

City of Fresno Action Plan for Lead Reports the EPA Above Action Level (15 ug/L)

The City is currently in the process of conducting water quality sampling in NE Fresno in response to reports of discolored water. In some instance, Lead concentrations above the EPA Action Level have been reported in some indoor plumbing fixtures used to draw water for cooking and drinking.

All of the water quality samples being collected are in support of the discolored water investigation, and are not for regulatory compliance monitoring and reporting purposes.

In those instances, when a Lead concentration above the Action Level is reported for an indoor plumbing fixture used to draw water for cooking and drinking, the City implements the following actions:

- The City transmits the tests results to residents with a cover letter describing the testing program and advising that a Lead result above the Action Level was reported for the home (see attached Transmittal Letter).
- The letter includes public information and education material about the investigation, the public health concerns for lead, the possible sources of lead, and mitigation measures residents can use to protect themselves from Lead exposure (see Attachment B)
- As additional follow up, the City works with residents that have a Lead report above the Action Level to retest the fixture after the application of mitigation measures (fixture change out, system chemistry changes, stagnation reduction, etc.)

For additional about the City's Action Plan for Lead reports above the Action Level, contact Thomas C. Esqueda, Director of Public Utilities, at 559-621-8610 or by email at thomas.esqueda@fresno.gov.



Department of Public Utilities

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<Date>

<Address Line 1>

<Address Line 2>

<Address Line 3>

Subject: Transmittal Letter – WQ Sampling Results

Dear <Address Line 1>,

On behalf of the City of Fresno, I would like to express my sincere appreciation to you for taking the time to report the presence of discolored water at your home and participating in our water quality sampling program.

In January 2016, the City of Fresno Department of Public Utilities received reports of discolored water in Northeast Fresno. The area currently reporting discolored water is generally bounded by Copper Avenue to the north, Willow Avenue to the east, State Route 41 to west, and Sierra Avenue to the south. Within this bounded area, there are approximately 22,500 homes, and the City has received reports of discolored water from approximately 1,800 homes. The City is not representing that discolored water in NE Fresno is limited to 1,800 homes, but this is the current number of homes that have reported discolored water.

Discolored Water Investigation

In response to the reports of discolored water, the Department of Public Utilities initiated an investigation in February 2016. The investigation has included water quality sampling at residential homes, site visits and inspections at residential homes, as well as plumbing material testing and soil testing of samples collected at residential homes. The results of the water quality sampling conducted at your home are attached to this transmittal letter (*WQ Reports are attached to each letter*).

The USEPA and the State Water Resources Control Board have established an Action Level (AL) for concentrations of Lead in drinking water, and the AL is 15 parts-per-billion of Lead (15 ppb or 0.015 mg/L). The water quality sampling conducted at your home indicates that Lead is present in an indoor potable plumbing fixture at your home at a



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concentration that is at or above the established Action Level. Please note that hose bibs, bathtub/shower related plumbing fixtures as well as utility fixtures are not considered potable fixtures and are exempt from current Lead Free manufacturing regulations. Lead may be present above the AL at these water use points but are exempt from the Lead Free requirement established by USEPA in 2014.

Other Potential Causes of Discolored Water

While the water quality sampling program indicates that Lead is present in your drinking water at or above AL concentrations, the discoloration you are observing also suggests that your residential plumbing system is experiencing some degree of corrosion. The corrosion of residential plumbing systems can be caused by a number of factors, several of which were observed to be present during our site investigations and sampling of residential homes conducted February 2016. A summary of other potential causal factors is included in this transmittal as Attachment B. We encourage you to review this summary of other potential causes to determine if one or more of these may be present at your home.

If you have any additional questions, or require additional information, please do not hesitate to contact me at your earliest convenience by email at Thomas.Esqueda@Fresno.Gov or by telephone at 559-621-8610.

Sincerely,

Thomas C. Esqueda, Director
City of Fresno
Department of Public Utilities

Attachments:

Attachment A – Water Quality Sampling Results
Attachment B – Public Notice

Attachment B – Public Notice

City of Fresno Department of Public Utilities Water Division

INTRODUCTION

In January 2016, the City of Fresno Department of Public Utilities received reports of discolored water in Northeast Fresno. The area reporting discolored water is generally bounded by Copper Avenue to the north, Willow Avenue to the east, State Route 41 to west, and Sierra Avenue to the south. The City has the flexibility to serve this area with surface water from Pine Flat Reservoir and Millerton Lake or with groundwater from a number of public water supply wells located in NE Fresno. Within this bounded area, there are approximately 22,500 homes, and the City has received reports of discolored water from approximately 1,800 homes. The City is not representing that discolored water in NE Fresno is limited to 1,800 homes, but this is the current number of homes that have reported discolored water. The reports of discolored water have been occurring for both surface water and groundwater.

