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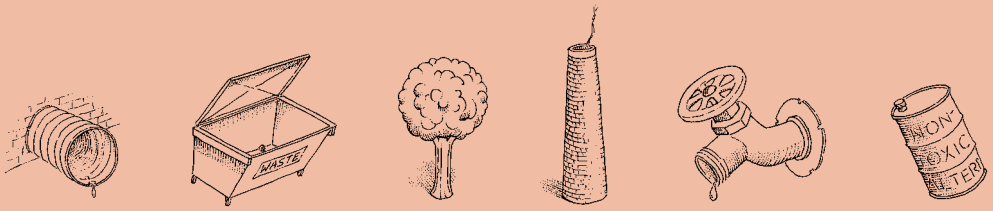
INTERAGENCY POLLUTION PREVENTION ADVISORY TEAM [IPPAT]



Pollution Prevention Summary Report

Consolidated from reports submitted by members of the Interagency Pollution Prevention Advisory Team for the fiscal year 2003

March 2004

POLLUTION PREVENTION
Right From The Start

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Introduction

The Pollution Prevention Summary Report is a consolidation of the summary reports on pollution prevention activities for the fiscal year 2003, submitted by participating Minnesota state agencies.

Purpose of the report

Every year, state agencies are required to prepare a summary of their progress in preventing pollution. This report fulfills the requirements of Governor's Executive Order 99-4 providing for the implementation of pollution prevention by state government. Agency contacts are listed on the opposite page.

Organization of the report

This report is divided into four parts:

- Description of each agency, including the number of employees, locations of the agencies, and pollution prevention training held during the last year.
- Summary of each agency's policy and regulatory activities that have incorporated pollution prevention (P2) in its broader sense.
- Summary of each agency's efforts toward pollution prevention within specific category headings. It is designed to facilitate greater use of the document by participating agencies and by others seeking information about pollution prevention opportunities.
- Matrix of the agencies providing activity summaries under the different categories. It allows the reader to identify all the categories in the report for which a particular agency has provided a summary of activities.

An original signed copy of each agency's report is on file at the Office of Environmental Assistance. For more information, contact Emily Moore at the OEA at 651-215-0201 or toll-free at 800-657-3843.

Part 1
Agency Descriptions

Part 1 includes general information about the participating agencies, including size of staff, the number of locations, and the amount of pollution prevention training staff has had during fiscal year 2003.

Department of Administration (Admin) – The mission of the Department of Administration is "to improve the quality and productivity of Minnesota government." Admin provides a diverse range of business management, administrative, technological, and professional services, as well as a variety of resources to state and local government agencies and to the public. With 23 distinct business units and about 900 employees, the department strives to address the needs of government and citizens, from managing government buildings and grounds to establishing statewide technology policy. Throughout its daily and strategic work, the department is committed to offering the best possible service and making government work better. Admin communicates environmental and other information through the following Internet sites: http://www.admin.state.mn.us/, http://www.rro.state.mn.us, and http://www.mmd.admin.state.mn.us/.

Admin's Materials Management Division and Plant Management Division's Resource Recovery Office (RRO) incorporate pollution prevention in their service to state and local agencies and in outreach through the Minnesota's State Resource Recovery Program. Administered by the Resource Recovery Office, this program provides interagency waste reduction and recycling assistance, on-site consultation and training, recycling progress measurement and reporting, management of recycling collection and marketing systems, and operates the Minnesota State Recycling Center. The RRO also works closely with Admin's Materials Management Division (MMD) to implement the program's environmental purchasing and surplus property requirements. The purpose of the program is to "promote the reduction of waste generated by state agencies, the separation and recovery of recyclable and reusable commodities, the procurement of recyclable commodities and commodities containing recycled materials, and the uniform disposition of recovered materials and surplus property" as set forth in Minn. Stat. § 115A.15, subd. 1. Eight environmental awards and two scholarships resulted from Admin's customer services in the last three years and reflect public recognition of program achievements.

Department of Agriculture (MDA) – The Minnesota Department of Agriculture currently employs approximately 500 personnel. There are 26 different MDA facilities located throughout the state. This report is primarily for the St. Paul office complex located at 90 West Plato Boulevard.

Bemidji State University (BSU) – Bemidji State University includes two locations: the BSU main campus and the Center for Research and Innovation. BSU employs approximately 540 faculty and staff, and 541 student employees. This summary reports on both locations. No specific training was conducted in FY 2003.

Department of Commerce – The department employs approximately 314 staff in downtown St. Paul and an additional 38 staff in Roseville. This report covers agency pollution prevention activities at both locations. Department of Commerce staff has not received any pollution prevention training during the past year.

Department of Corrections (DOC) – The DOC has approximately 3,400 employees at 10 adult and juvenile facilities, and a central office. Throughout the year, selected facility staff members within the DOC have received P2 training.

Office of Environmental Assistance (OEA) – The Minnesota Office of Environmental Assistance (OEA) was established on July 1, 1994. OEA's predecessor agencies, the Minnesota Office of Waste Management and the Minnesota Waste Management Board, had been in existence since July 1, 1980. The OEA employs a staff of 62 people in the St. Paul office and one staff person in each of five regional offices to provide local government assistance and three regional staff to provide environmental education assistance. OEA's mission is to help Minnesotans make informed decisions and take actions that conserve resources and prevent pollution and waste to benefit the environment, economy, and society. OEA works in partnership with businesses, local governments, schools, community organizations, and individuals to apply innovative approaches to Minnesota's environmental issues.

The OEA also provides funding for the Minnesota Technical Assistance Program (MnTAP), which helps Minnesota businesses develop and implement solutions to maximize resource efficiency, prevent pollution, and reduce costs. Established in 1984, MnTAP is funded primarily through a grant from the Minnesota Office of Environmental Assistance to the University of Minnesota, School of Public Health, Environmental and Occupational Health Division. MnTAP provides free technical assistance tailored to business needs. By reducing waste and increasing efficiency, businesses can save on disposal and raw material costs, and decrease regulatory compliance burdens. Businesses can also maintain healthier and safer working conditions for employees.

Department of Human Services (DHS) – The Department of Human Services has about 6,587 employees. The department has six Regional Treatment Centers, the Minnesota Sexual Offender Program (MSOP) site, over 100 State Operated Community Services (SOCS), Minnesota Extended Treatment Options (METO) sites, and the Central Administrative Offices at eight St. Paul locations. This report will include pollution prevention efforts at all of the Regional Treatment Centers and the central administrative office. The SOCSs are operated as households and comply with the solid waste requirements of their host communities.

More than 20 maintenance workers and safety officers received their annual asbestos training that included proper repair, handling, and disposal of asbestos-containing materials. The facility maintenance and support staff also received training about working with and disposing of lead-containing building materials.

Iron Range Resources and Rehabilitation Agency (IRRR) – The IRRR is a state agency that strives to enhance the economic vitality of the Taconite Tax Relief Area through value-driven, cost-effective projects and programs designed for the long-range benefit of the area. The agency goals are to:

- Position the agency to be a leader in developing and implementing a strategy for the long-term economic viability of the northeastern Minnesota region.
- Sustain the region's economic base by working with existing businesses to retain existing jobs and expand to create new jobs.
- Diversify the region's economy by growing new businesses and recruiting expanding businesses from outside the area.

The agency complement, including all departments and locations, is 75 employees as of October 9, 2003, down 20 employees from fiscal year 2002. These employees staff three facilities owned and operated by IRRR. The main administration building is located two miles south of Eveleth on Highway 53. This building provides office space for Accounting, Administrative Services, Development Strategies, Marketing, Communication and External Affairs, Mining and Natural Resources, Purchasing, Shop, and Tourism.

The second facility, Ironworld Discovery Center, is located on the edge of Glen Mine in the heart of the Iron Range. Ironworld Discovery Center preserves and presents northeastern Minnesota's iron

mining and immigration history. Ironworld Discovery Center interprets the life, the work, and the cultural traditions that emerged on the Iron Range during this period of immigration. An integral part of Ironworld Discovery Center is the Iron Range Research Center, which is a public records repository and resource for historical documentation and interpretative information. Primary interest areas are geology; mining; settlement; industrial development; immigration; ethnicity; logging; natural resources; social, political, and economic history; and genealogy. The research center focuses on the history of Minnesota's iron ranges and the personal history of the people who settled there.

Ironworld is also home to the IRRR's Mineland Reclamation Division, which undertakes safety, environmental, and economic development projects on abandoned minelands of the pre-taconite era, often in cooperation with adjacent communities. This year, IRRR Mineland Reclamation grew and planted 160,000 containerized seedlings on the Mesabi, Vermilion, and Cuyuna iron ranges.

The third facility is Giants Ridge Golf and Ski Resort located near Biwabik, Minnesota. Giants Ridge is one of the Midwest's most popular four-season resort destinations, offering guests a championship 18-hole golf course, the Legend, which was named Minnesota's number one public golf course by *Golf Digest,* 1999, and a second 18-hole championship golf course, the Quarry. The resort's ski area is ranked number 3 in the Midwest and number one in Minnesota and features 34 alpine ski runs; 70 kilometers of groomed cross country ski trails; the Midwest's best snowboard terrain park; easy access to thousands of groomed snowmobile trails; hiking, biking and canoeing; an 18-hole disc golf course; a variety of quality lodging choices on site and in the surrounding area; great food; special events; and entertainment. Giants Ridge is committed to providing guests with premier recreational experiences through first class customer service. The facility also plays an integral role in the area's economic development through tourism.

Metropolitan Airports Commission (MAC) – The Minnesota Legislature created the Metropolitan Airports Commission in 1943 as a public corporation and established as its mission to "provide a system of airports that promotes regional, national, and international transportation of passengers and cargo. This system shall be operated, consistent with the public interest and promote the overall goals of the state's environmental policies and minimize the public's exposure to noise and safety hazards around airports." The MAC is governed by 15 commissioners (13 are appointed by the governor and the other two are the mayors of Minneapolis and St. Paul or their designees).

The MAC currently owns and operates six reliever airports and the Minneapolis/St. Paul International Airport (MSP). While MSP handles commercial air traffic, the reliever airport system handles the majority of the general aviation traffic. In 2002, MSP serviced more than 32 million passengers and supported 494,000 flight operations. The reliever airport system supports more than 748,000 flight operations per year.

The MAC presently employs 525 people responsible for a wide variety of duties. The airport system has been likened to "running a small city." The organization can basically be divided into three areas: Landside, Airside, and Administration. Landside includes Ground Transportation, the Airport Directors Office, Energy Management, and Facility Management. Airside consists of Operations, Carpentry, Communications, Electrical, Fire, Police, Maintenance (field and mechanical), and the Paint Shop. Administration includes Airport Development, Environment, Commercial Management, Executive, Finance, Human Resources, Insurance/Risk, Labor Relations, Legal, IS, Public Affairs, and Purchasing.

This summary will constitute a report for the agency as a whole. Staffed facility locations include the Lindbergh and Humphrey Terminals at MSP International, as well as Maintenance, Trades, and two administrative locations. The MAC continually reevaluates and updates all pollution prevention methods and practices. Communication and topic-specific training is ongoing.

Metropolitan Council Environmental Services (MCES) – The Metropolitan Council Environmental Services is a division of the Metropolitan Council (Council), the public agency which

coordinates regional planning and guides development in Minnesota's seven-county Twin Cities metropolitan area. The MCES operates the regional wastewater collection and treatment system in most of that same seven-county area. Additional regional environmental responsibilities include industrial wastewater pretreatment and management, air and water quality monitoring, environmental compliance, environmental education, water resources planning, and nonpoint source pollution abatement.

