

Testing Water for Lead at St. Paul Public Schools

Customer: [Saint Paul Public Schools](#)

Application: [Testing of Municipal Drinking Water for Lead Concentrations at St. Paul Public Schools](#)

City of St. Paul, MN, USA

Every day, Saint Paul Regional Water Services (SPRWS) produces an average of 40 million gallons of drinking water and distributes it through 1,200 miles of water main to 425,000 residents of Saint Paul and the surrounding communities. A large percentage of this water is drawn from the Mississippi River, which travels through a chain of lakes, including Charles, Pleasant, Sucker, and Vadnais before reaching the treatment plant. In addition, groundwater from 10 deep wells, which tap into the Prairie du Chien-Jordan aquifer, provides a small percentage, as needed.

In the SPRWS 2016 Water Quality Report, which is required annually by the Minnesota Department of Health (MDH), it was reported that 3 of 50 sites samples exceeded the 0.015mg/l action level for lead and that 90% of the samples were below 9.8ppb. The most recent testing performed in July 2014.



The district's goal is to provide lead safe drinking water sources throughout all its facilities. Thus following instructions provided in EPA and MDH guidance documents especially designed for schools to reduce lead in drinking water, Environmental Services Group (ESG) with the help of Institute of Environmental Assessment (IEA), Saint Paul Public Schools (SPPS), the state's largest school district, serving approximately 38,380 students, conducted lead in water testing from April 2016 to August 2016 to make sure that drinking water in the school system is safe for children and school staff. More than 6,500 water samples from across the school district's 72 buildings were collected and analyzed.

Problem/Concern: Health concerns over lead levels in water have recently become a widespread focus in the US. The EPA states that; "Young children, infants, and fetuses are particularly vulnerable to lead" and that "low levels of exposure have been linked to damage to the central and peripheral nervous system, learning disabilities, shorter stature, impaired hearing, and impaired formation and function of blood cells."

Although, unlike most drinking water contaminants, lead is rarely found in the source water used for public water supplies. Instead, lead enters tap water as a result of corrosion that takes place over time when materials containing lead in the water distribution system or household plumbing come into contact with water. For example, lead can leach out of service lines, pipes, brass and bronze fixtures, solders, or other lead materials, and contaminate drinking water. Thus, a major source of lead in drinking water has been linked to particular fixtures and/or plumbing within the household or facility itself, such as drinking fountains or taps used for cooking. So while St. Paul does offer free testing to homes with lead service lines, this effort does not address the primary source of lead in drinking water, thus separate testing efforts must be initiated within homes and other facilities, especially in schools where the consumption is primarily by the highly affected youth.



ANDalyze Solution: To help quickly and easily identify lead issues at all water sources that are considered "drinking sources" such as drinking fountains and dispensers, classroom sinks, all kitchen and nurse area sources, and restroom, office and boiler room sinks, the City of St. Paul purchased (3) AND1100 handheld fluorometers and 7000 lead sensors, in addition to leasing (2) additional AND1100 fluorometers for 90 days to allow up to five tests to be performed at once.



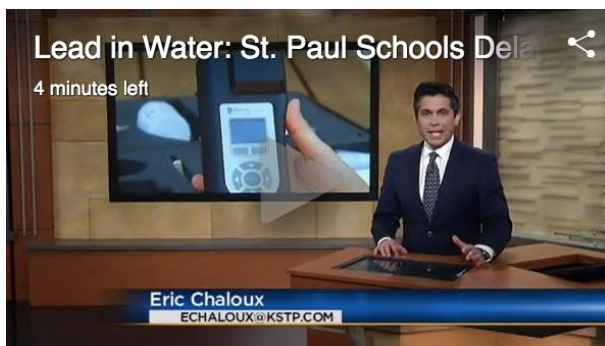
AND1100 Fluorimeter

Results/Discussion: To standardize the testing procedure, SPPS developed a formal “Testing Methodology and Protocol” for lead in drinking water modeled after the Minnesota Department of Health’s “Reducing Lead in Drinking Water: A Manual for Minnesota’s Schools”. The program identifies drinking water sources, provides for testing these sources for lead and outlines follow-up procedures for fixtures testing high in lead content. According to the protocol, sample collection is performed on Sundays to obtain a “worst case” sample of the drinking water a person may consume from a fixture; “first draw” test results should be at or below 20 parts per billion (ppb); If the results are above 20ppb then take flush sample where the water is run for exactly 15 sec before collecting the sample. Finally, to help verify all the results and correct operation of the on-site equipment, approximately 10% of the samples taken were sent to PACE Analytical for full laboratory testing. And to confirm there has been no changes to the lead levels, the protocol indicates “all drinking water sources shall be sampled every five years.”

After performing over 6,500 tests, 233 water sources were identified with lead levels above the EPA/MDH standard of 20 parts per billion (ppb). After performing the 15 second flush, 220 of these samples passed. The remaining fixtures impacted were shut off and “Out of Order” signs were placed to make sure no one used the water until the problem was fixed. As of November 9th 2016, all the water sources with high levels of lead have been remediated.

Conclusion: Since flushing a fixture is not typical practice prior to consuming water, a “first draw” can often be a danger thus it is good practice to address those sources as well. In addition, the EPA limit for lead in municipal systems in 15ppb a much lower level than used in this testing, thus it is possible that a much higher percentage of fixtures should be remediated.

In an ABC Eyewitness News report titled “Lead in the Water”, after showing the AND1100, Jeff Connell, the assistant facilities director and manager of the testing team, said that “the speed and the lower cost was really important to us” and that “This gives us results instantaneously”. It is clear that the speed, simplicity, and low cost that on-site devices, such as the ANDalyze technology provides, allows users to test EVERY potential water source, locate and rectify the issue, and verify the issue has been addressed, all within minutes and at a fraction of the cost of laboratory testing.



Technology: ANDalyze develops and offers innovative instruments for on-site water testing using a patented DNA-based technology that was originally developed at the university of Illinois. The US EPA ETV validated technology is a universal platform that offers simple, fast, inexpensive and reliable measurement of trace metals, such as lead and copper, and other targets including bacteria, viruses and chemicals such as pesticides. It is capable of accurately measuring well below regulatory levels in a variety of water types including public drinking water supplies, industrial water operations, mining water management, and environmental waters including sea water.

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