

Southeast Rural
Community Assistance
Project, Inc.



Water Is Life®

Community Profile

RCAP Helps Tennille, Georgia, Solve Mystery of Wastewater Treatment System Overload



Tennille is a small city near the center of Georgia. It is typical of many areas in the very rural South today; its heyday is either past or hasn't arrived yet. Once a railroad town, Tennille is now overshadowed by the neighboring city of Sandersville, which is larger and has a much more diverse and prosperous economy.

In 2003, USDA Rural Development asked Georgia RCAP to help Tennille respond to a consent order issued by the state primacy agency, the Georgia Environmental Protection Division (EPD), for excessive hydraulic overloading of its wastewater treatment facility. Tennille officials had settled a similar order in 2001, but were again facing hefty fines. The water and wastewater systems were operating in the red and were being heavily subsidized by the city's general fund. As a preliminary measure to address the anticipated cost of fixing the system, the city dedicated approximately \$750,000 in Special Purpose Local Option Sales Tax (SPLOST) funds to the cause.

RCAP work began with Technical Assistance Provider (TAP) Jim Caldwell reviewing the results of a recently completed TV inspection of the sewer lines. Field data indicated serious extraneous flows into the sewer system. Analyses of the community's financial, managerial, and technical processes for the water and wastewater systems were also needed to fully understand the situation. The technical analysis uncovered a water loss of more than 60 percent – Tennille was pumping an average of 10 million gallons of water a month but selling less than four million gallons. This water loss had gone unattended for several years. (Excess water loss can be cause for a consent order, but in Tennille's case, the Georgia EPD was concerned primarily about the excessive volume entering the wastewater treatment facility.) Unfortunately, indicators such as pump run-time data at the city's well,



Tennille officials discuss RCAP findings and potential user rate changes

compared to the pump's data plate rating and discharge meter reading, had not been monitored. As a result, about 200,000 gallons a day were being pumped and treated but unsold, a significant volume considering Tennille's small size and relatively flat geography. The cost of treating, pumping, storing, and distributing that much unsold water contributed significantly to the negative cash flow of the system.

In addition, the influent meter at the wastewater treatment facility had been inoperative for a long time. Therefore, it was not possible to accurately measure how much wastewater was being treated at the city's facility; yet the state's consent order was based on the understanding that far more effluent was going over the weir than was permitted, based on the facility's design capacity.

Despite these issues, field work revealed no leaks. Therefore, the first order of business was to address the flows into the sewage treatment facility. Once reliable treatment data could be logged, it was possible to compare daily potable water use with the volume of influent, and an investigation to confirm the growing suspicion of water leaks directly into the collection lines could begin.

Caldwell began by verifying that the operational meter at the city's well was working properly. The operating well,

along with a backup well, were each examined to determine whether pressurized water from the distribution system was finding its way back into the shafts of those wells. A midnight-to-dawn analysis of the drawdown of the water level in the town's elevated storage tank showed steady overnight use, which supported the premise that water distribution leaks were the culprit.

Caldwell then arranged for a professional leak detection analysis of the entire system. The review found 43 leaks, 17 of which were moderate to severe, and one potential major water loss. A major loss that was not a leak was at the Department of Transportation (DOT) district work facility in the city. The DOT work site had a meter installed for the office area (one small bathroom, with no additional water use) but not for the maintenance yard, where trucks outfitted as water haulers were filled via a six-inch main to transport water to roadwork sites. The result was untold lost water revenue for the city.

The investigation then turned to the influent meter at the wastewater treatment facility. Ongoing drought conditions meant infiltration and inflow were minimal at the time and could be discounted. A comparison of 90-day influent data at the wastewater facility with the pumping data from the operational meter at the

town's well, as well as with total accounted-for water from customers' meters, revealed that a significant portion of the hydraulic overloading problem was caused by the water system leaking into the sewer system.

Fortunately, this finding meant that the funds Tennille committed from the SPLOST to address the wastewater issue could legally be used to fix the water system leaks, reducing the amount of debt that would be incurred, as well as the amount water rates would need to be raised to repay the debt. The community is now moving forward with a project to repair the numerous leaks.

Mystery Solved, Money Talk Begins

With Jim Caldwell's work well underway and a sense in the community that the bulk of the wastewater system infiltration problem had been identified, Tim Grogg entered the picture. Grogg is a financial specialist for Georgia RCAP, and it became his job to work with officials in Tennille to address the financial capacity issues with the water and sewer systems. The magnitude of the water loss problem, combined with the large number of identified leaks, meant a fix would be expensive.

continued on next page

Grogg's financial analysis and reporting were quite extensive. As is often the case with a major infrastructure expense, every Tennille council member had an idea about how to proceed. Grogg reasoned that it would be wise to develop a financial tool to hand out to each council member to help them arrive at a decision. The spreadsheet that he developed was based on an extensive rate-forecasting model developed from customer consumption patterns – this eliminated a lot of back-of-a-napkin calculations among council and community members. The result is a matrix that shows the effects on water revenues of incremental increases in the base charge versus the cost per thousands of gallons used. Anyone can quickly scan the matrix to find the various combinations of base and usage rates that will produce the amount of revenue needed annually to meet ongoing expenses and repay any debt incurred to fix the water loss problem. This simple tool reduced the amount of time needed to come to a consensus in the planning phase. The water portion of the rate matrix is shown to the right.

providing for itself, assuming the water loss problem is resolved. If losses can be lowered to between 10 and 15 percent, it would be to Tennille's financial advantage to contract with Sandersville. If water loss cannot be brought under control, or if Tennille residents are unwilling to cede control of their water supply, the other, more expensive options are available. However, no testing has been completed to determine whether a site for a new well can be found that meets SDWA requirements.

loop of a distribution system. Twenty-four hours later, the city worker can repeat the drive-by read and correlate the combined use from the individual meters with the readings from the meters on the mains (into and out of the loop), which will provide a direct indication of the location of leaks in the system, as well as their size. Under some funding assistance programs, the meters are an allowable cost.

