



# CITY OF KOTZEBUE NOTICE

## Virtual Community Hall Agenda

June 12, 2024 at 5:15 PM

Online/Virtual

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### THE PUBLIC IS ENCOURAGED TO ATTEND.

For residents who want to participate telephonically call: **1-800-315-6338**; access code:

**49401#**

- I. **Staff & Guest Introductions**
- II. **Presentation(s)**
  - a) Kotzebue Water Treatment Plant Overview
  - b) Tetra Tech Plan for Water Treatment Plant
- III. **Discussion / Q&A**
- IV. **Adjournment**

# OVERVIEW OF THE PROJECT

The City of Kotzebue's (City) old water treatment plant was constructed in the 1960s and was unable to treat water to current drinking water standards.

In 2012, the City began planning for the new water treatment plant. Funding was secured through EPA and IHS grants and included nearly \$25 million. Design commenced in 2018 and construction March of 2020.

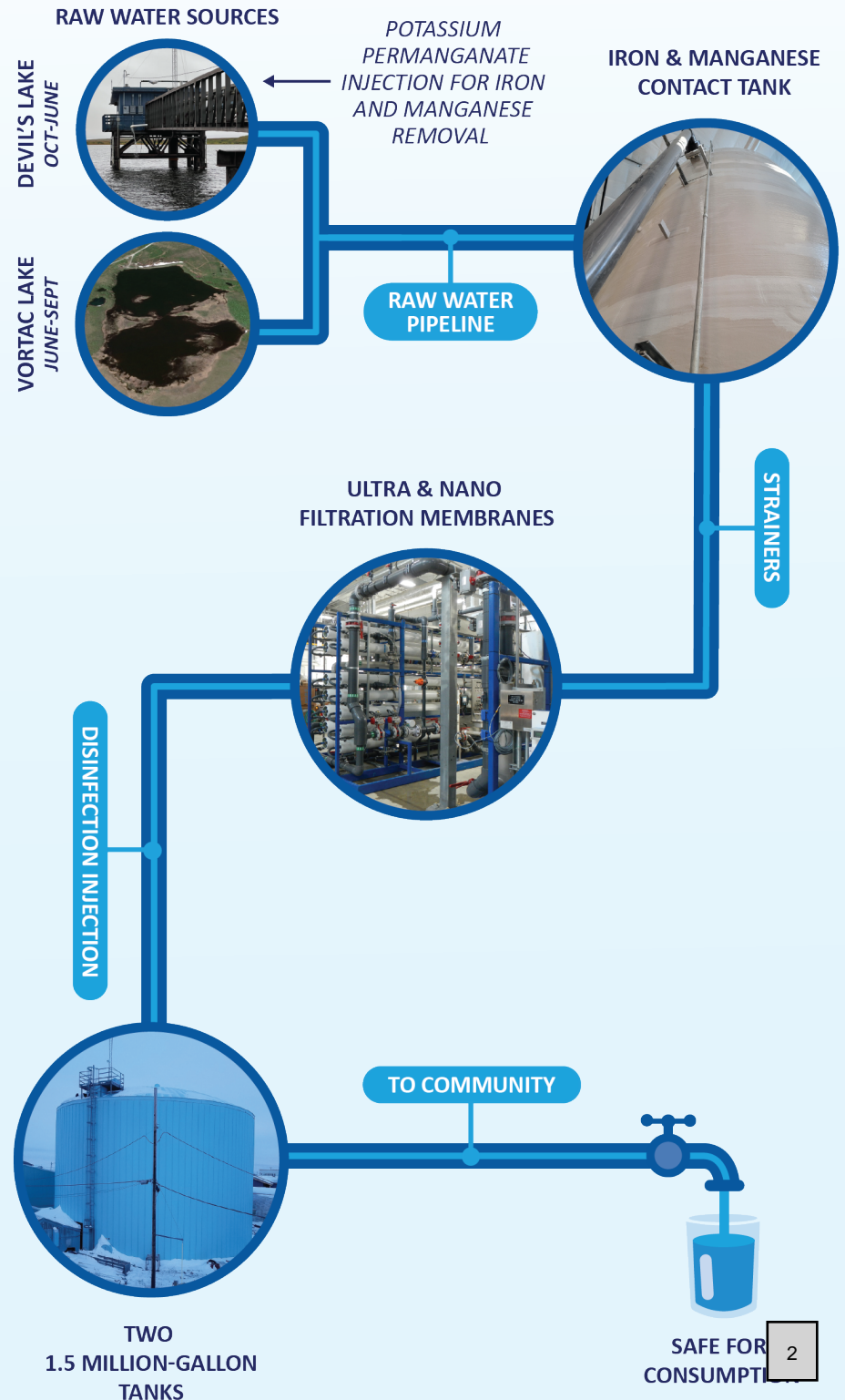
The new water treatment system, once operating as intended, will be able to meet the community's demand and produce water of significantly better quality.

