Packaging waste adds up and makes an impact

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- Consider reusable containers for transport
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In 2009, the Minnesota Pollution Control Agency estimated that nearly 5.7 million tons of solid waste were generated in Minnesota. According to the U.S. Environmental Protection Agency, roughly 30% of solid waste can be attributed to packaging materials. In Minnesota, that would equal approximately 1.7 million tons of waste per year.

Packaging waste, whether from industrial transport or consumer products, is a significant environmental issue. Only a portion of solid waste is routinely recycled and the rest is often sent to landfills. Overall recycling rates in the State of Minnesota are around 40%. Manufacturers can help reduce the generation of packaging waste by reducing product packaging, and requiring less or reusable packaging on materials. Reductions in packaging may reduce production costs and a facility's environmental footprint.

Packages Entering Your Facility

Reusable transport packaging (totes, boxes, and bins) can be used for shipping supply materials when the return of empty transport packaging components can be repeated. This can include reusable pallets and pallet rentals. Reusable packaging can save both the company and the supplier money and disposal hassles. Additional benefits include better product protection, a more productive distribution flow, and lower replacement costs.

To implement this practice, start by identifying the packaging that is included with materials/parts repeatedly entering the facility. Consider if the materials can be placed in reusable totes that can be sent back to the supplier for the next shipment. Then work with the supplier to establish a reusable shipping container practice. More information on reusable transport packaging is discussed on page 3 of this issue of the *Source*.

Products/Packaging Leaving Your Facility

It is a safe bet that products leaving the facility are leaving in some type of packaging. As a manufacturer, you can lessen the environmental impacts of your product by minimizing the product's package.

The first step in analyzing your packaging choices is to evaluate the purpose of the packaging. Some questions to ask during this evaluation are:

- Does your product need to be contained or protected from various elements?
- Is packaging simply part of your marketing strategy?
- If the packaging material is necessary can it be made from recyclable materials?
- Can the amount of packaging be reduced?

It may be likely that your product requires some type of packaging; however, you can choose the best materials that are recyclable, reusable, or compostable to lessen the environmental impact. Beyond the packaging material itself, evaluate external coatings such as inks or adhesives and consider only those products that are safe for human health and the environment.

Equally important to choosing the right packaging material is educating your consumers by providing information on responsible disposal options to help ensure your product packaging does not end up in a landfill. Go beyond printing the recyclable or compostable information on the package; include it in other product information guides and marketing materials.

Recycle or Reuse

If you still have packaging remaining from your suppliers and other materials that you cannot avoid, the best option is to reuse the materials rather than sending them to the landfill. The Minnesota Materials Exchange program offers an outlet for business to responsibly dispose of unwanted items.

Route:

- ☐ health and safety
- ☐ maintenance
- ☐ owner/president
- ☐ process engineer
- ☐ purchasing

Improve product packaging from all angles

Packaging comes in many different shapes, sizes, and colors. Consider environmental concerns when designing packaging.

Product packaging serves many purposes for manufacturers and consumers. It can protect the product, be used to track shipments and sales, attract consumers, and relay product information. Consumers and regulatory bodies, both in the United States and other areas of the world, are demanding more environmentally-friendly product packaging as well as less product packaging overall. Manufacturers can meet these demands by using less material, switching to recyclable or compostable material, and reducing waste in the packaging process. The following are some ideas that have proven to reduce packaging and may help start the process of identifying ways to reduce product packaging waste.

Eliminate Product Packaging

The first question to ask when trying to reduce packaging waste is whether the packaging is necessary. Many products can perform well without any extraneous packaging. For example, many years ago, deodorant products were packaged in cardboard shelf boxes. By making adjustments to shelving units, those shelf boxes were able to be eliminated.

A recent MnTAP intern identified a similar situation at a medical device manufacturer. She was able to determine that cardboard shelf boxes were not enhancing product safety and were not necessary. The company was able to eliminate the shelf boxes, reduce the amount of packaging, and save money.

Concentrated Products

The size and amount of packaging is determined by the amount of product being sold. Therefore, designing and selling products in concentrated amounts can greatly reduce the amount of packaging needed. This is very commonly seen in cleaners and detergents, which can be formulated so that less product is needed for each use.

Concentrated products can lead to cost savings by reducing packaging materials, transportation costs, and shelf space. Additionally, companies can benefit from additional non-packaging related savings by producing concentrated products.