MCES operates eight treatment plants in addition to three maintenance facilities, a field office, and administrative headquarters for a total of 13 staffed facility locations. MCES has approximately 698 staff (full-time equivalent positions). This report will describe P2 activities for the entire MCES. A separate report will cover P2 for 2003 for Metro Transit, the division of the Metropolitan Council that provides public transit, i.e. bus service and a light-rail system presently under construction, for Minneapolis, St. Paul, and surrounding suburban areas including 78 cities.

MCES is an active member of the Interagency Pollution Prevention Advisory Team. In addition to this professional contact, interagency exchange, and subsequent internal sharing of information, some informal P2 training occurs at the treatment plants related to maintenance, and all employees in the Industrial Waste and Pollution Prevention Section have been trained.

Metropolitan Council Metro Transit – Metro Transit is the major supplier for mass transit in the seven-county metropolitan area, operating more than 900 buses over 109 routes. To accomplish this service, Metro Transit operates five service garages, one overhaul facility, one police station, and an office building, with a total staff of 2,340 employees. In 2002, Metro Transit took control over its first light rail line, the Hiawatha Line, and will formally open it to the public in April 2004. This will add 22 light rail train cars to the fleet inventory plus the building required to operate the new system. During 2002 and 2003, Metro Transit tested the trains and systems and assured completion of the tracks, stations, centenary, crossings, and personnel reading the system for the opening.

This report will cover all of the buildings that are operated by Metro Transit. During the last year, no formal P2 training was conducted by Metro Transit, but opportunities were given to staff to attend programs put on by other agencies pertaining to pollution prevention. Metro Transit is committed to excellence and leadership in protecting the environment. In keeping with its policy, the objectives are to reduce the amounts of hazardous waste that are generated at any of the facilities and to keep air emissions at a minimum. By successfully preventing pollution at its source, the agency will be able to increase its operational efficiencies and provide a safer and healthier environment for all of its employees and customers.

Metropolitan Mosquito Control District (MMCD) – The Metropolitan Mosquito Control District controls mosquitoes and black flies in the metropolitan counties of Anoka, eastern Carver, Dakota, Hennepin, Ramsey, Scott, and Washington. The district employs 50 full-time staff and approximately 185 part-time staff during the mosquito and black fly breeding season. The district currently operates a warehouse facility, six field operations facilities, and a central administration building. Additionally, the district owns and operates a small fleet of vehicles. This report covers pollution prevention activities for all the facilities operated by Metropolitan Mosquito Control District for the 2003 fiscal reporting period.

Department of Military Affairs (DMA) – The Department of Military Affairs is composed of the Army National Guard and the Air National Guard. Units are located throughout the state of Minnesota in approximately 80 locations. The DMA has approximately 10,200 part-time employees and 2,100 full-time employees, exercising both state and federal missions.

This report summarizes the ongoing activities of the DMA throughout the state. Training occurs throughout the year on specific issues relating to the maintenance and management of DMA equipment and resources.

Minnesota Pollution Control Agency (MPCA) – The Minnesota Pollution Control Agency has approximately 750 staff members that are located in the central office in St. Paul and seven district offices in Duluth, Brainerd, Detroit Lakes, Mankato, Marshall, Rochester, and Willmar. This report covers all activities of the agency statewide. Some staff members have received pollution prevention training, but most have not.

Minnesota State Colleges and Universities (MnSCU) – MnSCU is a network of 34 two-year and four-year state colleges and universities, serving about 140,000 students each semester. Each report separately; see Bemidji State University, Minnesota West Community and Technical College, North Hennepin Community College, and St. Cloud State University.

Minnesota West Community and Technical College – Minnesota West Community and Technical College is a merged comprehensive community and technical college. The college is composed of five campuses located in the southwestern Minnesota communities of Canby, Granite Falls, Jackson, Pipestone, and Worthington. The college employs approximately 300 faculty, staff, and administrators dispersed among the five campus locations. This summary reports on the college as a whole, with no distinction to any particular campus.

North Hennepin Community College (NHCC) – Approximately 350 staff members work at two locations: North Hennepin Community College campus, with off-campus classes occurring at Buffalo High School in Buffalo, Minnesota. This report covers only the North Hennepin Community College campus. P2 training is required of Plant Services staff and certain other staff, and is voluntary on the part of other staff.

St. Cloud State University (SCSU) – St. Cloud University employs approximately 1,500 administrative, teaching, clerical, and technical maintenance personnel in both full- and part-time positions. The campus consists of 42 buildings and is situated on more than 100 acres. For purposes of this report, all campus locations will be included. Members of the SCSU staff are receiving an increased level of training in the areas of pollution prevention and recycling. During the past year, the services of an outside consulting firm, MacNeil Environmental Inc., have been expanded to better address this training issue.

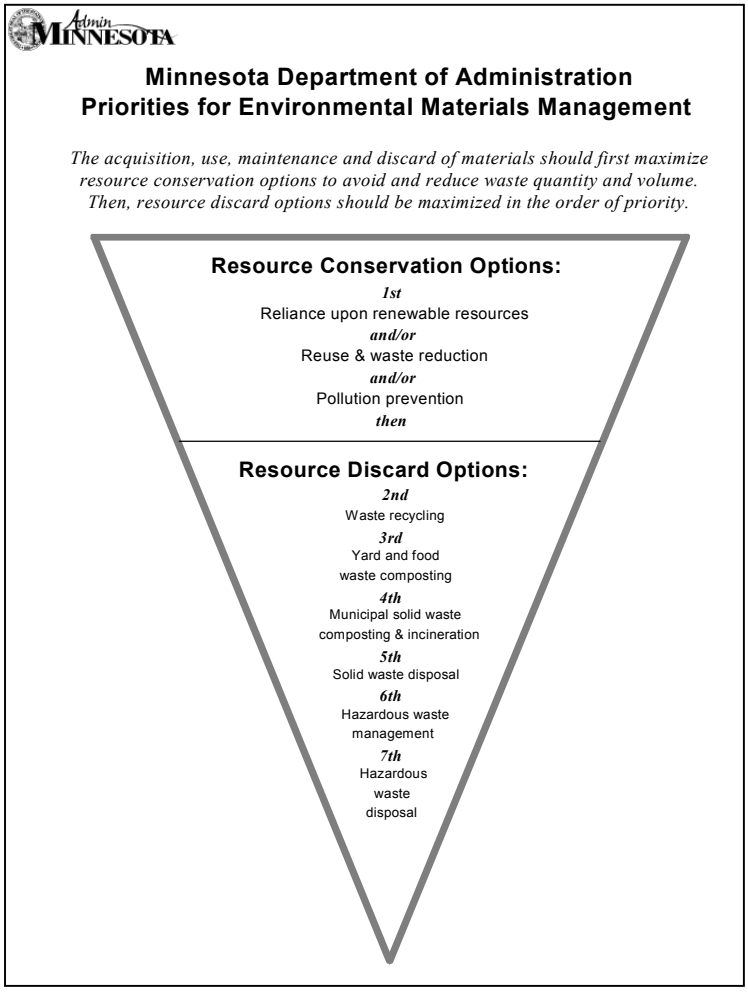
Department of Transportation (Mn/DOT) – The Minnesota Department of Transportation has approximately 5,100 employees. Mn/DOT is a decentralized organization with one central office and eight districts. Mn/DOT has 16 major truck stations with 135 additional truck stations, as well as numerous remote salt sheds and gravel pits. The department maintains approximately 12,000 miles of highway and 5,002 bridges. This report represents Mn/DOT as a whole with respect to Mn/DOT's efforts in pollution prevention.

University of Minnesota – The University of Minnesota has 31,288 employees and 63,769 students on four major campuses: Crookston, Duluth, Morris, and Twin Cities (the Twin Cities campus, which is counted as a single campus, includes both the Minneapolis and St. Paul campuses), and operates the University Center Rochester in cooperation with MnSCU.

The university has approximately 22 experiment or research stations, extension agents in all 87 counties in Minnesota, and has approximately 50 EPA ID numbers for hazardous waste generator sites around the state of Minnesota. Total managed space is 13,679,592 square feet. This report covers the university as a whole. Approximately 2,500 staff and faculty received pollution prevention training during the past year.

Part 2
Policy and Regulatory Activities

Department of Administration – Leadership in environmental stewardship is included in the mission statements of Admin's Plant Management and Materials Management Divisions. The Resource Recovery Office promoted the adoption of environmental values by the Plant Management Division and Materials Management Division. Employees of the Plant Management Division are directed to use resource conservation and pollution prevention practices in the maintenance of buildings, grounds, support operations, and during their daily service to customers. The Resource Recovery Office developed Admin's "Priorities for Environmental Materials Management" statement that has been in effect since adoption in 1991 (see sidebar). The Materials Management Division and the Resource Recovery Office distribute these priorities to public employees during purchasing training and other opportunities.



Admin's focus on environmental partnerships during the past decade has helped to leverage resources, prevent pollution, and contribute toward a more sustainable quality of life. Sustainability requires a balance between economic, community, and environmental considerations.

- Admin specifically addresses pollution prevention as a top priority of the department's "Policy on Environmental Materials Management" and the "Priorities for Environmental Materials Management" (see sidebar).
- The Plant Management Division's mission statement encompasses pollution prevention and other environmental concepts (see next page).
- The Resource Recovery Office in the Plant Management Division encourages pollution prevention and promotes the preferred waste management practices contained in Minnesota Statutes § 155A.02 during the acquisition, use, maintenance, and disposal of materials.
- The Plant Management Division revises and updates employee position descriptions as a continuous process, requiring each employee to be individually accountable for achieving environmental stewardship as a function of his/her job responsibilities. Employees are to follow state and federal requirements and shall identify opportunities to implement environmental values.
- The Materials Management Division requires that vendors provide environmental codes on the goods and services they are offering to the state.

- The State Architect's Office publishes and maintains "Sustainable Design Guidelines" for use on state construction projects.

Plant Management Division
Mission Statement

Our mission is to deliver consistent quality services to ensure clean, safe and environmentally sound buildings, grounds and operations.

Our customers are all people who use our services throughout the state of Minnesota.

The services we provide are a continuum of building, grounds, and professional services specific to the customers' needs. They include building maintenance, cafeterias, energy management services, grounds, janitorial, materials transfer, parking, administration of the state resource recovery program, and special use of state facilities permits.

Our core values are:

- **High quality professional staff** with accountability, honesty and ethics, loyalty, integrity, commitment to teamwork, respect of others and ourselves, and knowledge.
- **Responsiveness to our customer needs** through communication, efficiency, and timeliness.
- **Provide quality work** through modern technology and employee training.
- **Responsible business practices that encourage:**
  - professionalism
  - cost effectiveness
  - open communication
- **Plan for the future, considering:**
  - technology
  - employee development
  - establishment of long-term goals
  - involvement of clients
- **Environmental stewardship with:**
  - conservation of resources
  - prevention of pollution
  - promotion and education
  - integration into all work places and services

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Department of Agriculture – MDA's Laboratory Services Division continues to research ways to reduce the amount of hazardous waste it generates by purchasing new technology that reduces the use of hazardous chemicals. In addition to new technology, the division looks for alternative methods that will help in the reduction of hazardous waste streams.

The Department of Agriculture has an ongoing waste reduction program and actively looks for ways that they can reduce the amount of non-recyclable/reusable products used on a daily basis. The department continues to educate the public on the responsible use of pesticides and fertilizers within their environment.

Department of Commerce

Automotive fuels: The department actively promotes the use of E85 with funding and informational materials, and sales volumes have nearly doubled each year for six years in a row.

