 **Tertiary Treatment**  
Meeting Permit is Just the Beginning

By: Joshua Gad

 **Mankato Wastewater Treatment Plant**



## Mankato Wastewater Treatment Plant

- Design Average Flow - 9.38 MGD
- Maximum Monthly - 11.25 MGD
- Max Hydraulic - 22.5 MGD
- Current Yearly Average - 7.5 MGD
- Current Influent cBOD - 225 mg/l
- Current Influent TSS- 245mg/l
- Current Influent Phos- 6mg/l
- Current Influent pH - 7.2

## Mankato's Water Reclamation Facility



## Mankato's Water Reclamation Facility

- Secondary Pumps
  - 4 6.5 MGD Pumps
- Actiflo System
  - Ferric Chloride
  - Anionic Polymer
  - Silica Sand
- Hydrotech Disk filters
  - 15 Micron Mesh
- Chlorine Contact Tank
- High Service Lift Pumps

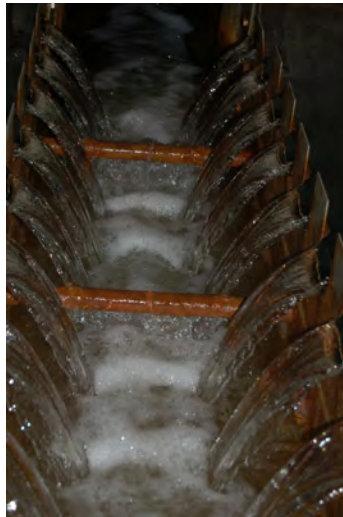
## Actiflo System



## Actiflo System



## Actiflo System



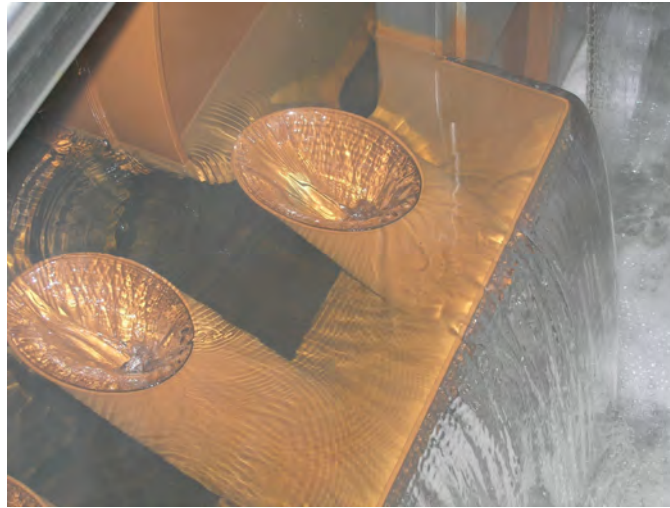
## Disk Filters



## Disk Filters



## Disk Filters



## Chlorine Contact

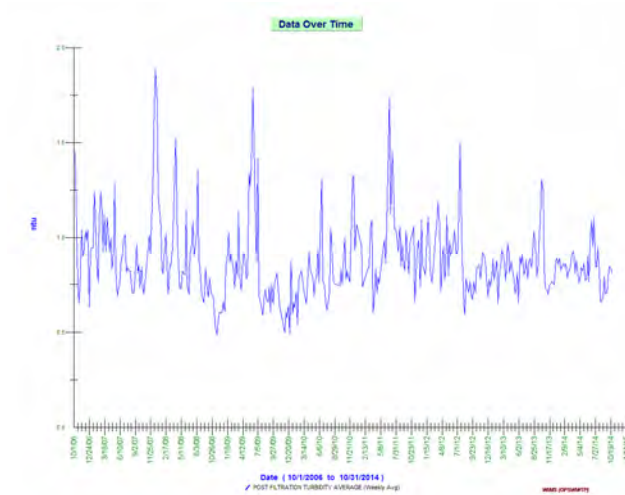


