Technical Memorandum

Discussion of Lead in Drinking Water

Las Cruces, New Mexico

Prepared for **Las Cruces Utilities**

Las Cruces, New Mexico

October 18, 2016

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

Technical Memorandum
Discussion of Lead in Drinking Water
Las Cruces, New Mexico

1. Introduction

Lead is a naturally occurring element found in the earth's crust, and has been a part of our civilization for thousands of years. Although lead has proven to have beneficial uses, it has the potential to be toxic to humans and animals. Beginning in the 1960s, regulations regarding public exposure to lead began to limit the use of lead in engineered systems. These regulations include limits imposed through the Clean Air Act (1970), limits on the use of lead in paint (1971) and gasoline (1984), and limits set through the Safe Drinking Water Act (SDWA) (1974, 1986, 1996) and most recently the Reduction of Lead in Drinking Water Act (2011).

2. Sources of Lead in Drinking Water

Lead in drinking water primarily comes from one of two places: (1) the source water itself (groundwater from wells, surface water from a river or spring, etc.) or (2) the distribution lines or the service lines between distribution lines and the point of use, including the piping and solder within homes. If lead concentrations in a source water exceed allowable levels, the water utility treats the water to remove lead prior to distribution. Pursuant to the SDWA, the U.S. Environmental Protection Agency (EPA) published the Lead and Copper Rule (LCR) in 1991. The LCR seeks to specifically control lead and copper by addressing the pipelines and fittings that convey water to users. The purpose of this rule was to reduce the risk of public exposure to lead and copper—especially for more vulnerable parts of the population such as pregnant women and children (NMED DWB, 2016a)—by requiring utilities to make drinking water less corrosive to the materials with which it comes in contact within the water distribution system.

The LCR established an action level for lead that has gone through multiple revisions since its inception, and is currently set to a concentration of 15 parts per billion (ppb) (0.015 milligrams per liter [mg/L]). The action level is based on the 90 percent level of tap water samples, meaning that if concentrations exceed the 15 ppb level in 10 percent of taps sampled, the water

provider must engage in a range of additional actions to control corrosion. These actions include water quality parameter monitoring, corrosion control treatment, source water monitoring/treatment, public education, and lead service line replacement. The primary way water is impacted by lead, if not present in the source water, is through corrosion of solder or fittings within the distribution system.

Public utilities are required to test for lead through programmatic sampling at the tap every three years. The City of Las Cruces (the City) drinking water continually meets the standards set forth by the SDWA. During the last round of testing, 30 samples were collected throughout the City. The sample results are shown in Figure 1. The highest detected lead concentration was 6.8 ppb; none of the detected lead concentrations exceeded the action level of 15 ppb (Las Cruces Utilities, 2015). To determine a representative system concentration, the EPA prescribes that all sample results be sorted from smallest to largest. The 90th percentile sample is determined, and the concentration of the 90th percentile sample is reported as the system concentration. For 2015, the 90th percentile sample (30 samples * 0.90 = 27th sample) had a concentration of 2.7 ppb (Figure 1). This is the concentration listed in the consumer confidence report.

Samples are collected from a mixture of residential, commercial, and educational buildings constructed before 1982. A letter is sent to building owners requesting their participation in sampling. If the building owner agrees, the City provides a sampling kit and instructions and the owner collects the sample. To collect water that has a long contact time with pipes, the water sample is collected first thing in the morning, after the water has been sitting in the pipes overnight. Samples are analyzed by a licensed, certified, independent laboratory. Owners receive a copy of the laboratory report showing the test results for the water from their home/ building. Anonymous results are provided to all City water users in the consumer confidence reports. The number of required samples is determined by the number of people served by the water utility. As mentioned above, the last round of sampling included 30 samples. Due to growth of the City, the next round of testing will include 50 samples.

