

# SUCCESSFUL WATER EFFICIENCY PROGRAMS FOR INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL FACILITIES

Judy Adler, P.E.<sup>1</sup> and Joel Dicks<sup>2</sup>

*AUTHORS:* <sup>1</sup>Senior Pollution Prevention Engineer, Pollution Prevention Assistance Division, 7 Martin Luther King Jr. Drive, Suite 450, Atlanta, GA 30334; <sup>2</sup>Senior Environmental Engineer, Southwire Company, One Southwire Drive, Carrollton, Georgia 30119.  
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**Abstract.** Successful water efficiency programs for industrial, commercial, and institutional facilities are dynamic programs that involve all employees and integrate water management planning into an organization's overall strategic planning. Benefits of establishing a water efficiency program include savings in water, sewer, energy, and wastewater treatment costs, as well as water demand reductions and reduced environmental impact.

Southwire Company in Carrollton, GA developed a water conservation program based on the continuous improvement model presented herein. With clear management vision, good planning, and team effort, Southwire was able to keep their facility in operation during the 2000 drought, and set the stage for longer-term water conservation projects.

## INTRODUCTION

In the past, Georgians have considered clean water to be an unlimited resource. As we enter the next century, Georgia is facing its fourth consecutive year of drought coupled with booming growth. Average rainfall deficits range from 20 to 30 inches below normal. Twenty-three cities and five counties reported a water supply of thirty days or less during the summer of 2000. Georgia's population has grown to eight million, and experts predict that Georgia will continue to grow by over one million people every decade. To ensure sufficient water supplies for present and future generations, we must use this precious resource wisely. Effective water management can increase the life of existing raw water supplies, minimize the impact of drought, and postpone infrastructure development.

Industrial, commercial, and institutional water use can have a significant effect on local water demands. In addition to the environmental benefits, water efficiency programs can reduce costs and increase the profitability of a business through reduced water and

**Table 1. Steps for a Successful Water Efficiency Program**

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|-----|---|
| 1 - | Establish commitment and goals                        |
| 2 - | Develop support and resources                         |
| 3 - | Survey water use and develop a facility water balance |
| 4 - | Identify water efficiency opportunities               |
| 5 - | Develop and implement water management plan           |
| 6 - | Track results and publicize success                   |
| 7 - | Update water management plan                          |

sewer, wastewater treatment, and energy costs. Furthermore, as water quality regulations become stricter and the cost of water increases, organizations that use water more efficiently will gain a competitive edge.

## WATER EFFICIENCY PROGRAMS

Achieving an effective water efficiency program requires developing a comprehensive water management plan. This plan focuses on continuous improvement and integrates water management planning into an organization's overall strategic planning. The steps outlined in Table 1 can be used as a model for a successful water efficiency program. The program can stand alone or be integrated into an organization's overall pollution prevention program, environmental management system, or cost reduction program.

### Establish Commitment and Goals

Management commitment is key to a successful water efficiency program by ensuring that adequate human and financial resources are allocated. After collecting initial information on water usage, the

organization can establish water efficiency goals. At individual facilities, staff may choose to reduce overall water consumption by a set percentage or, if possible, set a goal based on a baseline index (e.g. gallons of water per pound of product manufactured).

#### **Develop Support and Resources**

A water efficiency coordinator and water conservation team should be designated to oversee and implement all aspects of the water efficiency program. The team should represent diverse groups, including facility management, engineering and maintenance, sanitation, operations, wastewater treatment, and outside assistance providers (e.g. Pollution Prevention Assistance Division (P<sup>2</sup>AD), local water and wastewater utilities, consultants).

#### **Survey Water Use and Develop Facility Water Balance**

Facility staff perform a water audit to characterize all water uses at a facility including flow rates, flow direction, and quality requirements. This information can be collected from a facility walk-through, interviews, utility bills, facility drawings, operations data, equipment and plumbing fixture specifications, water meter readings, and the simple "bucket and stopwatch" test. During the water audit, the team calculates the true cost of water, including water and sewer costs, wastewater pretreatment costs, on-site water treatment costs, and energy costs for heating or pumping water.

#### **Identify Water Efficiency Opportunities**

After water uses and costs are characterized, the water efficiency team develops a list of potential water efficiency opportunities, and prioritizes these opportunities based on potential water savings, cost, feasibility, and operation and maintenance requirements. Water efficiency measures can include retrofit and replacement options, as well as behavioral and operational changes. Before implementing any water efficiency measure, it is important to consider compliance with USDA and FDA regulations, environmental regulations such as wastewater discharge limits, building and plumbing codes, and product quality requirements.

#### **Develop and Implement Water Management Plan**

Once the team decides on water efficiency measures, a work schedule and responsible parties are established for implementing each measure. While internal personnel may implement some measures

within a few days, others may take several months and require outside contractors. The water management plan may also include the items from the first four steps of the water efficiency program including goals, water balance, water costs, and rationale for choosing water efficiency measures.

