

## Cutting water use helps General Mills save big dough

A \$700 investment to cut water use at the Chanhassen General Mills plant results in a one-time savings of \$22,000 and an annual savings of \$5,400.

The General Mills Inc. Chanhassen plant, formerly Pillsbury, makes food products such as cookies, cakes, rolls and muffins. In 2000, the plant used an average of 100,000 gallons per day (gpd) of water. It was used as a product ingredient, for domestic use, in cooling towers or boilers, and on the production floor for cleaning tasks.

The plant had cut water use by an estimated 41 percent with the help of a consultant. But, complying with new Food and Drug Administration (FDA) rules led to increasing the frequency of line and equipment cleaning—increasing water use. As a result, when renewing its sewer discharge permit, the plant was assessed a one-time sewer access charge (SAC) fee of \$135,000 for increased water and sewer use. The plant was given one year to cut water use for a reduced SAC assessment.

**MnTAP intern** Nancy Mahagnoul, a chemical engineering student at the University of Minnesota, worked with plant staff to further reduce water use and lower, or eliminate, the SAC.

### Large water users

“First we wanted to look at what our largest water users were, so we conducted a mass balance,” recalled Dotti Shay, environmental coordinator at the plant.

The mass balance indicated that a lot of the plant’s water was used in domestic, cleaning and cooling pro-



cesses. The intern found opportunities to cut water use in all of these areas.

To reduce domestic and cleaning water use, sink moderators—flow restrictors that screw on faucet openings—were installed on restroom and production floor sinks. The water flows of the low flow moderators that were first

installed proved to be inadequate, so moderators with higher flows were installed. The intern conservatively estimated that at least 2,100 gpd would be reduced by installing the moderators.

“Who would think to look at the hand sinks?” said Shay, “Nancy did, and it saved us \$2,100 a year in water and sewer costs.”

The freezer belt-washer had the highest peak water use in the plant—40 gallons per minute (gpm). The belt-washer operated one hour during the week and up to six hours on weekends. The intern cut its flow to 10 gpm with good results. Over the next six weeks cleaning effectiveness declined, so flows were increased. When cleaning effectiveness declined a second time at the higher flow, Dean Leners, the plant maintenance supervisor, determined the problem was the diaphragm pump. A piston pump was installed and the system has functioned well with the lower flow of 10 gpm.

The intern identified a leaking, bent rinse-header in the pan washer. Replacing the header cut water use by 2,100 gpd at the plant. An unneeded cooling flow from a boiler purge and a leaking faucet also were found. These two flows added up to about 200 gpd.

(continued)

(General Mills, continued from cover)



**6,000 gallons per day**

These changes and repairs cut the plant's water use by 6,000 gpd, resulting in a total one-time SAC savings of \$22,000 and annual savings of \$5,400. The

changes cost \$700 to implement.

Identifying, quantifying and understanding where water was used in the plant was crucial to the success of this project. Critically evaluating the volume of water used to see if it matched the plant's production, quality and safety requirements also was important.

"[Before Nancy] the hardest part was not having someone who had the time to stay focused and devoted to this one project. She had the ability to, and was wonderful," said Shay.

**Next step**

The plant has approved installing split streaming controls to meet General Mills' corporate water hardness specifications. The system will cost \$6,000 and installation is scheduled during an upcoming plant shut down. Once installed, the plant's water demand will be cut by 2,500 gpd and will save \$3,000 per year in water and sewer costs. The plant may also see a one-time savings of \$12,000 in SAC charges.

**More information**

The full summary *General Mills Saves Over \$27,400 by Reducing Water and Sewer Costs* is available online at <[mntap.umn.edu/intern/projects/generalmills.htm](http://mntap.umn.edu/intern/projects/generalmills.htm)>. ■

## Tight as a drum

Is your operation tight as a drum, or are water leaks costing you money? Leaks throughout your operation unnecessarily raise your overall water consumption, increasing sewer and water costs. The following table illustrates how much water—and money—can be lost from a leak, based on 50 pounds per square inch (psi) pressure and 365 days a year.

