs, which are established at very conservative levels, provide protection and are the regulatory definition of what is considered "safe".

PHGs for non-carcinogenic chemicals in drinking water are set at a concentration "at which no known or anticipated adverse health effects will occur, with an adequate margin for safety." For carcinogens, PHGs are set at a concentration that "does not pose a significant risk of cancer." This is usually a one-in-a-million excess cancer risk for a lifetime of exposure. MCLGs, like PHGs, are strictly health-based and include a margin of safety. One difference, however, is that the MCLGs for carcinogens are set at zero because the USEPA assumes there is no absolute safe level of exposure.

None of the practical risk-management factors that are considered in establishing MCLs are considered in establishing PHGs/MCLGs. MCLs include analytical detection capability, availability, or treatment technology, benefits, and costs.

PHGs/MCLGs are not enforceable and are not required to be met by any public water system. In addition to cost and technological feasibility, PHGs/MCLGs may provide a basis for revising MCLs.

Health Risk Categories

Health Risk Assessments are categorized for various PHG/MCLGs. Health risks are based on long-term exposure to low levels of contaminants as would occur with drinking water, as opposed to high doses from a single or short-term exposure. These are the first or most sensitive adverse effects that occur when chemical exposure reaches a sufficient level and duration to produce toxicity. Basing health goals to protect against high dose/short term exposure also protects against risks that would occur from short-term exposure.

Numerical Public Health Risks have been assigned to carcinogenic health risk categories, whereas the cancer risk is stated in terms of excess cancer cases per million (or fewer) population. No numerical Public Health Risk has been calculated for chemicals considered non-carcinogenic.

Various Health Risk categories and specific health outcome are as follows:

- Acute Toxicity – adverse health effects that develop after a short-term exposure to a chemical. Exposure may last only minutes or occur over a few days.
- Carcinogenic – capable of producing cancer.
- Chronic Toxicity – adverse effects that usually develop gradually from low levels of chemical exposure where exposure may occur from months to years.
- Development Toxicity – adverse effects on the developing organism that may result from exposure prior to conception, during prenatal development, or postnatal to the time of sexual maturation. Adverse development effects may be detected at any point in the life span of the organism. Most developmental toxicity is manifestation by:
    - Death of developing organism
    - Structural abnormality (birth defects)
    - Altered growth
    - Functional deficiency
- Neurotoxic – capable of destroying or adversely affecting the nervous system or interfering with nerve signal transmission. Effects may be reversible (for example, effects on chemicals that carry nerve signals across gaps between nerve cells) or irreversible (destruction of nerve cells).
- Reproductive effects – the occurrence of adverse effects on the reproductive system of females or males that may result from exposure to environmental agents. The toxicity may cause changes to the female or male reproductive organs, the regulating endocrine system, or pregnancy outcomes. Examples of such toxicity may include adverse effects on onsets of puberty, egg production and transport, menstrual cycle normality, sexual behavior such as sexual urge, and lowered fertility, sperm production, length of pregnancy and milk production.

Water Quality Data Considered

All water quality data collected within the District's three public water systems between January 1, 2022, and December 31, 2024, have been considered for the purpose of determining compliance with the primary drinking water standards. Data from 2022 through 2024 is summarized in our Consumer Confidence Report (CCR) and distributed to our customers on or before July 1, each year.

Best Available Treatment Technology & Cost Estimates

Both the USEPA and State Water Resources Control Board (SWRCB) adopt Best Available Technologies (BATs), which are the best-known methods to achieve compliance with MCLs for drinking water standards. Costs of these BATs are difficult to predict. Some approved analytical methods may not be able to verify that levels have indeed been reduced beyond the method detection limit. However, since many PHGs and all MCLGs are set much lower than MCL, it is not always possible nor feasible to determine what treatment is needed to further reduce a constituent downward to or near the PHG or MCLG. In some cases, installing treatment to try and further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

Constituents Detected that Exceed a PHG or MCLG

The following constituents were detected in one or more of our drinking water sources at levels above the PHG or MCLG.

- FLUORIDE

  Fluoride is a common element that is widely distributed in the earth's crust. Traces of fluorides are present in many waters, with higher concentrations often associated with groundwater. OEHHA has established the PHG for fluoride at 1 mg/L. The MCL for drinking water standards for fluoride is 2 mg/L. Fluoride has a health risk category of musculoskeletal toxicity (causes tooth mottling).

  Between 2022 and 2024, MSWD monitored 13 active water wells within the District's three public water systems. Out of the 13 sites sampled, In 2023, two sites were found to be exceeding the PHG for fluoride but were below the MCL for drinking water standards. Analysis on our samples indicated fluoride levels ranging from 0.45 to 1.30 mg/L.

- URANIUM AND GROSS ALPHA PARTICLE ACTIVITY

  Uranium is a silvery white metallic radioactive element that is present, to some degree, in almost everything in our environment. It occurs naturally in granites and other mineral deposits, and it generally finds its way into water by leaching from these natural deposits. OEHHA has established the PHG for uranium at 0.43 pCi/L (pico curies per liter). The MCL for drinking water standards for uranium is 20 pCi/L.