In response to the reports of discolored water, the Department of Public Utilities initiated an investigation in February 2016. The investigation has included water quality sampling at residential homes; site visits and inspections at residential homes; plumbing material testing; and soil testing of samples collected at residential homes. Based on the preliminary results of the water quality sampling of homes in NE Fresno, a number of homes have been identified as having Lead concentrations above of the federal and state Action Level of 15 parts-per-billion of Lead, per liter of water (15 ppb or 0.015 mg/L). Your home has been identified as one of the homes with concentrations of Lead that are at, or above, the state and federal and state Action Level at an indoor plumbing fixture designed to draw water for cooking or drinking.

Under state and federal law, the City is required to have a program in place to minimize the concentrations of Lead in drinking water, and that program has been in place since 1993, when the EPA promulgated the Lead and Copper Rule. This program includes corrosion control treatment, and water quality monitoring at the City's Northeast Surface Water Treatment Facility and the public water supply wells that are located in Northeast Fresno.

HEALTH EFFECTS OF LEAD

Lead is a common metal found throughout the environment. It is found in lead-based paint found in homes built before 1978; soil; household dust; imported foods such as candies; imported pottery, porcelain, lead crystal and pewter; and water. Lead poisoning can occur if too much Lead enters the body. Lead poisoning can cause damage to multiple organs such as the brain and kidneys, and can cause adverse health effects including behavior problems, reduced IQ, hearing problems, slowed body growth, aggressive behavior, anemia, decreased appetite and fatigue. The populations with the highest risk for adverse health effects are children under age 6 and pregnant women. In addition, a child at play often comes into contact with sources of Lead like dirt and dust. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

LEAD IN DRINKING WATER

- 1) Water is naturally corrosive, and in some cases, can corrode pipes, plumbing, and fixtures that contain Lead such as brass and copper fixtures and fittings, and galvanized pipe. Lead typically enters drinking water primarily as a result of corrosion, or deterioration of materials containing Lead in household plumbing, fittings and fixtures. These materials include lead-based solder used to join copper pipe, brass and chrome plated brass faucets, and in galvanized piping that is used for residential plumbing.
- 2) When water remains stagnant in household plumbing systems that contain lead (galvanized pipe for example) for several hours or more, the Lead may corrode and dissolve into the drinking water at a residence. This means the first water drawn

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from the tap in the morning or later in the afternoon after returning from work or school can contain concentrations of Lead that are above the federal and state Action Level of 0.015 mg/L.

- 3) Lead is seldom found in drinking water sources. Lead contamination almost always occurs after water has left the treatment plant or groundwater supply well and moves through the City's water distribution network and then into household plumbing, fittings and fixtures that may contain Lead and corrode. In NE Fresno, the City's water distribution system piping is primarily non-metallic and does not contain Lead, and there are no Lead service lines in NE Fresno.
- 4) Lead in drinking water, resulting from the corrosion of plumbing, fittings and fixtures, is rarely the sole source Lead exposure for humans. However, the presence of Lead in drinking water can increase a person's total Lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water that contain Lead. The U.S. Environmental Protection Agency estimates that drinking water can make up 20 percent or more of a person's total exposure to Lead.
- 5) In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the Lead content of faucets, pipes and other plumbing materials to 8.0%. In California, a similar law prohibiting the use of both lead solder and Lead pipes was enacted in 1985.
- 6) In 2011, Congress enacted the Reduction of Lead in Drinking Water Act, which as of January 2014, prohibited the use pipes, pipe fittings, plumbing fittings or fixtures that come into contact with drinking water that do not meet the new definition of Lead free. This legislation changes the definition of "lead-free" to mean the concentration of Lead present in pipes, pipe fittings, and plumbing fixtures must be less than 0.25% by weight. Accordingly, any new residential plumbing pipes and fixtures that are installed after this date must meet this new definition, as well as any parts that are used in the repair of plumbing pipes and fixtures. However, the "lead-free" requirement only applies to kitchen sinks and bath sinks, and bath tubs, showers, hose bibs, and other fixtures not used to draw water for cooking or drinking are exempt from the "lead-free" requirement.

