On Tap

Volume 2, Issue 1
Winter 1993

Drinking Water News For America's Small Communities

Achieving Small Water System Viability in Pennsylvania

by Stephen Schmidt
Vice President
American Commonwealth Management Services Company, Inc.

Editor's Note: This article was taken from remarks made at the Pennsylvania Municipal Authorities Association annual conference and was first printed in its publication, The Authority. *It is reprinted here with permission from the association and with updates from the author.*

Here is a May 1991 headline from an article in the Philadelphia *Inquirer*: "Many small water companies may be going down the tubes; short on revenue, they may be unable to meet stricter safe water standards."

The graphic on page 12 shows the water systems in Pennsylvania that serve populations fewer than 500. If all the small systems were placed on the picture, the dots would blot out the state. This display gives some idea of the scope and distribution of small systems. For this discussion, small systems are defined as those serving less than 1,000 connections or 3,300 people, but many of the conditions to be discussed can also apply to medium-sized systems.

Small systems such as this one in Claysville, PA (below), may have trouble meeting new drinking water regulations. Under orders from the PA Department of Environmental Resources, the system is now undergoing a number of upgrades, including the repair of valves on the dam's gate tower (left). During the last year, water rates for the system's approximately 600 consumers have increased from $15.00 to $27.50 per thousand gallons.

There is good reason to be concerned about the viability of water systems. Pennsylvania alone has more than 2,100 small community water systems, comprising 87 percent of all water systems in the state. Many of these systems are operating at a marginal financial existence or are in the red. Seventy new small systems spring up each year with no assurance of adequate managerial or financial capabilities. Estimates of the number of nonviable small water systems in Pennsylvania run into the hundreds.

Continued on page 12

Contents

Native American Tribe Granted State Status, Seeks Stringent Water Standards

Recent developments in wastewater regulations, stemming from the 1987 amendments to the Clean Water Act, may lead to tougher water quality standards for communities and Native American Indian tribes.

Provisions in those amendments allow individual Indian tribes to apply to the U.S. Environmental Protection Agency (EPA) for state status. This would allow tribes to set their own standards for all surface waters within their reservations. Discharges upriver of the reservation would be required to meet those standards at the reservation boundary.

State status was recently granted—for the first time—to the Pueblo of Isleta, a Native American Indian tribe in New Mexico. The tribe is now awaiting (and expects to receive) approval for water quality standards it submitted to EPA earlier this fall. Those standards are much more stringent than New Mexico's standards. Directly affected will be the city of Albuquerque, and officials there are considering possible legal action to fight the new requirements.

"The city of Albuquerque needs an eye-opener; the state of New Mexico needs an eye-opener," said Tribal Council President Verna Williamson at the recent state-sponsored Conference on the Environment. "Very few people understand the significance of the war Isleta is waging," she continued. "We are a sovereign government and we are

Continued on page 3

NDWC Thanks Readers, Highlights First Year of Operation

by Sanjay Saxton
NDWC Interim Program Coordinator

We're celebrating a birthday! The NDWC is now more than a year old, and this marks the one-year anniversary issue of *On Tap.* (See page 15 and back page for information about the *On Tap* index.)

There's another first in this issue: an article by an outside contributor, Stephen Schimdt (see cover story). Steve has been involved in the water industry for more than 25 years, and we hope his article encourages others to submit articles and information to *On Tap.* (See staffbox on this page for more information about submissions.)

Our anniversary is also a good time to thank all of you for the appreciation you've voiced about the newsletter. During our first year, the *On Tap* mailing list grew by more than 60 percent from our initial mailing list of 5,100 community officials, engineers, and outreach personnel with an interest in drinking water issues.

On the technical assistance side, the NDWC answered questions on a number of issues during the past year, ranging from the use of rainwater as a drinking water source, to the cause of foul water odors, to lead and liability. We responded to more than 2,900 product orders from operators, town managers, municipal leagues, engineers, citizens, and school children, among others. We also referred callers to a variety of other assistance providers, such as the U.S Environmental Protection Agency, state regulators, Rural Community Assistance Programs, and state Rural Water Associations.

Altogether, the NDWC took more than 3,000 calls; people accessed our Drinking Water Information Exchange Bulletin Board System (DWIE-BBS) more than 2,200 times; our staff attended, exhibited, and made presentations at a number of conferences; and we made many friends and acquaintances in towns and organizations around the country.

Sanjay Saxena (right), NDWC interim program coordinator, and technical assistant Mohamed Lahlou discuss the low-cost technologies that have thus far been entered into the NDWC's Small Drinking Water System Database. See "Small Systems Information . . ." article on page 15 for more information.

We also set up our Small Drinking Water Systems Database (SDWSD) and thank those who've started contributing information to it. Those of you who've not yet filled out an SDWSD questionnaire are encouraged to do so. For your efforts, we'll send you an *On Tap* baseball cap, but more importantly, you'll be helping to establish a valuable source of information for operators, engineers, town managers, and state regulators around the country—a resource you yourself may someday wish to use. (See page 15 for more about the SDWSD.)

Although this is a time of celebration, it is also a time for contemplating the future to determine how we can serve you better. Later this year we will conduct an *On Tap* readership survey and hope you'll respond candidly.

Overall, we are pleased with our first year of operation and hope that you are, too. If you're not, please let us know. We value your input and welcome all comments, including letters to the editor. Remember, the NDWC is here for you. ■

NDWC's First Year Highlights

- *On Tap*'s mailing list grew to include nearly 9,000 readers quarterly.
- The NDWC received more than 3,000 calls via our toll-free telephone line.
- Our electronic bulletin board system (DWIE–BBS) was accessed more than 2,000 times.
- Nearly 3,000 product requests were filled through our product distribution service.

Established in 1991, the National Drinking Water Clearinghouse is funded by the Rural Development Administration and is located at West Virginia University.

On Tap
Sponsored by
Rural Development Administration
Mary Ann Baron, *Administrator*
Donna Roderick, *Loan Specialist*

National Drinking Water Clearinghouse
John L. Mori, Ph.D., *Manager WVU Environmental Services and Training Division*
Sanjay Saxena, *Interim Program Coordinator*
David Pask, P. Eng., *Technical Services Coordinator*
Diana Knott, *Editor*
Beth Cahape, *Staff Writer*
Rob Whitmore, *Graphic Designer*

ISSN 1061-9291

On Tap is a free publication, produced four times a year (February, May, August, and November). Articles, letters to the editor, news items, photographs, or other materials submitted for publication are welcome. Please address correspondence to:
Editor, *On Tap*
National Drinking Water Clearinghouse
West Virginia University
P.O. Box 6064
Morgantown, WV 26506-6064

Plan Now for Earth Day, National Drinking Water Week

National Drinking Water Week and Earth Day are a few months away, but small water utilities should begin planning now to make the most of the opportunities they present.

Although drinking water public awareness and education campaigns can effectively take place any time of the year, National Drinking Water Week (May 2–8) and Earth Day (April 22) provide a nationwide emphasis that interests schools, community groups, and members of the media. Any number of activities will serve to heighten awareness about drinking water issues, including:

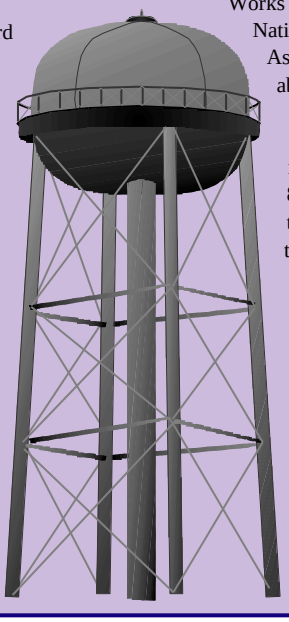
• having utility board members, operators, or town council members speak at schools or conduct tours of the town's water plant for groups or a local reporter;

• sponsoring drinking water poster contests for schoolchildren to heighten not only the children's awareness, but also that of their parents;

• asking your local radio station to broadcast public service announcements about drinking water and the environment. These short (30- to 60-second) announcements might remind residents to conserve, to be careful not to spill oil or other contaminants onto the ground, or to remember that drinking water doesn't become—or remain—safe by chance;

• enclosing a photocopied flyer with your water bills that details your water system's staff, efforts, and future challenges.

Be creative and think of activities that would most interest and involve your community. Such organizations as the American Water Works Association and the National Rural Water Association may be able to provide you with public relations and education materials. (Call 1-800-624-8301 for these organizations' telephone numbers.)