## High Lift Pumps

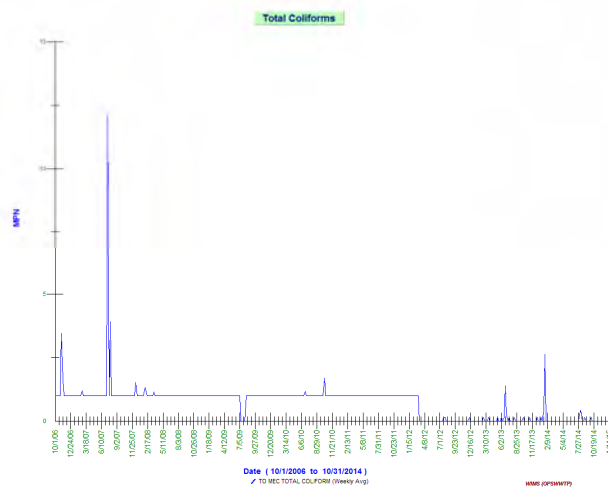


## The Results

## Turbidity - < 2

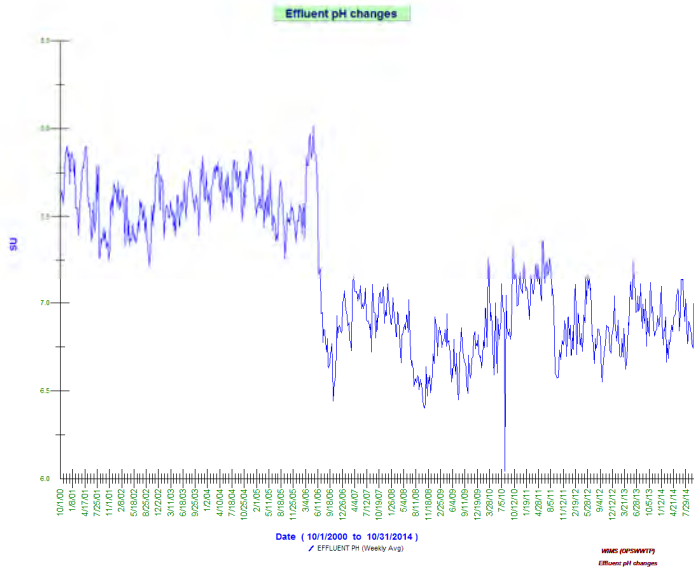


## Total Coliforms - < 2.2

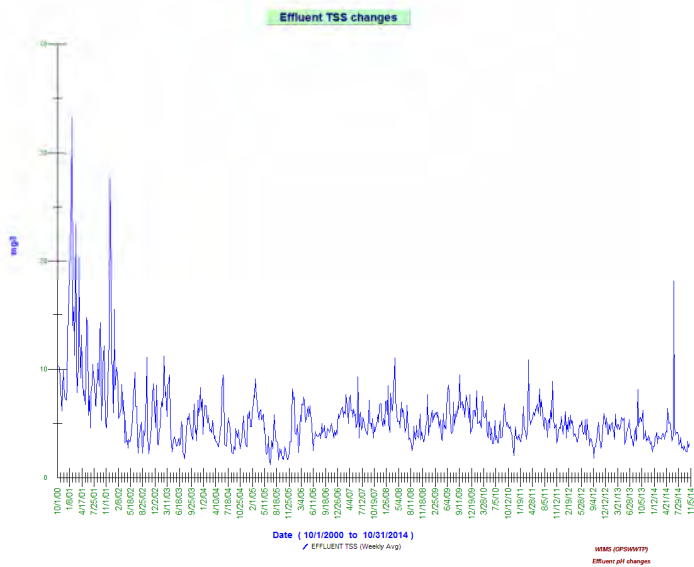




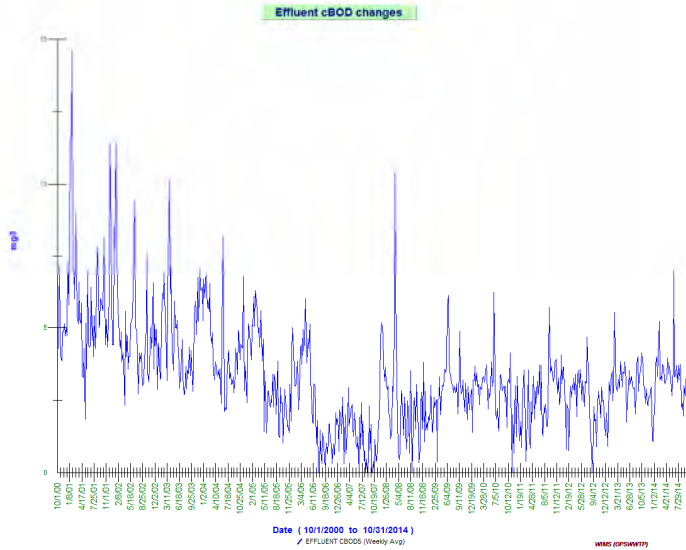
## Effects on Effluent pH – 6 - 9



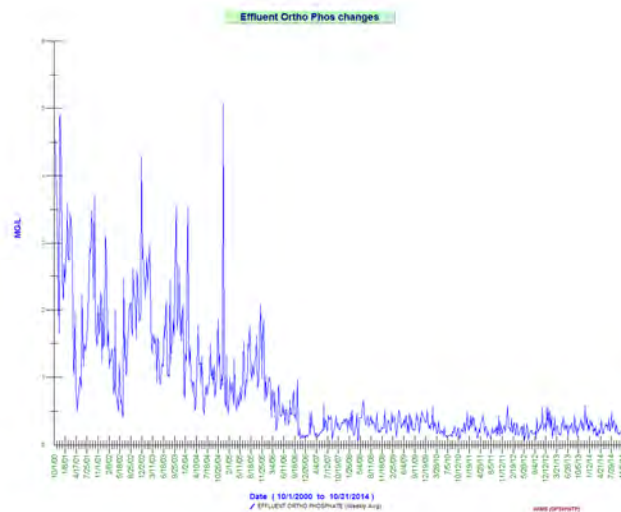
## Effects on Effluent TSS - < 30

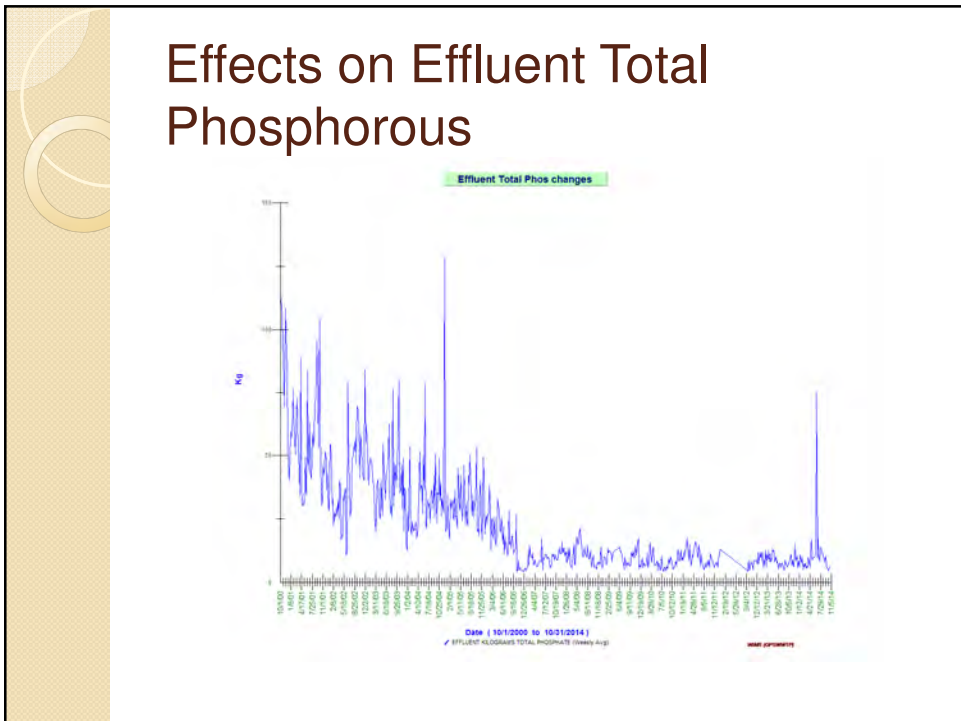
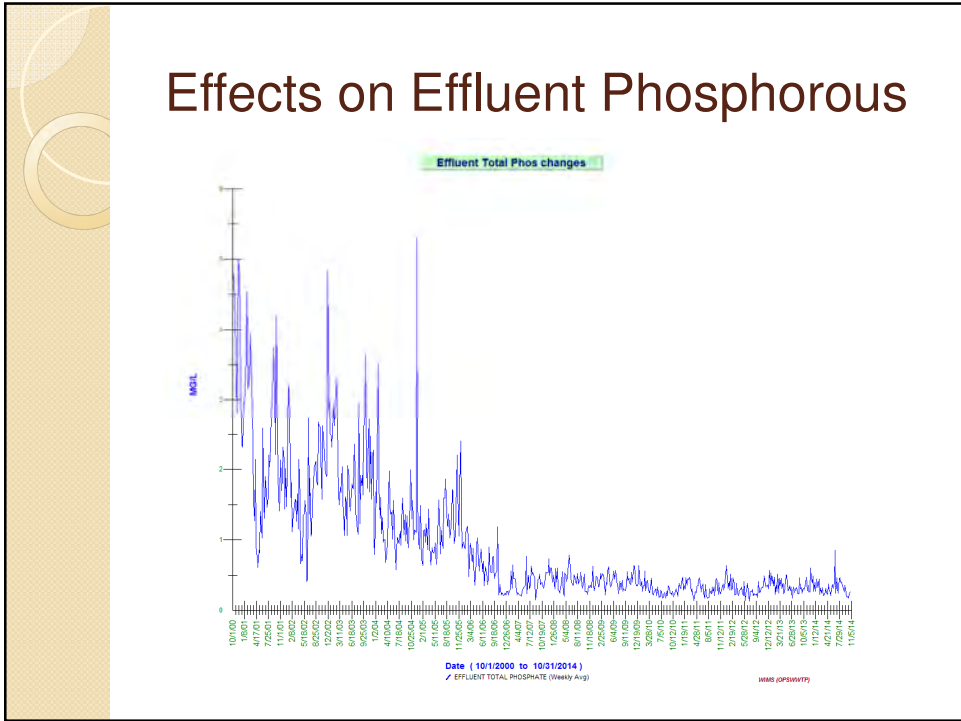