The start-up has been complicated by erratic raw water quality, and other unforeseen challenges. The City, design team, and construction contractors are actively working to make the plant resilient to fluctuations in raw water quality.

Currently, the plant is receiving more than twice the amount of Iron (Fe) and Manganese (Mn) than it was designed to treat, which is creating water coloration issues. The design and construction team and the City has an action plan to improve the treatment process to treat this unusual amount of iron and manganese.

## WATER TREATMENT PLANT PROCESS

This figure shows how the system works and where and when water is taken from various sources.

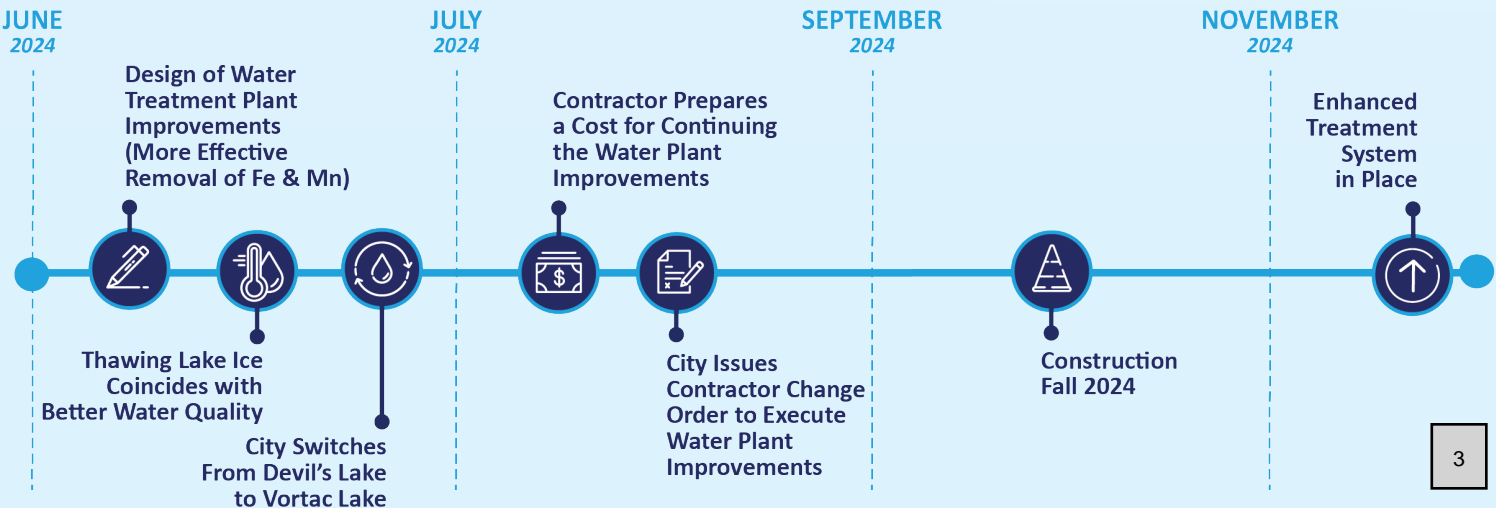


# FREQUENTLY ASKED QUESTIONS

- 1 Why is the water brown?**  
 The new treatment plant currently struggles to remove iron and manganese, which occur naturally in the City’s water sources. The raw water feeding the plant has more than twice the amount of manganese as expected during the design.
- 2 Are there times of year when the coloration is better/worse? Why?**  
 Late winter into early spring is the worst time for discoloration due to the source water being ice-covered, starving it for oxygen, thereby keeping the Iron and Manganese from being properly oxidized, thereby remaining in suspension. When the ice melts, Oxygen is reintroduced into the water, causing the Iron and Manganese to settle out properly.
- 3 Will the water coloration improve as spring turns to summer?**  
 Yes. History tells us that March to early June are the worst times for raw water quality (high Fe and Mn). We are already seeing improved raw water quality and thus treated water quality. But given the size of the storage tanks it takes time (days or weeks) to wash out of the system.
- 4 What is the City doing about this problem?**  
 The City greatly appreciates all of our residents’ patience as we work to address the complex problems. The City met with the designers and contractors in Kotzebue on May 29 to devise a plan

