



Tonka Talk

Tonka Equipment Company Newsletter

Fall 2007

Chairman's Corner

By Fred Friswold

We pretty much all have two feet with 5 toes on each. However, none of us would even think to buy a shoe designed for "one shoe fits all". There are just too many individual variations for that approach to work. We all need a custom fit.

The same is true for water treatment plants. While water sources have some things in common, each raw water source can have individual characteristics that need to be considered in treatment plant design. Thus the selection of water treatment processes and equipment types doesn't lend itself to a "paint-by-numbers" approach. Design should start with a detailed water chemistry analysis to determine the contaminants to be removed and the other characteristics of the water that might impact the treatment process. The nature of the site is also important – proximity to contamination sources, site elevation and system hydraulics, storage requirements and options, and distribution system characteristics need to be considered.

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Modern Water Plant for Attica, OH

by Sherri Westphal

Attica, Ohio, located in Western Seneca County, outgrew its existing surface water treatment plant. Built over 50 years ago, the old concrete structure was not conducive to retrofit or expansion. With a new WTP planned, the city hired GGC Engineers to assist them in designing an efficient, cost-effective plant that would meet the needs of this growing community.

Benefits of Ground Storage Reservoirs

A decision was made to install large upground reservoirs. These reservoirs fill during the rainy season and from high flows in a local creek. Unlike "a direct surface water source", this water was allowed to settle in the reservoirs prior to treatment. This offered two benefits: many solids were settled to the bottom of the reservoir and kept out of the plant, and the water coming into the plant was more consistent in its water chemistry, making it easier to treat.

Design Selection

Significant deliberation was required to select a final design. The city and engineer toured a Tonka surface water plant at Kelleys Island, Ohio. Ultimately, Attica selected a highly modified surface water treatment package plant – a Tonka UTS. This package plant combines the treatment phases of coagulation, sedimentation and filtration.

Ohio EPA Approval

A pilot study was conducted in conjunction with Ohio State University. Tonka offered extensive assistance in jar testing the water. Meeting stringent

Ohio EPA requirements was critical to the success of the design and final installation. Major modifications were made to the standard design to follow Ohio EPA requirements. This design and the Tonka system installed at Kelleys Island hold the distinct honor of being the only Ohio EPA approved

package plants in the state of Ohio.

Efficient Operation - High Quality Water

Tonka provided a highly automated plant control panel. As an integrated component of a SCADA system, provided by others, the Tonka control panel operates all aspects of the water treatment plant including water influent pumps, effluent pumps, chemical feed, chlorine analyzers, and filter backwash.

This modern, highly efficient plant produces high quality water with limited operator effort, and gives the Attica community room for growth and progress. ♦



Unitized Treatment System Package Plant

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Germantown Complies with USEPA Regulations

by Todd Butz

Germantown, Wisconsin has a small-town rural atmosphere, but its easy access to Milwaukee offers suburban amenities that attract many newcomers. The residential and business growth of the area has been steady, allowing this unique community to maintain its rural charm and distinct German heritage.

Radium in Their Groundwater

A major concern of the community was the need to remove radium from its potable water source and bring the water treatment plant into compliance with current USEPA regulations. After consultation with Ruekert-Mielke Engineering, the village chose the Hydrous Manganese Oxide (HMO) radium removal technology offered by Tonka Equipment Company. HMO is a chemical that can be fed into the raw water that binds with radium. The HMO/radium particle can then be filtered through a conventional pressure or gravity filter.

Design of a Pre-Formed HMO Feed System

There are several issues to consider when designing a plant utilizing HMO for radium removal. A crucial factor involves achieving uniformity and precise solution strength of the HMO chemical solution. Even slight inconsistencies can affect the quality of the finished water.

TonkaZorb™

To alleviate the problems associated with non-uniformity of the HMO solution, Tonka developed an NSF-approved, pre-formed HMO chemical solution called TonkaZorb™ that is available in bulk shipments for delivery directly to the water treatment plant. Using a pre-mixed HMO solution also eliminates the need for on-site mixing of chemicals, improving overall plant safety.

Advantages of TonkaZorb™

1. TonkaZorb™ undergoes regular quality assurance testing to ensure correct solution strength, particle sizing and solution stability.
2. Increased overall plant safety.
3. Using the pre-mixed solution saves labor costs and simplifies the operator's job.
4. A properly engineered HMO feed system allows for trouble-free feeding of TonkaZorb™.

Water Quality

The people of the village of Germantown can be assured that they have excellent water quality and the most current and efficient technology for removing radium from their water source. ♦



HMO Horizontal Pressure Filter

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Thoughtful analysis at the beginning of a new water treatment project can save a lot of headaches later on and assure the community that it will achieve its objectives. Early collaboration among design team members can bring valuable results.