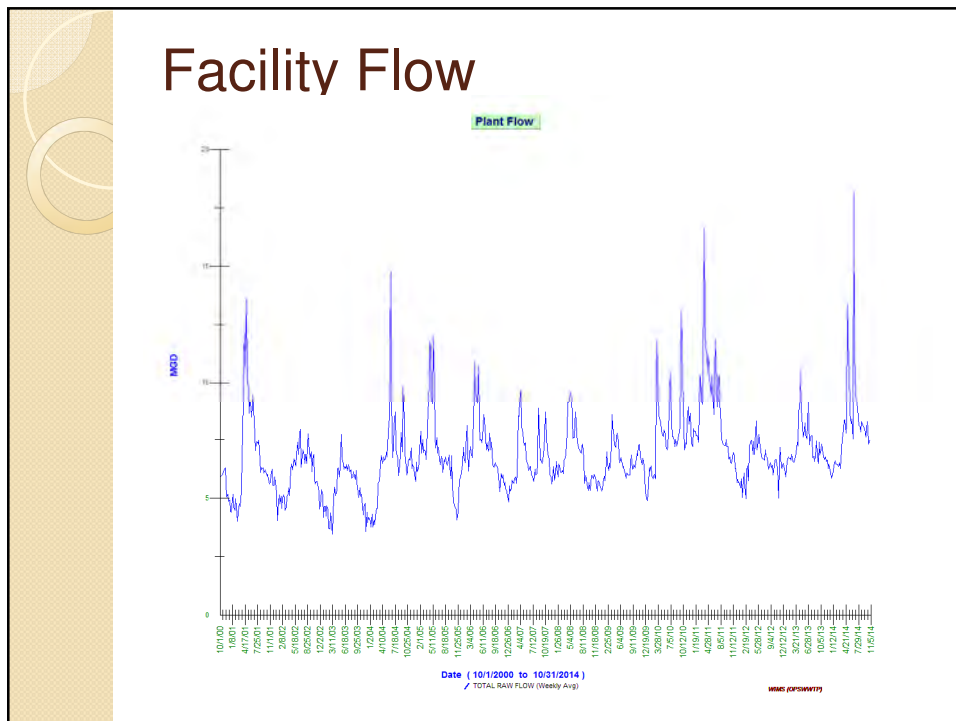
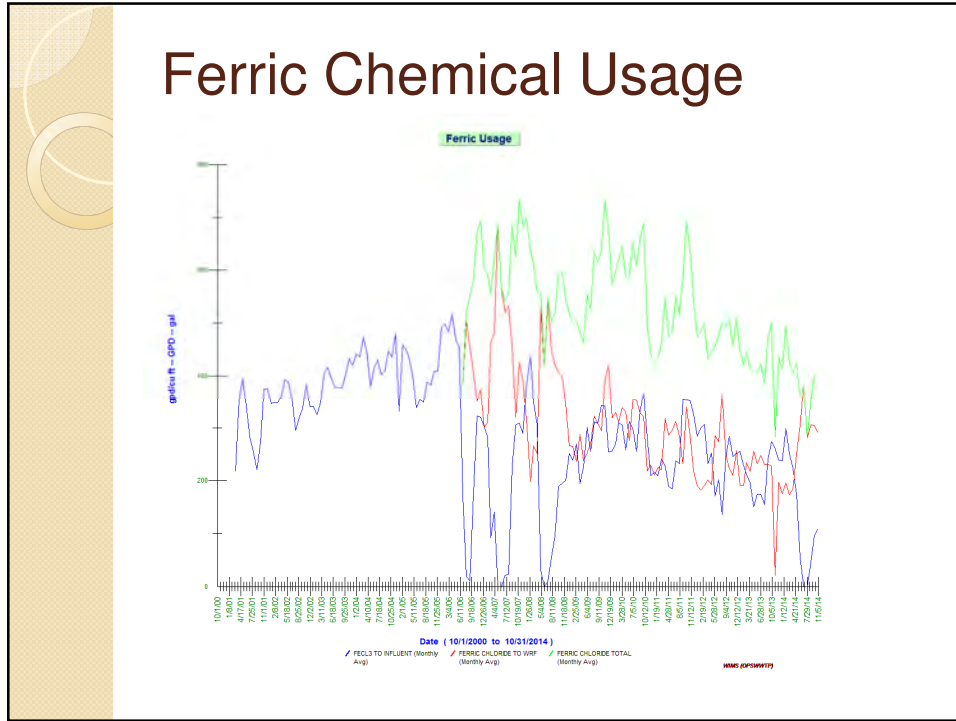
## Effects on Effluent cBOD - < 22