While You're In There...

Georgia RCAP staff has long advocated that, when water distribution system improvements are made in small towns, consideration should be given to replacing or retrofitting customer meters to remote read meters. The design should include meters (such as induction meters or compound meters) strategically placed on the larger mains to work in conjunction with the individual meters. With a simple drive-by reading of the meters, a city worker can validate the amount of water sold in a

RCAP Sticks Around

Caldwell and Grogg continue to work with Tennille officials to resolve their water and wastewater issues. The community understands that addressing the water loss problem may not resolve the overloading problem at the wastewater treatment facility. Additional measures – such as repairing or replacing sewer collection lines and upgrading the wastewater facility – may be needed in order to be released from the consent order. Whatever happens, RCAP will be there until the end to provide technical assistance and training to local officials. ■

Where There's a Well, There Must Be Two

Water loss is not Tennille's only water system challenge. In Georgia, a backup well is required for municipal groundwater systems. Several years ago the community constructed a new well to serve as a backup, but its water quality did not meet Safe Drinking Water Act (SDWA) standards. Jim Caldwell worked with Tennille officials to analyze the options for bringing the community into SDWA compliance. Those options include developing a chemical treatment system for the inoperative well, developing a new well (which would become the primary water source), or negotiating with the neighboring city of Sandersville to deliver potable water to Tennille customers.

Sandersville has offered to provide water at a fraction of the cost of Tennille

Tennille, GA Water System Revenue Analysis

ANNUAL WATER SYSTEM REVENUE	NO CHANGE	BASE +50¢	BASE +\$1.00	BASE +\$1.50	BASE +\$2.00	BASE +\$2.50
NO CHANGE	\$ 170,914	\$ 175,060	\$ 179,206	\$ 183,352	\$ 187,498	\$ 191,644
PER 1,000 GALLONS ABOVE MINIMUM +25¢	\$ 179,706	\$ 183,852	\$ 187,998	\$ 192,144	\$ 196,290	\$ 200,436
PER 1,000 GALLONS ABOVE MINIMUM +50¢	\$ 188,498	\$ 192,644	\$ 196,790	\$ 200,936	\$ 205,082	\$ 209,228
PER 1,000 GALLONS ABOVE MINIMUM +75¢	\$ 197,290	\$ 201,436	\$ 205,582	\$ 209,728	\$ 213,874	\$ 218,020
PER 1,000 GALLONS ABOVE MINIMUM +\$1	\$ 206,082	\$ 210,228	\$ 214,374	\$ 218,520	\$ 222,666	\$ 226,812
PER 1,000 GALLONS ABOVE MINIMUM +\$1.25	\$ 214,874	\$ 219,020	\$ 223,166	\$ 227,312	\$ 231,458	\$ 235,604
PER 1,000 GALLONS ABOVE MINIMUM +\$1.50	\$ 223,666	\$ 227,812	\$ 231,958	\$ 236,104	\$ 240,250	\$ 244,396
PER 1,000 GALLONS ABOVE MINIMUM +\$1.75	\$ 232,458	\$ 236,604	\$ 240,750	\$ 244,896	\$ 249,042	\$ 253,188
PER 1,000 GALLONS ABOVE MINIMUM +\$2.00	\$ 241,250	\$ 245,396	\$ 249,542	\$ 253,688	\$ 257,834	\$ 261,980
PER 1,000 GALLONS ABOVE MINIMUM +\$2.25	\$ 250,042	\$ 254,188	\$ 258,334	\$ 262,480	\$ 266,626	\$ 270,772
PER 1,000 GALLONS ABOVE MINIMUM +\$2.50	\$ 258,834	\$ 262,980	\$ 267,126	\$ 271,272	\$ 275,418	\$ 279,564
PER 1,000 GALLONS ABOVE MINIMUM +\$2.75	\$ 267,626	\$ 271,772	\$ 275,918	\$ 280,064	\$ 284,210	\$ 288,356
PER 1,000 GALLONS ABOVE MINIMUM +\$3.00	\$ 276,418	\$ 280,564	\$ 284,710	\$ 288,856	\$ 293,002	\$ 297,148
PER 1,000 GALLONS ABOVE MINIMUM +\$3.25	\$ 285,210	\$ 289,356	\$ 293,502	\$ 297,648	\$ 301,794	\$ 305,940
PER 1,000 GALLONS ABOVE MINIMUM +\$3.50	\$ 294,002	\$ 298,148	\$ 302,294	\$ 306,440	\$ 310,586	\$ 314,732

Each 50¢ increase in the water base charge = \$4,146 in new annual revenue
 Each 25¢ increase in the water use charge = \$8,792 in new annual revenue