E85 FUELING STATIONS AND RETAIL CONSUMPTION DATA

Year	Number of stations at year's-end	Total yearly volume (in gallons)	Monthly average (in gallons)
1997	11	5,933	214
1998	11	37,243	288
1999	14	75,120	583
2000	45	320,177	780
2001	59	629,857	965
2002	70	1,160,847	1,479
2003*	77	1,144,413	2,235

* through July 2003

The department coordinates Minnesota state agency reporting to the U.S. Department of Energy regarding alternative fuel vehicle acquisition requirements. All 11 state agencies that fall under the federal Energy Policy Act (EPAct) met the 75 percent light-duty alternative fuel vehicle acquisition requirement in FY02. Over the next year, the department will work with the American Lung Association of Minnesota and the Department of Administration's Travel Management Division to educate these fleets about E85 usage and develop a tracking mechanism to determine usage by each agency.

Education: The department operates the Energy Information Center, which is staffed by full-time energy specialists who answer consumer inquiries and who staff outreach events at trade shows and the State Fair. The Energy Information Center recorded over 63,000 contacts (e-mail, phone, in-person), handed out over 127,000 information pieces, and had over 94,000 downloads from its web site in FY03.

SERP: The department received funding from Xcel Energy's Renewable Development Fund to administer a solar electric rebate program (SERP). Xcel Energy electricity customers are eligible for between $2,000 to 8,000 for installing a qualifying solar electric system on a home, business, or nonprofit, reducing the installed cost by about 20 percent. Approximately 70 kW of new solar electricity has or will be installed by the program over the next year, representing just under a 100 percent increase from the total before the program began.

Legislative Commission on Minnesota Resources (LCMR) funding: The department was awarded a LCMR grant to implement both a Community Energy Resource Team formation for local energy planning needs and a Community Wind Rebate Program for reducing the cost of installing a utility-scale wind turbine in two communities outside of southwest Minnesota in the next two years. Both programs began in the fall of 2003.

Conservation Improvement Programs – Electric: The department oversees utility investment in conservation and demand-side management through implementation of Conservation Improvement Programs (CIP). All investor-owned electric utilities (except Xcel Energy) are required to invest 1.5 percent of their gross operating revenue into energy conservation projects, while Xcel Energy is required to invest 2 percent of its gross operating revenues. The commissioner uses the CIP process to promote sound, cost-effective conservation practices that reduce or stabilize electricity consumption.

ELECTRIC ENERGY SAVINGS AND AVOIDED EMISSIONS DUE TO ELECTRIC CIP

	1998	1999	2000	2001	2002 (proj.)
Electricity (kWh)	299,418,391	214,160,804	302,905,644	323,267,204	243,411,089
CO_2 (tons)	176,662	126,359	178,720	190,734	143,617
SO_2 (tons)	321	229	324	346	260
Mercury (lbs)	105	75	106	113	85
NOx (tons)	160	114	161	172	129

CO_2 = carbon dioxide, SO_2 = sulfur dioxide, NOx = nitrogen dioxides

Conservation Improvement Program – Gas: In addition to the electric CIP, the department oversees gas CIP projects. Six investor-owned gas utilities offer CIP projects, reviewed and evaluated by staff and subject to commissioner approval. The utilities are required to spend 0.5 percent of their gross operating revenues on CIP. The commissioner uses the CIP process to promote sound, cost-effective conservation practices that reduce or stabilize gas consumption.

NATURAL GAS ENERGY SAVINGS AND AVOIDED EMISSIONS DUE TO GAS CIPS

	1998	1999	2000	2001	2002 (proj.)
Nat gas (Mcf)	946,034	1,310,255	1,349,630	1,527,548	1,137,377
CO_2 (tons)	56,762	78,615	80,977	91,652	68,242
SO_2 (tons)	0.3	0.4	0.4	0.5	0.4
NOx (tons)	44.5	61.6	63.4	71.8	53.5
VOC (tons)	2.6	3.6	3.7	4.2	3.1
PM (tons)	3.60	4.98	5.13	5.8	4.3
CO (tons)	18.92	26.21	27.00	30.6	22.8

CO_2 = carbon dioxide, SO_2 = sulfur dioxide, NOx = nitrogen dioxides,
VOC = volatile organic compounds, PM = particulate matter, CO = carbon monoxide

The Weights and Measures Division distributes a pamphlet to educate petroleum storage tank owners on the proper maintenance of petroleum storage. In the past, approximately 400 tanks a year had to be emptied due to contamination. The material was then treated as hazardous waste.

The Minnesota Petrofund Program, housed at the Department of Commerce, provides a reimbursement mechanism to help businesses and citizens clean up areas where petroleum leakage has occurred.

MINNESOTA PETROFUND PROGRAM

	1998	1999	2000	2001	2002
Applications approved	1,881	1,440	2,184	1,630	1,204
Funding approved (millions)	$21.4	$14.5	$18.9	$13.1	$10.6

Department of Corrections – The following is taken from the DOC policy manual (DOC Policy – 100.010: Mission, Philosophy, and Vision of the Department of Corrections):

> **Mission Statement:** To develop, provide, and promote effective correctional practices that contribute to a safer Minnesota.
>
> **Values**
>
> - Respect: We value every individual and recognize the need for respect and fairness.
> - Ability to grow and change: We affirm and support every individual's ability to change.
> - Healing and restoring relationships: We believe in restoring individual and community relationships.
> - Staff as our most valuable resource: We are committed to the personal/professional growth of our staff in an inclusive, safe, and healthy environment.
> - Open, two-way communication: We support sharing information and responsive listening through clear, accessible forms of communication.
> - Leadership through partnership: We believe in leading by example, shared decision-making, partnerships, and teamwork.
>
> **Goals**
>
> - Humane/safe environment for staff and offenders.
> - Offender accountability.
> - Community safety through shared responsibility.
> - Operational effectiveness.
> - Sound public policy.

The mission, goals, and values listed above demonstrate the department's commitment to being a good neighbor and protecting our staff, offenders, and community. Sound environmental, health, and safety practices contribute to these ideals. The DOC facilities continue to work with county hazardous waste inspectors, hazardous waste contractors, vendors, and all of our employees to reduce the hazardous waste generated at facilities.

Office of Environmental Assistance – The OEA concentrates on pollution prevention policy and outreach. MnTAP focuses the vast majority of its efforts on technical assistance to other organizations and companies with a goal of preventing pollution. Pollution prevention programs in Minnesota have had a distinct advantage over many other states by having stable, well-funded programs for the past 10 years. The Toxic Release Inventory and other data sources have shown a decrease in emissions and waste generation.

A whole host of new information and tools are available that expand our original pollution prevention vision, including environmentally preferable purchasing, green buildings, Design for the Environment, and Environmental Management Systems. OEA programs promote all these initiatives. MnTAP also uses all these tools in their assistance to Minnesota businesses. With help from MnTAP services over the last year, companies have eliminated 6.2 million pounds of waste, resulting in company savings of $2.7 million.

The OEA's product stewardship policy and initiatives also employ a preventive approach to conserving resources, and reducing waste and toxicity. Product stewardship encourages people to think differently about the products they make, buy, and use, so that manufacturers, retailers, and consumers think about and treat products as *resources* rather than waste. Product stewardship means that everyone involved in designing, manufacturing, selling, and using a product takes responsibility for the environmental impacts at every stage of that product's life. In particular, product stewardship asks manufacturers to share in the financial and physical responsibility for recovering and recycling products when people are done using them.

The OEA's product stewardship policy creates partnerships between government and industry to reduce the environmental impacts of manufactured products throughout their life cycles in an economically efficient and environmentally beneficial manner. When manufacturers share the costs of recycling products, they have an incentive to use recycled materials in new products and design products to be less toxic and easier to recycle, incorporating environmental concerns into the earliest phases of product design. Minnesota is the first state to develop and implement a product stewardship policy.

Department of Human Services – The Department of Human Services produces a very small amount of hazardous waste from campus maintenance and client work programs. DHS is moving toward the elimination of mercury-containing medical devices on all campuses. DHS continues its statewide electronic benefits transfer program (EBT). The EBT program replaces paper transactions with an electronic debit card at the point of sale.

Iron Range Resources and Rehabilitation Agency – The IRRR is committed to agency policies and practices that will help educate and encourage employees to continually strive for the prevention of pollution and conservation of energy and environmental resources. The common sense approach to achieve attainable goals has been working very well at the agency. Tips regarding pollution prevention are included from time to time in the *Weekly Resourcer*, the agency's electronic employee newsletter.

IRRR is committed to keeping northeastern Minnesota safe and healthy in the following ways:

- remain informed of environmental regulations.
- obtain environmental friendly ideas that support pollution prevention from the staff.
- demonstrate that pollution prevention must be a shared goal among government, communities, and individuals.

Metropolitan Airports Commission – The Metropolitan Airports Commission recognizes pollution prevention as an integral part of its services. The MAC's strategic plan reflects its commitment to environmental protection with the stated goal of establishing sound environmental strategies that lessen adverse environmental impacts on the natural environment and the surrounding communities. We encourage our tenants to do the same. The MAC also promotes taking a proactive approach to environmental protection and supports cooperation with other regulatory agencies.

Purchasing/procurement. Implementation of several MAC purchasing policies has been an effective means by which the MAC has been able to prevent pollution. Policy dictates that recycled content paper be used with few exceptions. Reuse is promoted internally through a policy of the purchasing department. A procedure has been established outlining the steps to take when MAC-owned property is no longer needed by a particular department. Internal notices are distributed offering one department's surplus to another. This reuse strategy reduces waste while holding costs down. In addition, an office supply surplus center has been established to provide a location to store surplus office supplies that are always available for employees to browse. MAC's new p-card program allows employees to purchase goods and services with a credit card, eliminating invoices in most cases, as well as the paperwork required to process thousands of payments. This program has streamlined the purchasing/accounts payable process, as well as dramatically reduced the amount of paper used. Surplus equipment was previously sold by sending lengthy descriptions, bid sheets, as well as terms and conditions, to numerous recipients on a mailing list. More recently, the use of Internet auction sites has allowed MAC to reach a great many more potential bidders, eliminate the large and frequent mailings, thereby reducing paper usage, and it is probable that selling prices are higher using this method. (See also categories 21, 22, 28 and 30 in Part 3.)

Technology and accepted practices. With the advent of internal and external electronic mail capabilities, the MAC has embraced its use for many purposes. E-mail is a quick and efficient means by which people within and outside the organization communicate and is also effective means of

reducing the amount of paper consumed. It has become MAC's accepted practice to use e-mail for notices such as job postings, organizational updates, press releases, human resource announcements, etc.

Similar to the use of e-mail is the MAC's Intranet site. Here employees can electronically access many internal documents once only available on paper. Multiple copies become unnecessary, and employees can access them only if they are in need of the document. Not only is this more efficient and time saving, it also saves paper.

Regulatory activities. With the many and varied activities at MSP, as well as at the reliever airports, it is essential that MAC staff work closely with a variety of regulatory agencies in order to ensure pollution prevention. For instance, the MAC works on an ongoing basis with the Minnesota Pollution Control Agency and the Minnesota Department of Health to help the reliever airport tenants to maintain or obtain compliance with existing regulations associated with their lease space activities. The MAC also uses the services of the Metropolitan Council Environmental Services for treating glycol impacted storm water.

Metropolitan Council Environmental Services – The council promotes activities and outcomes that are sustainable in development, transportation, affordable housing, and the environment. This is accomplished largely by policies, partnerships, grants, and by providing information and technical assistance to local communities, not by enforcement.

The council has a general Environmental Sustainability Policy (Section 1-2) that addresses issues relevant to the entire region. The companion Environmental Sustainability Procedure (Section 1-2a) addresses P2 in day-to-day operations by the staff.

The Industrial Waste and Pollution Prevention Section (IWPPS) controls the use of the public sewer system—largely by the implementation of wastewater pre-treatment standards—in order to ensure compliance with local, state, and federal water quality regulations. See categories 11, 16, and 33 in Part 3 of this report for a complete description of the many activities of IWPPS that are relevant to pollution prevention.