A leak this size	Water loss in gallons		Annual loss in dollars @ \$4.00 per 1,000 gallons
	Average per day	30 day average	
	185	5,550	\$270
	2,945	88,350	\$4,300
	18,395	551,850	\$26,860
	47,090	1,412,700	\$68,750

Leak identification and repair are important. Reduce your costs by identifying and fixing leaks of all sizes at your facility. ■

# Maximize efficiency

Don't jump head first into a water efficiency program. Use the following four steps to develop a successful program at your facility.

1. Conduct a water audit to measure water use in different areas of your facility. Often the water use of specific operations is not known.
2. Develop a plan to deal with large or inefficient uses. It should be a simple, step-by-step guide outlining your specific goals and strategies.
3. Gain management support and commitment. Showing short payback periods can help prove water efficiency is a sound investment to quickly gain long-term savings. For Twin Cities metro area facilities, impending SAC fees should put water conservation in the fast lane.
4. Create an employee participation and awareness program. Commitment from your staff is essential to the success of a water reduction program. Form a committee of employees

to help create and implement the plan. Develop an incentive program to recognize water saving ideas and discuss water efficiency at staff meetings. To help build credibility and offer a new perspective to employees, bring in speakers from other organizations.



*A Water Conservation Guide for Commercial, Institutional and Industrial Users* by the New Mexico Office of the State Engineer contains information on areas where water savings can most likely be realized, including water conservation guidelines for specific water uses and case studies of businesses and institutions with successful water conservation programs. For more information, see this article in the online *Source* at <[mntap.umn.edu/source.htm](http://mntap.umn.edu/source.htm)>. And, for help identifying strategies customized to your facility for reducing water use, call MnTAP at 612/624-1300 or 800/247-0015 from greater Minnesota. ■

## Engineering strategies

After the water audit is complete, you have the task of developing strategies for cutting water use. Making some of the following engineering changes can advance your success.

### Reusing or recycling water

Water reuse is using wastewater or reclaimed water from one application for use in another. Water recycling is using water again for the application that it was originally used in. Before reusing or recycling water, be sure it meets your water quality requirements

and identify any treatment steps that may be needed. Non-contact cooling water is ideal for water reuse if process demands match supply.

### Recirculating cooling water

Water is typically used to cool heat-generating equipment or to condense gases. Recycling water with a recirculating cooling system can greatly reduce your water use.

### Improving rinsing systems

Rinsing products and equipment with deionized water is common for

removing contaminants. The amount of deionized water can be cut without affecting product quality by switching from a continuous-flow to an intermittent-flow system. Consider reusing deionized water because it is often more pure than municipal water even after its initial use.

For tailored assistance to conserve water and use it effectively at your facility contact MnTAP at 612/624-1300 or 800/247-0015. ■

# The price of water in the land of 10,000 lakes

**Even in a state of abundant water supply, companies pay twice for water.**

You pay for the volume of water provided and for the amount of water discharged to the local treatment facility. Cutting water use is a straightforward strategy for lowering these water costs. Additional costs, like SAC, may drop as well.

## Volume increases

Every three years the Metropolitan Council Environmental Services (MCES) reviews permittees in the Twin Cities metro area to determine if their SAC fees need to be reassessed. A SAC is a one-time fee based on new connections or increased volumes of wastewater. In 2003, one SAC unit—274 gallons

of water per day—cost \$1,275. To give companies the opportunity to reduce water use and discharge in lieu of new SAC fees, MCES begins its SAC review one year prior to permit renewal and any new assessment.

Twin Cities metro area communities may assess water access charges (WAC), or other municipal-impact or connection fees based on the SAC.

## Strength

The wastewater fees of most publicly owned water treatment plants are based on the amount of waste in the discharged water—the strength. Companies may be subject to additional fees if their wastewater has high biochemical oxygen demand (BOD), chemical oxygen demand (COD), total

suspended solids (TSS) and, in some cases, phosphorus. You'll want to get the alphabet soup of BOD, COD, TSS and phosphorus out of your wastewater. To estimate strength charges in the Twin Cities metro area, use the MCES Strength Charge Calculator available through this article in the online *Source* at <mntap.umn.edu/source.htm>.

MCES also charges permitted industrial users a fee based on their reporting frequency. For more information, call MCES at 651/602-1000 or your local publicly owned treatment works.