POTENTIAL CAUSES OF LEAD IN YOUR HOME

Despite the City's best efforts to reduce the corrosiveness of the City's groundwater and surface water supplies to reduce the potential for Lead to corrode from residential plumbing systems and fixtures, corrosion of plumbing systems and fixtures can be caused by other factors that can result in Lead levels that are above the federal and state Action Level of 0.015 mg/L.

Other causes of plumbing system corrosion at residential homes in NE Fresno that have been identified by the City in NE Fresno during this investigation include:

- a) **Insufficient Galvanized Coating.** The American Society for Testing Materials (ASTM) has established a quality standard for galvanized piping used for residential plumbing (ASTM A53-79). The City has collected samples of galvanized piping used for indoor plumbing systems in NE Fresno, and sent those samples to a material testing laboratory for metallurgical analysis. Based on the known year of home construction for the pipe samples collected, the ASTM standard for Zinc content in galvanized pipe is 1.6 ounces per square foot. The results of the metallurgical analysis revealed the presence of Lead as expected, but also revealed that the Zinc content is below the standard established by ASTM. If the galvanized pipe installed as residential indoor plumbing has a deficient galvanized coating, then it is vulnerable to corroding at an accelerated rate.
- b) **Plumbing Installation Workmanship.** During residential site inspections of properties reporting discolored water, City staff observed locations where Copper and Brass fittings and fixtures were directly connected to galvanized pipe. Joining these two dissimilar metals directly in a plumbing system will create an electro-chemical reaction (galvanic reaction, or electrolysis) –

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like in a car battery – that results in creating an electrical current that promotes corrosion of the Lead-containing galvanized pipe. In this reaction, the Zinc in the galvanizing will sacrifice itself to protect (acting as an anode) the copper or brass that are directly connected, and the underlying Iron will be exposed. When this reaction is occurring, elevated concentrations of Lead, Zinc, and Iron are found to be present in water samples. The reaction is more pronounced (i.e. higher concentrations present) for pipes, fittings and fixtures that run hot water.

During one inspection, City staff disassembled the fittings and found corrosion to be present at the point where the two dissimilar metals were jointed together directly. To address this situation, the industry standard practice is to use dielectric union to join the two dissimilar metals to disrupt or inhibit the creation of a corrosion-promoting electrical current. During another inspection, a dielectric union was found to be present separating copper from galvanized, however, dielectric unions have been reported to fail and must be inspected periodically to ensure the dissimilar metals are isolated. In these locations where copper, brass and similar metals are directly connected to galvanized pipe – or the dielectric union has failed – corrosion of the galvanized piping will occur – regardless of the water supply or corrosion control strategy – and Lead will be found present during sampling.

c) **The Presence of Corrosive Soils.** Soil samples were collected from two residential properties in NE Fresno that reported discolored water. The soil samples were sent to a laboratory for testing to determine the degree of corrosiveness of the soils. The results of the laboratory testing indicate the presence of soils that can be characterized as mild to moderately corrosive.

During residential site inspections of properties reporting discolored water, several residents were able to provide copies of the original building plans for their homes. Upon reviewing the building plans, the plumbing notes indicate that, “*Water piping to be Schedule 40 wrapped galvanized steel or Type L copper*”. The presence of this specific plumbing note suggests that the designer was aware of the need to provide an added measure of corrosion protection for pipe that was to be buried, and in some instances, installed under the concrete slabs.

i) For galvanized pipe, wrapping systems generally consist of three parts – a corrosion inhibiting primer of some sort applied directly to the dried and cleaned surface of the pipe; an inner wrap placed over the primer; and then outer wrap placed over the inner wrap for added moisture protection.

ii) For copper pipe, the most common types are Type K, Type L, Type M and DWV. Each type represents a series of sizes with different wall thicknesses. Type K pipe has thicker walls than Type L pipe, and Type L walls are thicker than Type M, for any given diameter. Type L copper piping is typically used for underground applications and hot water applications, and Type M is commonly routed through the walls and ceilings of residential construction.