Metropolitan Council Metro Transit –The Metropolitan Council has a general Environmental Sustainability Policy (Section1-2) that addresses issues relevant to the entire region. The companion Environmental Sustainability Procedure (Section 1-2a) covers P2 for council staff. Transit does not have any regulatory activities.

Metropolitan Mosquito Control District – The Metropolitan Mosquito Control District is committed to protecting the environment. It is the policy of the district to significantly reduce and, whenever possible, eliminate the release of toxic pollutants and the generation of hazardous and other wastes. By successfully preventing pollution at its source, we can improve the quality of the environment we live in and maintain a safe, healthy workplace for our employees.

Environmental protection is everyone's responsibility. The MMCD is committed to being a good neighbor and operates in strict compliance with federal, state, and local environmental laws. Meeting this commitment requires the cooperative effort of all MMCD employees. Technologies and methods that substitute nonhazardous materials and use other source reduction approaches will be given top priority for integration into MMCD operations.

Department of Military Affairs – The Department of Military Affairs is committed to actively protecting the environment. We intend to accomplish the following:

- provide a clean and safe environment in our communities
- ensure a safe and healthy workplace for our staff

- comply with all applicable laws and regulations
- efficiently accomplish our mission
- reduce waste management costs
- reduce future liability for waste disposal

To accomplish these objectives, we will implement programs for reducing or eliminating generation of waste through source reduction and other pollution prevention methodologies.

Minnesota Pollution Control Agency – MPCA staff, working with Minnesota Technical Assistance Program (MnTAP) completed a packet of Phosphorus Management Plan Development Resources (PMP), which is designed to assist wastewater treatment operators in reducing phosphorus through source reduction and other methods. The materials have been presented at several conferences and have been mailed to all wastewater treatment plant operators. The resources are also posted on the MnTAP web site. In the months of May, June, and July, the web site received 918 visitors. This is a sign that the project was a success.

MPCA and its consultant are working on the P2 Tools Initiative. Surveys and interviews of agency staff, including supervisors and managers, resulted in 38 project proposals in air and water priority areas. Three to five of these pollution prevention pilot projects will be implemented through the regulatory and nonregulatory programs in FY04. MPCA staff continues to give strong consideration to pollution prevention principles to new rules and rule revisions. MPCA provided grants to MnTAP and the Minnesota Erosion Control Association (MECA) to build their technical assistance capacity.

MnTAP developed energy efficiency expertise and resources to enhance its pollution prevention technical assistance services to Minnesota businesses, especially related to in-process opportunities. As a result of this project, MnTAP staff is trained and better equipped to provide businesses with information that will help them identify and implement energy efficiency opportunities, and cut costs through material, environmental, and energy savings. In addition, other business assistance providers participated in training and can now have access to newly developed resources on MnTAP's energy web page.

Minnesota Erosion Control Association used the funds for an innovative project in the spring and summer of 2003. MECA and its network of engineers and designers facilitated a series of design workshops during which alternate design assessments were prepared in response to proposed conventional developments. The assessments were based on the concepts included in Project NEMO (Nonpoint Source Education for Municipal Officials) presentations. Commonly known as low impact development, this approach treats the raindrop as a resource instead of a waste product.

The workshop results were inspiring. One of the alternate designs now being implemented includes environmental enhancements, such as vegetated swales and bioretention rain gardens that will result in on-site management of a storm water volume up to the 100 year event. The city will save $200,000 implementing this design rather than the conventional design. All of the projects illustrate the importance of incorporating alternative design assessments into the conceptual stage of the development process, while plans are still flexible. The body of work shows the logical progression—from educating municipal officials to hands-on project work—that is necessary to shift perspectives towards more sustainable or on-site management of storm water.

Minnesota West Community and Technical College – Through the technical programs offered by the college, we have identified potential pollution concerns in the Collision Repair, Auto and Diesel Mechanics, Fluid Power, Machine Tool, Plant Processing, and Construction Electrician programs. Efforts are ongoing to include pollution prevention in the classroom and lab/shop activities. Staff training is available online and through campus in-service training meetings sponsored by the campus safety and health committees.

North Hennepin Community College – NHCC has identified the sources of waste generation on campus and evaluated the waste stream from these sources. Plans have been developed and implemented to separate recyclable/recoverable items in these waste streams to make better use of resources. Recyclables such as aluminum, glass, cardboard, etc. have been recycled for several years here on campus. Office supply products such as file folders and binders are redistributed and reused when staff leave or clean out files.

St. Cloud State University – Pollution prevention continues to be a factor in purchasing and implementation of new procedures. In addition, SCSU procurement policies demand office paper with 30 percent minimum total recycled content and 30 percent post-consumer fiber content. Bath tissue is 95 percent, or more, recycled/post-consumer fiber.

Department of Transportation – The Minnesota Department of Transportation is committed to lowering its waste disposal costs and liability and protecting the environment. In keeping with this commitment, we strive to use cost-effective and practical methods to reduce adverse toxic impacts from the transportation infrastructure on the air, soil, and water.

Mn/DOT's environmental guidelines include the following:

- lowering expensive disposal costs and liability associated with the use of regulated materials/waste. Reducing and eliminating the generation of waste through research, design, and field operations.
- identifying and implementing pollution prevention opportunities by involving all employees. These opportunities include new methods, technologies, and product substitution.
- seeking to demonstrate its commitment by adhering to all environmental regulations.
- promoting cooperation and coordination between government and the public toward the shared goal of preventing pollution and conserving our environment.

Part 3
Pollution Prevention Activities during the Fiscal Year 2003

Part 3 contains information about the pollution prevention activities practiced by the participating agencies. The information is organized by category of material, listed alphabetically. All individual agency summary reports that address pollution prevention measures for a given material are listed in the same order as in Part 1.

1. Absorbents

Department of Administration – The Travel Management Division and the Materials Management Division's Surplus Services Section uses absorbents to clean oil/antifreeze spills. The Plant Management Division uses absorbents to clean oil/antifreeze spills and recycles the absorbent.

Department of Corrections

MCF-Stillwater – Absorbents are used in various industry shops. Shop supervisors regulate the use of this product in an ongoing effort to reduce its use. The waste is disposed of in accordance with the EPA/MPCA regulations.

MCF-St. Cloud – Absorbents are on hand and ready for use at the facility. The cost of these products is approximately $300 per year, and they allow us to keep hazardous waste out of landfills for compliance with MPCA. St. Cloud recycles rags at a cost of $150 dollars per year, eliminating the need to dispose of oil-grease rags by sending them to Metro-Furnace per MPCA regulations.

MCF-Shakopee – Absorbents are used in the maintenance department for oil-based products. Safety Kleen recycles all oil products and will continue to do so for FY 2004.

Iron Range Resources and Rehabilitation Agency – The IRRR does not use clay absorbents at its facilities. Our shop staff members use rags for oil changes and vehicle lubrication.

Metropolitan Airports Commission – The MAC continually evaluates a variety of absorbents. Currently, corncob fractions, clay floor-dry, and disposable rags are used to absorb oil and grease in the maintenance shop. Also, although the MAC is not responsible for any aircraft fueling operations or related spills, it does provide corncob fractions to its tenants, which are used exclusively to absorb spilled jet fuel. Booms are also used as a stopgap to prevent miscellaneous debris and other contaminants from reaching the river. The sorbents are saturated as much as possible before disposal. The spent absorbent materials are managed as a nonhazardous industrial waste and are burned for energy recovery.

Metropolitan Council Environmental Services – With the change in state regulations regarding the disposal of used oil absorbents, MCES has switched from a clay-based inorganic product to Spill-Dri™, a material made from 100 percent reclaimed natural fiber cellulose. In many other applications, polypropylene pads are used as absorbents. Products that are absorbed primarily are hydraulic fluids, crankcase oils, and other lubricating oils. The larger facilities send the used absorbents via OSI Environmental, Inc. to be burned as a fuel for energy recovery. Two MCES facilities have industrial

wringers, which squeeze the oil from the synthetic pads, allowing their frequent reuse. Another facility has analyzed its used absorbent for Toxicity Characteristic Leaching Procedure (TCLP) heavy metals. Since none of the listed thresholds were exceeded, the absorbent is handled along with industrial co-disposal waste (grit) with the approval of the regulating county. For 2002, 349 gallons of used absorbents were sent for energy recovery, a decrease of 71 percent from the previous year.

Metropolitan Council Metro Transit – In 1996, Metro Transit switched from the use of clay-based absorbents to a cellulose type of absorbent. The change was made after reviewing the comprehensive studies and report done by the Minnesota Department of Transportation. An in-house comparison of absorbents validates the effectiveness of the selected absorbents. The change has eliminated over 8,000 pounds of clay from the waste stream and has diverted the used absorbents from being sent as a hazardous waste to being used as a fuel source.

Department of Military Affairs – The DMA is developing a clay floor-dry recycling contract that will eliminate the need to dispose of POL-contaminated clay floor-dry, which is currently used and reused until saturated, before it is disposed of. Under the contract, the contaminated floor-dry will be cleaned of all POL by the contracted vendor and returned for reuse.

St. Cloud State University – Absorbent pad and pans or other similar products and launderable rags are increasingly available and used at SCSU. Absorbent materials to contain hazardous chemical spills near floor drains are being supplemented with drain covers and increased training and inspections.

Department of Transportation – The sorbents currently used are used either as a waste-derived fuel for the generation of steam and electricity, or extracted and reused. Mn/DOT continues, on a small scale, to use launderable rags. Mn/DOT reuses its sorbents, since it has found that the single largest factor in reducing an absorbent waste stream is reuse. It is important to use absorbents to their full potential prior to discarding.

University of Minnesota – The Vehicle Fleet Operations use absorbent pads to clean up small routine spills, in place of and/or in combination with floor-dry. The pads are laundered and reused. Absorbent disposal has been cut by five to 10 drums per year.

Printing & Graphic Arts uses rags for printing operations cleaning and Studio Arts uses rags for cleaning in painting and other art techniques. The rags are centrifuged to remove solvents as needed and then laundered for reuse. Laundering of rags provides a distinct financial advantage to disposing of the rags as hazardous waste.

2. Adhesives

Department of Administration – The State Architect Office specifies materials such as fiber-based fabrics, adhesives, carpeting, and upholstery that are free of toxins and formaldehyde.

Department of Corrections

MCF-Stillwater – Adhesives are used in the vocational-tech carpentry, upholstery, and furniture shops. These shops are using improved products and effective handling procedures that nearly eliminate waste. If waste is generated, it is disposed of in accordance with EPA/MPCA regulations.

MCF-Shakopee – All adhesives purchased were used during the past fiscal year, meaning none of these products had to be discarded.

North Hennepin Community College – NHCC uses several types of adhesives, primarily in the art and plant services departments. Every effort is used to properly control product and follow manufacturer recommendations to ensure all adhesives are completely used and handled correctly to avoid being wasted.

St. Cloud State University – As a matter of practice, SCSU contractors are required to use adhesives that do not generate hazardous vapors. This is not always possible to enforce as often as we would like. (Specific products that provide superior adhesion are sometimes warranted.) But we keep reducing their usage as we find alternatives. The primary goal is to employ a product that will not produce volatile organic compounds that may cause temporary air quality concerns with building occupants.

3. Air Quality, CFCs

Department of Administration – The State Architect Office specifies air quality standards as well as statewide asbestos control programs based on federal and state standards. The InterTechnologies Group requires vendors to comply with federal and state refrigerant recovery statutes for air conditioner refill or replacement. The Plant Management Division retrofitted one existing chiller at the History Center with non-ozone-depleting 134a refrigerant.

Department of Corrections

MCF-Oak Park Heights – Plans call for replacement of the chiller, installed 20 years ago and rebuilt last year. The present chiller uses CFC refrigerants. Although a refrigerant reclaimer has been used for a number of years, and the oil is recycled with the rest of MCF-OPH waste oil, replacing the present chiller will be more efficient and environmentally practical, not only in terms of energy consumed, but also in terms of efficiency of the system.