Through public education and involvement, even the smallest utilities can help gain support for their work and for the inevitable rate increases that come with keeping water safe to drink. ■

GAO, Others Warn of Drinking Water Budgetary Problems

Amid the protests of water industry officials about the lack of funding for current and future U.S. Environmental Protection Agency (EPA) regulations, new concerns have been voiced, this time from the federal government's watchdog agency—the General Accounting Office (GAO)—and members of the state regulatory community.

"We've all been talking about primacy withdrawal for several years, but now the situation is serious. It is here," said Vanessa Leiby, executive director of the Association of State Drinking Water Administrators (ASDWA) at this fall's National Rural Water Association conference. (All states except Wyoming currently have "primacy"—or the authority to run the federal drinking water program in their states. When primacy is withdrawn or returned, EPA runs the program directly.)

"States [regulatory agencies] are in trouble," Leiby continued, "as are small systems and some large systems. In 1991, 33 states experienced severe budget deficits . . . and some are now considering the return of primacy. Collectively, we are facing a potential national crisis."

These statements are echoed in a recent GAO report, titled "Widening Gap Between Needs and Available Resources Threatens Vital EPA

Continued on page 8

Native American Tribe Granted State Status

Continued from page 1

going to do what we have to do to protect our natural resources."

The Isleta, whose drinking water supplies primarily come from groundwater wells, have proposed regulations that make surface water quality in the Rio Grande meet "ceremonial use" standards. "They essentially want drinking water quality standards in the Rio Grande river," says John Geddie, New Mexico Environment Department's public information officer. "We have no say in this. We're basically waiting to see what EPA does. [Albuquerque] will probably have to figure out how to deal with these standards, and how to have, essentially, zero discharge."

The *Albuquerque Journal* reports that the city's sewage treatment "has generally complied with the terms of its federal discharge permit." This will not, however, be the case should the city be required to comply with Isleta standards. "We won't be able to meet them," says Gene Leyendecker, division manager of Albuquerque's wastewater utilities. "We'd have to put in equipment costing anywhere from $60 to $100 million dollars. It's our opinion that the standards should be scientifically established."

According to those EPA regional officials involved in the tribal standards process, Albuquerque's wastewater treatment plant may need to be upgraded, but the standards apply only to the water that reaches Isleta land, meaning that Albuquerque's discharge will be mixed with existing river flow. However, "Isleta standards are still under review," says Carl Young, environmental scientist with EPA Region VI. "These tribal standards aren't very different from those established by states for streams and lakes. Isleta just has more stringent criteria in some cases."

Meanwhile, other tribes around the country are closely watching the outcome, and many are said to be considering similar actions. Two other Pueblo tribes—the San Juan and Sandia—have already applied to EPA for state status.

How will this impact drinking water systems using surface water around the country? It's hard to say, but according to environmental scientist Diane Evans of EPA Region VI, "Tribes could potentially use water quality standards to improve the quality of their drinking water supplies." ■

50 Percent Loss?

How to Detect Small Utility Water Leaks

by David Pask
NDWC Technical Services Coordinator

A decade ago, over a period of three years, I had the opportunity to study six small water utilities in rural North America, for different reasons. The populations served ranged from 900 to 10,000, but in no case was the leakage from the distribution pipe system less than 30 percent of the actual water produced. The average amount of leakage was over 50 percent.

Why be concerned?

Today, leakage problems continue to plague small systems in areas where water supplies are plentiful. Such figures may not seem of great concern, but there are serious implications to leaks in a public water supply system. The biggest concern is that of health. It is impossible to maintain pipes so that they are full of water and under pressure indefinitely. Pipes must be shut down for new extensions, pumps may be stopped for repairs or because of power outages, or a fire in town may require the crew to draw so much water that the pressure may fall below the atmospheric pressure in parts of the system.

When the pressure drops, water that was leaking out of the system becomes water that is leaking in. This brings with it any contaminants in the vicinity of the pipe, whether they be toxic waste or bacteria from a nearby sewer.

A second concern is the cost of the power used to pump the wasted water and the chemicals used to treat it. Even if you use no pumps or treatment, there are still factors to consider, such as your town's projections of its water consumption growth. If the apparent growth is actually leakage, then you may waste capital investment that was deemed necessary to satisfy the increased demand.

How much leakage is OK?

Whether you like it or not, all water distribution systems leak to a greater or lesser extent, whether your system was constructed in the 19th century or was installed just last year. The leaks can arise from a variety of circumstances. Pipe joints can be disturbed by ground settlement, by seasonal changes in temperature, and by water hammer or pressure surges. (Does your firefighting crew need training in how to close a hydrant when the fire is out? The pressures generated by this activity can be quite large!)

Leakage also leads to corrosion, both internal and external. Leakage within buildings is usually repaired, but the buried service line is often another culprit. Also, many smaller leaks are allowed to proliferate due to lack of maintenance on hydrants and sluice valves.

The amount of leakage that can be tolerated in a distribution system is a matter of economic return: the benefits of repair versus the labor invested in detecting and solving the problems. A reasonable target is to get your leakage rate down to 15 percent of your total water production. Few systems get below 10 percent. If your system is dispersed, with infrequent connections, then another "rule of thumb," or reasonable leakage target, is 70 gallons per day per mile of pipe per inch of diameter.

How do you monitor leakage?

There are three basic ways to monitor system leakage. The first is to conduct a regular "water audit" whenever the consumers' meters are read. The amount of water entering the system can then be compared to the amount of water being used. The difference provides an estimate of the amount of water "lost," or leaking, from your system. However, meters should be tested to ensure that they are accurate.

Of course, if you do not have universal metering, conducting an audit becomes impossible. In these cases, operators should concentrate on waste assessment and control by monitoring daily consumption.

A daily record of the water consumed can be derived from knowing both the amount of water produced and the change in the level of stored water in the reservoir or tower. (Monitoring consumption weekly is acceptable, but is less helpful in determining the normal characteristics of your system.) Any significant increase in demand that persists over two days should be treated with suspicion as a possible new leak. This routine accounting procedure can be performed at your desk during working hours.

What method is best?

The most successful method of monitoring leakage, however, may involve some overtime and loss of sleep, unless your system has modern meters and recording gear. This technique involves measuring your system's "night flow," or "nightline," and it is one of the easiest ways to estimate the amount of leakage from your distribution pipework. Measuring night flow does not require universal consumer metering, and it can be performed on any size system. It has the added advantage of allowing you to check on your system more frequently than the usual quarterly billing period.

The night flow technique is based upon the premise that between the hours of 2:00 a.m. and 5:00 a.m., most of your customers will be asleep, leaving the flow in your system to be almost entirely generated by leakage. If you have an industry or hospital that draws water at all hours, it will be necessary to read these meters to make the correct allowances. Depending upon the design of your system, there are several strategies to determine night flow.

How is it done?

Most systems have a service reservoir or water tank, and the supply pumps can be shut down for the three hours of your test. Few systems seem to have a meter to record the flow from the reservoir; so it will generally be necessary to make some reasonably accurate measurements of water level.

The typical level indicator, often a pressure gauge, is not nearly accurate enough for our purposes. (I have always used metric measurements because the millimeter is about the smallest measurement that you can easily see.) Therefore, you may need to jury-rig some form of temporary, yet accurate, water level indicator to your service reservoir or tank.

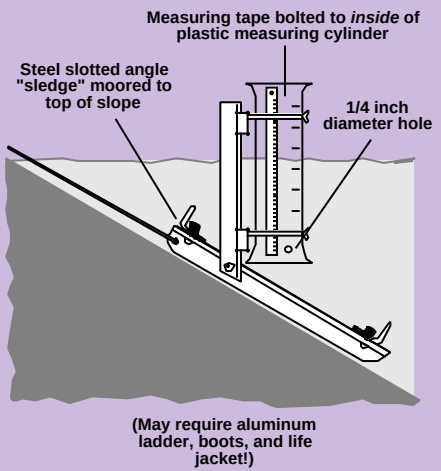
Next, manually record levels every 30 minutes or so during those quiet morning hours. Simple arithmetic, using the rate of water level fall and the dimensions of your tank, will give you the outflow. Now compare your outflow or night flow with your daily consumption figures. Is it close to 10 percent?

