



TONKA EQUIPMENT COMPANY

Project Profile

CHANNAHON, IL WATER TREATMENT PLANT

Pre-formed HMO Technology for Radium Removal

WATER TREATMENT PLANT

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DESIGN ENGINEER

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APPLICATION:

Iron and Manganese Removal
Radium Removal

TONKA PROCESS EQUIPMENT:

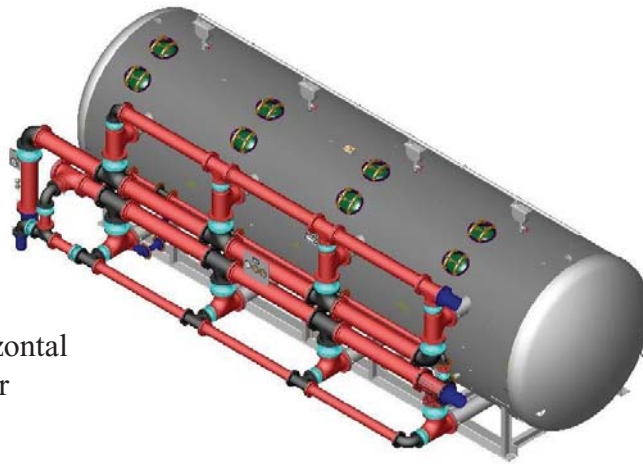
- TonkaBlend™ pre-formed HMO feed system
- Pressure detention vessel
- Isolated-cell horizontal pressure filter with Simul-Wash™

PROJECT

Channahon is a rapidly growing community of approximately 9,000 residents located 40 miles southwest of Chicago. Like many Midwestern groundwater sources, Channahon's well supply contains radium in excess of the EPA 5 pCi/l maximum concentration standard, which took effect in December 2003. The city hired Strand Associates to design an economical treatment system capable of removing radium, thereby bringing Channahon's drinking water into compliance with the new EPA standard. Strand Associates worked with Tonka in the design phase, drawing on our knowledge and experience in the design and implementation of pre-formed hydrous manganous oxide (HMO) systems for radium removal.

PROCESS

The overall treatment process consists of chemical addition, including pre-formed HMO, pressure detention, and pressure filtration through Tonka's non-accumulative IMAR media. The key to the operator friendly pre-formed HMO process for radium removal is uniform mixing and proper feeding of the pre-mixed HMO slurry solution. Channahon utilizes the TonkaBlend™ system to standardize this process, allowing the operator to easily make a consistent concentration of stabilized HMO solution and feed the slurry solution without complication.



Isolated-cell Horizontal
Pressure Filter

The horizontal pressure filter is designed with isolated-cell compartments above and below the arched plate underdrain. This allows for each individual filter cell to be backwashed or taken completely off-line while the remaining filters continue to produce filtered water. The isolated-cell design provides the necessary filter redundancy for the removal of radium, a primary contaminant, in a cost-saving, compact footprint.

Each filter cell includes the value-added “Simul-Wash™” backwash process. This unique process uses air and water simultaneously at sub-fluidization water rates, providing the most effective means of backwashing granular media filters.¹ Tonka’s Simul-Wash™ media rejection backwash trough was integrated into the filter design, which enables the air and water backwash cycle to continue for an unlimited time without media loss. These process features maximize filter cleaning efficiency and reduce backwash wastewater by approximately 50% over conventional methods. The superior cleaning action of Simul-Wash™ is especially important in this application due to the high amount of solids loaded on the filters during operation.

PERFORMANCE

The treatment process has been highly efficient in delivering quality water, which exceeds current EPA standards for radium, as well as secondary standards for iron and manganese. The results are listed below.

Constituent	Raw Water	Finished Water
Iron (Fe)	1.5 mg/l	Non-Detectable
Manganese (Mn)	0.3 mg/l	Non-Detectable
Radium 226	6.6 pCi/l	1.48 pCi/l
Radium 228	5.3 pCi/l	0.75 pCi/l

FOR ADDITIONAL DETAILS, CONTACT:

Tonka Equipment Company

¹Amirtharajah, Appiah, et al. *Optimum Backwash of Dual Media Filters and GAC Filter-Adsorbers With Air Scour*, AWWA Research Foundation and American Water Works Association, 1991.



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