For example, food processing facilities that produce juice concentrate do not require the large amount of water that is typically added to non-concentrated juice. The companies are then able to save money by reducing water use as well as product packaging.

Recycled Package Material

While many products now are available in recyclable packages, some companies have also chosen to use recycled materials in the packaging. This reduces the amount of virgin material used and can have a positive impact on the environment.

According to a March 8, 2011, article from *USA Today*, Seventh Generation developed a laundry detergent bottle made from 100% recycled cardboard and newspaper. A plastic bag that holds the detergent lines the inside of the bottle. While the plastic bag is solid waste, the cardboard casing of the package can be recycled or composted by the consumer after use. The bottle uses 66% less plastic than traditional laundry detergent bottles. To read more of the article, visit <www.mntap.umn.edu/source/2011-1/productpackaging.html>.

Optimal Package Design

Another key to reducing packaging waste is to consider the design of product packaging. Streamlining packaging can save money in raw material costs and potentially increase efficiency.

Endocardial Solutions, Inc. (ESI), a medical device manufacturer, worked with a MnTAP intern to reduce the amount of unnecessary material used in their product packaging. Overall, the company redesigned the product packaging to include a more lightweight tray and reduced plastic use by 431 pounds per year. Additionally, product information was printed directly onto the boxes rather than on labels. Finally, the sterilization process was changed so that products did not need to be reopened and inspected. The savings from sterilization packaging changes resulted in $29,140 annual cost savings.

For More Opportunities

The four opportunities identified in this article are ways to start thinking about product packaging and the waste that is generated by it. There are many more opportunities to reduce packaging, depending on each product and the manufacturing processes used. Overall, product packaging should not be overlooked as improving and reducing it can lead to cost savings, waste reduction, and potential energy savings. ■

Consider reusable containers for transport

Shipping containers, pallets, stretch wrap, and cushioning all contribute to a facility's total packaging. These materials are known as transport packaging and are high contributors of solid waste in many industrial sectors, but can be replaced with reusable transport packaging to reduce solid waste.

Using reusable transport packaging reduces waste at the source, which conserves the raw materials and energy needed to extract, process, and recycle packaging materials. Additionally, it reduces pollution from the manufacturing and recycling processes.

How Reusable Transport Packaging Works
Reusable transport packaging can help your facility reduce waste while managing distribution logistics. Plastic totes, pallets, carts, and pails are ideal for picking orders, storing product, and manufacturing applications. This type of packaging works best in a closed-loop distribution system, but with the proper logistics and tracking protocol, open-loop systems may also allow for reusable transport packaging use.

There are many features of reusable transport packaging that may lead to cost savings for your facility. Additionally, they are a more environmentally-friendly choice because the plastic containers are formed from recycled materials and, at the end of their useful life, they can be broken down and recycled into new products.

Facility Benefits
Reduced packaging costs. The purchase price of reusable shipping containers is generally higher than that of single-use containers; however, over the course of their use, the cost per reusable container per trip is lowered, making reusable containers cheaper to use than single-use packaging.

Reduced damage. Reusable containers are designed with the durability to withstand multiple uses. Using these containers may decrease the rate of damage to goods and materials shipped.

Reduced labor costs. Workers do not need to spend time breaking down and removing packaging waste from assembly-line operations. Reusable containers are generally simpler to take off the line.

Avoided disposal costs. Eliminating one-way containers significantly reduces the amount of packaging materials to be landfilled or recycled.

Reduced space requirements. Reusable plastic containers can be collapsed, nested, or stacked to conserve space, or can double as storage containers. ∎

Toro Company Uses Reusable Packaging
The Toro Company designed and implemented reusable steel racks to replace one-time-use wood pallets for shipping utility vehicle components. The racks stack or nest, allowing for easy shipment and return of transport packaging. Since implementing the steel rack system, no products have been damaged during shipment or handling. Toro's steel racks eliminate approximately 58 tons of wood pallet waste annually. To learn more about Toro's shipping changes, visit <www.rethinkrecycling.com/businesses/tips-industry/shipping/case-studies/-toro-company>.

