By Dr. John Regnier, Consultant, National Rural Water Association

Ergs, Joules & Such

I appreciate the opportunity to provide this article to readers of *The Kansas Lifeline* magazine. I am a consultant to the National Rural Water Association; I have spent the last 50 years in environmental engineering, the last 25 of which have been related to public water supply issues.

The issue of unaccounted for water loss and leak detection are important considerations for public water supply systems. Although the possible energy savings that can be achieved through direct electrical use reduction are often remarkable, we need to remember that the biggest bang for the buck in energy conservation is through water loss reduction. Many readers are quite familiar with this subject, so this will be in the nature of a review.

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First, some statistics to get your attention:

- From work we have conducted, the average electric cost in our small systems to produce and distribute drinking water is about 50 cents/1000 gallons.
- In the U.S., small public water systems produce in the order of a trillion gallons or more of water per year.
- If even a small fraction of that is wasted through leaks (and we know it is) we're talking about significant amounts of wasted energy and money.

Let's go over another statistic that kicks around the waterworks industry. For years, water loss goals ranging from five to fifteen percent have been considered more or less acceptable. In today's era of high energy and water costs, these percentage goals probably need to be readdressed. Suppose we lose fifteen percent of that trillion gallons produced – that's 150 billion gallons and at our average electrical cost of 50 cents per 1000, we're talking an energy loss of $75,000,000 per year. And of course we know many systems lose much more than fifteen percent.

I would suggest that a much more realistic goal is not to accept any loss that's practical to find. In my experience, that's loss of around ten gallons per minute, or about 500,000 gallons per month. If that's concentrated in one leak, it may be pretty easy to locate. However, if it's spread over several small leaks, it may get pretty difficult.

That leads to another industry practice that may need some reconsideration. As we know, it's common practice to check for unaccounted-for water at the end of the month. I recently explained a scenario of what it costs a water system because of delays in finding leaks to use the monthly unaccounted-for as a trigger for looking for leaks. There is likely to be a minimum of $900 or so just in electrical cost for a 20-gpm leak. There's a simple way around this I'll touch on in the next paragraph.

One path to quicker leak detection is use of flow meters. As an example, why not put an inexpensive, recording propeller meter in a main feeder line? Every morning when the operator reports in, check what the flow was at say 2:00 a.m. when water use should be low. If that line doesn't normally have night use on it, the flow will probably be low and fairly constant. But suppose one morning the flow rate increased by 30 gpm. You can be pretty sure there is a leak downstream from that meter and by watching the meter and shutting valves you can soon isolate the leak to one section. Pinpointing is usually easy after that.

Think energy conservation!

The year 2010 promises to be a year of increased concern about energy. As we know, it is a major facet of water utility operations. As the economy continues to improve (hopefully), I think we can assume fuel prices will start back up, the furor over climate change may involve major energy impacts, and the National Rural Water Association will be pushing new energy conservation initiatives in the Congress and elsewhere. A major one is Senate Bill 1462 which would establish an energy circuit rider program. Also, a grant request to the DOE Energy Efficiency and Conservation Block Grant Program is being prepared.

Dr. John Regnier has a Bachelor of Chemistry degree from the South Dakota School of Mines and an ME and PhD in Environmental Engineering from the University of Florida. He is President and owner of High Point, Inc., an environmental engineering consulting firm in Prattville, Alabama. He is a consultant to the National Rural Water Association, currently his sole client.