Arizona and Arsenic: POU Treatment as a Compliance Strategy for Small Public Water Systems

Jeff Stuck

The state of Arizona has been a test case of sorts on using POU technologies as a compliance strategy for small systems. This article is based on a presentation given at the 2005 WQA national meeting by Jeff Stuck, Safe Drinking Water Section Manager at the Arizona Department of Environmental Quality (ADEQ), that describes the planning and addressing of concerns related to instituting and monitoring the use of POU devices for arsenic compliance.

The article is based on the transcription of the audio from the original presentation and has been edited for clarity.

Complying with the Maximum Contaminant Level (MCL) regulation for arsenic is a large problem in Arizona. The impact that this contaminant has on the number of water systems in Arizona, both large and small, has made it a very significant issue and one that has caused the Arizona Department of Environmental Quality (ADEQ) to move forward and wade into the point-of-use compliance strategy waters.

First, a look into the background of the arsenic problem we're facing in Arizona.

The state regulates approximately 1,700 public water systems. Of those, 1,000 are either community water systems or nontransient/noncommunity water systems. These are the systems to which the new arsenic regulation applies, which is an MCL of 10 ppb. Of those thousand, 330 water systems have one or more entry points to the distribution system that has arsenic above 10 ppb or thereabouts. These systems are either going to have to remove the source from service, they are going to have to find a way to blend a high source with a low source, or they are going to have to install some type of treatment.

In Arizona, we're in a perpetual drought, so removing a source from service is a difficulty, as is blending from multiple sources. It's particularly a problem for the smaller water systems, where even if there are two sources, they are typically on the opposite ends of the distribution system. The result is that when we start talking about transmission lines, controls, and storage to effect a blend of the water, we start looking at costs that make that option financially less viable.

There is this fact, too. Of those 330 systems, 280 serve 10,000 or fewer people, and 150 of them serve fewer than 3,300 people. Arsenic, in other words, is not only a big problem in Arizona, generally, but a very big problem for small water utilities in particular. These are the utilities that are least poised to deal with compliance issues – and in particular causative compliance. The noncompliance rate has caused us to get into an in-depth analysis of what we were facing with this regulation.

The impact in our state was unprecedented. Because of the unique nature of this issue – so deeply affecting small utilities – we worked to develop the Arizona Arsenic Master Plan. It can be found at azdeq.gov

The Master Plan has been leading to a comprehensive evaluation of every water system that we have in our state that has a problem with arsenic, or in fact, has arsenic at 1 ppb or above. We wanted to even take a look at the areas that were potentially going to have a problem with arsenic.

In effect, we looked at each water system, each entry point for each water system, and each source specifically. From there, we evaluated various technologies to determine which were feasible for those particular water systems, based on their water quality and the configuration of their system. Next, we ranked these in terms of cost, so that we can guide systems and arm them with information to lead them to using the most cost-feasible approach to their arsenic problems. We also included what we would consider a "general facility layout" and criterion in this document. The purpose was to help the water systems when they are working with their consulting engineers in determining what is the best approach for them.

Since we also survey water rates across the state, we could clearly see that central treatment is not affordable.

In Arizona, the highest actual rate case that we have seen for raising rates to install arsenic treatment was $80/month, and we expect rate increases higher than that to deal with this problem. It must be acknowledged that $80 per month is a significant amount for consumers.

Giving money away to water systems to solve their problems is a very difficult proposition for Arizona. As we grant money, we reduce the coverage we have for the bonds that are already out, and the bond rating consequently goes down. In other words, the cost of money goes up for people borrowing money from us.

We also have to face the fact that the systems and the customers simply won't accept the cost. Again, $80 per month rate increase for water is something that's just not acceptable. Think about what typically is paid for bottled water, which might be something on the order of $30 per month. Essentially, we would be asking consumers and taxpayers to lay out more than twice the cost of bottled water to solve this single issue.

Arizona and Arsenic: POU Treatment as a Compliance Strategy for Small Public Water Systems

continued from page 14

But there are solutions available.
Let's get out of the dismal part and get into the good news. The solution that many of us believe in Arizona will work for our small water systems is point-of-use (POU).

We recognize that point-of-use is going to mean a difficult compliance strategy for water systems to implement. We further recognize that our program won't look like the EPA's early guidance that came out related to point-of-use programs. But, we also should understand that POU gives us the best opportunity to extend the public health protections envisioned by the safe drinking water act much further than centralized treatment will.

One of the lessons we have learned as we have explored point-of-use as a compliance strategy is that consumers want to have the opportunity to make a choice and have a little bit of control over their own outcome. This means, we need to make point-of-use an available compliance option for them.

We next confronted the question of how to move forward. How do we get as much information related to point-of-use to help bring this solution about?

