

"Recipe For Success" Should Include Calculating Water Loss Monthly

It seems that every year goes by faster and faster working Kansas Rural Water Association (KRWA). It seems that it was only last month that the 2011 conference was held. I'm writing this article on January 29 – and the flurry of activity associated with the 2012 conference is about to descend. Final preparations for this year's conference on March 27 – 29 at Century II in Wichita are ongoing. The theme is "Recipe For Success".

So what is the "Recipe For Success?" Someone has a magic formula for being successful? I don't think so. "Recipe For Success" is a theme that was selected to portray the various ingredients if you will, for municipal and rural water utilities to efficiently do what they are supposed to do. That is, to provide service to the public.

KRWA helps systems provide efficient service. While some of KRWA's staff work closely with conference issues, KRWA's field staff continue to work with water and wastewater systems. One aspect of KRWA's efforts is to help those water systems that have high water loss. By "high" I mean those systems with 30 percent or more unaccounted for water. The systems are identified from the previous year's Water Use Report which is sent to the Kansas Department of Agriculture, Division of Water Resources. The Kansas Water Office (KWO) has contracted with KRWA to provide "On-Site Technical Assistance to Public Water Suppliers" to reduce high unaccounted for water loss. As of February 1, 2012, KRWA is working with 19 cities and 26 rural water districts to reduce high water loss. Helping reduce water loss is only one aspect of the help that is provided through the contract; the funding is available through the Clean Drinking Water Fee. The systems are referred to as "Special Focus" projects.

Numerous prior articles in *The Kansas Lifeline* have detailed issues that contribute to high water loss, from equipment malfunction to errors in recordkeeping. Knowing the amount of water produced or purchased, sold and

provided free is essential if water loss is going to be calculated correctly. Systems

should be calculating water loss on a monthly basis. However, there are still cities and rural water districts that do not attempt to determine the loss until the end of the year.

KRWA is presently working with one smaller town where the operator records the master meter readings every day. The customer meters are read monthly with the reading provided to the city clerk who has the responsibility to send out the monthly bills. Customer bills are calculated and mailed. Payment is returned to city hall; payments are recorded and deposits are made to the bank. So far – so good.

Now comes the practice that should – and needs to change. Remember, the operator in this smaller town records the readings from the master meters at the well houses every day. That's a good practice. The problem is the operator is only writing down the meter readings; there's no calculating the amount of water produced each day.

There's no way to know when a problem with loss occurs. Next, the operator keeps this information until the end of the year. There's no way for anyone to know what the loss is on a monthly basis. After the operator delivers the water produced for the year, the somewhat bewildered city clerk is left to calculate the amount of water produced each month.

The story doesn't end with that; it gets even more convoluted. The city clerk has to run a report, or in cases, manually tabulate the water sales by month. Now she has all the information necessary to complete the Water Use Report that is required to be filed by cities or RWDs that have water rights. Purchasing systems are "encouraged" to file the report. After the water production is calculated – nothing more is done with the information other than to fill out the Water Use Report. What's missing is there has not been and will not be a calculation of the percentage of water loss. The only thing known is the total water not accounted for the

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previous year. No one knows if the unaccounted for water has increased or not. This is the way the process has been conducted for years in that town. The new city clerk isn't aware of a better process. In that town, there has never been a determination of percentage of water sold versus produced on a monthly or annual basis. It's only because of dedicated staff in a state agency that the small town knows what the loss percentage is. When it's greater than 30 percent, the system ends up being referred to KRWA for assistance. We're now back at the well house and city hall with the operator and clerk, or mayor and council members trying to determine if the loss is due to record keeping, incorrect or inaccurate meter readings, other contributors, or lastly, leaking pipes. Leaking pipes is incorrectly the first thing most people assume to be responsible for high water loss. Often that is not the cause.

A water system will never have zero water loss percentage. Some do – but only on paper. KRWA staff have found systems that reported “making water”. Yes, there were undetected interconnections – and they were located and corrected.

There will always be variances between meters and there has to be an understanding that it takes time to read meters. It's impossible to have absolute accuracy because of the variables in the time meters are read and reported. However, every system should strive to maintain an annual water loss percentage of less than twenty percent.

Information about each of the “Special Focus” projects is posted on the KRWA Web site at www.krwa.net; find them under the “Technical Assistance” link. There is also a link to the entire FY 2012 contract performance at the link, searchable by system name or river basin.

Calculating water loss . . .

Unless the operator is paying very close attention to the amount of water produced daily and detects higher pumpage, no loss problem can be detected. The production meter is read daily and customer meters are read on the tenth of the month. It should be relatively simple to develop an accounting process to compare the production from the tenth of each month to the amount of water sold. For example:

Master meter reading on January 10:	82,550,500
Master meter reading on December 10:	- 80,885,300
Number of gallons produced:	1,665,200

Let's suppose that the sales in the period from December – January in this small town totaled 925,600 gallons. In this example, the unaccounted for water is 739,600 gallons. (1,665,200 produced – 926,600 sold = 739,600 unaccounted for)

To determine the percentage of loss, divide the unaccounted for water by the water produced and multiply by 100. The result is as follows: $739,600 / 1,665,200 * 100 = 44.4$ percent

Having a water loss percentage of 44.4 percent is excessive. The average water loss for Kansas is approximately 18 percent. Finding the contributors for high water loss is easier to determine if increasing losses are detected earlier versus waiting until the end of the year to do the calculation, mainly to complete the Water Use Report.