## Effects on Effluent Ortho Phosphate







## Uses

- Irrigation
- Landscaping
- Vehicle Washing
- Internal Equipment Cooling
- Cooling Towers
- Industrial Uses
- Pipeline Testing
- Air Conditioning
- Recreational Impoundments
- Groundwater Recharge
- Flushing toilets and urinals
- Priming Drain Traps
- Cleaning Roads, sidewalks, outdoor work areas
- Structural Firefighting
- Decorative fountains
- Commercial Laundries
- Consolidation of Backfill Around Water Pipelines
- Artificial Snow Making
- Commercial Care Washes, including unheated hand washing
- Industrial Boiler Feed
- Soil Compaction
- Mixing Concrete
- Dust Control on Roads and Streets
- Flushing Sanitary Sewers

## Uses

- **Irrigation**
- **Landscaping**
- **Vehicle Washing**
- Internal Equipment Cooling
- **Cooling Towers**
- Industrial Uses
- Pipeline Testing
- Air Conditioning
- Recreational Impoundments
- Groundwater Recharge
- Flushing toilets and urinals
- Priming Drain Traps
- Cleaning Roads, sidewalks, outdoor work areas
- Structural Firefighting
- Decorative fountains
- Commercial Laundries
- Consolidation of Backfill Around Water Pipelines
- **Artificial Snow Making**
- Commercial Care Washes, including unheated hand washing
- Industrial Boiler Feed
- Soil Compaction
- Mixing Concrete
- **Dust Control on Roads and Streets**
- Flushing Sanitary Sewers

## Inform the Public

**What is it?**

"Title 22 Reuse Water" is a non-potable water resource, which is produced through tertiary treatment of wastewater. The water is stabilized, disinfected, and tested to meet stringent standards under the Minnesota Pollution Control Agency (MPCA).