MCF-St. Cloud – Eliminates excess Freon at a cost of $300 per year. This practice limits the amount of atmospheric ozone depleting gases (greenhouse gases) used.

MCF-Shakopee – All refrigeration and air conditioning equipment at this facility has been converted to new refrigerants that are environmentally safer for use. Preventative maintenance is routinely done to detect leaks on all equipment and will continue for FY 2004.

Metropolitan Airports Commission – Maintenance performed on any system containing CFCs includes complete recovery and recycling of refrigerants by certified technicians. Appliances containing refrigerants are recycled through an approved vendor.

Metropolitan Council Metro Transit – In 1995, the Minnesota Pollution Control Agency (MPCA) required that Metro Transit apply for air discharge permits as mandated by the Clean Air Act Amendments. Subsequently, a complete stack inventory was conducted at all six garage facilities. In 1997, Metro Transit was issued permits for three of those locations. A review of the air emissions has shown that the permits were required at two of those garages because of the size of the dual fuel boilers that were installed. In 2000, Metro Transit was given a Class D air permit for its new garage in St. Paul. The fourth permitted facility, the Overhaul Base, is regulated due to the air emissions from the boilers and the exhaust from the paint shop and paint spray booth.

In 2002, Metro Transit received delivery of its first hybrid bus. This bus uses electric drive motors to power the bus. The electricity is produced by a small diesel engine that is also used for acceleration. In 2003, the agency received three additional electric hybrid buses. These will be tested for the next year and a report will be issued in late 2004 or 2005 on the feasibility of this style bus in our environment.

North Hennepin Community College – NHCC considers indoor air quality a high priority. Air quality sampling has been performed on problem/suspect areas with corrective action taken to prevent reoccurrence. Several of the older buildings have been renovated over the past five years with new higher efficiency air handling units installed that provide for better air filtration and increased fresh air supplied to interior spaces of these buildings.

CFC refrigerants are used on campus in central plant chillers (R-134), and several smaller air-conditioning (R-22) and refrigeration units (R-12, 22). No supplies or stocks of refrigerant are kept on campus. This type of work is performed by qualified outside contractors.

St. Cloud State University – SCSU continues to go beyond recycling Freon. A central chiller plant costing over $3 million was recently put online. It has added capacity to existing systems and reduced CFCs by using R-22 refrigerant. The university has been able to continue retiring cooling towers and R-12 and R-113 chillers, as more buildings are linked to the chilled water system.

Department of Transportation – Mn/DOT uses environmentally friendly 134-refrigerant in all vehicle air conditioners. CFCs in Mn/DOT vehicles and building air conditioners are phased out as warranted by repairs.

University of Minnesota – The university's Twin Cities campus has remodeled two of its coal-fired steam plants to use multiple fuel types and shut down a third. The result is a reduction of sulfur dioxide (SO_2) emissions from approximately 600 tons per year (tpy) to approximately 110 to 250 tpy, nitrogen oxide (NOX) emissions from approximately 1,370 tpy down to 280 to 310 tpy, and carbon monoxide (CO) emissions from approximately 280 tpy down to 130 to 150 tpy. Results vary depending on the ratio of fuel types used—gas, coal, and oil—in the modified plants. Use of natural gas maximizes the environmental benefits of reduced air toxics emissions. The current fuel plan is to use a minimum of 70 percent natural gas.

Reducing steam and electrical plant air pollution by conserving energy is a goal of Facilities Management Energy Systems' Energy Efficiency Program (www.facm.umn.edu/AboutFM/about_operations.htm#6). The mission of the Energy Efficiency Program is to reduce the Twin Cities campus energy consumption while maintaining or improving occupant comfort. Three components of the Energy Efficiency Program are: (1) optimum energy management; (2) building system analysis, repair, and upgrade; and (3) energy awareness campaign.

Optimizing energy use requires the coordinated effort of many Facilities Management staff, including building system technicians, engineers, pipefitters, mechanics, zone supervisors, and energy specialists. Each profession contributes information, skills, and expertise needed to improve building energy efficiency. The technology hub of our optimization program is the Building Systems Automation Center, which electronically monitors and controls heating, ventilation, and fire alarm systems in about 150 campus buildings. The Energy Efficiency Program has developed "University Building Efficiency Recommended Guidelines" to assist building managers and Building Systems Automated Control operators to maintain building energy use at the lowest level consistent with occupancy scheduling and comfort. Facilities Management employs energy management specialists who are certified commercial energy auditors who perform energy audits to identify building system equipment and controls that need updating or calibrating.

Energy-saving projects are typically funded through internal loans and paid back with the savings from the energy budget. The energy awareness campaign promotes energy conservation practices across the Twin Cities campus. Their efforts have reduced steam use on the Minneapolis campus central steam system by 20 percent, which translates to a 20 percent reduction in steam plant air emissions. Through energy conservation and the Energy Efficiency Program, overall energy consumption has decreased 12.7 percent since 1991, with energy cost savings of $1 million each year since 1995. An important part of the program is working with energy suppliers such as Xcel Energy and Reliant Energy to ensure that the university is taking full advantage of energy-saving programs

and rebates offered by suppliers. A recent example: in 2001 Reliant Energy presented the university with a rebate check for $225,000 as the result of the purchase of an energy-efficient chiller for the West Bank, which will also save the university $200,000 per year in avoided utility costs.

The university's Center for Diesel Research focuses on reduction of diesel exhaust emissions from mobile and stationary engines (http://www.me.umn.edu/centers/cdr/index.html). The center's mission is to: (1) develop new technology to reduce occupational and environmental exposure to internal combustion engine emissions; (2) evaluate the application of emission control strategies in confined spaces such as mines and densely populated areas; (3) offer unique educational and research opportunities to students; (4) provide high-quality research and development services to customers such as engine and exhaust after-treatment manufacturers, the petroleum and alternative fuels industries, and users of internal combustion engines; and (5) offer educational opportunities through outreach programs and short courses.

The Department of Parking and Transportation Services, Twin Cities campus, specified in their contract with First Student Lines, that all buses used on the campus meet EPA 1997 emission limits for metropolitan buses and any stricter, future EPA limits. Normally First Student Lines would not need to comply with these strict limits, because they fall into a less regulated category of school buses. The contract also specifies financial penalties, such as $50 a day for every incident of a bus having visible exhaust emissions.

The university's Facilities Management has an ongoing program to capture and reclaim CFC and HCFC from cooling units; as units are serviced, their CFCs/HCFCs are captured, then placed back in the unit after it is serviced. White goods are shipped to certified recyclers who recover CFC/HCFC prior to disposal. Annually the Twin Cities campus recycles (recovers then places into other units) approximately 300 pounds of R22 and 50 pounds of R12. Thousands of pounds of university refrigerants have been recovered and put back into the original units by facilities personnel after servicing, or recovered by off-site contractors.

With the heating plant modifications, there is a reduction of approximately 1,560 to 1,680 tpy of SO_2, NOX, and CO emissions. Reduced energy usage requires less steam and electricity generation, which means less pollution emitted to the air. Reduction of diesel exhaust emissions makes for a cleaner and healthier air to breathe. CFC and HCFC capture and reclamation program reduces emissions of global warming chemicals.

4. Antifreeze

Department of Administration – The Travel Management Division replaces antifreeze as needed, rather than as scheduled maintenance. Used antifreeze is collected and recycled. The InterTechnologies Group uses glycol for the cooling loops for the stand-alone air conditioners for the three Computer Operations Centers. The Plant Management Division continues the conversion of cooling coils at the all Capitol Complex Buildings to prevent freeze-ups using air from the air handlers rather than antifreeze. The Plant Management Division also collects and recycles antifreeze on a voluntary program, maximizing recovery by January 1, 2000.

Department of Corrections

MCF-Stillwater – Antifreeze is used in most vehicles at the facility. It is recycled for reuse when possible. If waste is generated, it is disposed of in accordance with EPA/MPCA regulations.

MCF-St. Cloud – All antifreeze from facility vehicles is changed by local service stations and then recycled. As a result, antifreeze is no longer disposed of with the local municipality water department.

MCF-Shakopee – Antifreeze, batteries, lighting, heavy metals, office supplies, oil filters, and tires are all items that we recycled and will do so for FY 2004.

Iron Range Resources and Rehabilitation Agency (IRRR) – The IRRR collects antifreeze and then sends it to Como Oil of Duluth for recycling.

Metropolitan Airports Commission – The MAC Maintenance shop is equipped with two antifreeze/engine coolant recyclers. At regular maintenance intervals, coolants are removed, processed, and returned to vehicles. The recycled antifreeze is supplemented with anti-corrosion additives and the pH is adjusted. This meets all manufacturer specifications for engine coolant. Very little new antifreeze is purchased and virtually no antifreeze is disposed of. Extended life coolants are used whenever possible.

Metropolitan Council Metro Transit – In January 1997, Metro Transit instituted a formal policy on the handling of all used antifreeze/coolant. This calls for storing the used material in 55-gallon drums and then having it recycled.

Department of Military Affairs – The DMA continues to operate an ultrafiltration antifreeze-recycling unit, which has reduced the waste stream from 6,000 pounds per year to 100 pounds per year. As part of a pollution prevention study, contractors will do a pollution prevention opportunity assessment cost comparison between the costs of recycling antifreeze versus the costs of disposing of it. The comparison will take into account such things as the cost of chemicals used to regenerate the antifreeze, time spent by operators during recycling process, disposal costs of used antifreeze, and the cost of new antifreeze.

North Hennepin Community College – The college no longer uses antifreeze to winterize cooling coils. A different method has shown favorable results and will be continued. Small quantities of automotive antifreeze from lawn equipment are brought to a local recycler.

St. Cloud State University – SCSU is moving away from using antifreeze to winterize cooling coils and is using more controls to reduce fleet use of antifreeze.

Department of Transportation – Most of Mn/DOT does not produce significant amounts of antifreeze, rarely changing out the old antifreeze. If a part needs to be changed, the old antifreeze is collected, temporarily held, and refilled into the vehicle. Mn/DOT has researched, identified, and implemented various recycling options for antifreeze. However, due to cost, most of Mn/DOT's biodegradable antifreeze is disposed of in the sanitary sewer with permission from the POTW. Some antifreeze generated by Mn/DOT is recycled through a filtration technology located in Crookston and Oakdale. The recycled antifreeze is used in Mn/DOT vehicles.

University of Minnesota – The university's Fleet Services Department, Twin Cities campus, rarely removes automotive antifreeze; rather they top off radiators with fresh antifreeze, and then sell vehicles after three to five years. The small amount of antifreeze collected is periodically regenerated on site by outside contractor.

5. Audits

Department of Corrections

MCF-Moose Lake/Willow River – Inspections of the hazardous waste storage area are conducted on a weekly basis.

MCF-St. Cloud – On going environmental audits ensure compliance with MPCA, wastewater, potable water, storm water, and OSHA requirements.

Metropolitan Airports Commission – The MAC continues to conduct environmental compliance inspections at the six reliever airports. These inspections help identify possible environmental issues and assist reliever airport tenants in achieving and/or maintaining compliance with existing regulations. Reliever airport tenants must pass an environmental compliance inspection in order to transfer or renew a lease. It is also an opportunity for the MAC to educate its tenants of the environmental impacts their actions may have, and to help them improve their waste management practices. This program is ongoing by design. MAC staff continues to provide education/training and technical support to the reliever airport tenants. Opportunities for pollution prevention are noted and incorporated in the Capital Improvement Process as indicated by the MAC's strategic plan. MAC routinely inspects and continuously audits its own operations in an effort to recognize and take advantage of any pollution prevention opportunities.