#### **Track Results and Publicize Success**

Continuously publicizing the success of your water efficiency program will encourage employee participation, enhance community and customer relations, and stimulate similar water management efforts. The results of the program can be discussed in staff meetings, posted on bulletin boards, and published in newsletters and annual reports.

#### **Update Water Management Plan**

Many times, water efficiency efforts are limited to an engineering report that is read once and never looked at again. The water management plan should be viewed as a dynamic document; the facility water balance, goals, implementation schedule, and responsible parties should be reviewed and updated periodically.

### **SHORT AND LONG-TERM WATER MANAGEMENT PLANNING AT SOUTHWIRE**

Water conservation has long been a way of life at Southwire facilities, but in the summer of 2000 Southwire's Carrollton facility depended on it for survival. At one point, continued operation was uncertain, unless significant measures were taken to conserve water and to find an alternate water source.

Southwire's approach to solving the anticipated year 2000 water shortage was somewhat unconventional due to the critical nature of the situation. Initially, Southwire jumped all the way to analyzing plant operations for water conservation opportunities and implementing them, where possible, prior to conducting the steps outlined in the preceding Table 1. Some of the greatest water savings were achieved through reduced filter backwash and cooling system blowdown (wasting of water to reduce mineral build-up). Southwire concurrently drilled two deep wells to provide an alternate water source.

Once they became confident that they had adequate water to supply the facility, Southwire backed up and took a more reasoned approach to pinpointing inefficient water usage. Significant additional gains were made through the more structured planning

approach, and the following management directive spurred these formalized efforts:

*"I want every Southwire facility to develop and implement a long-term action plan for water management with annual targets for improvement. My expectation is that you will build water management into your management systems so that we make measurable progress every year and show dramatic improvements over the next five years."*

Roy Richards  
CEO Southwire Company

To start the analytical process, teams were formed from a breadth of operational areas and included a representative from P<sup>2</sup>AD. The teams were charged with measuring baseline water use and identifying major water uses. Plant drawings, city water bills, run hour meter readings for pumps, and engineering intuition served as the basis for the analysis. Water meters were added, as necessary, to quantify water use. Every process utilizing water was examined for losses and water use efficiency. Once the best water saving opportunities had been identified, the next steps were to establish reduction goals and to develop and implement the opportunities. The schedule for implementation was prioritized based on potential water savings and ease of implementation.

The Southwire facility in Carrollton showed an annualized water usage reduction of approximately 40,000,000 gallons for the year 2000, as compared to 1999 (Figure 1). The facility is currently working on longer-term improvements including alternative cooling methods and water reuse, that will require more planning and infrastructure changes.

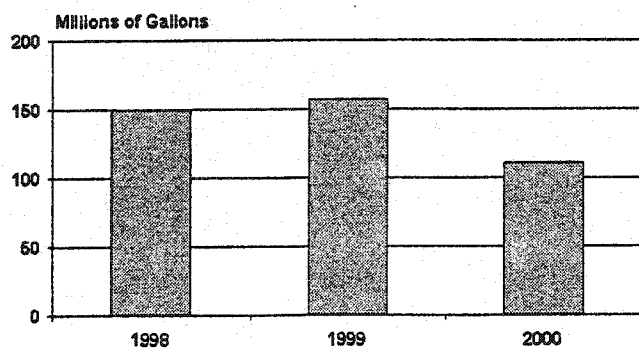


Figure 1. Annualized Water Usage, Southwire Carrollton.

In the process of identifying and capitalizing on water conservation opportunities, Southwire came to view water resources as another vital raw material, like process feed stocks. Water conservation practices remain in-force throughout Southwire to ensure continual improvement.

With clear management vision, good planning, and team effort, Southwire was able to keep their facility in operation and, just as importantly, seize a number of immediate water conservation opportunities and set the stage for longer-term water conservation projects.

#### POLLUTION PREVENTION ASSISTANCE DIVISION (P<sup>2</sup>AD)

P<sup>2</sup>AD is a non-regulatory division of the Georgia Department of Natural Resources that provides free technical assistance related to resource conservation and waste reduction to all sectors in Georgia. P<sup>2</sup>AD can provide on-site water efficiency assessments, serve as a technical resource for water efficiency, facilitate water efficiency teams, or assist facilities with performing water audits.

For more information, please contact Judy Adler at 404-657-7444.

#### SELECTED REFERENCES

- North Carolina Department of Natural Resources, 1998. Water Efficiency Manual for Commercial, Industrial, and Institutional Facilities.
- State of California Department of Water Resources, 1994. Water Efficiency Guide for Business Managers and Facility Engineers.
- Environmental Protection Division, Georgia Department of Natural Resources, 2000. 1998-2000 Georgia Drought Report.