In 2010, MnTAP helped businesses reduce waste and save $1.3 million

Each year, MnTAP tabulates the environmental results of our pollution prevention and energy efficiency work with Minnesota businesses. In 2010, MnTAP successfully helped businesses save over $1.3 million. Through funding from the Minnesota Pollution Control Agency, as well as other partners, MnTAP's 11 staff members are able to focus on providing cost-saving solutions to businesses in three ways:

- **On-Site Assistance:** site visits, intern program, internal team facilitation
- **Materials Exchange:** a business reuse network
- **Outreach Strategies:** newsletters, trainings, case studies, demonstrations

In addition to providing traditional technical assistance, MnTAP staff completed a number of special projects in 2010. Each of these projects helped lead to new relationships with businesses and partnering organizations, and provided the opportunity for staff to work one-on-one with businesses and their energy and waste issues.

MnTAP's full environmental benefits report, which highlights special projects and the organization's overall achievements, can be found online at <www.mntap.umn.edu>. ∎

2010 Results

Waste (lbs/yr)	163,000
Water (gal/yr)	17,412,000
Energy (kWh/yr)	3,520,000
Energy (therms/yr)	307,000
Cost Savings ($)	$ 1,312,000

Decreasing blue wrap saves time and money

In 2008, 134 of the 151 hospitals in Minnesota performed over 615,000 surgeries. Blue wrap accounts for a significant percentage of the waste generated by each surgery. It is a single-use disposable product comprised of polypropylene and used to envelop surgical instruments to ensure sterility. Healthcare facilities incur considerable expenses to purchase and dispose of blue wrap.

Prior to use, surgical tools are wrapped in blue wrap, secured with an indicator, and steam sterilized. The blue wrap material allows for steam sterilization and, once sterilized, prohibits contaminates from entering the package. In addition to being a single-use product, blue wrap is not easily biodegradable or recyclable. If the surgical tools puncture the blue wrap, it can pose a safety concern for staff and the tools must be flash sterilized, which increases the chance of infection, causes delays in surgery, and increases labor costs.

To seal blue wrap packaging, a disposable steam-activated sterilization indicator is often used and commonly contains a lead salt, a hazardous waste and human exposure concern. Blue wrap must be managed as hazardous waste when a lead-containing indicator is used.

Durable sterilization containers provide opportunities to reduce the quantity, costs, and toxicity associated with sterilization.

Blue Wrap Recycling Program Growing

Minnesota Waste Wise manages the Blue Wrap Recycling Program, an opportunity for Twin Cities hospitals/clinics to recycle hospital blue wrap. Since beginning the program in 2009, participating Twin Cities hospitals, including program partner Fairview, have recycled nearly 80,000 pounds of woven plastic material. The program is not currently available outside of the Twin Cities, but Waste Wise is working to expand outstate. To participate in the Blue Wrap Recycling Program, contact Kate Worley at 651.292.4662 or kworley@mnchamber.com.

A MnTAP intern reduced St. Luke's Hospital's blue wrap purchase and disposal costs with the implementation of sterilization containers.

Sterilization containers are hard-coated anodized aluminum boxes that are sterilized when surgical tools are placed inside. The use of a hard case minimizes the amount of blue wrap and indicators used and disposed of, thus reducing costs, hazardous waste generation, and employee safety concerns. In addition, hard cases are better for protecting surgical tools from damage and improving efficiency in surgical procedures.

Case Study

St. Luke's Hospital in Duluth, Minnesota, purchased 161 hard cases to use in place of blue wrap. A MnTAP intern conducted a cost and disposal analysis for the purchase of additional hard cases. Each hard case offset blue wrap purchase and disposal costs by approximately $391, provided a payback period of approximately one year, and reduced almost 50 pounds of waste annually. By purchasing 224 additional sterilization containers, St. Luke's can reduce blue wrap waste by 5.4 tons, reduce lead-contaminated indicator waste by 22.4 pounds, and save nearly $100,000 annually. ■

Packaging waste adds to facility's solid waste costs

This reuse network links businesses with items they need that another company no longer has a use for.

If you are unable to find a reuse option, the next best disposal option is to recycle the materials. A number of resources exists in Minnesota to assist businesses with recycling materials. In the Twin Cities, a good place to start is Rethink Recycling, at <www.rethinkrecycling.com>. For outside the Metro area, check with your county solid waste office or waste hauler.