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MUNICIPAL WATER USE REPORT WORKSHEET

(Use this template only for monthly production and sales information; transfer quantities to official DWR report for submittal)

MONTHLY WATER USE SUMMARY

NOTE: REPORT WATER PUMPED, PURCHASED, AND SOLD FOR THE MONTH OF ACTUAL USE. REPORT ALL AMOUNT IN UNITS OF 1000 GALLONS

- Column 1: The amount of water diverted, by month, from all points of diversion (wells or intakes). If possible, raw water meters should be read at the same time of the month as customer meters. The amount in this column should equal the total of the amounts reported in Part A.
- Column 2: The amount of water purchased, by month, from all other public water supply systems or the Kansas Water Office. Please provide further detail in PART E.
- Column 3: The amount of water sold, by month, to all other public water supply systems. Please provide further detail in PART E.
- Column 4: The amount of water sold, by month, to all industrial, pasture, stockwater, feedlot, and bulk water service connections. For rural water districts, include the amount of water sold to farms/leads using at least 200,000 gallons of water per year. Also include metered power plant usage, even if this water is supplied free.
- Column 5: The amount of water sold, by month, to your residential, commercial and institutional customers (include hospitals, schools, etc.)
- Column 6: The amount of water used, by month, that is metered at individual service connections and supplied free, such as for public service, treatment processes, and connections receiving free water. Please record metered power plant usage with industrial water use in Column 4.
- Column 7: The amount of unaccounted for water, by month. The gallons reported in this column are found by adding the numbers in Column 1 and 2 and subtracting the numbers in Columns 3, 4, 5, and 6. If you do not sell water to your customers, this column simply represents the total amount of water that you diverted or purchased.

Month	Column 1 Raw Water Diverted	Column 2 Water Purchased	Column 3 Water Sold to Other Suppliers	Column 4 Water Sold Industrial, Stock & Bulk	Column 5 Water Sold Residential, Commercial	Column 6 Metered Water Provided Free	Column 7 Unaccounted For Water	Unaccounted For Percent by Month	Loss in GPM
January	0	0	0	0	0	0	0	#DIV/0!	0.0
February	0	0	0	0	0	0	0	#DIV/0!	0.0
March	0	0	0	0	0	0	0	#DIV/0!	0.0
April	0	0	0	0	0	0	0	#DIV/0!	0.0
May	0	0	0	0	0	0	0	#DIV/0!	0.0
June	0	0	0	0	0	0	0	#DIV/0!	0.0
July	0	0	0	0	0	0	0	#DIV/0!	0.0
August	0	0	0	0	0	0	0	#DIV/0!	0.0
September	0	0	0	0	0	0	0	#DIV/0!	0.0
October	0	0	0	0	0	0	0	#DIV/0!	0.0
November	0	0	0	0	0	0	0	#DIV/0!	0.0
December	0	0	0	0	0	0	0	#DIV/0!	0.0
Total	0	0	0	0	0	0	0	#DIV/0!	

POPULATION, SERVICE CONNECTIONS, AND WATER RATES

- Population served: _____. Estimate number of persons served directly by your distribution system.
- Number of ACTIVE water service connections as of December 31:
 - _____ Residential c. _____ Industrial e. _____ Other (specify)
 - _____ Commercial d. _____ Pasture/Stockwater/Feedlot f. _____ Total Customers
- For cities, how many of the active residential water service connections shown in 2a are located outside of city limits. _____
- Date of last water rate change (Month and Year): _____. If rates changed during the previous year, attach rates that apply to residential users.

NOTE: This template is available for download at www.krwa.net, then under "Technical Assistance"

Download KRWA's water loss spreadsheet

KRWA has developed a Water Loss Spreadsheet, modeled on the Water Use Report but expanded to also do the calculations for water loss on a monthly basis. It's available for download through the KRWA Web site at www.krwa.net and then under "Online Services". This is not the "official DWR Water Use Report". The intent is to help systems track water produced/purchased and sold monthly – and to have the form determine the percentage of loss. The monthly data can be readily copied to the official report form that needs to be submitted annually to DWR by March 1.

Attend the conference

The upcoming 45th annual conference and exhibition at Century II offers a total of 58 training sessions, ten of them being five hours on Tuesday, March 27. EXPO Hall will

have 304 exhibit spaces filled with products and services. It's a great place to learn about new products. Many systems bring their shopping lists and they obtain price quotes right there. One city has regularly made deals to purchase at least \$100,000 in products at the conference. The KRWA conference is one of the best investments you'll find. We hope everyone takes advantage of it; I hope to see you there.

Greg Duryea has worked for KRWA since 1993. He presently is the Assistant General Manager and manages the Emergency Operator Program, with a variety of other responsibilities. He holds a Class I water certification and is the certified operator for Sycamore Springs Resort in Brown County.



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