- for addressing treatment of lower quality raw water. Tetra Tech, the engineer of record, is working on a design to add a new filtration step to the plant, and Swalling General Contractors, the construction contractor, is working on a cost to complete the work. The City is working with capital projects staff to identify funding. Regardless of where funding comes from, the City will move forward with design and construction.
- In near term, the design engineer and City operations staff implemented changes to the process in May that reduced the manganese in the treated water by over 70% to below the health advisory level by the end of the month.
- 5 Why do residents have to pay for more water and sewer, even if the water is inferior now?**  
 Simultaneous to the water plant construction, the City worked with a consultant to assess the current utility rates which had not been raised in 5 years. Even without the new water plant, rates must be increased to make ends meet with the utility. It is unfortunate that these rates were not raised as the cost to operate have increased in recent years. In fact, the cost of chemicals, heat, power, and staffing have increased significantly over this period.

# NEXT STEPS



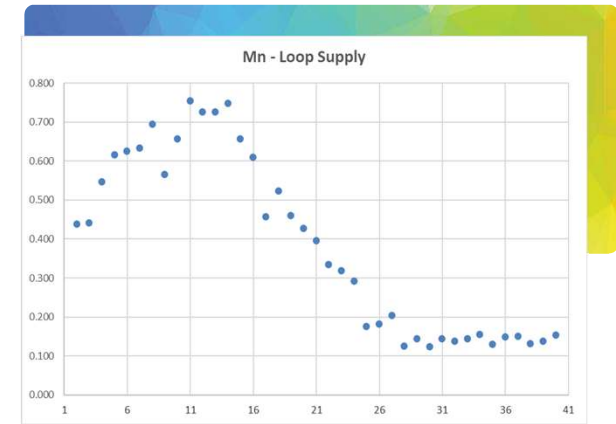


# Kotzebue Water Treatment Plant Action Plan

# Executive Summary



- Water Quality from the Plant is improving due to the increase in pH of 8.0 to 8.5 coupled with the permanganate injection at Devils Lake .
- Short Term Plant Modifications are needed to provide consistent flow and chemical feed.
- Two longer-term improvements are being analyzed:
  - Addition of a Clarifier, DAF, Greensand Filter or High-rate Clarifier prior to the UF System.
  - Addition of a Greensand Filter downstream of the NF system to capture any Manganese that passes thru the NF system.
- These longer-term improvements need to be further analyzed for capital costs, operating costs, funding potential and effectiveness.
- Team needs to analyze which proposed action meet the Raw Water quality experienced in Winter & Spring of 2024
- A revised Action Plan is provided at the end of the presentation