Department of Military Affairs – The DMA conducts inspections, site assistance visits, and audits of each facility to determine compliance. During this process, pollution prevention opportunities are evaluated. Three separate visits can occur at most of the facilities. The first would be a hazardous waste site visit; the second, a Minnesota Organizational Readiness Evaluation; and the third, an environmental compliance inspection. All of these help integrate environmental activities into the daily mission.

St. Cloud State University – MacNeil Environmental Inc. has performed increased environmental audit functions as part of their Environmental Health and Safety contract with SCSU. These relate to elements of hazardous waste disposal, storage tanks, and the OSHA laboratory standard, which encompass pollution prevention. The SCSU Chemical Hygiene Officer has received specialized off-site laboratory safety training this past year. He has become increasingly instrumental on hazardous waste audits, waste prevention planning, and hazardous waste removal. Departmental support, staffing focus, and investigative activities in these areas have also increased.

SCSU has continued to implement the suggestions of the latest Minnesota State Colleges and Universities facilities condition survey. Survey environmental recommendations included specific purchases and capital/repair projects. These affect HVAC and electrical system revisions and both energy and water conservation measures. We are continuing to benefit from their insights.

Department of Transportation – Mn/DOT conducts approximately 30 internal waste stream audits annually of Mn/DOT facilities. The purposes of these audits are to:

- evaluate Mn/DOT's hazardous and problem waste stream management methods throughout the department.
- identify various pollution prevention opportunities that warrant further research.
- evaluate potential areas of noncompliance with state and federal hazardous and solid wastes, tanks, and water quality laws and rules.
- make recommendations to correct and/or avoid potential areas of noncompliance.
- make recommendations to maintain an effective waste management program.

Mn/DOT annually conducts five to 10 external environmental audits of facilities that handle Mn/DOT wastes. The purpose of these audits is to evaluate potential and existing waste handling, storage, recycling, and disposal sites. This evaluation is based on a facility's waste management procedures, pollution prevention practices, compliance records, site geology, and financial strength. These audits help determine if the amount of environmental risk and liability associated with using a particular site is acceptable to Mn/DOT.

Both Mn/DOT's internal waste stream and external environmental audit programs have costs associated with them. However, based on Mn/DOT's experience, the cost of the program is minimal

compared to the cost associated with potential Minnesota Pollution Control Agency enforcement actions and potential environmental liability (Superfund). Both Mn/DOT's internal waste stream and external environmental audit programs offer environmental benefits in that they ensure that Mn/DOT waste is being managed in an environmentally sound manner.

University of Minnesota – The university's Department of Audits checks departments to see if they have hazardous waste compliance protocols (which includes pollution prevention) and OSHA laboratory standard protocols in place.

The Department of Environmental Health and Safety (DEHS) does targeted audits of large and/or non-compliant departments. All chemical waste generators are directed to minimize waste and prevent pollution via training and self-audit. The training and audit form is currently available on the DEHS home web page (http://www.dehs.umn.edu/hwd/guidebook/guidebook8.html) and in the Hazardous Chemical Waste Management guidebook.

6. Automotive Fuels

Department of Administration – The state purchased 221 alternative fuel vehicles that use E85 (85 percent ethanol fuel) in 2003 (170 passenger cars and 51 bi-fuel passenger vans/SUVs). We exceed the federal requirement of 75 percent E85 vehicles. Materials Management Division is in the process of reviewing all state fuel contracts to determine whether low sulfur is available and can be added to the contract as a less polluting option for end users. The Travel Management Division uses E85 fuel as an alternative energy source with reduced emissions. This facility is available to all state agencies and political subdivisions.

Department of Agriculture – The MDA continues to help promote the use of alternative fuels through their help with the farm community in the production of ethanol-blended and bio-diesel fuels. For further information, go to the department's web site at www.mda.state.mn.us/.

Bemidji State University – Bemidji State University purchased a battery-powered maintenance vehicle to replace a full-sized van. We now have two electric vehicles and are very pleased with their performance. The purchase cost of the electric vehicle was $9,800, approximately $5,000 to $6,000 less than a new van. Annual fuel savings are expected to be about $200 to $250. In addition to the fuel savings, the vehicles are quiet and easy to maneuver and to find parking space for around our campus buildings. Vehicle maintenance has been minimal. They have also functioned well during the winter months. Other electric-powered vehicles used on campus include a battery-powered forklift and self-propelled pallet jack used in the Central Stores and receiving area and the ice arena's Zamboni.

Department of Commerce – The department leases or owns 51 cars and trucks, four of which are E85 capable and 22 of which are non-E85 capable but are in the same size category as an E85 vehicle. As these vehicles are replaced, the department will look toward adopting E85 vehicles.

Department of Corrections

MCF-Red Wing – State vehicles are fueled at this facility. A 1,000-gallon aboveground concrete tank with spill containment and leak detection is in place.

MCF-St. Cloud – Ninety-five percent of vehicle filling is done at a public station. The only fueling done on site is for a limited number of plant operation vehicles, which limits the chances of fuel spills, explosions, and tank maintenance.

MCF-Stillwater – Automotive fuels are used in most MCF-Stillwater vehicles. If waste is generated, it is disposed of in accordance with EPA/MPCA regulations.

Iron Range Resources and Rehabilitation Agency – Diesel fuel and gasoline are stored in underground storage tanks at the agency's administration building. The IRRR uses a blend of ethanol and gasoline in all of the motor pool and agency vehicles. The storage tanks, newly installed in 1999, are equipped with computerized leak detection and spill containment devices.

Metropolitan Airports Commission – MAC has evaluated the feasibility of using battery-powered (electric) utility vehicles. Several departments have had an opportunity to demonstrate these vehicles for a period of time to determine their effectiveness and suitability. If implemented, these vehicles would take the place of fuel-burning light trucks or automobiles.

Metropolitan Mosquito Control District – As a pollution prevention activity for 2003, MMCD purchased new flex-fuel vehicles (FFV) capable of using E85 ethanol to replace some of the older fleet vehicles. Twenty percent of the new vehicles purchased by MMCD in 2003 were flex-fuel Chevy Silverado pickups. The FFV Chevy Silverado was on MPCA's list of recommended vehicles for fuel efficiency and least amount of pollutants for standard size pickups. All of the E85 pickups are in service at MMCD's Oakdale facility, which has convenient access to E85 filling stations.

By using FFVs in the fleet, MMCD hopes to reduce tailpipe emissions that contribute to urban air pollution and ultimately to global warming. Additionally, using E85 fuel will help fuel Minnesota's economy since ethanol is a renewable fuel made here in Minnesota. On the downside, the cost of the FFVs was $2,196 more than the standard Chevy Silverado pickup without flex-fuel capabilities. MMCD hopes to recover the extra cost over the next two to three years through lower fuel prices at the pump, as the per-gallon cost of ethanol is less than that of regular gasoline. MMCD is committed to reducing pollutants generated by its vehicle fleet and plans to continue in the future with a program of replacing older fleet vehicles with more efficient, cleaner running flex-fuel vehicles.

Department of Military Affairs – The DMA has a fuel program where contaminated diesel fuel is filtered so that it can be recycled. This prevents the costs and hazards of waste disposal.

North Hennepin Community College – Fuel for grounds equipment is stored in an aboveground 250-gallon diesel tank, which has spill containment. Gasoline for small equipment is kept in approved safety cans and stored in an approved safety cabinet.

St. Cloud State University – SCSU has 16 alternative fuel (ethanol E85) autos in its motor pool. They produce limited carbon monoxide. The college now has on-site refueling.

Department of Transportation – Mn/DOT is purchasing heavy equipment pieces that contain computer-controlled electronic ignitions that maximize vehicles' fuel efficiency. Mn/DOT is pursuing an EPA grant to fund a heavy truck retrofit project designed to lower diesel emissions, and is also purchasing vehicles that can use E85 (85 percent ethanol) fuel. Mn/DOT has purchased and is in the process of evaluating an electric hybrid car. Mn/DOT has contracted for commercial oil changes specifying re-refined engine oil.

University of Minnesota – The University of Minnesota Fleet Services is an active participant in the E85 fuel project. Fleet Services' customers have pumped over 20,000 gallons of E85 fuel in both 2002 and 2003. In fall 2000, the Department of Fleet Services, Twin Cities campus installed a 6000-gallon E85 fueling station and purchased 47 flexible fuel vehicles (FFV) that can use this environmentally friendly fuel. E85 is a renewable fuel made in Minnesota from corn and other agricultural products. E85 has many benefits as a renewable energy source. It helps create a cleaner environment, healthier air, and a stronger U.S. economy, while reducing overseas oil imports. Production and use of E85 instead of gasoline results in a 35 percent reduction in greenhouse gas emissions. E85 also reduces harmful exhaust emissions by more than 50 percent. Fleet Services has traded its three Toyota Prius hybrid electric/gasoline cars in its rental fleet for four new 2004 Prius. The Prius has an electric motor,

which is assisted by a clean, efficient gasoline engine for hard accelerating, higher speeds, and battery charging. Prius fuel efficiency is 42 mpg overall versus 28 mpg for the fleet's other compact cars.

The Power and Propulsion Division, Department of Mechanical Engineering, Twin Cities campus, tests engine efficiency and emissions of gasoline and diesel-powered engines and offers technical assistance, for a fee, to agencies or companies researching performance of automotive and diesel engines (http://www.me.umn.edu/divisions/#PnP). The Center for Diesel Research (http://www.me.umn.edu/centers/cdr/index.html) is a good resource of information on test procedures and simple maintenance that can greatly reduce diesel emissions from buses and trucks. Proper choices and use of fuels help reduce air emissions from automobile and bus exhausts and reduce fuel consumption.

The Department of Parking and Transportation Services received the 1997 Minnesota Government Reaching Environmental Achievements Together (MnGREAT) pollution prevention award for their ongoing efforts to reduce automobile wait times in parking lots through modifying software controlling access into and out of parking lots. The gate controllers annually reduce gasoline use by about 2,000 pounds and prevent approximately 7,000 pounds of carbon dioxide emissions.

7. Automotive Maintenance

Department of Administration – The Travel Management Division recovers and recycles automotive refrigerants for air conditioning units. Both the Travel Management and Plant Management Divisions' preventative maintenance programs are designed to minimize excessive and/or premature replacement of parts. They also use remanufactured parts whenever they are available.

Department of Corrections

MCF-St. Cloud – All vehicle maintenance is done at a local automotive dealership, which limits the chances of oil/fuel spills.

MCF-Stillwater – Automotive maintenance is done on most of the MCF-Stillwater vehicles by outside vendors. If waste is generated, the vendor is required to dispose of it in accordance with EPA/MPCA regulations.

Iron Range Resources and Rehabilitation Agency – All automotive maintenance, except for air conditioning systems, is performed in the IRRR shop at the administration building. Vehicle fluids are stored for recycling and parts are exchanged for remanufactured parts. All metal that cannot be exchanged is recycled by a scrap-metals facility.

Metropolitan Airports Commission – For specific information on automotive maintenance, see categories 1, 3, 4, 6, 8, 23, 25, 31, and 33.

Metropolitan Mosquito Control District – All major automotive maintenance and repair is done through commercial vendors by way of special maintenance agreements. Only minor vehicle maintenance and repair is performed at district facilities, including oil and oil filter changes, spark plug changes, and replacing some engine belts. The program to outsource most of the vehicle maintenance has eliminated most waste automotive chemicals and solvents from MMCD waste streams.

Department of Military Affairs – The DMA's Controlled Humidity Storage Facility: Camp Ripley Training Site serves as a major training area for National Guard units from throughout the nation. The MATES serves as a facility within the training site where units can obtain equipment to use while they are here for annual training periods and weekend drills. To reduce maintenance man-hours, work bay

time consumption, and production of waste liquids, the DMA "mothballs" a portion of its fleet during times when troop activity is reduced. The Controlled Humidity Storage Facility allows the DMA to store vehicles in an environment that will keep them out of the weather elements. This facility also allows the vehicles to remain operational in the event of a large mobilization of DMA troops.