For help reducing water use, BOD, COD, TSS or phosphorus contact MnTAP or your local treatment facility. ■

## How water flow impacts cash flow

	Water reduction			Current use	Water increase		
	50%	25%	10%		10%	25%	50%
Water use (gal/day)	5,000	7,500	9,000	10,000	11,000	12,500	15,000
Water fee	\$1,075	\$1,613	\$1,935	\$2,150	\$2,365	\$2,688	\$3,225
Sewer fee	\$3,013	\$4,519	\$5,423	\$6,025	\$6,628	\$7,531	\$9,038
Annual cost	\$4,088	\$6,131	\$7,385	\$8,175	\$8,993	\$10,219	\$12,263
SAC fees *					\$4,380	\$10,949	\$21,898
City impact fees*					\$10,401	\$26,004	\$52,007
<b>Economic impact</b> (year one)	<b>Savings</b>				<b>Increased costs</b>		
	\$4,588	\$2,544	\$1,318		\$15,599	\$38,996	\$77,993

Based on 2002 City of Chaska water rates for 250 operating days per year and on 2002 MCES SAC rate. \*Denotes one-time costs.

## where's your waste?

# Get solutions to your waste issues

Is your company being driven to become lean and cut waste? A MnTAP student intern can help—at no cost to your company. Through the MnTAP Intern Program your company can get:

- Suggestions for improved efficiency, cost savings, reduced waste and decreased regulatory compliance burden.
- An energetic college student with a technical background and research skills working at your facility for a summer.
- Project guidance from a MnTAP engineer or science-related professional.

### Delivering solutions

In 2002, MnTAP interns helped seven Minnesota companies save \$406,000 by reducing 152,000 pounds of waste and 5.7 million gallons of water. Using the research of a MnTAP intern, Technical Plating avoided \$44,000 in SAC. K-Bar Industries saves \$38,000 annually by decreasing the number of parts that need paint stripping.

MnTAP hires and pays college juniors or seniors, majoring in science or engineering, to work on finding solutions to inefficiencies and waste issues. Students work full time for three months at the company—you get the luxury of one employee dedicated to working on just that one problem. All at no charge.

**Intern Program Application  
Deadline March 1**

### Apply now

Applications are currently being accepted. If you would like a MnTAP intern to help solve waste-related problems, call Deb McKinley, intern coordinator, at 612/624-4697 or 800/247-0015. Program details are also available on the Web at <[mntap.umn.edu/intern/intern.htm](http://mntap.umn.edu/intern/intern.htm)>. Application deadline for summer 2003 MnTAP intern projects is March 1. ■

## In the men's room

Smith System Manufacturing in Princeton was charged \$22,000 for using about 4.3 million gallons of water in 1999. The manufacturer of metal office and school furniture wanted to cut its overall water use. **MnTAP intern** Amanda Roivanen, a chemical engineering student at the University of Minnesota, measured water use at the plant. One significant finding was that leaks were wasting water, costing the plant money.

Based on the intern's calculations of water use, the plant should have been using about 3.4 million gallons of water per year—not 4.3. When examining how and where water was used at the facility the intern tracked some of the unaccounted-for-water to leaks. Two urinals in the men's restroom were constantly running because of broken handles, the last tank in the five stage metal phosphatizing operation had a leak and two leaks were found in the stage-five pump to the risers. If left unrepaired, these leaks could have cost Smith \$24,000 per year. ■



## site visit

# Extra set of eyes cuts product loss

**Story:** The Dairy Farmers of America, Inc. (DFA) Zumbrota plant produces cheese and whey, shreds cheese and has a spray dryer. Like many dairy plants, DFA was losing product down the drain and was paying the wastewater treatment plant to remove it.

John Polanski, MnTAP food processing specialist, worked with the plant to help solve the problem. "After working with John, our waste reduction team focused on an area we knew was losing product to the drain in the cheese manufacturing area," said Jim McIntire, superintendent at the Zumbrota plant.

DFA lost product during startup and shutdown when flows through its equipment were switched between milk for production and water for cleaning. Flows needed to be directed and timed to maximize the amount of milk going to production and keep it from the sewer, while preventing too much water from entering the production vat during cleaning.

