TONKA WATER TREATMENT SYSTEMS

Tonka Talk

Tonka Equipment Company Newsletter

Fall 2008

Chairman's Corner

By Fred Friswold

The Loss of a Giant

Our industry lost one of its most thoughtful and productive minds with the recent passing of Appiah "Amit" Amirtharajah. After receiving a bachelors degree from the University of Ceylon, Amit attained Masters and Doctoral degrees from Iowa State University. He spent his later years associated with the Georgia Institute of Technology (Georgia Tech) and CH2M Hill. Over the course of his prolific career he was published by AWWA more than 80 times, was involved in more than 40 research projects, and authored more than 170 book chapters and articles. He was generally recognized as one of the world's foremost experts in coagulation, clarification, and filtration.

Tonka is grateful to him for his seminal findings published in the AWWARF publication entitled *Optimum Backwash of Dual Media Filters and GAC Filter-Adsorbers with Air Scour.* His study proved

Continued on Page 2

IN THIS ISSUE...

Small Town Has Good Water

By Dave Mielke

Boone, Colorado is a small town on the eastern slope of the Rocky Mountains. This quaint little town has struggled to maintain its identity in a rapidly changing world. The elementary school still continues to provide instruction for the town's younger students, but middle and high school students commute to nearby Avondale. Providing good water for its residents and keeping its water supply compliant and affordable have been major concerns for the town.

Gravity System

Located in an arid area of the state, the town has long depended on two small but productive wells. Both are artesian wells with water being piped all the way across the valley and up to the water treatment plant. This raw water source contains 15 mg/l of nitrates. The water plant uses an old cistern system that has been in place for many years. The cistern uses gravity to flow into the Town distribution system after treatment.

Two Tonka Ion Exchange vessels remove nitrates, providing quality water for Boone residents.

Nitrate Removal with Tonka Ion Exchange Technology

Two Tonka vessels use an ion exchange system with a Thermax resin to remove nitrates. Regeneration of the Tonka vessels is a four-step process. The backwash step is first and removes accumulated solids in reverse direction of flow and "fluffs" the resin. The brining step follows and introduces a 50% brine solution to the vessel, elutes off the nitrates previously exchanged on to the resin and replaces them with new nitrate-selective sites. The third step, a slow rinse, rinses away the brine that was delivered to the resin using fresh water. Finally, the fast rinse step introduces raw water to the vessel in the normal direction of flow and rinses out left over brine from the resin, vessel and gravels, and discharges all rinse water to waste. The finished water meets all regulatory requirements and puts the Boone Water Plant in compliance with EPA standards.

Organics in Your Water?

Nearly all raw municipal waters contain organics. Most of these organics result from the natural decay of vegetation and/or organisms. Organic material derived from such decay is termed "natural organic matter" (NOM).

NOM and Chlorination

NOM is important to water utilities because, under the disinfection influence of chlorine, these precursor compounds react to form "disinfection byproducts" (DBPs). The DBPs of concern are the regulated species known as trihalomethanes (THMs) and haloacetic acids (HAAs).

Ion Exchange Treatment

NOM is actually a mixture of organic compounds. These compounds may have a wide range of molecular weights – depending on their origins – but most have a characteristic anionic charge. Since they take the form of ions in solution, ion exchange is a viable treatment option for DBP pre-cursor removal. With fewer DBP precursors there will be lower concentrations of THMs and HAAs in the chlorinated plant effluent.

Tonka Experience

Tonka has used ion exchange technology for many years to remove DBP precursors, with system design flows up to 10 MGD. Our extensive experience in the removal of color, organics and DBPs using ion exchange technology has provided quality potable water in many areas of the country and has made Tonka the expert in this field.

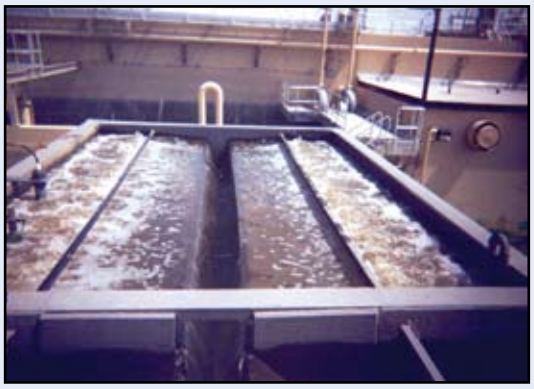
With a properly designed Tonka ion exchange system, a utility can be assured of meeting USEPA Stage 2 Disinfection By-Products rules. Contact your Tonka representative for solutions to your organic removal problems.