  There is no California PHG for gross alpha particle activity; however, the MCLG level is set at 0 pCi/L and the MCL is 15 pCi/L. Between 2022 and 2024, MSWD monitored 13 active water wells within the District's three public water systems, and gross alpha particle activity is detected without treatment in 13 active wells. Samples indicated gross alpha particle activity levels ranging from non-detectable to 12 pCi/L.

  The category of health risk associated with uranium and gross alpha particle activity is carcinogenicity and it usually affects the kidneys. The numerical health risk for uranium at the PHG is $1x10^{-6}$, which means one excess case of cancer per one million people. The numerical health risk for uranium at the MCL is $5x10^{-5}$, which means five excess cases of cancer per 100,000 people.

Between 2022 and 2024, MSWD monitored 13 active water wells within the District's three public water systems. Out of the 13 sites sampled, 12 sites exceeded the PHG for uranium but were below the MCL for drinking water standards. Analysis on our samples indicated uranium levels ranging from non-detectable to 15 pCi/L.

RADIUM-226

Radium-226 is a naturally occurring radioactive element found in certain types of rock and soil. It can dissolve into groundwater as it moves through mineral-rich formations. The PHG for radium-226 is 0.05 pCi/L. There is no separate MCL for radium-226 alone, but the combined MCL for radium-226 and radium-228 is 5 pCi/L. Radium-226 was detected in some samples at levels above the PHG but well below the combined MCL. The District's water system remains in full compliance with state and federal drinking water standards.

Exposure to elevated levels of radium-226 over many years may increase the risk of cancer. The PHG is set at a level designed to limit this risk to one in a million over a lifetime.

The best available treatment methods for removing radium-226 include reverse osmosis, ion exchange, coagulation/filtration, and activated alumina. These technologies are expensive and often unnecessary when levels are already well below regulatory limits. Because Radium-226 was detected at levels significantly below the MCL and the water system complies with all current standards, no additional treatment action is currently needed.

Between 2022 and 2024, MSWD monitored 13 active water wells within the District's three public water systems. Out of the 13 sites sampled, five sites exceeded the PHG for uranium but were below the MCL for drinking water standards. Analysis on our samples indicated Radium-226 levels ranging from non-detectable to 1.59 pCi/L.

RADIUM-228

Radium-228 is a naturally occurring radioactive element that forms as part of the decay process of thorium and uranium in soil and rock. It can enter drinking water systems through the erosion of natural deposits. The PHG for radium-228 is 0.019 pCi/L. While there is no individual MCL forradium-228, it is included in the combined MCL of 5 pCi/L for radium-226 and radium-228.

Radium-228 was detected in some samples at levels above the PHG but remained well below the combined MCL. All water quality results comply with current regulatory standards. Long-term exposure to elevated levels of radium-228 may increase the risk of cancer.

The PHG is set to reduce this risk to one in a million over a lifetime of consumption. Treatment options to reduce radium-228 include reverse osmosis, ion exchange, coagulation/filtration, and activated alumina. These methods are highly effective but expensive to implement, especially when current levels are already considered safe. Because radium-228 was detected below the enforceable standard and the water meets all applicable health regulations, no additional treatment action is currently needed.

Between 2022 and 2024, MSWD monitored 13 active water wells within the District's three public water systems. Out of the 13 sites sampled, five sites exceeded the PHG for uranium but were below the MCL for drinking water standards. Analysis on our samples indicated radium-228 levels ranging from non-detectable to 2.70 pCi/L.

Contaminant Removal

The District continues to remain in compliance and deliver safe award-winning drinking water to our customers. To protect our water supply and continue to deliver safe drinking water, it may be necessary to reduce or remove contaminants.

Staff have evaluated the BATs to remove or reduce contaminant levels of fluoride, uranium, gross alfa, radium-226, and radium-228. Each of these contaminants can be removed or reduced by using the reverse osmosis, ion exchange (IX), and coagulation/filtration treatment technologies. IX is an accepted and proven method for removal of many contaminants, and once installed at well sites, it can remove several other contaminants, including those that pose no risk at all.

Estimated design and construction costs associated with installation of IX systems are approximately $2.5M to $3.2M per water source, with an average annual operations and maintenance cost of $229.55K ($1.13 per 1,000 gal. treated) per site, per year. The five constituents mentioned above are frequently occurring contaminants found naturally in our groundwater, and if the District were to remove or reduce these contaminants throughout the system, the estimated cost would be approximately $41.6M for initial design and construction with an estimated on-going annual operations and maintenance cost of $2,300,000 per year. To meet these construction expenses, the District would need to collect approximately $2,964 per service connection within the District's water systems.

Recommendation for Further Action

The District continues to meet all State and Federal Drinking Water Standards set to protect public health. To further reduce the levels of constituents identified in this report that are already significantly below the maximum contaminant levels would require additional treatment processes with considerable cost consideration. As the effectiveness of additional treatment processes is uncertain, and the health protection benefits of any reduction are not completely clear nor quantifiable, the addition of treatment processes at this time are not justified. Therefore, no action is proposed currently. Staff will re-evaluate the need for additional treatment processes as needed, as well as being responsive to any required changes made to the State and/or Federal Drinking Water Standards.