We were very fortunate to strike up a partnership with Watts Quality Water (formerly Watts Premier, Inc.), a local point-of-use manufacturer in Arizona. Watts Premier has been tremendously helpful and eager to get involved in this approach and to make sure that point-of-use generally – not simply their company – becomes a viable option and a choice for people to make.

We put together two pilot studies with Watts Quality Water (formerly Watts Premier, Inc.) to answer some questions. Our goal was to find some of the options and to understand the obstacles to employing point-of-use treatment.

We, of course, understood that 100 percent participation would be impossible. But, we wanted to find out how we could encourage customers to participate, what to do when they are not willing to participate, and how we could allow water systems to go forward even though some customers may not want to participate. We wanted, also, to look at the monitoring and the frequency of testing that is required for this type of application.

It is critical to keep in mind that there could be a water system with 150, or even more, connections that all have a point-of-use device. It is impractical to attempt to sample all of those units once every three years to determine whether they are producing water with arsenic below 10 ppb. So, we asked ourselves whether there is an alternative approach that could provide a level of comfort.

Naturally, we also wanted to look at installation issues. A myriad of questions immediately emerged. What is one going to do if a customer already has a unit in their house and doesn't want others to come in and install the one that is proposed? How do we deal with liability issues related to installation? What if the technician went in and didn't hook up a hose right and flooded somebody's kitchen – how is that going to reflect insurance rates as a water utility? Finally, how do we determine the compliance statistics of the water utility, particularly the ones that don't have everybody participating at the very beginning?

We feel we have found some solutions.
Let's look at the question of customer participation first. We need meaningful participation rates, of course. To encourage involvement, we will begin by requiring any of our water systems in Arizona that want to use a point-of-use compliance strategy to complete an application that will identify all their service connections. This will include any agreements that they have been able to secure with their customers that stipulate that they are willing to participate in this program.

The next question is what we do when we have one or more customers that refuse to participate in the program. How are we going to look at these water systems? Further, can we allow a water system to have 80% or 85% of the customers participate, for example?

The goal, of course, is full participation. But, we all know this is not possible. There are inevitable instances where not everybody is in compliance all the time. In this case, we simply need to move toward 100% compliance as much as possible. The United States Environmental Protection Agency (USEPA) faces this problem quite often.

At this point, we are looking at an approach that would require systems to enter into an enforceable order that will stipulate that they will pursue the ability to compel customers not participating to do so. This can probably be done through a variety of options: an ordinance, obtaining a tariff to make installation a condition of service, or establishing a restricted covenant on the title of the property so that the next time that property is sold the property owner must allow the water company to install the point-of-use device as a condition of service.

There is another approach, too. In a state like Arizona, where we have a large number of homeowner associations, these associations have the ability to make installation of the point-of-use device a condition of service, as well.

Arizona and Arsenic: POU Treatment as a Compliance Strategy for Small Public Water Systems

continued from page 15

Lastly, there is the question of what activities are going to be required of water systems while they are pursuing this authority to make the installation a condition of service.

It is, naturally, very important that everybody pay any rate increase that results from a compliance strategy. We believe that this is within the legal boundaries of rate setting laws and regulations in Arizona. We are going to require monthly notification to the customers who are not participating, warning them of the health risks that they are exposing themselves to by failing to let appropriate devices be installed. We are also going to require the water systems to conduct periodic customer satisfaction surveys.

One of the most interesting replies to the customer surveys in the pilot study was consumers saying that their perceived benefit wasn't the treatment of arsenic, but that they don't have to go to the grocery store anymore and buy bottled water, and they don't have to have bottled water delivered; they have the same quality right at the kitchen sink. This could be a very powerful motivator for consumers with a visceral lack of interest in participating in the POU program.

Let's look next at monitoring of the units. We have tried to come up with a model which we think is a measured and reasoned approach to monitoring these units, based on the standardized monitoring framework that the USEPA uses in putting together their chemical regulatory monitoring requirements. The result is that we are going to require the water systems to monitor each unit within a 9-year compliance cycle.

They will be monitoring 1/3 of the units at three-month intervals and will allow the systems to have the option of using particular test strips that we've identified as reliable for a portion of those. Comparing the price of the test strips and wet lab testing may seem like a negligible difference. But, we start getting into issues of transportation of samples versus getting a result right on the spot within 10 minutes, and so we want to leave that option open to the water systems.

The water systems are also going to need to take over and assume maintenance of pre-existing units, and they are also going to have to make sure the systems meet all the NSF/ANSI standard requirements for a unit to be used as a point-of-use device in meeting the USEPA and the Safe Drinking Water Act requirements.

We are also working on a process to stage the way systems are installed, so that installers don't have to run around and replace components of the units on a regular maintenance schedule all at once. Rather, they can do portions of their system at one time and not be overwhelmed with the work.

