



# Tonka Talk

Tonka Equipment Company Newsletter

Spring 2010

## President's Corner

By Tom Davis

### Is your project at risk?

Owners and Engineers are seldom rewarded on the risks they take, but rather, they are rewarded for the integrity of services and designs they provide. Maintaining technical integrity from design through completion is key to controlling risk over the useful life of any project.

Building quality and integrity into publicly funded projects is an ongoing challenge facing Tonka's customers. Consultants and Owners everywhere are trusted with the responsibility of spending taxpayer dollars wisely – balancing "capital costs" with the "true costs of Ownership". That's what design integrity is all about.

The most important aspects of this rest in technical and procurement decision-making:

*What process works best for this water source?*

*What is the most cost effective solution that meets the needs of the Owner?*

*How can we ensure that we get what we pay for?*

Maintaining sound technical authority for a project is not a new challenge for engineering consultants – but it's one that comes under relentless attack when economic times are uncertain.

Among the many pitfalls are **crossover manufacturers and bidders from other industries arriving on the scene, hoping to survive on "municipal work" until their home markets improve.**

## Tonka Water Delivers Quality Water to Man - and Beast

by Tim Grogan

Tonka Equipment Company has recently furnished two (2) new 12'-6" diameter Dualator® VI units at one of our nation's top zoos.

### Twin polar bears at the zoo

The Columbus Zoo and Aquarium, located on the banks of the Scioto River, is a picturesque setting of naturalistic wildlife habitats.

The new habitat for Aurora and Anana, the twin polar bears, is designed to look like an Alaskan mining town. The bears are now getting used to their new habitat – a 1.32 acre space equipped with two pools, shelters and pits for digging.

The larger 67,000-gallon pool allows visitors to view the bears from above and below the tank. A second pool has an artificial tidal effect with various depths and moving water, simulating their natural habitat.



### Fast track project

The Columbus Zoo allocated \$20 million for the polar bear exhibit project, dubbed The Polar Frontier. Originally planned for later in the year, the project was on a fast track when it was learned the bears were coming. The one MGD iron removal system was delivered on schedule, and well before the polar bear cubs arrived at their new home.

### Water conservation with Simul-Wash™

The Zoo wanted a green approach for the non-potable water treatment system. Tonka was not only required to treat the water to national drinking water standards but also required to conserve water. With Tonka's Simul-Wash™ backwash system, the Zoo will save approximately 4.6 million gallons per year in backwash waste.

Tonka's Dualator® VI system is also used to treat water for the zoo's entire irrigation system, all animal exhibit pools and aquariums, fire suppression and restrooms on the property. It's clear that both man and beast will benefit from this quality water system for years to come. ♦

### WHAT'S INSIDE...

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# Color Removal with ORGANIX™

By TJ Stroebel

The Village of Ohio, Illinois recently commissioned their new water treatment plant to remove iron, manganese, arsenic, and color from the groundwater supply, by installing an integrated Tonka treatment system. A Dualator® VI, which incorporates aeration, detention and filtration, is used to remove the iron, manganese and arsenic. The unit is 11 feet in diameter and is designed to operate at 275 gpm. A Tonka ORGANIX™ anion exchange system was installed downstream of the Dualator® to remove dissolved organic compounds associated with color.

## Proving the process

During 2006-2007, Tonka conducted a pilot study on site under the supervision of the Village engineer, Willet, Hoffman & Associates.



The study showed that removal of iron, manganese and arsenic was feasible with Tonka's Dualator® VI system; however, color was not consistently removed to acceptable levels with this process alone. In anticipation of this, Tonka had also piloted anion exchange downstream of the filters, and the result was that anion exchange consistently yielded exceptionally colorless water.

## Consistent results with the Tonka ORGANIX™ System

Tonka has been utilizing anion exchange for over ten years to remove dissolved organic matter (NOM) associated with color and disinfection by-product formation. Organic matter is removed when ionized carboxylic groups on these large organic molecules exchange with chloride ions on a specially selected resin. Additional removal is achieved by means of adsorption within the resin



pores due to electrostatic, hydrophobic, and Van der Waals interactions. The Tonka ORGANIX™ System operates similar to a water softener, using a bed of ion exchange resin inside an ASME pressurized vessel. It is periodically regenerated with a sodium chloride brine solution, controlled by a Tonka ORGANIX™ panel.