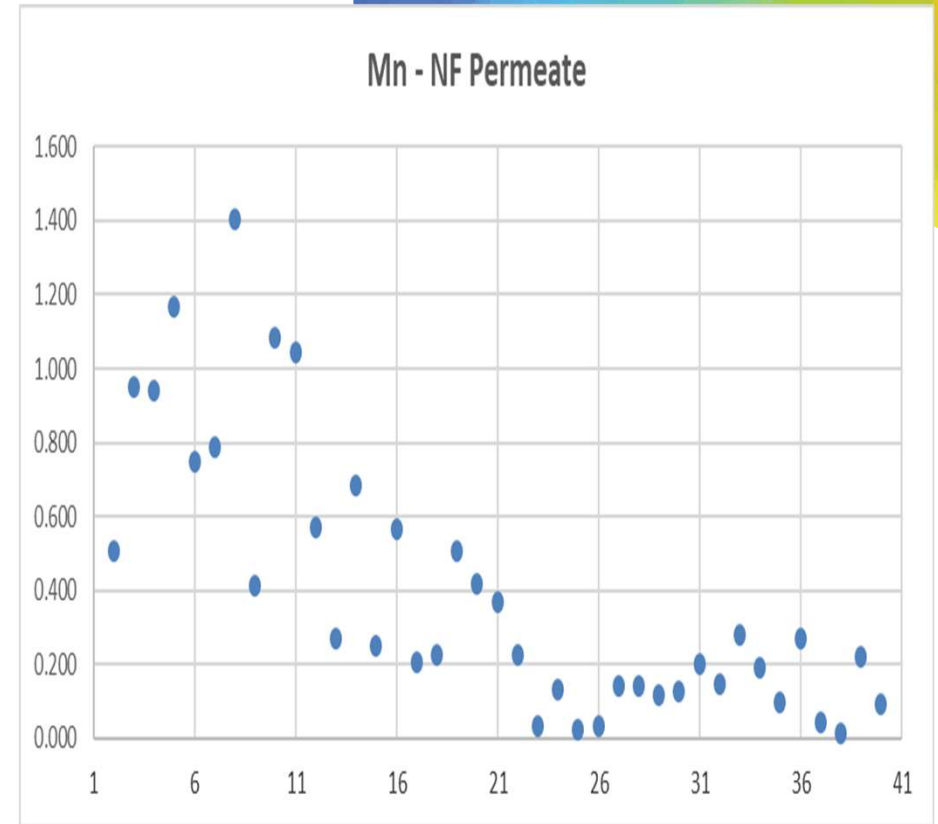
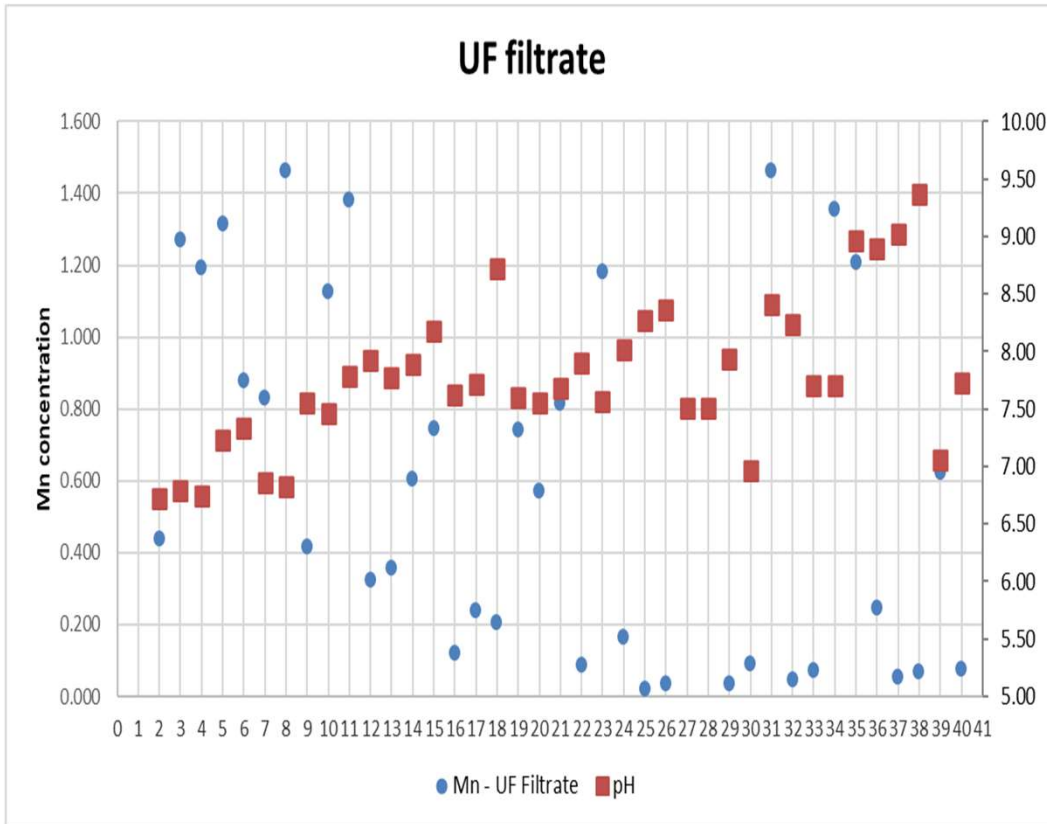