Overall, solid waste is a significant environmental issue in Minnesota. With over 30% of solid waste being attributed to packaging, it is important to analyze the packaging entering and leaving your facility. Determine if changes can be made to lessen the quantity, increase the recyclability, or otherwise alter your packaging to save money and reduce waste. ■

Spotlight on technology: Vision sensor
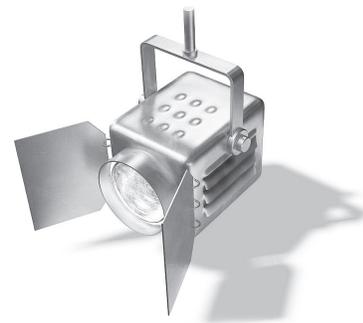
One source of excess waste in your facility may be from your packaging line. While it is normal to have both planned and unplanned downtime in your packaging process, decreasing downtime overall can increase the process' actual runtime, improve efficiency, and reduce changeover and rejected product costs. A number of technologies exist to improve your packaging line including vision sensors, which ensure packaging is correct and detect errors.

Vision Sensors

Vision sensors, also called optical sensors, are installed on conveyor lines to monitor the packaging assembly process and detect errors.

Vision sensors provide greater coverage of more visual attributes simultaneously than typical discrete sensors provide. Often multiple discrete sensors are used to error-proof labels; however, with these sensors, it is necessary for packages to be perfectly aligned on the conveyor line. A vision sensor, on the other hand, can proof the labels and perform other tasks even while the packages are not aligned. Additionally, vision sensors can eliminate the need for manual inspection and provide faster line speeds.

Timing is Everything

Installing vision sensors on your packaging line can greatly reduce the amount of errors and waste packaging. When an error is detected by a vision sensor, it can reject the product or shut down the process. Line jams are common packaging process problems that can be caused by incorrectly fed packaging materials, misaligned packages, undetected open flaps or cartons, or faulty products. Generally line jams result in discarded products and packaging material. Vision sensors can quickly detect a line jam and greatly reduce the waste generated per error. Additionally, they may allow the line to dynamically reject packages or shut down the process before large amounts of material and product are wasted.

In addition to reducing waste material, vision sensors can help reduce downtime. Planned downtime is needed for changing over to another product type or packaging, performing routine maintenance, sanitizing the line, and operator breaks.

Vision sensors can reduce changeover time, as they only require a new software program and lighting adjustments; discrete sensors may need to have their fixtures adjusted, which take more time to prepare. The downtime saved by vision sensors reduces operating costs.

For More Information

To determine if a vision sensor is appropriate for your packaging line, read the white papers "Reducing Planned/Unplanned Downtime with Vision Sensors" and "Where Vision Meets Sensors" from Balluff. Links to the white papers and more information is available on our electronic *Source* at <www.mntap.umn.edu/source/2011-1/visionsensor.html>. ■

Welcome to MnTAP: Laura Babcock named new MnTAP director

Laura Babcock joined MnTAP in January 2011 and has been actively meeting our partners, clients, and other stakeholders during her first few months. She was chosen to lead the organization after Cindy McComas, longtime director, announced her retirement.

Babcock joins MnTAP from the NorthStar Initiative for Sustainable Enterprise, a program of the Institute on the Environment at the University of Minnesota. In that role, she explored opportunities to improve corporate sustainability performance through enhanced asset exchange and material cycling. Prior to joining the University, Babcock worked extensively in the chemical industry in a variety of roles including a focus on sustainable technology. She received a Ph.D. in Inorganic Chemistry from the University of Illinois in Urbana-Champaign, Illinois, and B.S. in Chemistry from Rensselaer Polytechnic Institute in Troy, New York.

Babcock is looking forward to developing and expanding MnTAP's programs to meet business' needs, pursuing new and innovative funding opportunities for program activities, and collaborating with multiple in-state and national programs. "MnTAP has been extremely successful over the past 25 years and I look forward to helping continue and grow the success of the organization in the future," she said. ■

Laura Babcock
612.624.4678
800.247.0015
lbabcock@umn.edu

Intern program continues helping companies

Each year, MnTAP staff members identify projects within facilities that would benefit from intensive research to determine a solution. This year, eight companies will host MnTAP interns who will investigate energy efficiency and waste reduction measures. Throughout the summer, the interns will develop effective solutions to help their facilities save costs, reduce regulatory compliance burden, and decrease environmental impacts. The 2011 intern projects include:

- City of Rogers
- Ecolab, Inc., Eagan
- Radisson Hotel Bloomington, Bloomington
- Salo Manufacturing, Menahga
- August Schell Brewing Company, New Ulm
- Trident Seafoods, Motley
- Truck Bodies Equipment International Inc., Lake Crystal
- Uponor Inc., Apple Valley

This year, a number of utility companies in Minnesota are partnering to offer their clients interns through the MnTAP program. Xcel Energy, CenterPoint Energy, Dakota Electric, and Minnesota Energy Resources Corporation are all helping to sponsor part or all of a project within their service territory.