**Uses for Title 22 Reuse Water**

Title 22 Reuse Water from the Mankato Wastewater Treatment Facility has been approved by the MPCA for many uses including the following:

- Irrigation
  - Golf Courses
  - Sod
  - Hydro Seeding
  - Flower boxes
  - Gardens
- Dust Control
- Sewer Flushing
- Non-contact Cooling Water
- Snow Making

**Reuse Water Available**

April 15 - October 15

Mon - Fri 7:00 am - 5:30 pm  
Sat - Sun 8:00 am - 12:00 pm  
Holidays - by appointment only

\$2.50 per unit (750 gallons)  
% \$2.29 for potable  
\$5.00 pick-up fee  
Billed annually at end of season

**Questions?**  
Mankato WWTP  
Phone 507 387 8602  
P.O. Box 9148  
Mankato, MN 56002  
<http://www.mankato.mn.us/>

**WATER IS PRECIOUS  
RE-USE IT**

**TITLE 22  
REUSE WATER**

From the  
Mankato Wastewater  
Treatment Facility

Phone 507 387 8602

## Inform the Public

**History in Mankato**

In 2003 Mankato was approached to build a natural gas power plant by Calpine. The city offered wastewater effluent to supply the cooling water for the plant. This would decrease the hydraulic demand on local waterways. Calpine was familiar with reuse water, as many of their power plants are located in California, which require water reuse by industries due to water shortages.

From this proposition came the Water Reclamation Facility, located at the Mankato Wastewater Treatment Facility. It is designed to supply the Mankato Energy Center with 3 million gallons a day of reuse water.

Currently there is a surplus of reuse water, allowing Mankato to begin several initiatives to utilize this resource.

The surplus water has found the following uses; process water for the Mankato Wastewater Treatment Plant, irrigation water for Riverfront Park, for Spring street cleaning in Mankato, as bulk water for hydro seeding, and irrigation for Mankato's boulevard trees.

To help facilitate additional uses Mankato built a reuse water fill station at the Wastewater Plant, which allows companies access to this resource at a discounted rate from drinking water.

**Facts**

Mankato treats an average of 7 million gallons of water a day, of which only an average of 1 million gallons a day are utilized as Title 22 Reuse Water.

The largest users are the Mankato Wastewater Treatment Plant and Mankato Energy Center. Together over 200 Million gallons of drinking water is saved each year. This is enough water to fill the H.H.H. Metrodome two-thirds full, or enough water to equal a 1.3" rainfall over the entire city limits of Mankato.

Title 22 Reuse water passes the same bacteriological tests the Minnesota Department of Health uses for determining safe drinking water.

Reuse water is safe to use on food crops, including leafy greens.

Mankato is the first and currently only wastewater facility permitted to offer this resource.

**Warning Not Drinking Water**

While Title 22 Water is treated in a similar matter, and visual appearance is similar to drinking water, it does have its limitations. Title 22 water is **NOT DRINKABLE**. It has passed similar tests as drinking water, but has not been certified as drinkable by the Minnesota Department of Health.

Because of this reason the following precautions must be used when using reuse water.

**DO NOT DRINK.**

**DO NOT** Place water in a tank labeled "potable"

**DO NOT** Allow spray from irrigation come in contact with potable water fixtures

**WASH** any crops irrigated by reuse water prior to eating

## Inform the Public



**We're doing our part to conserve...  
we  
flood our skating rinks  
with reclaimed water**

 Not for drinking

Award Winning Water Reclamation Facility   
*Leading the way.*

The image shows a blue and white sign with rounded corners. The top section is blue with white text. The bottom section is white with blue text and logos. The sign is set against a light background with a decorative gold and white circular pattern on the left side.



## What is saved?

- Since 2006 – > 3 billion gallons of water
- Yearly to MEC – 178 MG
- Yearly to WWTP – 205 MG
- Yearly to Riverfront Park - 0.75 MG
- Yearly to Contractors – 0.6 MG
- Current Price for Contractors - \$2.50 / 750 gals
- Drinking Water Rate - \$3.36 / 750 gals

Questions?