Of course, we do have to look at the question of water systems that don't have 100 percent participation. Our plan is that we will consider them to be in compliance provided they've entered into an enforceable agreement and are meeting all the milestones that are established in that enforceable agreement. Much like any other water system that is out of compliance and that a state enters into a compliance order with, there is a schedule for the system to return to compliance. This is no different.

Water systems that don't have 100 percent participation and have not entered into an enforceable agreement, will be considered out of compliance – just like anyone would be for any other regulation. One of the questions we are left with when looking at the compliance status of water systems is this: How long can a water system be operating with less than 100 percent participation and still be considered in compliance by the regulatory agency? Fundamentally, this comes down to establishing a reasonable schedule set up by the state, considering the obstacles that a particular water utility is facing.

Ultimately what we will do in Arizona –and what can be expected of many other states that are choosing point-of-use for compliance – if a water system has less than 100 percent participation and does not make its way to full participation eventually, or shows its ability to get there eventually, it will then be ordered to go to a central treatment. Regulatory agencies have an obligation to carry out the Safe Drinking Water Act and the protections that it is supposed to deliver to the customers.

How is the POU for compliance approach being received in Arizona? Are the water systems accepting the approach? It appears that they are accepting that the ability to succeed is placed in their hands and that they are given choices to make. They also recognize the value of point-of-use, particularly when compared to the cost of central treatment.

Arizona and Arsenic: POU Treatment as a Compliance Strategy for Small Public Water Systems

continued from page 16

States are capable of taking a reasonable and measured approach to the flexibility that is provided right now with point-of-use. Naturally, some do not follow this approach, and certainly the USEPA needs to step in and set basic standards that they expect states to follow implementing this program.

But overall, this is a tremendous opportunity for us to see how we can take a creative approach to compliance and perhaps better the opportunity for people to comply with the regulation.

Will this approach work in Arizona? No one knows for sure.* But, the state is going to try it. We need to give water systems an opportunity.

**The Arizona DEQ will be reporting on their experience in using POU devices as a compliance strategy at the 2012 Workshop on Small Drinking Water Systems: Compliance Strategies to be held September 11-13, 2012.*

QUIZ 3: "Arizona and Arsenic" (0.25 CPD)

1. Blending multiple sources to dilute the contaminant concentration is a common practice for bringing water systems into compliance. Why is this not a viable method for small systems in Arizona?
   a. Blending wastes too much water.
   b. A second source is not always available.
   c. Secondary sources have even higher contaminant levels.
   d. Blending will negatively impact the taste of the water.
2. What factor most influenced the decision to try POU treatment as a compliance strategy in Arizona?
   a. The lower cost of POU treatment
   b. The greater ability of POU treatment to reduce arsenic
   c. The strong pressure from the community to use POU
   d. The USEPA directive to use POU treatment
3. What concern did the ADEQ express in this article about the installation process for POU treatment?
   a. The raw water wouldn't get tested every time.
   b. The effect of flooding from an improper installation on the utility's insurance rates.
   c. The effect on the consumer's health due to potential cross connections formed during installation
   d. The effect on the water pressure at downstream plumbing fixtures from improperly sized equipment
4. What is the customer participation goal for a system to be in compliance?
   a. 50%
   b. 75%
   c. 85%
   d. 100%
5. What option was being considered for a system to be in compliance even if the participation goal wasn't met?
   a. The system must agree to enter into an enforceable agreement to compel nonparticipating customers to do so.
   b. The system must force the property owner to sell the property.
   c. The system must agree to use local police to enforce customer participation.
   d. The system must make the customer sign a waiver discharging the utility of the responsibility to provide potable water.
6. What was a surprising result of the customer satisfaction survey after the POU equipment was installed?
   a. How many customers would have preferred bottled water delivery in place of the POU equipment.
   b. How many customers felt better protected after the installation of the POU treatment.
   c. How many customers reported better tasting water after the POU equipment.
   d. How pleased customers were at having bottled-water quality from the water at the tap.
7. What portion of the POU units will the water utility be required to monitor over a 9-year cycle?
   a. All of them
   b. Half of them
   c. A representative sample
   d. One third of them
8. Who will be responsible for the maintenance of any pre-existing POU units customers had in their homes?
   a. The homeowner
   b. The plumber performing the installation
   c. The local water treatment dealer
   d. The water utility
9. What was proposed for the installation process to avoid having to perform future maintenance on all POU units simultaneously in the future?
   a. Have standing contracts with a large number of plumbing companies for the installations.
   b. Train the homeowners how to perform the maintenance.
   c. Install for only a portion of the customers at a time.
   d. Install greater capacity units in a portion of the homes for longer windows between maintenance events.
10. What must a system that fails to meet the participation and action requirements for POU treatment do to be in compliance?
    a. Institute central treatment.
    b. Apply for exemptions.
    c. Turn off the water to nonparticipants.
    d. Seek legal action against nonparticipants