A few simple gauges that I have used when performing the above are indicated in Figure 1; sample readings and calculations, in Figure 2.

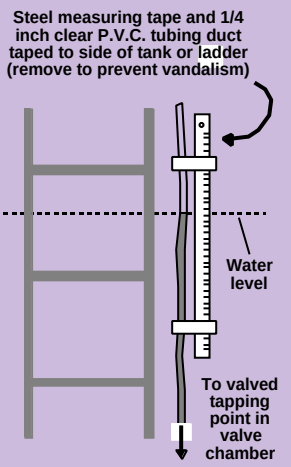
Continued on page 5

Figure 1: Measuring Gauges

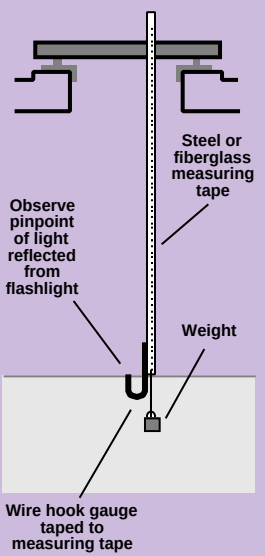
Stilling Tube for Open Service Reservoir with Sloping Sides



Sight "Glass" for Steel Elevated Tank



Gauge for Concrete Covered Service Reservoir



Continued from page 4

How do you find leaks?

If your leakage rate is too high, you'll now need to locate the leaks. There are a number of companies that specialize in leak measurement and detection, and they provide excellent service. If your water loss is very high due to many leaks, it is probably to your advantage to negotiate a contract to locate all leaks and bring your system under control. However, for small water utilities, the "do-it-yourself" survey method may be more practical.

Of course, you should always keep a sharp eye open for persistent wet patches on the roads and sidewalks, and, if you're also the works superintendent, for unusual clear water infiltration into the sewer system.

Still, you'll need to again take advantage of the peaceful, quiet nighttime hours, which are great for *listening*. Go out and listen to every hydrant in town, and you'll hear almost every one of your water leaks.

How do you conduct a survey?

To conduct a listening, or *aural, survey*, you'll need some form of stethoscope, or listening device. Operators who have very sensitive ears can make do with a dowel rod. There also are several commercial listening devices available, but beware of the older electronic ones. These

Continued on page 6

Figure 2: Sample Readings and Calculations

Example

Town of population = 1450
Average daily production = 121,500 gallons
Per capita production = 84 gallons

Service Reservoir

40 feet x 50 feet x 10 feet deep
12 columns 1 foot square
Water area = 40 x 50 – 12 = 1988 square feet
1/8 inch fall = 1988 ÷ 12 ÷ 8 = 20.71 cubic feet
= 20.71 x 7.48 (gals/cu. ft) = 154.93 gallons

Observations for "Night Flow"

Time	Difference	Gauge Reading	Fall in Level	Rate of Fall (Time for 1/8 inch)
02:17 a.m.		38 3/4 in.		
	35 min.		7/8 in.	1/8 inch in 5.0 min.
02:52 a.m.		37 7/8 in.		
	20 min.		5/8 in.	1/8 inch in 4.0 min.
03:12 a.m.		37 1/4 in.		
	15 min.		3/8 in.	1/8 inch in 5.0 min.
03:27 a.m.		36 7/8 in.		

Total Time: 70 min. for a total fall of 1 7/8 inch (15/8)

Average Rate of Fall = 1/8 inch in 4.67 min.
= 154.9 gal. ÷ 4.67 min. = 33.17 g/min.
= 33.17 x 1440 (min. per day) = 47,765 g/day

$$\text{Leakage Rate} = \frac{47765 \times 100}{121{,}500 \text{ avg. daily production}} = 39\% \text{ leakage rate}$$

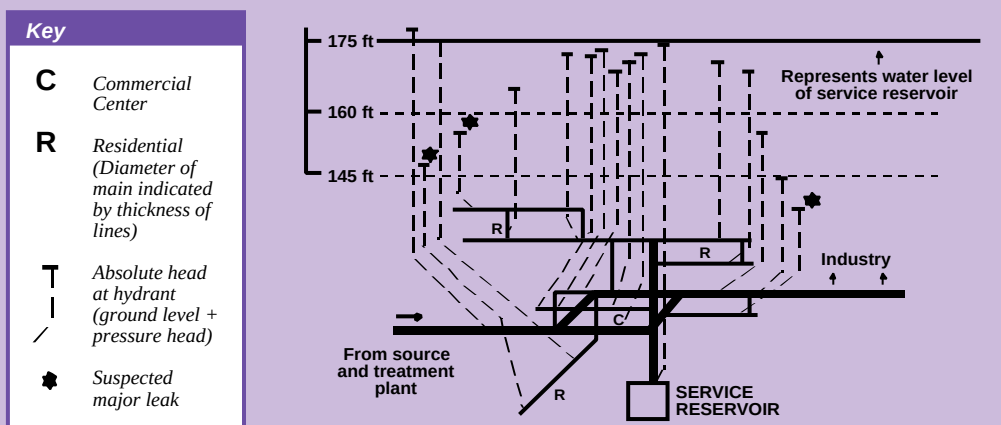
Useful Conversion Factors

1 lb/square inch (PSI) = 2.307 feet head of water
1 cubic foot = 7.481 U.S. gallons
1 day = 1440 minutes
1 meter = 3.281 feet
Change of level of 1 millimeter on 1 square meter = 1 liter
1 cubic meter = 1000 liters = 264.17 U.S. gallons
1 liter = 0.264 U.S. gallons

50 Percent Loss?

How to Detect Small Utility Water Leaks

Figure 3: Town Pressure Survey



Continued from page 5

earlier electronic circuits have internal background noise that is almost indistinguishable from leak noise. With a stethoscope, however, there's only the sound of the leak (barring high winds).

The best way to learn the different sounds is through practice. Escaping water under pressure creates a "white" noise that covers a wide range of frequencies. A small leak will make an intense sound at the high end of the spectrum. A large leak will typically lose a lot of energy due to friction in the pipe before it emerges, and will, therefore, produce a smaller sound at the lower end of the spectrum, which often carries further.

I've found that one of the most satisfactory pieces of equipment is the "geophone." This listening device has a sounding chamber with a loaded diaphragm. The casing vibrates by contact with the ground or hydrant, while the diaphragm remains more or less stationary as the amplified sound passes up the flexible tube to the ear. The device has a separate unit for each ear, and, if the operator has good stereoscopic hearing, he or she can tell from which direction the sound is coming. (Personally, my ears are not very sensitive, and I can only try to judge the intensity of the sound as I move along the route of a pipe.)

Geophones cost approximately $300, but you may be able to borrow one from a neighboring system.

In summary, to conduct an aural survey, you 1) measure the leakage 2) listen to locate the leaks 3) repair the leaks 4) measure the new leakage rate 5) repeat steps two through four until satisfied with the amount of leakage 6) wait up to six months and start the process all over again.

Is there another way?

When it is obvious that you have a major leak or leaks that can't be found by listening, you may want to try a *pressure survey* before bringing in a specialist. This type of survey involves taking pressure readings at night on a good sample of the hydrants around town, preferably with the source pumps shut off and the supply coming only from the service reservoir. You must also know the accurate elevation of every hydrant from which a pressure reading is taken. A topographic map may suffice, but it is better to obtain accurate figures by using a surveyor's level.

Next, all of the pressure readings are converted to feet head (see the conversion factors in Figure 2) and the hydrant elevations are added. This gives us the "absolute head" at every hydrant, which can now be plotted in three dimensional form on a copy of the distribution system plan (see example in Figure 3). You must plot "absolute head" because this eliminates the difference in pressure due to differences in ground level at each hydrant. As an alternative, you may simply write the absolute head next to every hydrant on your distribution system plan. Now study the plan, and you should be able to see an area of town where the pressure is unusually low. This pattern will indicate which streets you should concentrate on during your next aural survey.

The diagram on this page (Figure 3) is a simplified reproduction of an actual survey I conducted in a small town where the leakage rate was approaching 70 percent of production. During my first aural survey circuit, I found that every hydrant was "singing" from lack of maintenance. There was no way that I could find anything by ear, so I spent the remainder of the night taking pressures. One major leak was pinpointed on a hydrant branch, while another was identified on a section of main that had been buried under 15 feet of fill during a highway diversion!

