DENVER WATER'S
CORROSION CONTROL TREATMENT STUDY

While the water Denver Water delivers to our customers is lead-free, lead can get into water as it moves through lead service lines and household plumbing that contain lead.

We already take steps at Denver Water's three water treatment plants to make water less corrosive. Corrosion control treatment reduces the amount of lead that leaches into water from customers' pipes and fixtures.

Water providers across the country have safely and successfully used corrosion control treatment to enhance water quality for decades. Denver Water's current process deposits minerals, such as silica, to coat our pipes with a scale that protects them from the release of metals. By improving our corrosion control, we can significantly reduce the amount of lead at the tap coming from our customers' plumbing. This is an important step in reducing exposure to lead in drinking water while we work with our customers on the complete removal of lead service lines in our community.

Current research

We are evaluating our corrosion control procedures and identifying potential changes to enhance water quality. To do this, we are testing treatment strategies by running water from different sources through lead service lines removed from our service area. The three alternatives included in this pilot study were adding silica, increasing pH and adding a phosphate-based inhibitor.

Potential impacts

Additional treatment would enhance water quality, but we are researching potential unintended impacts, including precipitation potential, microbial growth, aesthetics, disinfection byproduct formation potential and impacts to wastewater treatment plants and streams.

We are also looking for impacts to consecutive systems, which range from using only Denver Water to blending our water with other source water to emergency interconnects and seasonal use. We are dedicated to reaching out to open up a dialogue about impacts these water quality changes may have on each individual consecutive system, although the regulatory direction is clear — we must optimize our corrosion control to lessen the amount of lead in drinking water at our customers' taps, regardless of these unintended impacts.

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RELATED REGULATIONS **AND STUDY TIMELINE**

The Environmental Protection Agency's Lead and Copper Rule (LCR) requires water utilities to determine the best way to adjust water chemistry to minimize corrosion by monitoring treatment performance. A corrosion control program is considered effective if the 90th percentile of this monitoring is below the rule's "action level" of 15 µg/L (parts per billion).

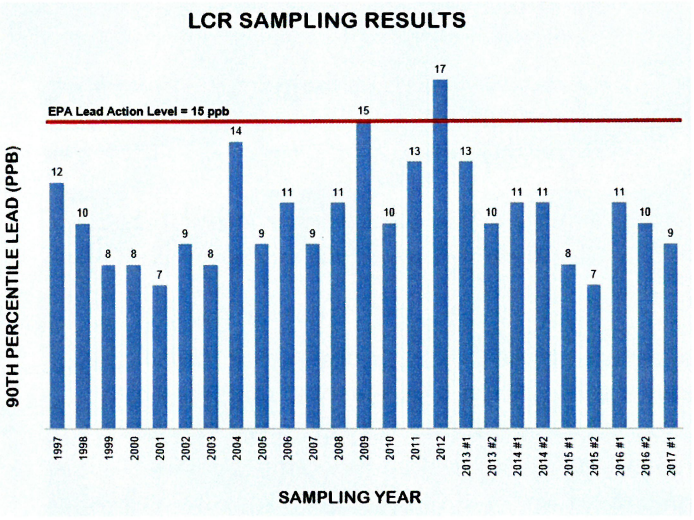
Denver Water collects a minimum of 100 water quality samples from homes every six months as required by the Colorado Department of Public Health and Environment under the LCR. Samples must be collected from single-family homes with lead service lines and single-family homes built between 1982 and 1988, which may have copper service lines with lead solder.

1994

Denver Water completed an evaluation to establish target finished water quality parameters for optimal corrosion control treatment. The state-approved parameters were: a minimum pH of 7.5 and a minimum total alkalinity of 15 mg/L as $CaCO_3$ (calcium carbonate).

2012

Results from one of the two monitoring periods exceeded the LCR action level for lead. Sampling results from homes indicated a monitoring value of 17 µg/L for the 90th percentile (meaning the concentrations were above 15 µg/L in more than 10 percent of the homes tested). This prompted follow-up requirements and the need to test corrosion control treatment alternatives.



2013

Denver Water completed a preliminary analysis by compiling historical water quality data, modeling scale formation and identifying potential corrosion control treatment changes.

2014

CDPHE approved the pilot testing protocol.

2015

Testing began at two treatment plants: Marston, which treats source water from Denver Water's South Platte system; and Moffat, which treats source water from the north (which has lower alkalinity, hardness and salinity).

Summer 2017

Testing continues for the two promising alternatives:

- Adjusting pH, which has been tested at a finished water pH of 8.8.
- Adding orthophosphate, which has been tested at a finished water dose of 3 mg/L as PO_4 (phosphate). Further testing is being done to see if lower doses are equally effective.

Sept. 20, 2017

Denver Water's deadline to submit a report recommending one treatment option to CDPHE, which will have six months to review and will ultimately determine what treatment option Denver Water will use.

March 2020

The new treatment method will be in use throughout Denver Water's distribution system, with improvements at the treatment plants brought online simultaneously.

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