The plant needed an extra set of eyes to watch the flow and divert it at precisely the right time.

**Results:** The plant installed an optical sensor in the cheese manufacturing area to be that extra set of eyes. An optical sensor uses a light beam to detect how much solids are in

the flow. Based on the amount of solids, the sensor's program automatically shifts a valve to send the flow to the production vat or the sewer.

Optical sensors cost about \$4,500 plus \$200 to \$300 for installation. "It was a small investment for the amount of product we have saved. We saw the results almost immediately," said McIntire.

DFA installed the optical sensor in October 2002. The plant has not yet calculated the amount of product saved from the sewer or the amount of money saved, but it has documented reduced BOD for its wastewater.

"John was very helpful. We wouldn't have gotten this going on our own, he was the driver for it," concluded McIntire.

**Prevention tips:** Don't send valuable product down the drain. Examine what you are sending to the sewer and develop a strategy to reclaim lost product.

Request a visit from a MnTAP engineer or scientist to get suggestions customized to your operation, call 612/624-1300. ■

## H2E workshops



Hospital and clinic staff are invited to attend one of five Hospitals for a Healthy Environment (H2E) workshops held on March 26, 27, 28, 31 and April 1 at various locations in Minnesota.

H2E is a partnership designed to provide health care professionals with tools to eliminate mercury and other

toxic chemicals from waste streams by 2005 and reduce overall hospital waste 50 percent by 2010.

Each workshop will introduce the H2E program and provide strategies to help your facility protect the environment, save money, reduce liability and gain community recognition.

And, don't miss the H2E tour of Ridgeview Medical Center in Waconia to see pollution prevention in action through H2E. The tour is April 17, 2003.

Ridgeview has used H2E tools, such as the *Chemical Minimization Plan* and environmentally preferable purchasing, to move toward becoming a sustainable hospital.

The workshops and tour are sponsored by MnTAP and the Minnesota Office of Environmental Assistance (OEA). Information is available online at <[mntap.umn.edu/h2eworkshop.htm](http://mntap.umn.edu/h2eworkshop.htm)>, or call Duane Gatzke, OEA, at 651/215-0248. ■

## materials exchange



A materials exchange program lists one company's unwanted material and makes it available for use

by another company. The lists below are examples from the Minnesota Materials Exchange.

For more information, call MnTAP at 612/624-1300 or 800/247-0015. Or, visit <[www.mnexchange.org](http://www.mnexchange.org)>.

### Materials available

**Boxes, corrugated cardboard:** 40 per month. Sizes vary from 5 1/2 x 12 x 4 inches to 18 x 36 x 18 inches. Used once. Free. St. Cloud. [MT:A08 13552]

**Buckets, plastic:** 100 per month. Five gallon and larger. Some with lids. Clean. Free. Blaine. [MT:A08 13631]

**Degreaser:** 55 gallons. Partsprep. GAF Chemicals Corporation. Open 55-gallon drum. Fee charged. Golden Valley. [MT:A12 13580]

**Form paper, carbonless:** One half case. Three part. Free. Roseville. [MT:A14 13610]

**Nails, finishing:** 514 boxes. One inch. 16 gauge. 5,000 per box. Some boxes damaged. Fee charged. Winona. [SE:A07 13641]

**Paint stripper:** 12 gallons. Sunstrip XP. Virgin. Solvent blend removes cured paint from a variety of surfaces. One gallon containers. Free. Minneapolis. [MT:A12 13606]

**Plastic covers:** 8,000 pounds per year. Hard plastic. GE 503 Lexan® or ABS. 6 x 8 x 3 inches. Covered radios for shipping. Free. Fergus Falls. [OT:A03 13601]

### Materials wanted

**Bricks, paving:** Any amount. Landscaping stones and sand also wanted. For community labyrinth. Prefer free. Cloquet. [NX:W07 13449]

