

Arsenic Treatment Solution For A Space Constrained Situation

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Introduction

Rosemont Water Company is a community water system in Rosemont NJ, a small town in rural Hunterdon County, New Jersey. It serves approximately 72 customers. The New Jersey Department of Environmental Protection (NJDEP) has established a state drinking water MCL for arsenic of 5 parts per billion (ppb). This is more stringent than the federal EPA standard of 10 ppb. With an arsenic level of typically 6-7 ppb, Rosemont was faced with finding an appropriate technology for arsenic removal.

The Problem

Rosemont's well site is in the midst of a residential community. It has no access to a sewer to handle any backwash stream. The well operates at 40 gallons per minute, and is housed in a well house that is an 8 ft. by 8 ft. structure. It is shown in Figure 1. Expansion of the well house was not an option, both for financial and aesthetic reasons. Further, NJDEP required that the arsenic treatment system be fully redundant. In other words, the overall system must comprise two complete units in series. The first or "lead" vessel removes all of the arsenic, while the second, or "lag" vessel serves as back-up. When the media in the first unit is exhausted the second unit protects customers until the media in the first unit can be replaced.

So the problem became finding an arsenic removal technology that could provide a 40 gallon per minute redundant system that did not require backwashing and that could fit in the available space.

The Solution

After studying the alternatives, Rosemont chose Isolux Technologies as the solution provider. The Isolux Technologies Division of MEL Chemicals, Inc. has developed adsorption based processes that can remove arsenic down to non-detectable levels using its patented zirconium based media. The characteristics of the media give this technology a number of advantages.

- **IsoluxTM technology does not require backwashing** of the unit and does not generate any liquid waste that requires disposal.
- **Spent IsoluxTM media is non-hazardous** by both the USEPA TCLP test and the California WET test.
- **IsoluxTM media is NSF Section 61** certified for use in drinking water systems.
- **IsoluxTM technology does not require use of large pressure vessels** to contact water and media. IsoluxTM technology uses a patented media

cartridge device to allow intimate contact between the water and media. The cartridge offers several advantages in terms of minimum system footprint and simplicity of media replacement. Empty bed contact time is only about 30 seconds. Cartridge replacement does not require any confined space entry.

- **The engineering design provides a high degree of reliability** and maximum degree of operational simplicity. The unit is designed to run unattended for long periods. No operator function, including media cartridge replacement, requires more than one operator.
- **Isolux™ media can be recovered.** MEL's approach to media management is to offer its customers the option of returning spent cartridges for recovery. This eliminates any solid waste handling issues for the water utility and provides a cost-effective alternative to landfill disposal. Recovered cartridges and media are re-used in non-drinking water applications.
- **Isolux™ media and systems are manufactured in the United States.** MEL Chemicals has been located in Flemington NJ for more than fifty years. Media is produced at our facility in Flemington. Systems are manufactured in the New Jersey/Pennsylvania area.

Isolux was able to modify its standard central treatment design to provide Rosemont with a 40-gom, redundant system that occupies a space of only 48 in. by 60 in. As with most of its systems, the Rosemont system was supplied as a pre-piped, skid mounted unit. It includes the two vessels connected in series, a pre-filter, and a booster pump to restore system pressure after processing through the unit. The components of the module were easily broken down on the site so they could pass through the standard 30 in. personnel door. Once inside the building the module was re-assembled. The module was delivered to the site, broken down, and re-assembled in place in approximately four hours.

A redundant system can be an economic benefit to the water company using it. In a non-redundant system, the cartridges can only be used until the arsenic level in the product water reaches the applicable MCL. In a redundant system, the cartridges in the lead vessel can be used almost to exhaustion, since the lag vessel will remove any arsenic remaining after the lead vessel. To make such an arrangement work, the lead and lag vessel must be rotated each time the cartridges in the lead vessel are replaced. To simplify the rotation, the piping manifold supplied with the module allows the relative position of the vessels to be changed simply by opening and closing valves.

The Project

A rendering of the system supplied is shown as Figure 2. Each of the large vessels holds nine Isolux cartridges. Each vessel has a hinged lid that is lifted when cartridges are removed and installed. The pre-filter is the thin vessel between the two cartridge vessels. The valve and piping arrangement allows either of the two vessels to serve as the lead vessel.

The module was delivered and installed at the Rosemont site on September 21, 2009. The module was placed into service on November 6, 2009. A picture of the module in place is

shown as Figure 3. The picture was taken from the access aisle where the operator can replace and install cartridges and the pre-filter bag.

The system has successfully been in service since start-up, delivering water with a non-detectable arsenic level to the customers of Rosemont Company.



Figure 1. Well house at the Rosemont Water Company site, Rosemont NJ

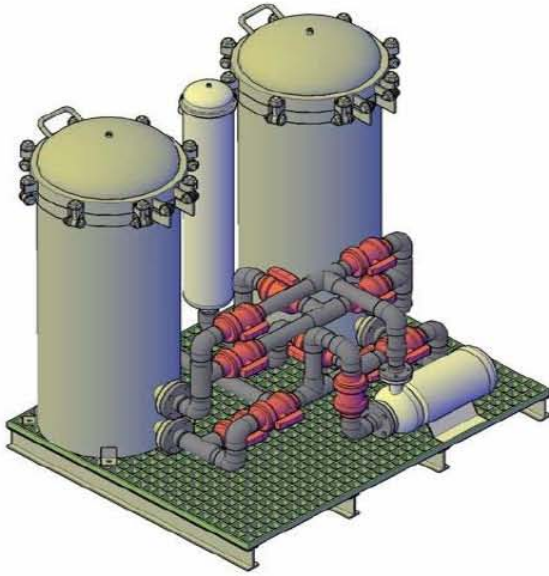


Figure 2. Rendering of the redundant module supplied to Rosemont Water Co.



Figure 3. Isolux module installed in the well house.