

Wellhead protection: local people finding local solutions

At some point in the future, your board or council will be asked by a customer, a regulator, a consultant, an attorney, or a wholesale purchaser about the programs your water system has in place to protect the water in your lake, river or aquifer. At some point, people will not assume you are in control of everything, even if you are. They will ask questions about your efforts and ability to keep the water they drink flowing. They will ask how you keep it safe. When will they ask? How will you respond?

Will they ask after a natural catastrophe like the one caused by Hurricane Katrina? Will they ask after a neighboring community experiences contamination of their

water supply? Will they ask after a boil order is declared for your system or after an interruption of supply?

When they do, how will you answer?

How to Get Started

It is estimated that less than 10% of the Kansas public water systems have developed a formal wellhead protection plan. Additionally, each system in the remaining 90% probably has a unique combination of multiple reasons for their lack of comprehensive protection planning. In increasing frequency, it seems that when an event occurs and the customers learn that water isn't available, they don't want to know the reasons that prevented



Some farmers are using llamas to protect sheep and goats from predators, as shown in this peaceful pasture located in Kingman County.

What is your water system's first line of defense in the protection of your drinking water?

the system from meeting their mission, they want to know why those reasons were allowed to interrupt their water supply. These reasons must be swept aside to

Every water system's strategic plan should include wellhead protection, in addition to infrastructure improvements, water rate reviews, etc.



*Doug Helmke
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These batteries dumped beside a gravel road obviously threaten the quality of local groundwater. Unseen and unknown liquid wastes and items hidden or buried may pose a greater danger.



Cross connection control and disinfection are only effective if the water introduced to the system is acceptable. A line of defense is necessary at and within the borders of the recharge, or wellhead

allow the system's strategic plan to include wellhead protection, to ensure a dependable supply of high-quality water at a reasonable price.

protection, area. Systems which have already adopted a wellhead protection plan should have continued protection in their long

range plans too, to maintain, enhance or remove protection activities as needed.

Build Knowledge

When your water system's leadership recognizes the danger of complacency and decides to take control of the future, they should first use the resources most readily available to them. A planning team of local experts and leaders should be identified and recruited. Water systems have experts in pollution reduction and soil conservation living and working in their county and they may even be customers of the water system. Wildlife experts are available who may be able to promote projects that positively effect water quality. Local businessmen and women may also be a resource for positive changes in the community. If needed, there are others across the state (think Kansas Rural Water Association) who would welcome the opportunity to advise and guide a water system toward the goal of protecting the water supply.

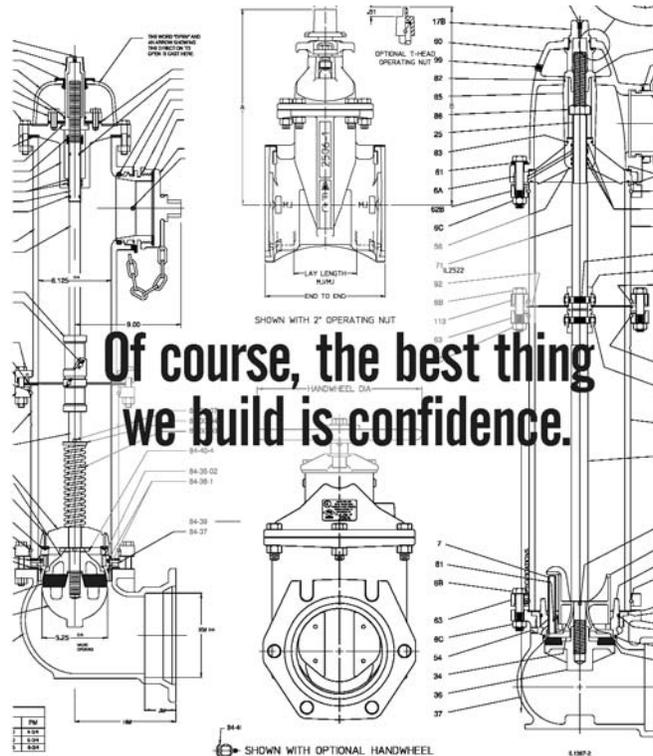
Once your team is in place, a little hydrology and geology education may be in order. A basic understanding of groundwater recharge and flow for the site of the water wells may prove beneficial in developing an

After establishing a wellhead protection area, the committee needs to know of the presence of contaminants on the surface and in the subsurface and how they move through the environment. An inventory must be done to identify

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effective protection strategy. An understanding of the history of the water system, specifically wells formerly used and studies commissioned to identify and select the existing wells, may also be useful. An understanding of well construction and maintenance may also be important. With an understanding of the groundwater and the recharge area of the water wells, a protection area can be established.