Yet another method of finding those annoying, large soundless leaks is to partition the distribution system, so that districts can be temporarily cut off at intervals when you are recording the night flow. Examination of the changing flow pattern should indicate which districts have the problem. Another night of readings and valve closures allows you to isolate and identify the leak locations more closely.

Any final advice?

When leak hunting, don't forget to wear(≤eflective clothing and, if possible, to take a partner with you for safety. Lastly, it may be wise to inform the local police of what you are up to; I was lucky to have identification with me the time I forgot to notify them!

Your state Rural Water Association (RWA) may be able to provide further assistance in your leak detection efforts. For your state RWA telephone number—or for advice or to share experiences about detecting leaks in small water systems—call me at (800) 624-8301. ■

Phase II Rule Imposes Challenges

by Beth Cahape
NDWC Staff Writer

In the last issue we examined various common contaminants in the Phase II Rule, along with possible waiver options for contaminants presenting no risk to a system. This rule also imposes a number of challenges, many of which center around affordability. For this final Phase II series article, we'll examine some of these issues through a discussion with Mike Muse, implementation coordinator of the chemical phases in the U.S. Environmental Protection Agency (EPA) Office of Drinking Water.

What about lab availability?

State regulators and water system personnel alike have expressed concerns over the availability of environmental laboratories that can test for all of the contaminants regulated under the Phase II Rule. Many states, for example, have no certified labs to test for dioxin, an unregulated Phase II contaminant now listed as a regulated synthetic organic compound (SOC) under the Phase V Rule. The unavailability of certified labs to test for asbestos is also common around the country.

When asked about this problem, Mike Muse, an EPA implementation coordinator, explained the agency's recent actions: "We've just put out two memos, one concerning asbestos and the other for dioxin, saying that [states] can provisionally certify labs. We're now going to try to compile and distribute information about those certified labs.

"Most states can accept another state's audit or certification in order to certify a lab. In other words, if Wisconsin certifies a lab, then West Virginia, or Arizona, or California may be able to accept that certification . . . but some states can't accept another state's certification," said Muse. However, "we *think* virtually all states can accept an EPA certification. What we're hoping to do is get the EPA regional labs to get out there as much as possible, to certify the available labs in their region.

"I want to make this very clear: *this will NOT be a national registry of certified labs*. All it is is a 'shopping list' for the convenience of the states."

Are states ready to enforce?

With so many federal regulations becoming effective at once, many small system personnel believe states are going to have trouble establishing and enforcing Phase II, as well as other new regulations. There is even some discussion that several states may lose their authority—meaning primacy—to implement and enforce regulations.
(See "GAO, Others Warn . . . " article on page 3.)

When asked about state enforcement, Muse said: "If a state doesn't have primacy by 1993, then EPA will be the one legally obliged, as the primacy agent, to have a monitoring plan." If the state hasn't already put together a monitoring plan, he said, then "the regional office will have to develop a monitoring plan for that state."

And EPA will be the one enforcing the regulations in states without primacy. "Probably around summer and fall of '93, [the regions] are going to start looking for people who didn't do their sampling in the first and second quarter," Muse said.

> *". . . if just one citizen in that community wants these laws enforced, he can take that operator, that town to court."*
>
> —Mike Muse, U.S. EPA

"If operators have not been in compliance, didn't act in good faith and do monitoring correctly, then they may be liable for enforcement by their state or EPA, but they could also be liable for litigation by third parties— namely, some of their own customers. If a system does not monitor at all, they could be accused of playing fast and loose with their own community's health."

Will extensions delay monitoring?

Meanwhile, a large number of states have recently requested, and will probably receive, two-year extensions for implementing Phase II regulations. This would extend their deadline for primacy approval while they update their programs to include this rule.

Some system managers are hoping this means that the Phase II enforcement also will be delayed two years. Muse, however, explained: "Extending primacy *never* extends program implementation. All it affects is who has lead responsibility. Phase II [monitoring] *has to* start in 1993.

"From an operator's standpoint, there's a variety of levels he can operate on. Just taking things at face value, he's liable/responsible for implementing the state laws. And if he doesn't, he's liable for enforcement. Typically, this can mean receiving an enforcement order to clean up his act, but this can mean fines in some cases."

What about liability?

"A community will be liable for third party enforcement," continued Muse. "If there's somebody in their community [who] wants to know whether this stuff is in the water (and the community is scheduled to do the monitoring in '93), that person can sue to make them do it. That means that if just one citizen in that community wants these laws enforced, he can take that operator, that town to court.

"But if you're in compliance, people can't sue you. If somebody disagrees with one of the MCLs [maximum contaminant levels]—maybe they don't think it's protective enough—but the town is in compliance with that MCL . . . they can't sue that town. We have, basically, the law saying, 'if you meet these requirements, you're safe.'"

Is affordability an excuse?

While loans and grants may be available in some states to assist water systems that must install treatment technologies (see chart on page 8 for EPA recommended technologies and estimated costs), there are no available funds for monitoring expenses. Many water system personnel probably think their systems cannot afford the lab fees and may be concerned about facing enforcement.

Muse detailed EPA's likely response to such financial circumstances: "In enforcement cases [involving] sampling, I think water systems are going to be told to spend the money if they've got it. This is something that whole communities should deal with, not just the operator.

"If they have to sample for everything—the full nine yards with no grandfathering and no waivers—it's going to cost them $12,000 to $14,000 over three years per sampling site. If compositing isn't allowed by a state,"

Continued on page 8

Phase II Rule Imposes Challenges

Continued from page 7
(see compositing reference on page 10) "a system with three separate wells must sample at each of those sites. This means it could cost that water system from $36,000 to $42,000 over three years.

"If the community can't afford it, and you take them to court and the judge says, 'Okay, they're in violation. What do you want me to do?' you're going to have to have an answer or you're wasting his time, wasting everybody's time.

"In this kind of situation, [regulators] look to what the community's really paying. Maybe they can't afford four samples, but maybe they can afford one or two."

What about the truly poor?

When asked about the communities that truly will not be able to afford even monitoring costs, let alone possible future treatment costs, Muse said: "Admittedly, a lot of towns don't have enough money to do the four [required] samples. My guess is—and I don't know of any study that's been done out there on this—but there are probably more towns who can afford one sample (but not four) than there are those who can't afford anything.

"I think that if we can get one sample out of a town, and it shows no 'detects' [of contaminants], then they're going to fall to the bottom of the [enforcement] priority list . . . at least below the towns that don't sample at all. With those towns [that don't monitor at all], we're probably going to have to take a careful look to see whether or not they *really* can't afford it.

"In a lot of those cases, the states will step in and do the sampling for them. There are going to be exceptions to this, but my sense is that most states are going to pick up the ball for the very small, poor systems. At least for one sample or something, they're planning to." ■

Best Available Treatments and Costs

Best Available Technology (BAT)	Percentage of Removal Efficiency	Estimated Cost Ranges in Cents/1000 gallons		
		25-100 (system size by population served)	3,300-10,000 (system size by population served)	>1 million (system size by population served)
Organics				
Volatile Organics				
• Granular Activated Carbon	*	910-950	36-76	14-19
• Packed Tower Aeration	*	130-315	9-60	6-41
• Oxidation	*	*	*	*
Synthetic Organics				
• Granular Activated Carbon	*	910-930	36-51	10-14
Inorganics		25-100 (system size by population served)	3,300-10,000 (system size by population served)	>1 million (system size by population served)
Conventional Technologies				
• Coagulation/ Filtration	80-99	N/A	19-52	3-34
• Lime Softening	45-99	N/A	9-130	1-61
Additional Technologies				
• Electrodialysis Reversal	51-94	150-590	35-210	17-150
• Ion Exchange	75-99	200-340	38-54	13-77
• Reverse Osmosis	67-99	150-620	120-220	17-150

**This data unavailable at press time.*

Note: Actual costs and efficiencies will largely depend upon type of contaminant, but special conditions may also apply to some figures.

Source: U.S. Environmental Protection Agency

GAO, Others Warn of Drinking Water Budgetary Problems

Continued from page 3
Program." This report declares that ". . . for years, the drinking water program's funding has been inadequate to meet the growing demand placed on the states and water systems. . . . The cumulative effect of this practice has been that one of EPA's most important programs is approaching a state of disrepair."

