The City of Saline WATER CLARITY SUMMARY

October 20, 2023

Water System Timeline

2005
A new water plant was built that included processes to reduce hardness in addition to iron. DPW completed bi-annual flushings of the system.

2008 - 09
Economic recession resulted in staffing cuts. DPW was not able to complete flushing as timely as they once were.

May 2018
There was a significant water main break and the entire city water system was depressurized.

2019 - 21
Notice of increased discoloration in the water system. The City instituted a citizen complaint system to track issues.

DPW increased the frequency of system flushing.

2022
The Michigan Avenue pipe was lined which helped remove a significant portion of tuberculation.

In June and July there were less than 10 complaints received through the complaint system.

Water Supply Well #4 went down. Rehab was attempted but unsuccessful. Due to the loss in water production, DPW had to reduce the scope and frequency of our flushings.

2023
Currently: Well #4 is being replaced with Well #7. The sand filter media at the water treatment plant, which is associated with reducing hardness, is also being replaced.

What residents can do

1. Annually drain your hot water tank. ***(Do this at the same time you check your smoke alarm batteries!)***
2. If you are frequently impacted with hard water, install an affordable inline filter.
3. Internal plumbing material can contribute to the problem, such as galvanized pipe and fixtures. Check with a plumber if you have these materials in your home.

Please report any issues to the Citizen Reporting Tool on the City of Saline website. This tool helps staff identify localized issues and create flushing schedules accordingly.

Why hard water is part of the problem

Tuberculation in Pipe

Lined Pipe

The American Water Works Association defines scaling or tuberculation scaling as the formation of hard deposits on the inside wall of the pipe.

These deposits are frequently the by-product of pipe corrosion, where iron combines with calcium and other minerals within the water to form tubercles. Historically, prior to 2005, the water treatment plant did not remove hardness. The distribution of hard water, containing calcium and other minerals, over years caused minerals to build up in our pipes.

Where the pipeline is heavily scaled, sediment settles into the recesses of the scale and builds up over time. This sediment can then be stirred up when the flow velocity increases (e.g., a fire hydrant is opened) or the direction of flow reverses. The result is discoloration. While unsightly to see, there is no cause for any health concerns.

Why flushing is part of the solution

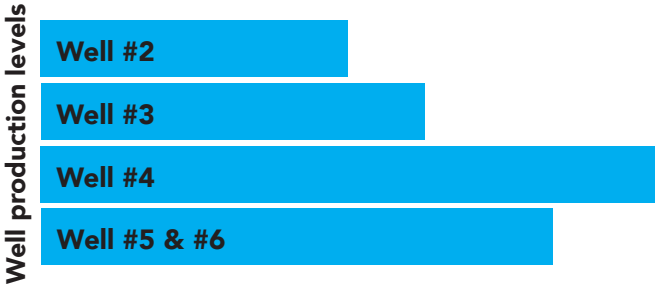
The result of tuberculation can be severely discolored water as a large volume of sediment becomes suspended and is delivered to the customer's tap.

Once the sediment accumulates in the pipe there are four mitigation options, listed in order of cost and impact to service:

1. Replace the pipe
2. Line the pipe
3. Pig the pipe
4. Flush the pipe

The City owns 54 miles of water mains. Flushing is the most cost effective and least disruptive of the methods.

Challenges at the Water Treatment Plant



Well #4 Water Production

Production Well #4 was a significant contributor of water. In 2022, the well failed and was taken out of service.

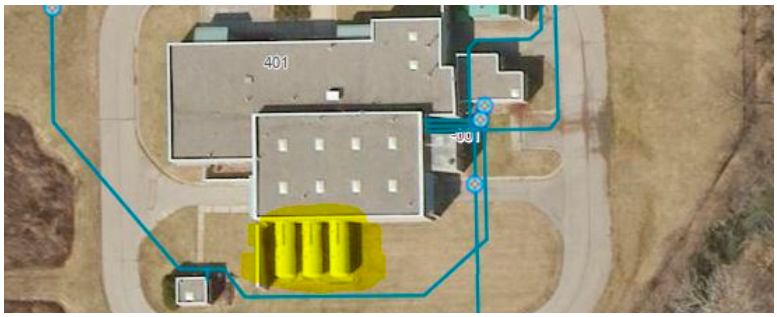
The city is actively working with the State Department of Environment Great Lakes and Energy to get replacement Well #7 installed and operational in 2023. Bringing a new well online required extensive regulatory testing to ensure a safe product.

Without a sufficient source of water, regular flushing of the system can not occur.

The fall 2022 flushing was not performed, as a result. This generated an increase of water discoloration complaints. In spring 2023 DPW instituted a modified flushing system. With the reduced volume of water there was a loss in the efficiency of the program.

Until the replacement Well #7 is fully operational and placed and flushing can be completed, conditions are likely to persist.

Green Sand Filters



The water treatment plant processes include filtration through three large sand filters that are located on the south side of the existing water treatment plant building (highlighted in yellow on aerial image).

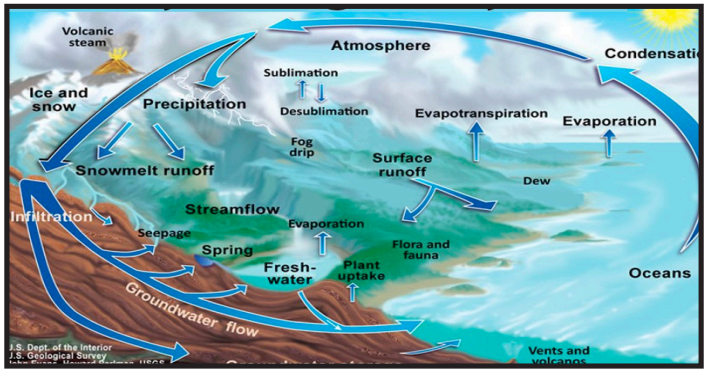
Periodic media replacement is necessary as particles and contaminants become permanently attached to the sand over time. This causes higher filter pressure and necessitates more backwashing.

The media replacement project began summer 2023 and is currently 6 - 8 weeks from completion. The project consists of media replacement, rehabilitation of the interior of the vault and replacement of the control valves.

This project is exacerbating water discoloration issues because the filters need to be taken offline for rehab. However, this work is essential as the sand filters ability to remove iron and magnesium is diminished over time.

Failure to perform the work would add to the turbidity of the water in the system.

How does water become "hard water"?



The Hydrological Cycle - Image courtesy of the U.S. Department of the Interior

Water is known as the universal solvent; meaning it wants to dissolve everything it touches.

When water passes through the hydrological cycle it dissolves minerals and rocks such as limestone and becomes hard.

The Midwest is known for having some of the "hardest" water in the United States. This is largely due to the amount of limestone that is found in this part of the country.

There are many ways we can remove iron from the water, the City of Saline uses a process called Reverse Osmosis. The Reverse Osmosis plant in Saline has been operational since 2005.

Ongoing mitigation

The City of Saline is taking measures to ensure long term resiliency in our system,. This process will take some time. We appreciate everyone's patience as we navigate these challenges.

Here are the steps the City is taking right now to work on water quality:

- Rehabilitating the sand filters at the Water Treatment Plant
- Installing Well #7 to restore production levels
- Launching a siting study for Well #8 to ensure greater redundancy
- Continue monthly dead end and biannual system-wide flushing.
- Meeting all standards required for health to ensure safe drinking water

Reporting issues

The City of Saline is always interested in receiving feedback or concerns from the public we serve.

If you notice any water discoloration issues, or have comments regarding any other City services or programs, please report them to our Citizen Reporting Tool found on the City of Saline website.