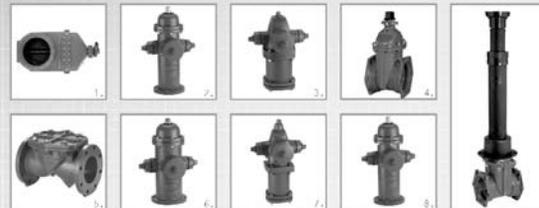
the potential contaminant sources within the chosen protection area. After compilation of the sources, the committee determines which are most likely to impact the water supply. The Kansas Source Water Assessment Program was developed to identify these threats for all water systems in Kansas and was completed in 2004. Although the assessments used a two-mile circle assessment area and not necessarily the recharge



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area, it usually gave a good identification of the most threatening contaminants.

Commitment & Ingenuity

For some water systems, the next step is the hardest one. In situations where the water wells are isolated from human activities that can be damaging, where the recharge area is distant and the water is filtered and diluted over many years before reaching the wells, protection activities may be few and easy to accomplish. The city of Overbrook and Osage Rural Water District No. 5, for example, have wells that are 375 to over 500 feet deep. The aquifer from which they pump is overlain with many layers of shale which likely prevents any surface contaminants at the well sites from reaching the aquifer. It is likely that the biggest threats to their source water are the wells themselves. As such, their wellhead protection plans strongly recommend a program of regular well inspections and maintenance.



This public water system well is located in close proximity to a corn field, a public road and a railroad. The underlying groundwater is threatened by the use of fertilizers and herbicides on the fields and right-of-ways, by spills on the railroad, and runoff into the road ditch. This well also has easy access for people with bad intentions.

For other systems, especially those with their wells located within their communities, the threats may be numerous and appear to be everywhere. Multiple activities are necessary to thwart these threats and with careful consideration of these threats and the measures to address them, prioritization of the protection activities is often done. One such example is a community that had crop production within

100 feet, a failing septic system within 500 feet and a grain elevator with carbon tetrachloride contamination within 2,500 feet of their wells. As the septic system problem was easily corrected by attaching the home to the city's sanitary sewer, this activity was given the highest priority. The grain elevator contamination was being monitored by the Bureau of Remediation and showed no signs

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INTAKE SCREENING

PROCESS
aeration, flash mixing, flocculation, lime softening, contact basins, packaged systems, ion exchange

CLARIFICATION
circular clarifiers, rectangular chain & scraper clarifiers, telescoping valves, baffles, launder covers

FILTRATION
membrane, gravity, pressure, packaged systems, tube settlers, underdrains, air/water backwash systems

CHEMICAL FEED
gas chlorination, gas sulfonation, liquid metering, lime slaker / silo, dry chemical feed, carbon dioxide, chlorine dioxide, scales, leak detectors

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open channel, magmeters

DISINFECTION
ultraviolet, ozone, chlorine

PUMPS
booster, packaged stations

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process control, instrumentation/controls, telemetry



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of movement toward the water wells so it was given the lowest priority. The nearby crop production was given a slightly lower priority than the septic system, only because the sanitary sewer solution was quicker and a one-time activity. A soil monitoring / fertilizer use reduction program will be ongoing and may take years to accomplish a reduction of nitrate in the groundwater that may have been created decades ago. Nitrate reduction moved to the top of their list after the sewer connection was made.

Because wellhead protection plans are developed by unique committees of local persons addressing unique local threats in unique hydrologic situations, there is no "standard" wellhead protection plan. Any activity that can be accomplished by the water system, their customers and their supporters, that can make a long or short-term difference in the

water quality, is eligible for inclusion in the plan. The committee should take some time to do some creative thinking to develop activities that can be included. They should also ask the local service groups if they need any projects or have any ideas.

Conclusion

If an activity will make a positive result, find a way to accomplish it. A few small steps to address minor threats may help get your system and the community going in the right direction. With a few small

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Invitations to those persons responsible for the potential contamination may also recognize the need to do something but are waiting for assistance, not accusations, to address the problem. With their involvement, a possible solution may be found. Don't forget to include your state and federal agencies, either. They may be able to help too.

victories, the larger problems will become more manageable.

Take this challenge to do more than hope that everything takes care of itself. Because a little work, focus and determination will result in you having the answers to the questions that will be asked; answers that will be easy to give because you are proactively managing your water system and protecting your water supply.

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