GAO evaluators looked at EPA's new "priority-setting strategy," where states prioritize those regulatory areas that represent the greatest risk to state residents. This "short-term" prioritizing is intended to give states an additional five years to "fully implement the [drinking water] program" by developing adequate funding for all current and future regulations.

However, says the GAO report, "the mere fact that EPA is implementing a priority-setting strategy is a vivid illustration of the program's serious condition. . . . By delaying implementation of some program elements for five years, EPA will not alleviate the situation. . . ." GAO evaluators also say that when implementation requirements are inevitably not met, many states will have to give up their programs and primacy, and the report expresses doubts that EPA can afford to take over those primacy responsibilities.

Why should small system operators and managers care about who oversees their compliance with the various regulations? Essentially, explains ASDWA's Leiby, in those states where EPA will take over primacy, "assistance to small systems will be minimal." EPA will set up a bare bones regulatory program, she says, where there will be no onsite assistance, limited technical assistance, and "the whole program will be enforcement oriented."

Concludes the GAO: "We also believe that to avert a deepening crisis in the long term, EPA will need to find more innovative and cost-effective ways to achieve compliance. This is particularly important for the thousands of small water systems whose limited rate bases often cannot generate sufficient funds for traditionally engineered treatment."

For a free copy of this GAO report, call (202) 275-6241; ask for document # RCED-92-184. ■

Phase II Begins New Standardized Monitoring Framework

by Beth Cahape
NDWC Staff Writer

The Phase II Rule introduces water system personnel across the country to a new monitoring schedule. "The goal of the framework," says a U.S. Environmental Protection Agency (EPA) document, "is to streamline the drinking water monitoring requirements" for contaminants listed under several EPA rules. Thus far, those rules include Phase I, II, and IIB. Also included is Phase V, the most recently published drinking water rule.

EPA believes that this framework will make specific monitoring requirements more uniform among the various contaminant groups rather than having different—and potentially confusing—requirements with each new rule. With the new framework, monitoring schedules will also be more simplified and coordinated across contaminant groups.

The contaminant groups included in the framework are inorganic chemicals (IOCs), volatile organic compounds (VOCs), and synthetic organic compounds (SOCs). Three individual contaminants—asbestos, nitrate, and nitrite—are included but listed separately because of their "unusual characteristics." (See chart on this page.) Not included in the framework are bacterial contaminants (such as coliforms) or lead and copper.

The framework operates on nine-year *compliance cycles.* The first nine-year cycle will be from January 1, 1993, through December 31, 2001. (See graph on page 10.) Within these cycles will be three, three-year *compliance periods,* which is where various monitoring requirements will be indicated for specific contaminants or contaminant groups.

When Monitoring Begins

When will this framework take effect? EPA officials state that monitoring on all new rules begins in the first full three-year compliance cycle after a rule is published. Hence, a rule like Phase II, that was published in January 1991, will require that your initial testing for Phase II contaminants be done sometime during the January 1993 through December 1995 compliance period. Your state regulators will tell you during which one of those three years your system must begin monitoring.

It is important to note that EPA will no longer require rules within this framework to be phased in by the size categories of small, medium, and large systems. Instead, explains another EPA document, states should "schedule *approximately one third of their systems* to monitor during each year of the three-year compliance period." EPA believes this approach to monitoring assignments avoids situations where everybody waits until the last year to do their monitoring, which, in the past, has invited noncompliance and numerous violations.

This approach makes sense, especially where states are running their own environmental labs and may not physically be able to conduct all of these tests in one, or even two, years. Ultimately, though, state regulators will decide how to divide up the thirds, and those decisions can be based on more than just lab availability. Other division options may be based on which systems are most vulnerable to contaminants, size or type of systems, or the number of sampling points per system.

Assigning Monitoring Years

Based on the above information, you *should not assume* that, because yours is a small system, you will probably begin monitoring for Phase II contaminants in 1995. In a recent trial run for a moderately populated state, EPA officials worked with that state's regulators to establish a schedule for their upcoming monitoring program. "This was just doing some staff work to provide some options and illustrations for their management," says Mike Muse of EPA's rule implementation staff.

Describing the trial run, he explains that the state "basically ranked all systems in descending order by population size. This listing also showed the number of sampling points in each of those systems."

The total number of sampling points, explains Muse, was divided by three, so that the first year of monitoring had a third of those samples (rather than systems) to be tested. While this division was mainly population-driven, the laboratory work load was more evenly spaced out over the three years of the compliance period.

According to Muse, state officials found that they were "down into populations of 500 or less in the very first year of monitoring. What 'small' means in that third year," he continues, "is *really small*. Maybe under 100."

Continued on page 10

Compliance Monitoring Requirements Under the Standardized Monitoring Framework

Contaminant	Initial Monitoring Requirements: Groundwater	Initial Monitoring Requirements: Surface Water	Trigger that Increases Sampling	Requirements for Waivers
Asbestos	1 Sample every 9 years		> MCL	Based on Vulnerability Assessment
Nitrate	Annual	Quarterly	≥ 50% MCL	No Waivers Allowed
	After 1 year < 50% of MCL, surface water systems may reduce to an annual sample			
Nitrite	1 Sample: If 50% of MCL, state discretion		≥ 50% MCL	No Waivers Allowed
Inorganic Chemicals (IOCs)	1 Sample every 3 years	Annual sample	> MCL	Based on analytical results of 3 rounds
Volatile Organic Compounds (VOCs)	4 Quarterly samples every 3 years Annual after 1 year of no detects		Detection (.0005 mg/l)	Based on Vulnerability Assessment
Synthetic Organic Compounds (SOCs)	4 Quarterly samples every 3 years After 1 round of no detects: systems >3300 reduce to 2 samples per year every 3 years; systems ≤ 3300 reduce to 1 sample every 3 years		Detection	Based on Vulnerability Assessment
Unregulated • IOCs • SOCs	1 Sample 4 Consecutive quarterly samples		Not Applicable	Based on Vulnerability Assessment

Source: U.S. Environmental Protection Agency

Phase II Begins New Standardized Monitoring Framework

Continued from page 9

Muse explains, "It's not mandated that states do it by size, but they usually want to try and do a third of the systems each year for practical reasons: mainly to keep the flow through their labs relatively evened out. They don't want to have some huge hump of samples coming through their labs.

"I'm not sure what [the above state's] ultimate monitoring plan will be," says Muse, "but the upshot of the exercise is that even where you front load your big systems in that first year [of the compliance period], in a lot of states you wind up with small systems sampling in 1993."

Phase V Exceptions

While EPA has stated that they will not require system personnel to monitor for new rules until the first compliance period following the rule's published date, an exception to this monitoring schedule has already been made.

Although Phase V's published date was in May 1992—which means that monitoring should also begin in the first (1993 to 1995) compliance period—this particular rule allows *systems with less than 150 hookups to begin monitoring in the second compliance period.*

Thus, these small systems (which account for nearly 50 percent of all water systems) will be allowed to delay their monitoring for Phase V contaminants until the 1996 to 1998 compliance period.

Delays Don't Mean Savings

Does this delay in testing for Phase V contaminants represent beneficial savings for those systems with less than 150 hookups? Not necessarily, says Michelle Moustakas, mobilization coordinator at EPA's Region IX. These systems might still want to consider doing part of their Phase V monitoring at the same time they do Phase II tests, she says.

Essentially, the requirement for most systems to test for both Phase II and Phase V contaminants in the '93 to '95 compliance period makes financial sense. Typically, several contaminants can be checked using one specific lab test (called an "analytic method"). With laboratory expenses, Moustakas explains, adding a few more similar contaminants to that particular method will cost systems much less in the long run. Ultimately, these systems will reduce costs because they won't have to run the same analytic methods all over again for many of the second, Phase V groups of contaminants. Even if your system is under 150 hookups, you would see that same savings.

Says Moustakas, "We've been trying to emphasize that within the Standardized Monitoring Framework, water systems can group contaminants from several different rules and monitor them together. Particularly with VOCs and pesticides, many have the same analytical methods [requirements] and [a system] can monitor them all at once."

It is *essential* that you make certain your state is offering the "grandfathering" option (see below) before you plan on this cost-saving option, however, as you could potentially end up paying double, should your state not allow earlier tests.

Furthermore, some contaminant testing fees will be the same, regardless of which compliance period you choose to do your monitoring in. Several contaminants in both Phase II and Phase V must have specific analytic methods tests that no other contaminant or contaminant group shares. Dioxin, endothall, and glyphosate are three such compounds from Phase V. Economically, it may be more feasible for eligible systems to wait until the second monitoring period to test for these contaminants.