North Hennepin Community College – Major vehicle repairs are performed by auto dealerships. Minor maintenance such as oil and filter changes are performed by qualified staff on campus. The used oils, filters, and antifreeze are recaptured by staff and sent to a local vendor for recycling.

St. Cloud State University – The SCSU vehicle repair shop has revamped procedures for brake pad/shoe replacement to ensure asbestos fiber release control. Replacement pads are non-asbestos. The Diesel Repair, Locksmith, Print, and Driving Range shops, have been using a water-based parts washer that generates only a small amount of sludge to be disposed of as hazardous waste.

Department of Transportation – Mn/DOT is purchasing brake cleaners that are less toxic and easier to manage as a waste. See also categories 24: *Parts Cleaning* and 23: *Oil, Oil Filters.*

University of Minnesota – The Department of Fleet Services, Twin Cities campus, uses a recycling service for their used oil. Oil and gas filters are crushed, the oil recycled, and the metal scrap recycled. Automotive lead acid batteries and air conditioning refrigerants are also collected and recycled. Underground storage tanks for fuels have either been removed or upgraded to meet MPCA and EPA requirements, which will prevent contamination from leaking tanks.

Fleet Services has installed a parts washer system using a proprietary solvent that is non-flammable and is perpetually cleaned by a recirculating filter system. Filters periodically need to be disposed of, but the solvent does not need to be shipped off site for recycling/disposal. This system potentially will eliminate 240 gallons of solvent waste per year.

Vehicle fleet operations use absorbent pads to clean up small routine spills, in place of and/or in combination with floor-dry. The pads are laundered and reused. Absorbent disposal has been cut by five to 10 drums per year.

8. Batteries

Department of Administration – The Resource Recovery Office informs agencies that the Rechargeable Battery Recycling Corporation (RBRC) has a Charge Up to Recycle!® program that is free of charge to public agencies. Collection kits are available at no cost, and the RBRC will pay for all shipping, materials, processing, and recycling costs. To obtain information and collection kits, call 678-419-9990. The state also has a vendor for recycling rechargeable batteries and has contracts for hazardous waste disposal. Agencies have statutory responsibility to properly dispose of or recycle single-use and rechargeable batteries. The State Recycling Center does not receive batteries due to these recycling opportunities. The contract for automotive batteries has provisions for all state agencies to recycle batteries. The Travel Management Division recycles automotive batteries.

The Materials Management Division procures only reduced or no mercury batteries in accordance with Minn. Stat. § 115A.965, subd. 2 (see below). The mercury content in flashlight batteries has been either eliminated or reduced to negligible levels due to the Environmental Protection Agency's mandates in the late 1980s and early 1990s.

> Subd. 2. Total toxics concentration levels. The total concentration level of lead, cadmium, mercury, and hexavalent chromium added together in any packaging must not exceed the following amounts:
>
> - 600 parts per million by weight by August 1, 1993;
> - 250 parts per million by weight by August 1, 1994; and
> - 100 parts per million by weight by August 1, 1995.

The Plant Management Division returns batteries from vehicles and janitorial equipment to vendors for recycling; the division also participates in a voluntary "other" internal battery collection and disposal program. The InterTechnologies Group uses recycled batteries for three uninterruptable UPS units that are located in the two Computer Operations Centers in the Centennial Office Building and one uninterruptable UPS unit located in the Administration Building.

Department of Commerce – A battery-recycling bin is located in the employee lunchroom.

Department of Corrections

MCF-Faribault – Participates in recycling rechargeable Ni-Cad batteries at an average cost of about $10 per shipping container. Many cordless power tools are being replaced with electric models to reduce battery waste.

MCF-Moose Lake/Willow River – Batteries are collected and shipped in batches to a recycler. There was no shipping activity during FY 2003.

MCF-Red Wing – This facility recycles all batteries with the Goodhue County Recycling Center.

MCF-St. Cloud – Batteries are collected and recycled, which ensures proper disposal.

MCF-Stillwater – Batteries are used in all MCF-Stillwater vehicles, as well as other applications throughout the institution. Waste batteries are disposed of in accordance with the EPA/MPCA regulations.

Office of Environmental Assistance – The OEA purchases alkaline rechargeable batteries and continues to be pleased with their performance. All rechargeable batteries are recharged as many times as possible and then collected for management by the Rechargeable Battery Recycling Corporation (RBRC) Charge Up to Recycle!® program that is free of charge to public agencies..

Iron Range Resources and Rehabilitation Agency – The IRRR collects batteries that cannot be recharged and transports them to the Virginia area regional landfill where they are recycled by Arrowhead Battery of Buhl.

Metropolitan Airports Commission – All MAC batteries are recycled. Spent lead-acid batteries are returned to the supplier for recycling. NiCad, NiMH, lithium, and alkaline batteries are collected by MAC electricians from the various points of generation and recycled by an approved vendor.

Metropolitan Council Environmental Services – Spent lead-acid batteries (SLABs) are collected as a special hazardous waste and sent to battery recyclers. For most over-the-road vehicles, used SLABs are exchanged for new ones at the time of service. The used batteries that do accumulate and are stored for recycling are from heavy equipment, electric carts, and standby emergency electric power diesel-fueled generators. In 2002, 2,248 pounds of SLABs—a decrease of 84 percent over the previous year—were recycled from MCES facilities, mostly through A-Battery City in Minneapolis.

Metropolitan Council Metro Transit – Metro Transit continues to recycle all of its spent lead acid batteries (SLABs) with its supplier. This procedure has been in place since the 1960s.

Department of Military Affairs – A battery-recycling program reduces the second largest waste stream within the DMA system. Used lead acid batteries are sold and other batteries are recycled with a nominal fee to cover packaging and transportation costs.

Vehicles that are stored outside over the winter have had solar-powered battery trickle chargers installed on them. These chargers can be moved from vehicle to vehicle and maintain a charge on

batteries during periods of non-use. This will greatly reduce the number of batteries that lose their charge and crack during the winter.

Minnesota Pollution Control Agency – The MPCA Alliance for Recycling and Reduction of Waste (ARROW) continues to coordinate its battery collection program in FY 2003. Onyx Environmental Services picks up and recycles the agency's used batteries. for FY 2003, the agency will recycle over 30 pounds of batteries.

North Hennepin Community College – All batteries are recycled. Every effort is made to ensure that when a new lead-acid battery is purchased, the old one is brought in for exchange. Other batteries are recycled through a local supplier.

St. Cloud State University – SCSU stores unreliable automotive lead acid batteries in a secondary container until recycling pickup and is experimenting with recycling smaller sealed lead acid batteries. Non-special program hazardous waste type batteries are managed for recycling/reclamation quarterly through Batteries Plus and through the University of Minnesota's Chemical Safety Day Program.

Department of Transportation – Mn/DOT sends all used nickel-cadmium, lead acid batteries, nickel metal hydride, mercury button, and lithium batteries to approved battery recyclers.

University of Minnesota – Facilities Management and the Department of Environmental Health and Safety collect mixed dry cell batteries from all campuses. Several types of waste batteries are considered hazardous waste if not recycled, and most batteries will contribute metals to solid waste incinerator air emissions. Batteries are sorted by chemistry type and managed for recycling/reclamation where possible. Lead-acid batteries from various university operations are recycled. Rechargeable battery systems are used for various functions by departments.

During fall 2000, Facilities Management and the Department of Environmental Health and Safety reviewed and updated the battery collection program, purchasing new, colorful collection containers and distributing them to all office recycling sites on the Twin Cities campus. The goal was to increase participation in the proper management of dry cell batteries, and indeed the amount of batteries collected increased by 55 percent compared to the previous year, by another 18 percent in the second year, and by 3 percent in the third year.

9. Cleaning Supplies

Department of Administration – The Materials Management Division is currently working on the award of Cleaning Supplies Contract. The Materials Management Division, with cooperation from the Office of Environmental Assistance and Minnesota Department of Health, has developed criteria used in this award that will provide products to agencies that have less impact on public health and the environment.

Each product will be screened to see if it meets environmental criteria in several areas. The undiluted product must not be toxic to humans. The undiluted product must not contain any ingredients that are carcinogens or that are known to cause reproductive toxicity. The undiluted product cannot be corrosive to the skin or eyes. The product in its application cannot contain more than 0.5 percent by weight phosphorus to help prevent eutrophication (nutrient loading). The product's organic ingredients must be readily biodegradable in water. Other criteria being considered, which will ensure greater safety to our agencies and the environment are aquatic toxicity, combustibility, skin sensitization, photochemical smog, tropospheric ozone production, and indoor air quality. Each solicitation responder was required to have their formulations reviewed by an independent laboratory to verify all ingredients found in their products.

The Resource Recovery Office uses cleaning supplies from the state contract that have high environmental attribute scores and that are in bulk form to minimize waste and packaging. The Plant Management Division uses janitorial products that are appropriate to discard in sewers and buys chemicals packaged as concentrates to reduce packaging waste by 85 percent. The division also uses automatic dispensing systems to ensure correct dilutions from concentrates and minimize waste. The InterTechnologies Group refills small spray bottles with glass/desk cleaner from gallon containers to avoid the use of aerosol cans.

Department of Corrections – Environmentally friendly products are in use at all facilities. DOC policy helps to ensure the use of the safest possible product, with the lowest potential for generating hazardous waste and polluting the environment. Potentially unsafe products, i.e. hazard rating of more than 0 or 1 on HMIS or NFPA scales, are replaced with a suitable product that will accomplish the same end. Staff places a high priority on using techniques, methods, and products that are nonhazardous or less hazardous, to implement the concept of source reduction.

> ***MCF-Shakopee –*** This past fiscal year, a large quantity of powdered bleach and liquid air fresheners were donated to not-for-profit agencies for their use, rather than disposal.

Iron Range Resources and Rehabilitation Agency – The shop and custodial staff, as well as the office staff, are made aware that purchasing cleaners through the Environmentally Preferable Purchasing Guide will prove to be cost effective, environmentally safe, and less hazardous to the user. Most of these supplies are available through Central Stores.

Department of Military Affairs – The DMA uses a centralized collection point where soiled rags are exchanged for clean rags. Soiled rags are collected, segregated, and stored at the centralized site for the contractor to pick up. Only rags soiled with POL products are sent off for cleaning. The program saves money and reduces waste entering landfills.

Minnesota Pollution Control Agency – The MPCA Alliance for Recycling and Reduction of Waste (ARROW) group recently implemented a plan to encourage environmentally preferable purchasing. This initiative focuses on purchasing products that are nontoxic, water-based, have recycled or post-consumer content, and have no odors. Products that meet these criteria are placed on a list for all individuals who order office and cleaning supplies to reference when ordering. There are 67 items on the list, including Simple Green Concentrated all-purpose cleaner, Nature Saver recycled paper clips, Earth Smart recycled notebooks, and many more.

North Hennepin Community College – Environmentally friendly cleaning supplies are used. MSDS sheets are maintained in each custodial closet, and safety procedures are adhered to when products are dispersed and used.

St. Cloud State University – A SCSU committee has been in place for several years to review cleaning products that can be substituted for those which pose a hazard to the employee using them or pose a pollution risk. Cleaning products are purchased in bulk as much as possible and then transferred into hazard labeled reuseable/refillable bottles and containers.

Department of Transportation – Mn/DOT uses concentrated cleaners, which allows for the reuse of dispensing containers.