Corrosion of lead from conveyance lines will occur naturally, and is influenced by a number of factors, including (1) the water chemistry (acidity and alkalinity), (2) the amount of lead-containing pipe with which the water comes in contact, (3) the temperature of the water, (4) the

amount of time the water remains in the pipe, (5) the age of the pipe and fixtures, and (6) the presence of protective scaling or coatings inside the plumbing materials. Homes built after 1986 benefitted from the regulations discussed in Sections 1 and 2, and were built with "lead free" pipes and fixtures. Also, New Mexico's water is typically alkaline or hard due to the mineral content of the aquifer; these minerals form a scale that coats the wetted parts of pipes and fixtures. This scale coating minimizes the contact between the water and the pipe material. However, if the water chemistry changes (due to a change in source water or change in a pre-treatment process), this change could result in the removal of the protective mineral scale, and therefore result in lead once again becoming accessible to the distributed water.

3. Las Cruces is not Flint, Michigan

The recent increase of lead in the drinking water supply of Flint, Michigan is an example of how changing the source water for an old distribution system can have unintended impacts on the water quality. In an attempt to save money, officials representing the City of Flint made the decision to change water suppliers, which required the construction of a new pipeline. During the time it took to build the new pipeline, the City of Flint switched to using the Flint River as a water source. The river water had chloride levels 8 times higher than those of the previous source and was not treated prior to entering the public supply. Chloride is extremely corrosive, and it began corroding the old lead-containing pipes in the City of Flint's distribution system.

When it comes to the potential for elevated levels of lead entering the drinking water, Las Cruces is the opposite of Flint. This is for two reasons: the drinking water source and the water system. Surface waters generally require a higher level of treatment than groundwater due to the presence of sediments, biological contaminants, and pollutants. The City of Las Cruces uses a stable groundwater drinking source that has natural hardness due to the presence of minerals in the aquifer, and is therefore not very corrosive. The groundwater requires very little treatment due to its high quality, and only receives chlorination for disinfection. There are no plans to change this source in the near future.

Secondly, most of the growth experienced by the City occurred after the LCR passed in 1991. This means that when new homes and businesses were being built, plastic pipe (polyvinyl chloride [PVC]) was used for plumbing. A substantial effort was made by the City in the 1990s

to replace lead distribution pipes up to household service connections, and replacement of aging infrastructure throughout the City is an ongoing process. However, the City is only responsible for the lines up to the water meter, and it is the resident or business owner's responsibility to manage the line from the meter to the faucet. In the older parts of the City, lead pipes likely remain in place. If individuals are concerned about lead in their drinking water, they should follow the steps outlined in Section 4.

4. Recommendations

If you are concerned about lead in your drinking water, the first step is to collect a sample of water from the tap and have it analyzed at one of several laboratories around the state. The New Mexico Environment Department (NMED) maintains a list of accredited laboratories which can be accessed at https://www.env.nm.gov/dwb/lccnm.htm (NMED DWB, 2016b).

Consult a plumber to determine if there is lead in the service connection or internal plumbing of the home or business. Also, the EPA recommends flushing the tap for 30 seconds to 2 minutes prior to drinking or cooking to minimize the potential for lead exposure due to stagnant water. Alternatively, special filters can be installed to treat water for the whole house or at the faucet. Additional recommendations and more information on lead in drinking water can be found on the EPA site (U.S. EPA, 2016): https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water.

References

Las Cruces Utilities. 2015. *Water report: 2015 consumer confidence.* 2015 consumer confidence report for water quality. Available online at <http://www.las-cruces.org/~/media/lcpublicwebdev2/site%20documents/article%20documents/utilities/res%20ts/regulatory/2015%20ccr%20-%202015%20data.ashx?la=en>.

New Mexico Environment Department (NMED) Drinking Water Bureau (DWB). 2016a. Lead fact sheet. Accessed August 2016. <https://www.env.nm.gov/dwb/contaminants/documents/LeadFactSheet.pdf>.

NMED DWB. 2016b. Laboratories currently certified for New Mexico. <https://www.env.nm.gov/dwb/lccnm.htm>.

U.S. Environmental Protection Agency (U.S. EPA). 2016. *Basic information about lead in drinking water*. Available at <https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water>. Last accessed on August 31, 2016.