Grandfathering, Waivers Possible

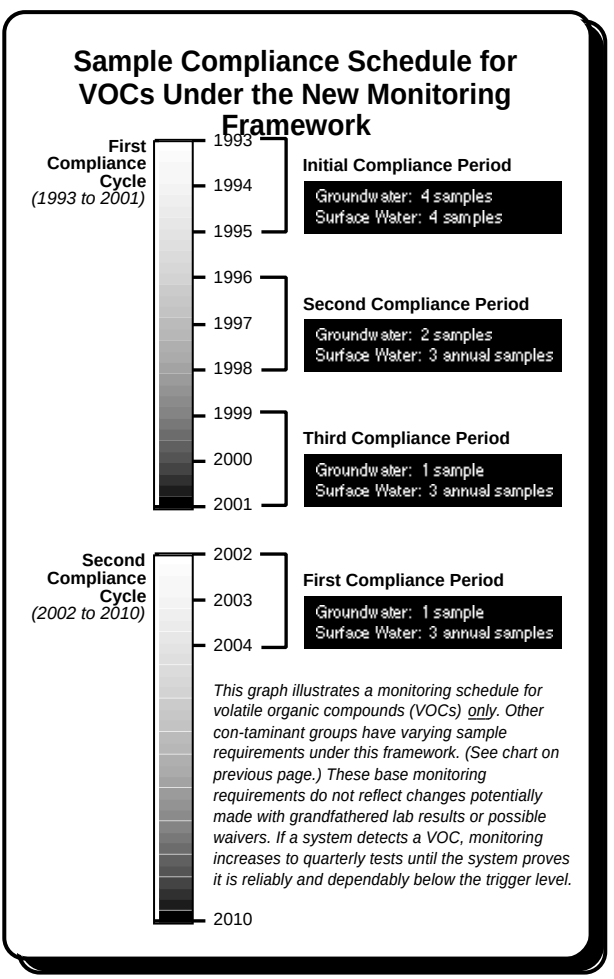
Waivers on specific contaminants, along with grandfathering earlier lab results, are options states might allow systems in the new monitoring framework. As detailed in part two of this Phase II series, waiver options may be available to a water system based on the system's vulnerability to a specific contaminant.

Many operators, anxious to know the quality of their source water before regulations take effect, have chosen (or may choose in the future) to test for specific contaminants ahead of time. Tests run before a contaminant's monitoring is required might be applied—or "grandfathered"—to that system's future monitoring requirements. Your state regulators can tell you more about grandfathering restrictions on both dates and analytic methods, as each contaminant group has different requirements.

Grandfathering and waiver options could potentially result in substantial savings to small water systems, but EPA *will not require* states to offer these options. How many states will offer them? According to Muse, "About three quarters of the states have indicated plans to issue waivers. We don't know about the other quarter yet.

"Maybe a dozen—and that's just a guess at this point—are going to have informal regional office approval for waivers by the first of the year [1993]."

Continued on page 11



Contingent Fee Contracts Can Be Unethical

Dear Editor:

We have read "Planning, Care Necessary When Choosing a Water Project Engineer" in the November, 1992 issue of *On Tap* and thought that your article was very good, particularly the information you supplied to your readers on selecting an engineer on the basis of qualifications.

In several places, you recommend that readers include in their contract with the engineer a contingency clause which states that the engineering firm would only get paid for a preliminary engineering report if and when the funding is approved. Such a contingency clause may be a violation of the NSPE Code of Ethics for Engineers which states, "Engineers shall not request, propose, or accept a professional commission on a contingent basis under circumstances in which their professional judgment may be compromised." (Section III, 7, a)

The purpose of this section is to prevent situations in which the engineer's judgment may be influenced during the course of his or her preliminary studies to produce a favorable finding that will result in his or her being retained for the full project. If the engineer is only providing preliminary factual data and the decision or recommendation is being made by the governmental body, then there may not be an ethical problem. However, if the engineer is being asked to recommend approval of the continuation of the project, such a contract would probably be unethical.

Each state has its own code of ethics for engineers, although they very often follow the NSPE Code of Ethics for Engineers. Public officials and engineers should be careful that they do not place themselves and their consulting engineers in a situation that would be a violation of professional ethics.

Sincerely,
Paul W. Brady
Executive Director
Connecticut Society of Professional Engineers

We certainly do not want to advocate—or suggest that small communities encourage—the violation of professional engineering ethics, so we appreciate your bringing this issue to light. Your letter illustrates that, in some instances, contingency clauses aren't in the public interest and can actually work against it.

Community officials should keep the information you present in mind and discuss it with their prospective consultants and/or with a representative from their state's Society of Professional Engineers.

Thanks for your letter and also for the information from the November/December 1992 issue of the Wisconsin Professional Engineer *on just this topic.* ■

Phase II Begins New Standardized Monitoring Framework

Continued from page 10

However, because of their widespread presence and serious health risks to infants, no grandfathering or waivers will be allowed for nitrate and nitrite.

Reaching "Trigger" Levels

An important feature in this monitoring framework deals with what your system will be required to do when a contaminant is found. If the results of the laboratory analysis show that your water has reached a "trigger level" for a particular contaminant, you must begin quarterly monitoring for that contaminant.

"Trigger levels" vary according to the kind of chemical you're dealing with. Nitrate, for example, has a trigger of 50 percent of its MCL, while any inorganic contaminant simply has its MCL as a trigger. The trigger for VOCs and pesticides is generally when a lab's analytic method detects the presence of that contaminant.

If your samples reach a trigger level for a contaminant, EPA requires that you take quarterly samples until the state determines the system's water is "reliably and dependably" below the MCL. One EPA document defines "reliably and dependably" as a situation where the water system has "sufficient knowledge of the source or extent of the contamination to predict that the MCL would not be exceeded."

A surface water system must take at least four additional quarterly samples once a trigger level is reached, and systems using groundwater must take a minimum of two quarterly samples before the state can determine that the system's water is "reliably and dependably" below the MCL. However, says one EPA official, quarterly monitoring for a full year will probably be the norm for many systems, since such a monitoring schedule accounts for seasonal variations.

Systems with unpredictable lab results (with wide variations), or lab results that are close to an MCL, don't meet this criteria and will have to continue quarterly sampling. Such systems may want to consider an alternative water supply or consolidating with another system. Ultimately, these systems may decide to treat their water for the contaminant. This may be a last resort, though, as most treatment technologies are very costly.

Compositing Unlikely

Water system operators and managers may have heard of another possible option—compositing samples—for cost savings. However, this option is unlikely to be made available by state regulatory agencies.

Developed specifically for systems serving less than 3,300 people, up to five small systems could potentially make an arrangement with a lab to composite their samples. The lab would combine and test these as just one sample at substantial cost savings. This compositing option is also applicable to individual systems that have several water sources to be tested.

So why is this an unlikely option? According to one official, most states are reluctant to allow compositing because the dilution which would occur in composite samples would make the tests inaccurate, with results indicating a contaminant is not present, when, in fact, it is.

Even with more stringent composite trigger requirements, most pesticides and VOCs would not be detectable in dilute samples. Lab test "trigger" levels for these compounds are already extremely low—in fact, at "detect" levels. Composite samples could mask the presence of these especially harmful compounds, as well as other contaminants, resulting in a potential threat to the public's health. ■

Achieving Small Water System Viability in Pennsylvania

Continued from page 1

Statistics from the Pennsylvania Department of Environmental Resources (DER) show that more than $700 million worth of improvements are now needed at all state community water systems, not counting the additional millions needed to meet the new waves of federal requirements. A related concern is the lack of a uniform planning process at the state, county, or local government levels.

SDWA Causing Changes

The pressures of new drinking water regulations are causing significant changes at water systems. For example:

• Sampling for new contaminants often leads to violations. The resulting Pennsylvania DER enforcement actions climbed from 10 cases in 1986 to 300 actions in 1990.

• Enforcement actions lead to water systems installing new or upgraded treatment facilities, witnessed by the number of required contruction permits, which increased from 100 in 1986 to 500 in 1990.

• These additional projects demand increased funding, as shown by the millions of dollars provided through the Pennsylvania Investment Authority Act (PENNVEST).

• Restructuring of system ownership is also resulting, including mergers and the use of contract management and operations.

