Ask the Experts

What groundwater contaminants or other groundwater problems does your community or system encounter? What are the solutions?

Each issue, we ask members of the *On Tap* Editorial Advisory Board to answer a drinking water-related question. We then print as many responses as space permits. The opinions expressed are not necessarily those of the NDWC.

Handle Each Situation Differently

Peninsula Light Company owns or manages more than 90 very small water systems. In our service area, we have not experienced primary groundwater contamination, although other areas of the state have experienced nitrate, arsenic, and radionuclides that exceed the maximum contaminant levels. Our primary water quality concerns are:

1. iron and/or manganese exceeding the secondary contaminant standard,
2. hydrogen sulfide odor complaints,
3. potential risk for salt water intrusion, and
4. sanding or sediment problems from wells not being properly developed or pumping capacities being overstated.

We have handled each of these situations differently depending upon customer desires, resources available, and/or degree of the problem.

For iron and manganese, we may or may not provide treatment. If we are fortunate enough to have more than one source, we can blend or set pumping schedules to provide the best water quality possible. Treatment can be provided, but due to resource limitations, as a policy it is only provided to systems that are willing to pay for the true cost of operation and maintenance, not just capital investment costs. Our policy is consistent with the state's.

Hydrogen sulfide can be handled by proper aeration at a storage facility. Unfortunately, many of our systems do not have adequate storage. Chlorination is used with a slight benefit. When we get calls in the winter we can flush lines with some improvement. When we get calls in the summer on one of our systems with storage, it's because there is less retention time and flushing only exacerbates the problem.

There are systems in our area that have salt-water intrusion problems. We have a few systems more at risk that we have an increased monitoring requirement for chlorides. The system with the most at-risk well has two wells, so pumping at the one has been restricted to only what is needed for system capacity, and chlorides are checked on a quarterly basis.

Sanding problems, which not only result in complaints from customers, but can affect the pump's useful life, affect a couple of the systems we have acquired. One new system we elected not to acquire because they would not install storage and reduce pump capacity. Another new system agreed to the added cost of storage and reduced pump capacity. And another small system we own said we could reduce the pump capacity because of storage that we added. We've also installed sand filters. It's much more expensive to go back and retrofit or redevelop wells.

The later two problems (salt water and sanding) are also more manageable when customers are metered and conservation is encouraged.

Elisabeth A. Raysby, P.E.
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A Different Twist on Groundwater

I would like to propose a different twist on this question. I am guessing that most will respond in the area of contaminants, treatment, and such. That is great, and they certainly deserves discussing.

I might suggest that we look into the issue of the actual availability of water. Having just moved to Colorado, I am finding out that this is becoming a very serious issue for the western states and possibly all across the country. The big issues are:

1. Water rights
2. Water augmentation
3. Who owns "what you can't see," i.e., groundwater?

4. Is groundwater really a renewable resource?
5. And if so, is it being used faster than it is being renewed?

In the old days in this country, they used to hang people for stealing horses and cattle. The attitude these days seems to be: "I'm not worried about my horses or my cattle, but if you take my water–get a rope!"

The availability of water may be the real demise of the small system. In theory, there is a treatment technology available for any contaminant; it may be expensive but the problem can be treated. However, if the groundwater is just not available, you have no option but to close your doors.

Another area is to delve into things like global warming and changing weather patterns and how that may be impacting aquifer recharge areas.

I hope I have given you a flavor for what the issues might be. And as I said, I am just beginning to learn about this.

Rod Coker
Tribal Utility Consultant (retired)
Indian Health Service

Conduct a Detailed Study

Wellhead protection (source water protection) is an attempt to prevent contamination by controlling land uses in the general above the area of the well. Imposing wellhead protection after the well has become contaminated is not a viable solution.

If the well already is contaminated, you need to conduct a fairly detailed hydrogeologic and hydrochemical investigation. The objectives of the study would be to:

1. develop a conceptual model of the subsurface geology that includes identifying the aquifers, confining layers, direction of groundwater flow, and likely recharge areas;
2. gain a detailed understanding of the contaminant found in the well including the time it was detected and concentration levels over time;
3. use knowledge of the contaminant with knowledge of the aquifer to identify potential contaminant sources and flow patterns and long-term fate of the well/aquifer system; and
4. develop a plan for remediation of the well and aquifer or abandonment of the well and development of an alternative water supply source.

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