



Project Profile

Radium, Iron and Manganese Removal with LayneOx™ City of Rockford, Illinois



Ninety miles west of Chicago, Rockford, Illinois is home to a population of over 168,000. Since the 1930s Layne has been instrumental in developing Rockford's water supply.

Rockford needed to bring six of its thirty-nine wells into compliance with the U.S. EPA's revised Radionuclides Rule. The City saw an opportunity to improve its water quality and determined that five other wells required treatment for iron and manganese. Pilot tests showed that LayneOx™ was the most cost-effective treatment solution.

Layne engineered and fabricated eleven filters with capacities ranging from 1200 to 2100 gpm. The catalytic filters have 30-inch bed depths of LayneOx™ and use pressure aeration with sodium hypochlorite to oxidize iron and manganese. Six of the filters also feed Hydrous Manganese Oxide (HMO) to remove radium. In pilot tests the HMO process was shown to reduce radium concentrations from 6-10 pCi/L to 2 pCi/L, far below the US EPA's MCL of 5 pCi/L. In total, these systems will treat up to 27 MGD of potable water. Layne also provided start-up services and operator training.

The use of LayneOx™ media enables the iron and manganese filters to operate at a higher loading rate of 6.25 GPM/ft², with no detention basin and no permanganate feed. The catalytic nature of the media helps with oxidation and the removal of manganese, reducing equipment size, minimizing the accessory equipment required, and reducing the building size and cost.

Two of the plants are online and performing within design parameters. The remaining nine plants are scheduled to be in operation by February of 2011.

Start Date: April 2008
Completion Date: February 2011

Contacts:
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Superintendent
City of Rockford, Illinois

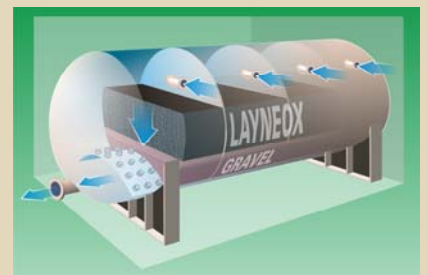
Larry Johnson
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City of Rockford, Illinois

Design Engineer:
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Equipment Supplier:
Layne Western, a Division of Layne
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Jim Goose – Water Treatment Spec.
Mike Piercy – Water Treatment Eng.

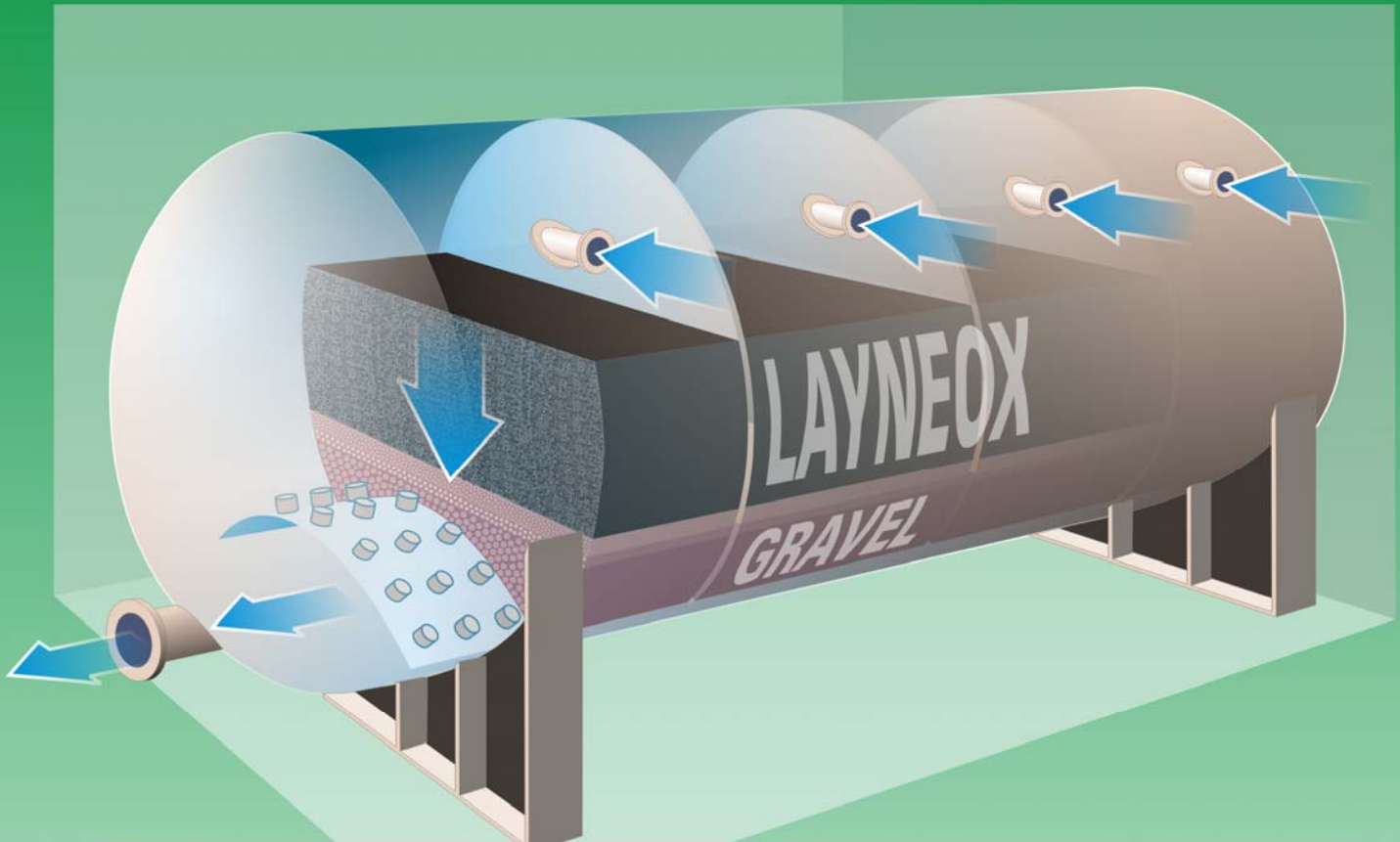


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Rockford IL depends on groundwater for its municipal drinking water. Untreated, some of the city's wells contain more than twice the Maximum Contaminant Level (MCL) for radium and other wells have 2 to 3 times the secondary MCL for iron and manganese. The city has installed 11 special treatment plants to continue to provide safe drinking water. As an added benefit, the filters also remove iron through oxidation.

CONTAMINANT	TREATMENT METHOD	LIMIT (MCL)	BEFORE	AFTER
Radium (Ra^{2+})	Hydrous Manganese Oxide (HMO)	<5 pCi/L	6-10 pCi/L	2 to 3 pCi/L
Iron (Fe)	Sodium Hypochlorite w/ Aeration	<0.3 ppm	0.1 to 2.0 ppm	<0.1 ppm
Manganese (Mn)	Sodium Hypochlorite w/ Aeration	<0.05 ppm	0.01 to 0.15 ppm	<0.02 ppm