What Is Viability?

Dealing with all these factors has focused attention on one central issue: viability. But what exactly does that mean?

A viable water system may be defined as being *self-sustaining* and having the *commitment* and *financial, managerial, and technical capability* to reliably meet state performance requirements on a long-term basis.

A nonviable system, therefore, has:

• inadequate recognition of ownership and management responsibilities;

• lack of management and business plans to assure effective administration and operation and maintenance; and

• insufficient revenues to cover the full costs of providing water service over the long term.

Teenagers can be a very graphic analogy to nonviable small water systems. They are both not yet fully self-reliant. They depend on others for support and direction. They are somewhat insecure and often act without full knowledge of the consequences. They have little savings, could be described as living on marginal financial existence, and can spend their allowance without long-range planning.

An important goal for both government and professional organizations is to help nonviable water systems "grow up," plan ahead, continue their education, use their judgment to comply with the laws, and become independent and fully self-supporting.

Community Water Systems in Pennsylvania Serving Population of 500 Or Fewer

Improving Viability

One of the current state and federal recommendations for improving water system viability includes making systems prepare a *business plan*, just as any other successful business might do. This ensures that management recognizes the full costs of providing reliable service.

State and federal governments are considering using the business plan as a method to screen out nonviable systems. The basic tool would be the permit for the new system. By requiring a business plan before a permit is issued, the prospective owner can be educated to the full costs of proper operation very early in the process and can be directed to the least cost alternative of starting a new system.

The business plan should have four parts:

1) a financial plan to prove sufficient revenue;

2) a management plan to show the roles and responsibilities of the personnel, as well as their credentials;

3) an operation and maintenance plan to help assure effective day-to-day operation; and

4) performance guarantees, such as bonds, letters of credit, or the commitment of another water company or municipal government as a responsible back-up agency.

Another important component is the annual financial report, which ensures that funds are allocated according to the submitted business plan.

Some viability screening is already being performed for a small percentage of existing systems that have funding applications before PENNVEST or rate cases before the Pennsylvania Public Utility Commission (PUC). Agreements between DER, PUC, and PENNVEST are being considered to achieve uniform reviews, so that a system will have to prepare the financial information only once.

Conducting financial reviews for enforcement cases is also an option under consideration. The belief is that completion of the business plan will uncover the real reasons for continuing violations, such as the failure to charge sufficient rates for such necessities as hiring a knowledgeable operator, performing monitoring, or providing proper treatment.

Another method of improving system viability is to remove barriers and provide incentives for restructuring. For example, in 1991 the Pennsylvania Legislature passed Act 24, which allows a PUC-regulated company to include the costs for acquiring a failing system in its rate base. This helps to promote mergers and acquisitions.

In March 1992, the Legislature passed Act 5, known as the Small Water Systems Assistance Act, which

Continued on page 13

Continued from page 12

funds a small water systems regionalization grant program and provides a Technical Assistance Center for operator assistance programs.

In April 1992, the Legislature passed Act 27, which allows the PUC to order the acquisition of a troubled small system by a larger, more capable one. This can occur only after a full hearing with the affected customers and after the acceptance of a plan to correct all the small system's deficiencies. The intent is to provide a last resort safety net for improving nonviable systems.

Driving Forces of Consolidation

It is important to recognize the driving forces assisting such consolidations. Let us look at this first from a marketing standpoint. There are 50 to 70 restructured water systems each year in Pennsylvania, comprised mainly of mergers, acquisitions, and contracted management and operations. These consolidations are due to two main forces.

First, about half of the community water systems in Pennsylvania are investor owned. The larger stock companies have a profit motive, which is met by increasing the number of rate paying customers and capital facilities. Their general rule of thumb is that it takes about 5,000 connections to produce a profitable return on investment. Another factor may be the small systems' groundwater source or surface water allocation, which is needed by the larger system for future development in its franchise. These large systems are actively developing their acquisition plans years down the road and become an important ally to small system viability.

A second driving force is the Safe Drinking Water Act (SDWA) itself. Some systems are offering DER or a larger neighboring system the keys to the system. Their comments are basically, "I've had it with these costly and confusing regulations. I'm not making any profit. I want out of this mess."

The combination of increasing SDWA pressures plus aggressive acquisitions by large private water systems is pulling nonviable systems along the road to restructuring.

Voluntary Restructuring

Voluntary areawide restructuring is yet another approach to improving viability. The beauty of this approach is that no new law is needed. The catalyst of change can be local leaders, state agencies, or municipal authorities. For example, a cluster of small water systems in Cambria County are trying to restructure into one large system with the help of the Rural Water Association, DER, and local legislators.

This voluntary process involves a number of small systems recognizing they are in financial or compliance trouble. Next, support resources must be gathered, such as funding agencies and planning commissions. A coalition of the principal support agencies and systems must be formed.

It is also helpful to find a success story in the vicinity that demonstrates restructuring can be achieved. In the Cambria County case, the success story is a water authority in an adjoining county that formed out of a group of small coal mining towns. Next, engage the local persons who are "spark plugs" or champions of the cause. These people really are an essential ingredient. Although consolidations take a lot of planning and dedicated effort, the end product can be more viable systems.

Various Approaches at Work

In summary, there are various approaches at work in Pennsylvania to help achieve small system viability. These include:

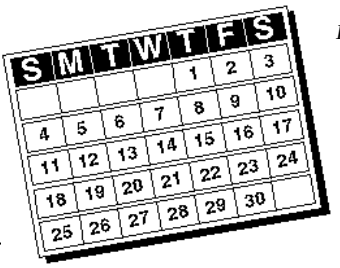
- requiring a *business plan* to force recognition of the full costs of providing reliable water service;
- enacting a *screening method* through permits or enforcement review;
- *removing barriers and providing incentives to restructuring,* such as "rolling in" acquisition costs to base rates or offering grant/loan support;
- providing a *safety net* for failing systems, including ordered acquisition by a more capable system;
- conducting *areawide water supply planning,* including wellhead protection;
- allowing the *market forces* of private industry to spur the acquisition and mergers of nonviable systems and to supply contracted management and operations;
- promoting *voluntary areawide consolidation* of clustered systems;
- providing *technical assistance,* such as DER's Technical Assistance Program for Small Systems, to train operators in their facilities and to maximize the effective operation of existing systems;
- offering *grant and loan programs,* such as PENNVEST, to upgrade existing facilities;
- forming *partnerships between industry and government* to leverage resources;
- developing *fees* to help pay for the assistance programs;
- using *forums,* such as DER's Small Systems Coordinating Committee, to bring different agencies together and to develop initiatives; and
- *educating the public* about the reasons for the higher rates to maintain viable systems.

From this list one can see the necessity of developing an array of approaches to deal with the complex viability issue. Also, multiple funding sources must be available to implement these initiatives.

Viability has gained national attention as the central issue to resolving many water system problems. Cooperative efforts between authorities, government, and the other sectors of the water industry will bring about significant water system improvements. The effort and expense invested in the various methods of improving system viability will pay off with self-sufficient systems that will deliver quality water and service to their customers.

In addition to serving as vice president of American Commonwealth Management Services Company, Inc., in Hershey, PA, Mr. Schmidt serves as chair of the American Water Works Association's Guidance Committee to Small Systems and is an active member of the Water Works Operators Association of Pennsylvania. He has more than 25 years experience in solving water system problems and initiated the Technical Assistance Program for Small Systems, mentioned in this article. ■

CALENDAR OF EVENTS



If your organization is planning a conference, workshop, exhibit, or seminar that is relevant to the people who work with small water systems, please send information about the event to NDWC Editor at the address listed in the staffbox on page 2.