## Pilot study is a critical step

The extent of NOM removal depends on the specific molecular weight distribution of the dissolved organics and varies among water sources: Tonka has seen between 50 and 90 percent removal of NOM at various locations throughout the US. This means that piloting is critical for any site considering what to do for organic removal. Piloting at Ohio, IL predicted organic-induced color removal from 45 CU to less than 5 CU, and we're happy to say that the full scale system is achieving these results. ♦

**To all our customers:**

**Tonka Equipment Company, as a US manufacturer of water treatment systems, complies with the "Buy American" provisions of the American Recovery and Re-Investment Act (ARRA) of 2009.**

# West Salem – the path to quality water for consumers

## History

West Salem, located in the Ohio River Basin, was faced with a dwindling surface water supply in 1986 due to upstream development. The Village entered into a 30-year contract with the Rural Lorain County Water Authority for supplemental supply of up to 150,000 gallons per day of treated water coming from Lake Erie. In 1996, with the advent of more stringent surface water treatment requirements, the Village opted to shut down their supply and treatment facilities and utilize the Rural Lorain County Authority as the sole source of supply.

In 2002, the Rural Lorain County Water Authority advised the Village that the contract probably would not be renewed at the end of the agreement term in 2016. This non-renewal would be due to the fact that The Great Lakes Annex enacted in June of 2001 would further limit the quantity of water being transferred out of the Great Lakes Basin and resulted in the Village needing to find a new source of supply.

## Poor Quality Water

Both surface and groundwater sources are very limited in the West Salem area. However, a local well driller was able to locate a limited aquifer immediately north of the Village which could produce up to

200 gallons per minute from two wells. The quality of water was less than desirable having concentrations of iron (1.23 mg/l), manganese (0.07 mg/l), sulfate (385 mg/l) and total dissolved solids (980 mg/l), far in excess of the Ohio Environmental Protection Agency Secondary Contaminant Recommended Maximum Levels. Further, the hardness of 841 mg/l was much higher than the aesthetically pleasing and desirable level of 80 to 100 mg/l.

## Pilot Study for Membrane Treatment

The sulfate and total dissolved solids of the raw water could not be removed with conventional treatment methods. The decision was made to investigate membrane treatment as the means of producing acceptable water for consumers. Since this technology was not prevalent in Ohio, a pilot study was required by Ohio EPA to prove the treatment capabilities for this water supply. The pilot study was performed by Tonka Equipment Company in the summer of 2006, and the results indicated the treatment by this method to be viable.



## Treatment Process

The treatment system provided by Tonka includes iron and manganese removal by oxidation with potassium permanganate followed by manganese greensand filtration in two 8' diameter pressure filters; dissolved solids including sulfate and hardness removal by membrane filtration in two nanofiltration skids; fluoridation by sodium fluoride addition; disinfection by sodium hypochlorite addition and stabilization by caustic soda addition. The capacity of the treatment plant can be doubled by the installation of one additional pressure filter and one additional membrane filtration skid. ●

*Thanks to Gary Daugherty, P.E., of Engineering Associates, Inc, for his help in preparation of this article.*



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Technical decision-making and procurement must rest on the shoulders of knowledgeable Owners and their Engineers. Bidders and manufacturers must be equally held to the technical and commercial details of the contract documents. This always ensures integrity in the Engineer's customized design that addresses the Owner's true cost of treatment and his utility's budget constraints. The right time to make technical project decisions is upfront in the design and specification process – never after bids are taken. **When this happens, you'll have a successful project!** ●

# Maintenance Tip - *It's all about the Backwash*

By Rick Boyum

Optimizing every backwash will improve your overall filter performance and help reduce backwash frequency.

Increased backwash frequency is indicated by:

- Excessive headloss (debris buildup in media)
- Diminished effluent water quality

About once a month:

- Gather a sample of backwash water halfway through Simul-Wash™ or a backwash.
- Swirl the sample in a jar; if there is media present, this will cause it to settle in the bottom-center.
- Allow settling for a few minutes and note if there is media present. Any media collected should be negligible – less than a dime in size and very fine in texture.
- If you see an excessive amount of filter media, your backwash water rates are probably too high. This will also affect your filter performance.

Adjust the flow rates to get highest rate without excessive media loss.

- If you haven't checked the rates recently (over the last 12 months), then gradually increase flow while sampling, until a trace of media is observed, using the above technique. Then back off this rate.

Simul-Wash™ and backwash durations vary depending on your raw water quality and frequency of backwash. **Tonka recommends:**


- Simul-Wash™ about 6 to 10 minutes; purge the air out of the media for about 2 minutes; then backwash until the water is translucent without any solids, about 1-5 minutes.
- Each filter plant backwash duration will vary depending on your specific application and water conditions. ***If you have questions, by all means call us to discuss!***

For optimal filter performance, making sure your filter media gets clean during backwash is “what it's all about”.



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US POSTAGE  
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**Tonka Equipment Company**  
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The logo for Tonka Water Treatment Systems is a blue teardrop shape. Inside the teardrop, the word "TONKA" is written in large, bold, white letters. Below "TONKA", the words "WATER TREATMENT SYSTEMS" are written in smaller, white, all-caps letters, arranged in a circular pattern around the bottom and sides of the teardrop.