

Drips & Drops



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John Trax — Jerry Biberstine, NRWA Senior Environmental Engineers

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Arsenic Treatment Options for Small Systems

Background

The compliance date for the new arsenic standard is January 23, 2006. Nearly 97% of the water systems affected by this rule are systems serving fewer than 10,000 people. The challenges for small systems are daunting given their higher per capita costs for treatments. USEPA made a commitment to work closely with states and small water systems to identify ways to reduce arsenic levels at a reasonable cost to ratepayers. USEPA also committed \$20 million to help small communities to meet the new standard through more cost effective technologies and provide technical assistance and training to operators of small systems to help reduce costs. By their actions, USEPA believes that small systems will have a difficult task in achieving compliance with the arsenic rule.

What are the available treatment options?

In the final rule package, USEPA chose **activated alumina (AA)** as the treatment of choice for small systems. A key factor in that choice was the assumption that the disposal of spent AA either from central treatment plants or point of use devices using AA will not pose any problems. USEPA believes that AA will be non-hazardous because leaching tests showed levels below those of concern. USEPA recommended that the treatment train be operated in series (two treatment units in sequence) and no pH adjustment be designed into the treatment train. While pH adjustment to low levels will optimize AA removal of arsenic it may be costly because of extra facilities needed to handle and store the chemicals and may create additional risk to operators handling the chemicals. Operation in series will allow for longer run times and more cost-effective disposal of spent media. AA, as a point of use device, should also be considered in addition to central treatment as described above.

Greensand filtration is a relatively inexpensive technology that may be appropriate for those systems that have low arsenic levels (in the 10-20ppb range) to remove and the iron content is high in the source water. Research indicates that greensand filtration can achieve 80% removal when the iron to arsenic ratio was 20:1 but only 50% when the ratio was 7:1.

USEPA believes that **reverse osmosis** is an effective technology to remove arsenic. However, it is not likely to be used as a central treatment option because of higher costs associated with the technology. This technology is more likely to be used as a point of use device. USEPA did not consider the use of **nanofiltration** as a removal technology because of the high cost relative to other available technologies. In the final rule package, USEPA did not consider **anion exchange** with chemical precipitation and disposal to a land fill and **anion exchange** with discharge to evaporation pond and disposal to a landfill because of the concern for creation of a hazardous waste disposal problem.

Comment:

USEPA is currently demonstrating several promising technologies at the plant scale in a national demonstration project for arsenic removal. The technologies will be tested at local sites and operated by local operators to determine efficiency in the real world.