EVENT	DATE & LOCATION	CONTACT
Utility Automation and Management	February 11–12: San Jose, California	**(303) 347-6108** Lana Stewart, American Water Works Research Foundation
***Principles of Ground Water Hydrology**	February 16–18: Phoenix, Arizona	**(614) 761-1711** National Ground Water Association
Agricultural Research to Protect Water Quality	February 21–24: Minneapolis, Minnesota	**(800) THE-SOIL** Soil and Water Conservation Society
***Introduction to Ground Water Geochemistry**	February 22–25: San Diego, California April 27–30: Atlanta, Georgia	**(614) 761-1711** National Ground Water Association
***Corrective Action for Containing and Controlling Ground Water Contamination**	March 1–3: Denver, Colorado	**(614) 761-1711** National Ground Water Association
Symposium on Geographic Information Systems and Water Resources	March 14–18: Mobile, Alabama	**(301) 493-8600** Michael Fink, Cosponsored by the American Water Resources Association and the U.S. Geological Survey
WQA Annual Convention and Trade Show **Watershed '93: A National Conference on Watershed Management**	March 16–21: San Antonio, Texas March 21–24: Alexandria, Virginia	**(708) 505-0161, Ext. 210** Jeannine Collins, Water Quality Association **(202) 833-8317** Jennifer Paugh, Cosponsored by many federal and environmental agencies, including the U.S. Environmental Protection Agency, Extension Service, Tennessee Valley Authority, National Water Research Institute, and American Water Works Association
National Conference on Aquifer and Wellhead Protection	March 28–April 1: Coeur d'Alene, Idaho	**(509) 456-6024 or (509) 456-3600** Sponsored by the U.S. Environmental Protection Agency and state and local agencies; cosponsored by the National Association of Counties, National Environmental Health Association, National League of Women Voters, American Water Works Association, American Society of Civil Engineers, and the American Planning Association
***Ground Water Monitoring and Sampling**	April 12–14: Minneapolis, Minnesota	**(614) 761-1711** National Ground Water Association
Sixth Annual Virginia Water Resource Conference	April 12–14: Richmond, Virginia	**(703) 231-8038** Elizabeth Crumbley, Virginia Water Resources Research Center, Sponsored by the Water Center and Virginia Lakes Association
NETA Fifteenth Annual Conference	April 19–21: Seattle, Washington	**(602) 956-6099** National Environmental Training Association
ASDWA Eighth Annual Conference	April 19–22: Nashville, Tennessee	**(703) 524-2428** Association of State Drinking Water Administrators

***short course**

Small Systems Information Still Being Sought

Responses to the Small Drinking Water System Database (SDWSD) questionnaire are beginning to reach the National Drinking Water Clearinghouse. Information about systems using package plants and a variety of technologies have been received, and the information supplied about each is being entered into the database.

Those who responded to the questionnaire, which was enclosed in the November O*n Tap*, will soon be receiving an *On Tap* baseball cap as our thanks for contributing your time to this worthwhile effort. There are still caps left, and we encourage any of you who are aware of low cost (no more than $325 per household per year), small flow water system technologies, including pilot studies, to complete a database form and send it to us.

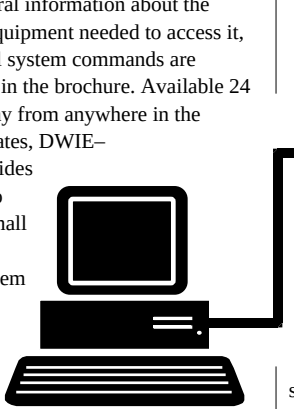
For new readers or those unfamiliar with the project, the SDWSD will house information about small drinking water systems around the country. The types of treatment technologies used, the technologies' performance, system manufacturers and distributors, water characteristics, system operating costs, target contaminants, contact names, and other information will be included in the database and made available to anyone requesting it. Such information should be of particular interest to consulting engineers and state and local officials.

To receive a questionnaire, or for more information about the SDWSD, phone (800) 624-8301. ■

DWIE–BBS Users Brochure Is Available

A free brochure that describes the National Drinking Water Clearinghouse's Drinking Water Information Exchange Bulletin Board System (DWIE–BBS) is now available by request.

General information about the system, equipment needed to access it, and useful system commands are discussed in the brochure. Available 24 hours a day from anywhere in the United States, DWIE–BBS provides a forum to discuss small drinking water system issues. A computer with a modem and communications software are necessary to log on to the system, which may be reached by dialing (800) 932-7459. Comments, questions, and requests for information concerning all drinking water topics are welcome. Currently, a "regulations conference" that encourages open dialogue on drinking water regulatory issues is also being offered through the system.



When ordered alone, there is no shipping or handling charge for the DWIE brochure; however, if the brochure is ordered in conjunction with other products, a shipping and handling charge will apply to the additional items. For more ordering information, see the back page. ■

Free *On Tap* Index Is Now Available

If you're a new subscriber to *On Tap*, or have loaned, misplaced, or thrown away your old editions, you may want to order the 1992 *On Tap* index.

Every article from our four 1992 issues is included in the index, and photocopies of these articles are available by request for 10 cents a photocopied page.

To order the index, call (800) 624-8301 and request the item number listed on the back page of this issue. ■

AWBERC Small Systems Resource Directory Is Available

A new small systems resource directory, published by the U.S. Environmental Protection Agency's (EPA) Office of Research and Development, is now available through the National Drinking Water Clearinghouse.

The July 1992 publication, called the *Andrew W. Breidenbach Environmental Research Center Small Systems Resource Directory*, discusses the center's 29 drinking water-related projects, as well as projects concerning municipal wastewater, multidisciplinary studies, and solid and hazardous waste management.

Included are drinking water studies about package plants; corrosion control; radium, radon, nitrate, and arsenic removal; point-of-use treatment; and alternative filtration technology, among others. Each project listing includes introductory information, a description of the project, a list of related available publications, and a research center contact.

Located in Cincinnati, Ohio, the Andrew W. Breidenbach Environmental Research Center (AWBERC) is one of EPA's largest research and development facilities. It encompasses seven technical laboratories and offices that manage a range of research programs and includes two administrative offices.

AWBERC staff collaborate with state and local governments, federal agencies, universities, industry, and international organizations, as well as other EPA program and regional offices, to identify environmental problems and develop solutions.

The 75-page document is free. For additional ordering information, see the back page. ■

New Products Include Resource Directory, DWIE Brochure

Note: Free items are limited to one of each per order. If free items are not available, you will be given the opportunity to receive free photocopies.

Shipping and handling (s/h) charges apply to all orders, unless otherwise noted.

A free catalog that lists all of the National Drinking Water Clearinghouse's free or low-cost educational products is now being developed. To be added to the catalog mailing list, please call Cheryl Trentini at 1-800-624-8301.

Andrew W. Breidenbach Environmental Research Center Small Systems Resource Directory

Item #: FMPCGN11

(See page 15 for description.)

Price: $0.00

DWIE–BBS Users Brochure

Item #: DWIE

(See page 15 for description.)

Price: $0.00 (free s/h)

1992 *On Tap* Index

Item #: DWPCIN01

(See page 15 for description.)

Price: $0.00 (free s/h)

TO ORDER:

Call 1-800-624-8301. Shipping and handling charges apply.

Ensuring the Viability of New, Small Drinking Water Systems. A Study of State Programs

Item #: DWBKRG16

Conclusions drawn from specific state case studies are included in this 122-page report, which discusses limiting the creation of systems lacking the technical, financial, or managerial resources to comply with regulations.

*Price: $8.50**

Improving the Viability of Existing Small Drinking Water Systems

Item #: DWBKGN06

This report provides information about how others have successfully addressed problems common to small drinking water systems. Case studies and recommendations for imple-menting state programs are included.

*Price: $3.25**

Manual for the Certification of Laboratories Analyzing Drinking Water Criteria and Procedures Quality Assurance

Item #: DWBKDM14

This third edition replaces the 1982 manual and addresses the increased complexity of drinking water regu-lations. Regional responsibilities concerning state laboratory certification programs are explained.

*Price: $7.00**

** indicates a U.S. EPA publication that has been photocopied because it is either out of print or temporarily unavailable.*

It is possible that free copies of these documents may still be available from the EPA Safe Drinking Water Hotline or the Office of Ground Water and Drinking Water Resource Center. Call the NDWC for the telephone numbers.

Rural Development Administration Regional Office Update

Please note the following changes (printed in boldface) to the Rural Development Administration regional office listing that appeared in the last (November) issue of *On Tap*:

- *Southeast* regional address: **1555 Richland Ave., East** Aiken, SC **29801**
- *Western* regional address: 317 S. 7th Street, **3rd Floor** Klamath Falls, OR 97601
- *Northeast* regional telephone no.: (717) **882-1000**
- *Delta* regional telephone no.: (601) **631-3900**.

For more information, call the NDWC at (800) 624-8301.

National Drinking Water Clearinghouse
West Virginia University
P.O. Box 6064
Morgantown, WV 26506-6064

Nonprofit Organization
U.S. Postage Paid
Permit No. 34
Morgantown, WV