	Mar-19	Mar-24	Increase	
			Factor	%
Temp	37.1	35.7	1.0	-4%
pH	6.85	6.84	1.0	0%
Color	78	243	3.1	210%
Turbidity	4.83	7.36	1.5	53%
Mn	0.34	0.82	2.4	137%
Fe	1.28	6.05	4.7	373%
TOC	15.0	24.1	1.6	61%

## Current Positive Results from the Plant

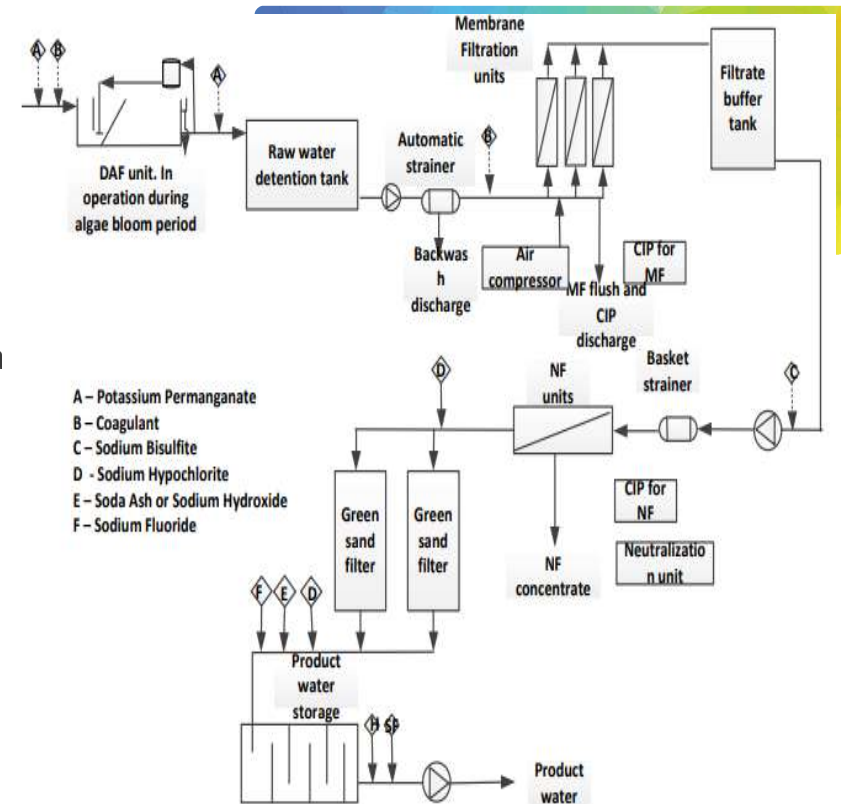


- Recent changes to raise the pH have shown positive results.



## Short-Term Action Items

- Continue to maintain pH at 8.0 to 8.5 prior to the UF by:
  - Add pH sensor after the NaOH and before the UF system. Use a cartridge filter or strainer before the sensor to prevent clogging. Program using a compound loop with raw water flow as the primary with a pH trim.
  - Add pH sensor after the UF to confirm pH and provide warning and shutdown alarms.
  - Consider adding additional contact tanks before the UF System (if available).
- Optimize the UF and NF Operations by:
  - Work with Delco and the programmer to be able to maintain a constant raw water flow into the UF system
  - Work with Delco and the programmer to operate the UF system with all three trains operating during normal flows and two trains during a backwash on one train. This will help to balance the flows to the UF.
- Membrane Evaluation
  - Determine if UF & NF membranes can meet the flow requirements with Winter/Spring 2023 water quality.
  - Evaluate if additional UF membranes should be added on the three trains where there is space set aside already.
  - Evaluate if any NF membranes need to be replaced.



# Long Term Action Items



- Additional Bench and/or Pilot Testing:
  - Perform bench scale testing in July 2024
  - Consider Pilot Testing Greensand Filters and Clarifiers?
- Evaluate Options for Improvements Upstream of UF:
  - Greensand Filters
  - DAF
  - Solid Contact Clarifier
  - High-Rate Clarifier
  - Evaluate each option based on Capital Cost, Operating Cost, Funding potential and effectiveness at treating Raw Water Similar to Winter/Spring 2024
- Addition of Greensand Filters After the NF System
- Membrane Replacement :
  - Order UF membranes to be installed in the open spaces in the racks
  - Order up to 40% of NF membranes to be replaced if required.

