



**Engineering
Enterprises,
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IN THIS EDITION

Spring/Summer 2007

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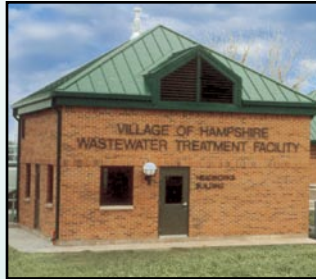
Did You Know?
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Enterprises

Radium in Water and Wastewater Systems

For several years, communities have focused on removing radium from drinking water using best available treatment technologies such as lime softening, cation exchange and reverse osmosis. These treatment systems



provide safe drinking water, however most of these methods generate a liquid waste stream containing elevated levels of radium that are discharged to the community's sanitary sewer system and ultimately to the community's wastewater treatment facility (WWTF). Once treated at the WWTF, the treated wastewater containing radium is discharged to a nearby surface water (river, lake or stream).

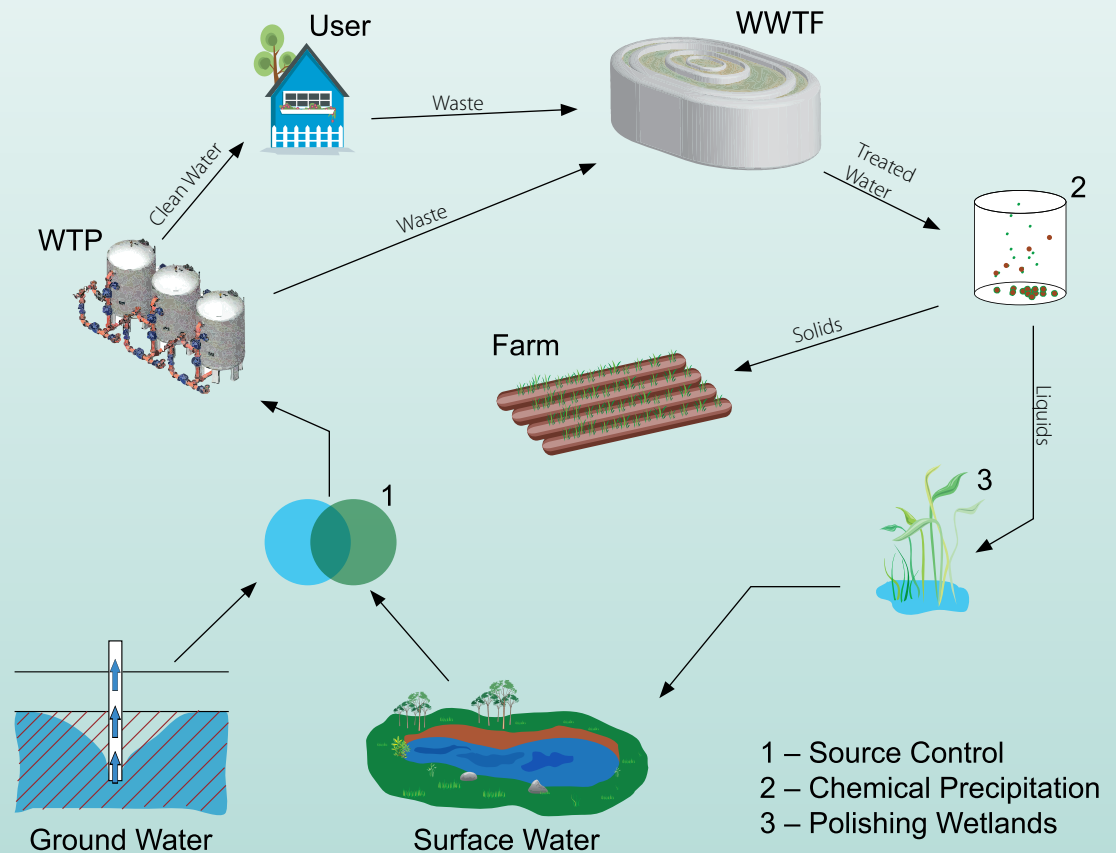
In 2006, the IEPA revised the water quality standard for radium in surface water potentially impacting communities discharging treated wastewater into a surface water. As a result of the revised standard, EEI began to study how radium travels through water and wastewater systems.