The 2011 interns will be presenting their projects at a public forum on August 24, 2011, at the University of Minnesota. For more information about the intern program, visit MnTAP's web site at <www.mntap.umn.edu> or contact Krysta Larson, 612.624.4697.

2010 Intern Program Results

Once an intern project has ended, MnTAP staff members continue to work with the companies to provide assistance and answer any questions that may still remain regarding the project. From that follow-up with companies, MnTAP is able to determine how much implementation has occurred from the interns' recommendations.

Significant implementation occurred in 2010. However, companies from previous years also continued to move forward with implementation of projects. In 2010, implementation from projects held in 2006 through 2010 totaled over $630,000 in savings for participating companies. Additional environmental results are shown in the table below. ■

2010 Implementation of Intern Recommendations

Project Year	Waste (lbs)	Water (gal)	Energy (kWh)	Energy (therms)	Costs ($)
2010	250	166,750	1,766,139	130,864	193,212
2009	37,032	425,500	451,993	15,780	103,725
2008	45,902	0	135,307	0	326,576
2007	0	0	0	0	0
2006	0	5,756,000	0	0	10,000
Total	**83,184**	**6,348,250**	**2,353,439**	**146,644**	**$633,513**

SBEAP helps company reduce regulatory obligations and costs

Industrial Fabrication Services, a metal fabricator in Lake Crystal, was spurred to action recently as a result of a letter from the MPCA, notifying them that they exceeded their Option C Registration Air Permit thresholds. The Small Businesses Environmental Assistance Program (SBEAP) staff helped them determine that if they reduced Hazardous Air Pollutant (HAP) emissions, they would qualify for a streamlined Option D Registration Permit, instead of the more rigorous and expensive state individual air permit.

The company worked with its paint supplier and substituted a non-HAP VOC for xylene, cutting emissions by 5,100 pounds per year. After making the switch, Industrial Fabrication Services applied for and received an Option D Registration Permit, thus avoiding additional regulatory obligations. By reducing its HAP emissions, the company saved $17,100 in avoided fees by not having to apply for a state individual air permit. ■

Materials Exchange

The Minnesota Materials Exchange program lists one company's unwanted material and makes it available for use by another company. For more information, call MnTAP at 612.624.1300 or 800.247.0015.

What is Materials Exchange?
The Materials Exchange is a free service that links organizations that have reusable goods they no longer need to those who can use them. This business reuse network helps prevent usable materials from becoming waste and saves users money.

Current Listings
Curious to what type of items are exchanged? For a complete catalog of listings visit <www.mnexchange.org>. Here is a sample of our current listings:

Available
- Film Cabinets. 40. 4' x 3' x 2.11' Free. [22188]
- Silicone Elastomer. One. MED-4211 and MED-6219. New and unused. [22190]
- Batteries. Amount varies monthly. 9 volt and AA. Used in medical testing. Have plenty of power left. Fee Charged 9 volt $0.60, AA $0.15 [22178]
- Toilet Seat Covers. 17 packages of 250. Fee $20. [22194]
- Smocks. 100. Electrostatic discharge (ESD). Free. [22178]

Wanted
- Test Weights. 0 - 10 lb. or 0 - 5 kg weight to calibrate scale. By the piece or in a set. [22197]
- Cart. One. For mail or file folders. Wheeled. [22158]
- Floor Mats. Large carpeted mats to use at warehouse entrance. About 5' x 8'. [22151]
- Recycling Bins. Five. Large, all-purpose. [22133]
- Meat Saw. Electric 2 Phase. Deep Throat. With large table. Will pay fee. [22151]

Follow @MN_Exchange on Twitter
The Materials Exchange program is posting daily featured listings on Twitter! Follow @MN_Exchange for Tweets to find items that may be useful to you.

Visit <http://twitter.com/MN_Exchange> to follow the Materials Exchange and view listings.