During the City's site inspections, copper piping was observed at water heater installations, and all other visible piping was observed to be galvanized piping. At all homes which were inspected, it was observed that the galvanized pipe was not wrapped, and upon potholing to inspect the condition of the buried galvanized pipe, the galvanized pipe was observed to be corroded. The presence of the exterior corrosion suggests that the pipe is reacting with the soil in some manner, and that reaction is expected to be occurring on both the inside and outside of the galvanized pipe. At these properties, where galvanized pipe has been installed in direct contact with the soil without protective wrapping, corrosion of the galvanized piping will occur – regardless of the water supply or corrosion control strategy – and Lead will be found present during sampling.

d) **Grounding of Residential Electrical System to Residential Plumbing System.** During residential site inspections of properties reporting discolored water, City staff observed that some residential electrical systems were grounded to the residential plumbing system. If grounding wires from the electrical system are attached to the plumbing system, there is the

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potential for accelerated corrosion of the water plumbing system which could cause Lead to leach into the water. Residents should consult with a licensed electrician to determine if it is feasible to ground the electrical system to an alternative grounding source. Residents SHOULD NOT attempt to change the wiring on their own because improper bonding or grounding can cause electrical shock and fire hazards.

e) **Use of Water Softening Systems.** During residential site inspections at homes reporting discolored water, several residents reported that their homes had been equipped with water-softening systems at the time of construction. Water-softening systems change the chemistry of the water, and the change in chemistry can result in increasing the corrosiveness of the water which can result in Lead concentrations above the action level of 15 ppb.

PRECAUTIONS IF WATER TESTS INDICATE WATER CONTAINS LEAD ABOVE 15 PPB

If testing indicates that the water sampled from a fixture designed to draw water for cooking or drinking contains Lead concentrations above 15 ppb, then you should take the following precautions:

- 1) Let the water run from the cold water tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water remains stagnant in a residential plumbing system with galvanized pipe, copper pipe, brass fittings and copper fittings, the greater the potential for Lead to leach from these materials. Flushing the tap means running the cold water faucet until the water is visibly clear, usually about 30 seconds to 1 minute. Although running toilets and showers will flush water through a portion of a home's plumbing system, residents observing discolored water should flush the water at each faucet before using it for drinking or cooking. During the City's water quality sampling program at homes, City staff collected samples of "stagnant" water and "flushed" water, and the data indicates that flushing is effective in removing the Lead from the plumbing system at the time of use. Flushing uses an average of one or two gallons of water, and the flushed water can be used to wash dishes or water plants.
- 2) Hot water can corrode galvanized pipe, copper pipe, brass fittings and copper fittings more quickly than cold water, and this is consistent with reports we are receiving from residents that are observing discolored water primarily from the hot water tap. If hot water is required for drinking or cooking, it is recommended that residents draw water from a flushed cold water tap and heat the water for drinking or cooking.
- 3) As an alternative to flushing cold water taps, residents may consider purchasing bottled water for drinking and cooking.
- 4) Contact a licensed plumber to inspect your home and identify locations where dissimilar metals may be directly connected (copper or brass connected to galvanized); locations where buried galvanized pipe may not be wrapped or provided with a protective coating to inhibit soil corrosion; locations where the galvanized pipe may not meet standards for zinc coating; and locations where the residential electrical system is grounded to the residential plumbing system. One, or all, of these factors could be contributing to the discolored water observed at residential homes in NE Fresno.
- 5) You may be able to identify the plumbing contractor that originally installed your plumbing system by checking the record of building permits, which are maintained in the files of the City of Fresno Planning Department.
- 6) Residents can consult a variety of sources for additional information on Lead exposure health risks.
 - a) Residents can consult with their family doctor or pediatrician to request a blood test for Lead and information about the health effects of Lead.

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- b) State and local government agencies that can be contacted include the California Department of Public Health, Childhood Lead Poisoning Prevention Branch at 510-620-5600 or the Fresno County Department of Public Health at (559) 600-3590.
- c) For more information regarding the City of Fresno's historical water quality sampling program and results, and information about the water quality regulations that apply to the City, residents can call the State Water Resources Control Board, Division of Drinking Water, at 559-447-3300.

Sincerely,

Thomas C. Esqueda, Director
City of Fresno
Department of Public Utilities
Direct Office Number: 559-621-8610