The owner, consulting engineer, and an experienced equipment manufacturer can draw upon their collective knowledge and experience to get a new project moving in the right direction.

Tonka has more than 50 years of experience, with more than 1700 potable water plants to its credit. Tonka is the leader in customized water treatment solutions. We welcome opportunities to collaborate in the pre-design stage to assure a cost-effective solution for individual project needs. ♦

Michigan Utilities Choose Co-Precipitation

by Rick Mann

BAT for Arsenic Treatment

There are several Best Available Technologies (BAT) to remove arsenic from potable water, and after careful consideration of the advantages and disadvantages of each, many Michigan water utilities have chosen Oxidation/Filtration, specifically in the form of **Iron Co-Precipitation Filtration**. Recently, Tonka has provided systems for Michigan communities that treat over 50 million gallons of water per day.

Effective, Efficient Treatment for Arsenic Removal

Iron co-precipitation filtration is a simple and very cost-effective method for treating arsenic, and the technology also removes iron and manganese. There are four steps:

1. **Oxidation** - Soluble iron, Fe(II), and arsenic, As(III), are oxidized, typically with chlorine. This step forms iron hydroxide solids and As(V) arsenate.
2. **Co-Precipitation or adsorption** - As(V) arsenate adsorbs or co-precipitates with the iron hydroxide solids. Additional iron may be added as FeCl₃.
3. **Filtration** - Particles/precipitants (ferric arsenate) are filtered from the water.
4. **Simul-Wash™ Backwash** - Particles/precipitants are backwashed to waste.

The oxidation step creates a form of arsenic As(V) arsenate which is preferred for iron co-precipitation because it is less toxic and less soluble. Arsenate is a charged anion, which makes it easier to remove with Iron Co-Precipitation.

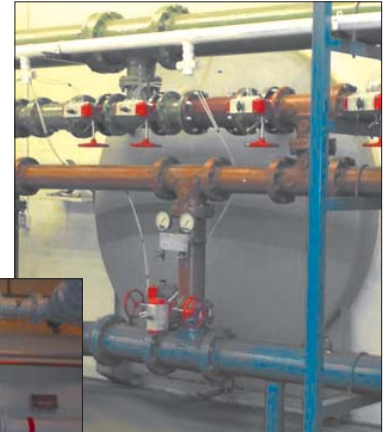
Arsenic removal efficiency is directly related to iron concentration. Tonka has had excellent removal at all of our plants in Michigan using naturally occurring iron. In the rare occasion (in MI) that the natural iron to arsenic ratio is not sufficient, additional iron can be added to achieve optimized arsenic removal.

Pressure or Gravity Vessels

Co-precipitation treatment can be offered in either gravity or pressure vessels with excellent performance.

Pilot Study

Piloting is a key step to demonstrate what level of arsenic removal can be obtained and to determine if iron levels are adequate or if additional chemical feed is required.



Backwash

The backwash step removes As/Fe(OH)₃ solids from the filter. Arsenic does not build up in the filter media and there are no solid-hazardous waste disposal concerns as may occur with accumulative medias. Tonka's Simul-Wash™ backwash reduces the backwash volume by 50% over all other backwash methods. ♦

Michigan Water Plants removing arsenic with co-precipitation – Total MGD: 53.7

Charter Township of Oxford (Granger Water Plant, Oxford Woods)

Independence Township (Deer Valley, Deerwood, Deerwood Manor, Lake Oakland Woods)

Holly

Mayville

Millington

Centennial Farms

Mattawan

Caro

Carsonville

Pentwater

Yankee Springs

Cass City

Maintenance Tip - Mother Nature Can Be One Tough Lady

By Jeff Emerson

When it comes to the weather, water treatment plants get their share of what Mother Nature has to offer. Storms and rain, cold and heat – all can take a toll on the equipment at a water treatment plant.

High humidity can cause issues like corrosion, paint failures, and electronic failures. Adding a dehumidifier to a treatment plant can help to eliminate these issues.

When winter comes, and the possibility of freezing is in the forecast, having pipes insulated or heat traced may prevent a frozen pipe or a frozen tank – and a lot of headaches.

Water plants are like a magnet when it comes to stormy weather. Lightning can cause issues such as power outages and power surges. Having a back-up power generator or an uninterruptible power supply for the control panel along with surge protection can help to prevent control panels from receiving the brunt of what the storm will dish out.

When you are ready for what Mother Nature has to offer, keeping your water plant running is easy to do.

If you have any questions about weather precautions for your water treatment plant, call our customer service number at 1-800-530-1887. ●



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Tonka Equipment Company
13305 Watertower Circle
Plymouth, MN 55441
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