**Computer systems:** Any amount. Minneapolis. [MT:W13 13649]

**Dissecting microscopes:** Two. Functional. Prefer free or low cost. St. Paul. [MT:W12 13624]

**File cabinets:** Any amount. Four drawer, prefer locking. Minneapolis. [MT:A09 13650]

**Packing peanuts:** Any amount. Must be clean. Any type. Bloomington. [MT:W08 13607]

**Printers, electrostatic:** Any amount. Raster 5442 series. Or will take good parts. Eagan. [MT:W13 13613]

**Scaffolding:** For painting project. St. Cloud. [MT:W12 13619]

**Wood by-products:** Any amount. Sawdust, bark, shavings, scraps, ground or pallets. Untreated. Princeton. [MT:W05 13643]

### Successful exchanges

- A plater received 14,000 pounds of paper pallet-dividers from a metals manufacturer.
- A filter manufacturer provided 2,400 pounds of soda ash to a metal casting company.
- A health care organization gave four cash registers to several small businesses.
- A coating company got 125 five-gallon buckets from a recycler.
- A state laundry facility gave 235 15-gallon plastic buckets to a local business.
- Various businesses received maple flooring—a total of 15,000 square feet—from a deconstruction company.

## Governor's award winners

Congratulations to the winners of the 2002 Governor's Awards for Excellence in Waste and Pollution Prevention. These organizations demonstrate that pollution and waste prevention practices are environmentally and economically beneficial.

General Mills, Inc. installed VRTX to reduce the chemical treatment of cooling tower water. Water use was reduced by 40 percent and the plant received a one-time SAC savings of \$35,000 and an annual savings of about \$108,000.

Restore Products Company removes 13,620 64-ounce plastic bottles from the waste stream each year and replaced over 6,800 gallons of conventional cleaning products.

University of Minnesota Parking and Transportation Services and The Church of St. Joan of Arc also were honored.

For more information about the Governor's Awards Program and other awards and recognition, visit <[www.mntap.umn.edu/resources/busaward.htm](http://www.mntap.umn.edu/resources/busaward.htm)>. ■

helping businesses implement industry-tailored solutions that maximize resource efficiency



The **Minnesota Technical Assistance Program** helps businesses and industries maximize resource efficiency, prevent pollution and reduce waste—which saves time and money. Located at the University of Minnesota, MnTAP provides free technical assistance tailored to individual businesses. By reducing waste and increasing efficiency, companies save on disposal and raw-material costs and make working conditions healthier and safer for employees.

MnTAP is funded by a grant from the Minnesota Office of Environmental Assistance to the University of Minnesota, School of Public Health, Division of Environmental and Occupational Health.

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## calender

### **Environmental Workshop for Vehicle Repair Shops**

*February 25, St. Paul, MN.* Sponsored by the Minnesota Pollution Control Agency (MPCA) Small Business Assistance Program and MnTAP, 651/297-5754 or 800/657-3864. See *Pre-conference Training* section of brochure at <[www.pca.state.mn.us/news/training/mawwconference](http://www.pca.state.mn.us/news/training/mawwconference)>.

### **Minnesota Air, Water and Waste Conference**

*February 25-27, St. Paul, MN.* Sponsored by MPCA, 651/297-5754 or 800/657-3864, <[www.pca.state.mn.us/news/training/mawwconference](http://www.pca.state.mn.us/news/training/mawwconference)>.

### **MnTAP Intern Program Application Deadline**

*March 1.* MnTAP, 612/624-1300 or 800/247-0015, <[mntap.umn.edu](http://mntap.umn.edu)>.

### **66th Annual Wastewater Operators Conference**

*March 19-21, Bloomington, MN.* Sponsored by MPCA, 651/296-8868 or 800/657-3864, <[www.pca.state.mn.us/news/training/ww-66th-annual.pdf](http://www.pca.state.mn.us/news/training/ww-66th-annual.pdf)>.

### **Hospitals for a Healthy Environment One-day Workshops**

*March 26, 27, 28, 31 and April 1.* For locations call 651/215-0248 or visit <[mntap.umn.edu/h2eworkshop.htm](http://mntap.umn.edu/h2eworkshop.htm)>.

### **Ridgeview Medical Center H2E Tour**

*April 17, Waconia, MN.* Sponsored by MnTAP and the Minnesota Office of Environmental Assistance, 612/624-1300 or 800/247-0015, <[mntap.umn.edu/health/health.htm](http://mntap.umn.edu/health/health.htm)>.

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### **Minnesota Technical Assistance Program**

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