Success Stories
Over 12,000 people are registered with the MN Materials Exchange. Here are some of their comments on using the exchange.

"Great. Easy."
— Received 24 containers of UV Coating for free.

"The exchange went smoothly. We are glad that someone can make use of the products we no longer need."
— Donated cleaning items to an entrepreneur.

"Our school responded to a posting that mentioned various office furniture items. We got four fire proof file cabinets for free. Now our student records are more safe than ever."

"It was wonderful to be able to recycle these binders for our training course!"
— Received 70 3-ring binders for free.

"We were glad that the copier went to another neighborhood organization in Minneapolis that needed it."
— Donated a copier to a non-profit.

"Lights will be re-used instead of recycled."
— Received 30 explosion proof bulbs.

Share your experience!
Do you have a unique listing or success story that you would like to share with others? If so, contact Sarah Haas at 612.624.5119 or mnexchange@umn.edu to have your Materials Exchange story featured in the *Source* newsletter. ■

Help guide MnTAP newsletter content

We are interested in improving the *Source* and our monthly e-newsletters. We'd also like to determine the impact of our newsletters on your business. Therefore, we have developed a quick survey to get your feedback!

You may access our survey in one of three ways:

Online: <www.surveymonkey.com/s/mntap_source_survey>.
Hard-copy: Call MnTAP at 612.624.1300 to request a copy.
Email: Send an email to mntap@umn.edu to request the survey via email.

Please take a few minutes to answer the questions in the survey. Your responses are returned to us anonymously and will only be used in aggregate.

Thank you for your assistance in making our communications better! ■

MINNESOTA TECHNICAL ASSISTANCE PROGRAM

UNIVERSITY OF MINNESOTA

The Minnesota Technical Assistance Program (MnTAP) helps businesses and industries develop and implement industry-tailored solutions that maximize resource efficiency, prevent pollution and reduce costs and energy use to improve public health and the environment. As an outreach program 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 primarily by the Minnesota Pollution Control Agency's Prevention and Assistance Division and is located at the University of Minnesota in the School of Public Health, Division of Environmental Health Sciences. The University's mission, carried out on multiple campuses and throughout the state, is threefold: research and discovery, teaching and learning, and outreach and public service.

The University of Minnesota shall provide equal access to and opportunity in its programs, facilities, and employment without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression.

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Calendar

April 27, 2011. **Renewable Materials Summit: Emerging Markets in the Upper Midwest.** 8:30 a.m. - 4:30 p.m. Courtyard Moorhead in Moorhead, Minnesota. This summit will highlight and explore the developing and established markets for renewable materials, while exploring the issues confronted by industry. Sponsored by The West Central Minnesota Renewable Materials Coalition and BioBusiness Alliance. For more information, call Tim Welle: 952.746.3845.

April 28, 2011 & May 12, 2011. **Emergency Planning and Community Right-to-Know Act (EPCRA) Seminar.** 8:00 a.m. - 3:30 p.m. New Brighton Public Safety Center in New Brighton, Minnesota. This seminar will cover reporting required by all sections of the EPCRA, including the Toxic Release Inventory. Sponsored by Minnesota Department of Public Safety and the U.S. Environmental Protection Agency. $20. Register by April 20 for April 28 session, May 4 for May 12 session. Pre-registration is required. For more information, call Steve Tomlyanovich: 651.201.7417.

May 5, 2011 & June 7, 2011. **Hennepin County Hazardous Waste Training Class.** 9:00 a.m. - 3:30 p.m. Ridgedale Public Library, Minnetonka, Minnesota. Hennepin County offers free hazardous waste training classes throughout the year for hazardous waste generators of all sizes. The training is designed to give a general overview of the hazardous waste regulations. To register, call 612.348.3777.

May 5-6, 2011. **Health Care That's Healthy: Advancing Sustainability in the Delivery of Care.** Crowne Plaza Riverfront Hotel in St. Paul, Minnesota. Rally around the business case for developing and maintaining environmentally sustainable practices in health care operations! Learn about best practices, gain tools and resources, and have an opportunity for collaboration and peer-to-peer learning. For more information, visit <www.healthcarethatshealthy.com/>.

For more information, visit MnTAP's online calendar at <mntap.umn.edu/resources/cal.htm>.

☎ **Call MnTAP 612.624.1300 or 800.247.0015 • www.mntap.umn.edu**