Using the Village of Hampshire in northwestern Kane County, Illinois as a case study, EEI began conducting a radionuclide study. The Village, with a limited number of industries and isolated water and wastewater systems, was ideal for generating data for the study. The Village draws water from an underground aquifer that contains radium, removes it with cation exchange water treatment and discharges the regeneration waste to the sanitary sewer system.

The study evaluates three methods (source control, chemical precipitation and polishing wetlands) for reducing radium levels in treated wastewater discharged to Hampshire Creek. A general description of the three methods follows:

Source Control¹ refers to the blending of source waters to reduce radium levels. Source waters

include ground water (deep or shallow aquifers) and surface waters. By blending water having high radium concentration (deep aquifer water) with water having low levels of radium (shallow aquifer or surface water), a lower initial concentration of radium is achieved. With less radium in the drinking water to treat, there is less radium being



discharged to the sanitary sewer system and conveyed to the WWTF.

Chemical Precipitation² is the addition of chemicals (coagulants) during the wastewater treatment process. The chemicals are used to separate pollutants, such as radium, from the wastewater liquid phase by creating solids. Through the use of alum, which is commonly used for chemical phosphorous removal in WWTF's, radium levels were reduced by 62% in the wastewater effluent. The radium concentration in the solids increased by only 8%.

Polishing Wetlands³ refers to wetlands that are "engineered" to further treat and clean or "polish" wastewater. Wetlands are used to reduce biochemical oxygen demand, suspended solids, ammonia, nitrogen, phosphorus, pathogens and some heavy metals in wastewater before discharge to surface water. As part of the study, EEI is evaluating the effectiveness of polishing wetlands for the removal of radium. Preliminary results suggest that there is uptake of radium into the plants and soil of the wetlands, but the amount can vary seasonally. Continued EEI research will provide additional performance data further documenting this process.

Understanding how radium traverses water and wastewater systems will help communities adequately respond to new regulations. Using a combination of the above methods, municipalities will meet this new water quality standard and be better prepared for future regulations. ■



Pavement Management Programs

The sometimes arbitrary and difficult municipal roadway maintenance decision-making process could be a thing of the past. Questions on how to maintain a safe roadway system, prioritize roadway repair and allocate resources have become more easily and objectively answered through the development of a Pavement Management Program.

A Pavement Management Program assists municipal officials in providing their constituents with a safe and well-maintained roadway system at the lowest possible cost. This is because a roadway is less expensive to repair if it has not deteriorated excessively. The goal of a pavement management

program promotes rehabilitation before major and expensive reconstruction is needed.

A Pavement Management Program rates every street within the municipality. Each street receives a "pavement condition rating" and is prioritized based on "need for attention." This information is then used to prepare a multi-year pavement improvement plan. The Pavement Management Program provides objective information, assisting municipal officials in decision-making and allowing the municipality to apply its limited funds more efficiently and effectively. ■

Enterprises Challenge

Trivia, brainteasers and more...

The Enterprises Challenge will take place in each issue. The person with the first correct answer will receive a \$100 American Express gift card.

Send your answers to Ben Jessup at bjessup@eeiweb.com or fax your answer to 630-466-9380, attention Ben.

Q What Chicago landmark, built from Joliet limestone in 1869, was one of the few buildings to survive the Great Chicago Fire of 1871?

Q What route, built by Winfield Scott in 1832, went from Chicago, passing through Aurora and Naperville, to Galena?

A Army Trail

Did You Know?

At the Illinois Association for Floodplain and Stormwater Management Annual Conference in Springfield, Illinois, Jay P. Nemeth, P.E., CFM, a Senior Project Engineer within EEI's Water Resources Group, discussed floodplain protection and restoration issues in a presentation titled, "Protecting Floodplains in Advance of Development in Burlington, Illinois."

Jay presented the proactive measures the Village of Burlington has taken to protect floodplains. A number of related issues including funding, development criteria, planning and stream corridor restoration were also discussed.

If you missed the conference, please look for a follow-up article on this topic to be featured in the summer IAFSM newsletter.



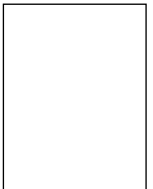
If you have any questions or would like more information on this topic, you may contact Jay at 630-466-9350 or at jnemeth@eeiweb.com. ■

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52 Wheeler Road
Sugar Grove, Illinois
630-466-9350

44W110 US Rte. 20
Hampshire, Illinois
847-683-3100



Contact the Editor

You may contact the editor at:
jziegler@eeiweb.com