Figure

P:_ES13-251\Lead TM.O-16\Fig01_SmplngRslts.doc

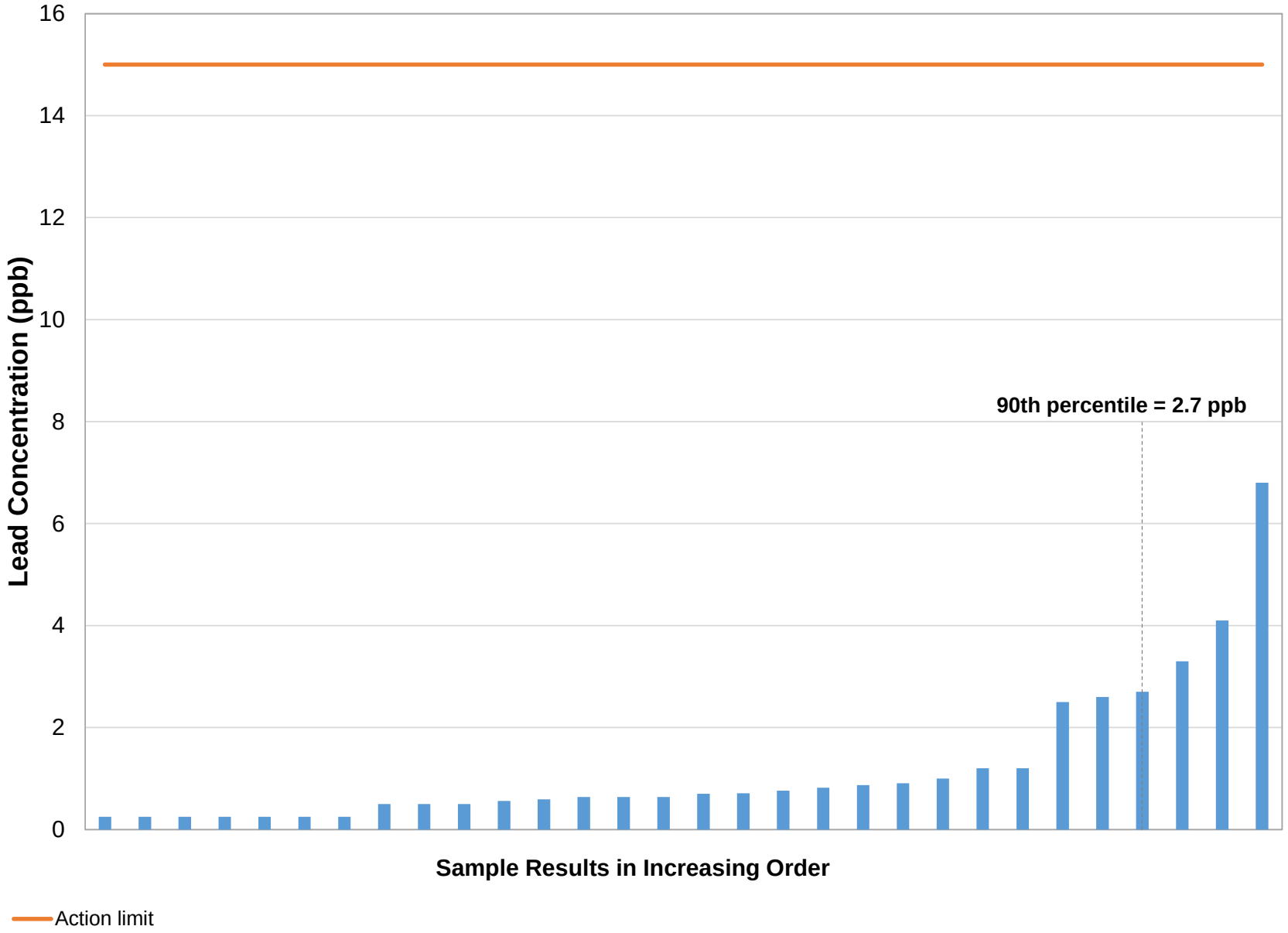

Figure 1

CITY OF LAS CRUCES

2015 Lead Sampling Results

Daniel B. Stephens & Associates, Inc.

10/18/16