Continued from Page 1

that backwashing filters with simultaneous air plus water at subfluidized rates provides the best cleaning of the filter media (emphasis added). He developed a mathematical model to determine the optimal air/water rates using fluid and soil mechanics theories. He also described the "collapse pulsing" action that occurs at subfluidization rates that provides violent scrubbing that scours off solids.

These findings revolutionized the art of filter backwashing, and provide the theoretical and experiential underpinnings of Tonka's unique Simul-Wash™ system. At the time of the AWWARF research study it was assumed that backwash duration would be limited by trough geometry due to media loss from the violent action created by combined air and water flows. Tonka solved this problem with its baffled trough which permits the operator to sustain the duration of simultaneous air/water backwash step to achieve optimal filter cleaning results without media loss. Tonka's Simul-Wash™ process also conserves approximately 50% of the backwash water generated in a conventional system.

Since Tonka introduced its unique Simul-Wash™ Backwash system it has been installed in nearly 500 plants across the country, improving water quality and saving billions of gallons of backwash water. Dr. Amirtharajah, we are eternally indebted to you!



State of the Art Treatment Plant Commissioned for North Prairie Rural Water District

By Todd Butz

The North Prairie Rural Water District supplies water to the 3,500 square mile region located approximately 100 miles north of Bismarck, North Dakota's state capital. The plant serves the surrounding homes and communities with water for domestic use throughout the year, while also serving the agriculturally rich area with the high volumes of water it needs during the spring and summer months.

Treatment Needs

North Prairie's groundwater supply is typical for the area, containing high levels of iron and manganese in addition to high concentrations of hardness and TDS. In 2006 Tonka performed a pilot study that included aeration, pressure filtration and ion exchange softening for hardness reduction.

The softening process contributes sodium to the finished water, which led to a finished sodium concentration in excess of 250 mg/l. While the EPA does not regulate sodium concentration in drinking water, sodium has been known to have negative health impacts for people with heart issues. North Prairie Rural Water wanted to supply the highest quality to their consumers so the decision was made to look at alternative methods of softening, while not increasing the sodium content of the finished water.

Nanofiltration – a Cost-Effective Solution

Nanofiltration was chosen as the most cost-effective technology to reduce not just hardness, but also overall TDS. Tonka performed computer projection models to determine the best design for system array, membrane elements, and overall system sizing to take into account blending and finished water stability.

Finished Water Guarantee

The overall 800-gpm treatment process integrates aeration for iron oxidation; potassium permanganate feed for further oxidation of the iron and manganese; detention, pressure filtration though horizontal pressure filters, which include Tonka's Simul-Wash™ combined air/water backwash system; followed by nanofiltration for hardness and TDS reduction. Tonka supplied the three major pieces of treatment equipment at the North Prairie Rural Water plant including the induced draft aerator, horizontal pressure filters, and nanofiltration skids, along with the associated controls. In addition, Tonka provided a finished water quality guarantee. By having a single manufacturer guaranteeing the total treatment process, North Prairie Rural Water received peace-of-mind and confidence that their new water treatment equipment and controls would meet the treatment objectives.

High Quality Water for District Residents

The plant was commissioned in September and is now supplying the North Prairie Rural Water District with high quality water.

Maintenance Tip -
Treat Your Traditional Greensand Right

By Jeff Emerson

Traditional greensand media is a versatile and user friendly filter media, but it requires periodic attention.

Traditional greensand facts:

1. In a pressure filter application, greensand has a differential pressure limit of 8 psi. Exceeding this level may damage the traditional greensand. (Note: Greensand-plus, the newer generation media is not so sensitive to differential pressure.)
2. Optimal pH range for all greensand is 6.2 - 8.5. Raw water sources with pH lower than 6.2 can remove the coating from the greensand, causing it to become inefficient. A simple pH adjustment can protect your greensand from having to be replaced.
3. Regeneration of all greensand every 6 to 12 months with permanganate is recommended, regardless of performance. This ensures that the manganese dioxide coating remains intact and available for contact oxidation.
4. Regeneration with permanganate will recondition the bed to a like-new condition, and will help extend its life for years to come.

Tonka recommends following a regimen of semi-annual or annual recharging – an inexpensive way to maintain optimal performance of all greensand media.

Call Tonka today with any questions you may have about regeneration of greensand media in your filters.

Tonka Equipment Company
13305 Watertower Circle
Plymouth, MN 55441