

First Treatment Units Based on New Radium Removal Technology

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The Village of Oswego currently has five, high capacity, deep wells. The combined concentrations of radium-226 and -228 range from 7 to 18 picocuries per liter (pCi/L) and are above the maximum allowable level of 5 pCi/L. Construction is scheduled to begin this spring on radium removal units for each well. These will be the first treatment plants in the country based on a new absorptive media process.



The patent pending process utilizes the proprietary Z-88™ media in a specially designed up-flow contact vessel. This technology is very efficient at removing

radium while not altering other water characteristics. The resulting passive treatment system only requires monitoring and sampling. No chemicals are added and no backwash or regeneration of the media is required. When the media reaches its design capacity for radium removal, it will be disposed of in a licensed facility and replaced with new media. The process generates no liquid waste streams that reduce production capacity or waste streams containing concentrated levels of radium that need to be disposed of by the water utility.

Oswego evaluated the available technologies for radium removal from drinking water before deciding on our new process. These included lime softening, ion exchange, and reverse osmosis, the usual processes for removing radium in conjunction with reducing hardness. Less widely used methods that are limited to radium removal

also were considered, including those incorporating hydrous manganese oxide or barium sulfate. All of the methods have high capital costs and significant operating disadvantages. These processes generate waste streams with concentrated levels of radium that require disposal. Most require regeneration and chemical feed systems and significantly alter water characteristics. Often, untreated water containing radium must be blended with treated water before it enters the distribution system. Thus, the final radium level in the treated water does not reflect the actual radium removal capability of the process. The EPA health-based goal of zero pCi/L can never be achieved. Since these treatment processes are often complex and require regular maintenance, their application requires the addition of licensed operating staff. Our new process does not have these disadvantages. The developer of this process, Water Remediation Technology (WRT) of Arvada, Colorado, will provide the process equipment, Z-88™ media, replacement and disposal of the spent media in an approved disposal site, and process maintenance under a twenty-year contract with Oswego. There is minimal operator effort and maintenance required by Oswego. Significant cost savings to the utility result from this approach. Oswego will reduce their construction costs by approximately \$1.7 million dollars compared to conventional ion exchange. In addition, they will not need to add operators or incur maintenance costs on five separate



treatment plants. This process will also be the most economical over the life of the contract compared to any other radium removal method. It was clear to Oswego that our process provided the best technological solution to their radium problem and the most economical alternative for achieving compliance with the radium regulations.



A pilot study incorporating the new process showed the effectiveness of the method on the Oswego water

supply and was used to obtain design parameters for the actual treatment units. A single treatment vessel with two stages was selected as the most efficient design for each well site. In order to minimize maintenance, the vessel and associated piping at each site are constructed of stainless steel. The media has an expected life of 2 to 3 years depending on the radium level and actual production of each well.

The treatment units are expected to be in operation by early December. They will be delivering water with low radium levels that are well below the maximum allowable under EPA regulations. In fact, the process is expected to yield radium levels in the treated water closer to the health-based goal of zero pCi/L than any other process Oswego could have installed.



Additional information on this application of the Z-88™ process may be obtained from Roy Holub at (815) 385-1778 or Jerry Weaver at (630) 554-3242.