University of Minnesota – Facilities Management (FM), Twin Cities campus, in collaboration with 3M's Commercial Care Division has developed a new, safe-cleaning program for the University of Minnesota custodians. The program includes eliminating the use of all cleaning chemicals that pose health risks and incorporating products and systems that are safe and environmentally responsible by 2005. 3M will help train workers on the products and systems they are using, gather feedback on the

program, and seek input for new product concepts. FM-Twin Cities campus also initiated a program to centralize purchasing of custodial supplies in an attempt to reduce the number of different custodial products used by their employees. The goal was to optimize supply management and to enhance worker safety and environmental friendliness through a product selection process. FM custodial services also cleaned out and disposed of old, unused custodial products from 900 custodial closets in the 250 buildings on campus.

FM formed a committee, the Material Review Board (MRB), comprised of both management and labor representation from each zone, safety, and purchasing for the sole purpose of improving the safety, health, and functionality for FM's custodial work force. A dominant cornerstone of the MRB's platform is to consistently improve upon, by careful evaluation and reduction, the inventory of approved cleaning products used by custodians. Reducing the number of approved custodial cleaning products completes two important objectives: first, it improves the safety and health of the end user by eliminating those products that have been evaluated as potentially harmful; second, it minimizes or simplifies the specialized training required for each product. After a successful reduction in 1999 (456 products to 150), the MRB made another impressive stride in FY 2001 by reducing the 150 approved products to 51—reduction of 66 percent.

The approved custodial list of 51 products represent those products that are only to be used in the custodial cleaning process, any other product not identified on the approved list is considered unapproved and not cleared for use. Each of the 51 approved products went through a stringent evaluation and testing process. The following is the process when an individual or vendor wants a new product to be considered for inclusion into the approved list. The vendor must first approach the supervisory staff and provide a cut sheet of the product, but they do not and are not allowed to drop off any product samples. The supervisor in turn provides the vendor with an evaluation packet called the Safety, Health, and Environmental Attributes Form that is to be completed by the vendor's resident chemist.

This form is an important first step, because the product is evaluated and scored based on categories of operational safety, ecological (environmental) stressors, product delivery/packaging, and existence of artificial dyes and fragrances. The operational safety category looks at components such as the product's toxicological dosage levels, whether or not it is a registered carcinogen, its pH, and flash points. The ecological (environmental) stressors category looks at if the product were disposed of into the waste stream, what effects would the product's constituent chemicals have on the environment based on a compiled list of products called the Minnesota Toxics Indexing System. This category also looks at the percent of the ingredients that are made from plant sources and whether or not the product contains constituents that may have a negative effect on the ozone. The delivery/packaging category analyzes whether the product has dispensing features with easy dilution ratios to minimize handling exposure, material handling issues, and the availability of the product's labeling to meet the specification of the Minnesota Employee Right to Know Act. Finally, the dyes/fragrances category identifies whether the product contains any artificial dyes or fragrances that may cause the end-user hypersensitivity problems. Once the vendor completes the form, it is submitted to the FM Safety Department, where it is in turn checked for accuracy and scored. The score is communicated to the members of the MRB, who then correspond with the vendor.

A product that earns a failing score does not advance in the evaluation process. A passing score indicates that the product can advance to the functional testing portion and will be brought in front of the next MRB meeting. At this MRB meeting, arrangements are made with the FM Purchasing Department to procure samples for which designated zone testing crews will test the product under objective criteria (which includes comparing it to a similar product already on the approved list) and provide their results at the next subsequent MRB meeting. At this meeting, a consensus is reached by the members to determine if the product is to be included on the approved list. In order for a new product to get on the approved list, an existing product must be removed.

In addition, the MRB has been embarking on the task of integrating the use of bio-based products into the custodial operations. Bio-based or plant-derived products provide functionality that rival the

existing line of approved custodial products while vastly improving the safety, health, and environment for the end user. A 1999 executive order from former president Bill Clinton set a goal of tripling U.S. use of bio-based products by 2010. The MRB intends to accomplish this by 2005, by annually replacing 15 percent of the current approved product list with bio-based products. Centralized purchasing of a more select list of custodial products leads to the cost efficiency of larger purchases. The custodial product selection process is designed to minimize air and water pollution and improve worker health and safety.

10. Commuting and Transportation

Department of Commerce – The department maintains a carpool-matching program on an internal web page, but participation rates are low.

METROPASS PARTICIPATION

Fiscal year	2000	2001	2002	2003
# employees	47	50	47	40

Department of Corrections – All facilities have video conferencing systems that are used to reduce the amount of travel required for meetings.

Office of Environmental Assistance – The OEA is continuing to test telecommuting for a few staff. These staff members work out of their homes one or two days per week. By not driving to work, they conserve fuel and reduce emissions from their vehicles. Regional OEA staff have frequent phone conferences with central office staff, thereby cutting down on travel.

The OEA and MPCA were the first public agencies in the Metropass program in April 1999, and the program continues. Under the terms of this program, employees are eligible to purchase an annual transit pass for an agency-subsidized rate. Employees may use the passes for commuting to and from the workplace, for business travel during the workday, and for personal travel at all other times when buses are running. Employees are currently paying a larger share of the cost than originally to maintain the subsidy within the agencies' targets for funding. The employee cost is kept below the cost of contract parking.

Metropolitan Council Environmental Services – The MCES has made several recent P2 improvements to its fleet of approximately 240 passenger and light service vehicles. There are now six vehicles that can run on E85 fuel in addition to unleaded gasoline. E85 contains 85 percent ethanol, which is distilled from grain such as corn. As a low emission fuel that is domestically produced, it is beneficial to both the environment and the economy. The models using E85 include Ford Taurus, Dodge Caravan, and GMC Yukon.

The MCES also has purchased two gasoline/electric hybrid vehicles. The Honda Civic hybrids have two motors—one that is powered by an 85 horsepower 4-cylinder gasoline engine and one that is powered by a 13 horsepower nickel metal hydride battery. The electric motor supplies additional power during acceleration, functions as a high-speed starter, and charges the entire electrical system during regenerative braking. The gasoline motor is still the main power source for the car and also recharges the battery. It is estimated that the hybrids achieve an efficiency of 46 miles per gallon in the city and 51 miles per gallon on the highway.

Minnesota Pollution Control Agency – MPCA continues its pollution prevention efforts by promoting alternative transportation, including annual B-BOP Day promotion; *Bikeways* and *Bus Fare* e-newsletters; Guaranteed Ride Home Program; special off-day parking; reserved carpool/vanpool

parking; discounted bike lockers; showers; and surveys and planning programs. In the survey summary dated January 1998, we found 6 percent of MPCA employees biked to work in the summer and 25 percent carpooled on three or more days per week.

Since 1999, MPCA has offered Metro Transit's Metropass, an all-you-can-ride bus pass. The idea is that with more transit use, fewer vehicles would be on the road creating air, water, soil pollution, congestion, parking, and urban sprawl. Also, waste is generated when vehicles are shared. Agency employees can buy a low-priced all-you-can ride bus pass. About 8 percent of staff is participating. We not only have employees using it to commute from home to work, but we are also encouraging them to use it as an alternative mode between work sites. The business travel aspect of the Metropass saves the state money in parking and vehicle expenses. MPCA staff has talked to several other state agencies and businesses about the benefits of this program and how it can work for them. We were the first state government agency in Minnesota to make the Metropass available to its employees. MPCA still has 61 percent more people using the bus for state business than in 1998 before we had the Metropass. This is in spite of a 12 percent loss of staff and a price increase in 2001. It appears that there are 35 to 40 round trips per month on the bus using Metropass for business travel, saving at least two state vehicles on an ongoing basis.

In 2001, MPCA purchased two electric bikes for business use. Yellow bikes are also available to staff at the DNR for lunchtime trips or any other travel purpose. We also have two hybrid-electric cars in the agency fleet.

St. Cloud State University – SCSU subsidizes bus passes for students and faculty, including evening transportation in the campus area. In the near future, SCSU will be partnering with St. Cloud Metropolitan Transit Commission to provide free service on 17 bus routes to current SCSU ID cardholders. Over 30 apartment complexes are within a 20-minute bus ride of campus.

Department of Transportation – Mn/DOT has installed various traffic lanes set aside for vehicles with multiple passengers and has set various park-and-ride sites that promote carpooling or busing. Mn/DOT continues to promote telecommuting for employees in the Twin Cities metropolitan area.

Mn/DOT continues to promote various alternative transportation options such as high occupancy vehicle lanes (HOV), commuter rail, bus, bicycling, walking, and light rail. Mn/DOT plans to partner with other state agencies, citizens, and local officials to set up pilot projects to encourage alternative transportation.

University of Minnesota – The Humphrey Institute's State and Local Policy Program has been working with the University of Minnesota's Intelligent Transportation Systems (ITS) Institute to conduct a set of federally sponsored studies on how transportation systems can be planned in an increasingly complex social, political, economic, and technological environment—Sustainable Technologies Applied Research (STAR) TEA-21 Project (http://www.hhh.umn.edu/centers/slp/projects/startea21). The research team discussed common threads of their various research endeavors and arrived at a common theme, which integrates the separate activities. The theme that cuts across the tasks is "Places And Networks: New Hierarchies in Access and Activity." The lead phrase captures the intersection of various networks—including ITS-infused transportation networks—and how they interact with physical places. The second phrase connotes the changes that are occurring among and between networks and the dimensions (e.g., access, activity) that concern the STAR researchers.

The Twin Cities campus is host to nearly 80,000 arrivals per day. The campus spans nearly five miles from east to west. With a free intercampus bus system and a comprehensive tunnel and skyway system, students do not need a car once on campus. The Department of Parking and Transportation Services is continually studying and implementing new strategies to (1) reduce automobile traffic to the Twin Cities campus, and (2) more efficiently direct the flow of vehicle traffic and pedestrians when they reach the university. Employee and student population densities are mapped to show

critical areas for mass transit lines. Routes for express buses have been maintained, in spite of shrinking state funding. Carpooling is actively promoted through advertisements, reduced parking rates, and preferential surface lot locations. Biking and walking routes are promoted with signage and special lanes on university roads. The Twin Cities campus uses a mass transit system to bus students, employees, and guests from parking lots to various locations on campus. Mass transit is an environmentally friendly alternative to single-occupancy vehicles, and a bus carrying as few as seven passengers is more fuel-efficient than the average single-occupancy vehicle.

The campus bus routes and schedules have been evaluated and rearranged in an effort to more effectively serve the riders while minimizing congestion on the urban campus streets and fuel consumption and air pollution as buses sit in traffic. Since 2001, these efforts have reduced bus miles traveled by over 200,000 miles annually, which translates into conserving over 10,000 gallons of fuel and significant reduction of environmental pollution.

In the fall of 2000, the University of Minnesota, Twin Cities initiated a deeply discounted student, staff, and faculty bus pass program designed to reduce traffic congestion, ease parking shortages, and improve the environment through increased bus ridership. The university is the state's third largest traffic generator; so the increase in bus ridership by university students, staff, and faculty eases traffic congestion throughout the metropolitan region. Since the introduction of U-Pass program, we have realized a positive change in people's travel mode to campus. Before the introduction of this program, 43 percent of those visits were people driving to campus, while 13 percent used the bus as a means of getting to work or school here at the University of Minnesota. Since U-Pass, we estimate that there are now 32 percent driving and 24 percent arriving by bus. The goal at the introduction of the program was to increase bus ridership by 40 percent.

Before the program began, the university had more than 7,000 bus riders. As a result of the U-Pass and Metropass programs, transit ridership increased by over 25 percent during the 2000-2001 academic year. In fall 2001, combined U-Pass and Metropass sales were 13,035, meaning a transit ridership increase of over 85 percent. In fall 2002, over 14,500 U-Pass and Metropass cards were sold, meaning a transit ridership increase of over 100 percent for the program. One encouraging result shows 64 percent of students who buy a U-Pass use it to travel to other destinations in the metro area. This percentage illustrates that students are incorporating mass transit into their daily routine. Through the creation of the U-Pass, it is hoped that students will learn the benefits and convenience of mass transit in order to establish positive transportation patterns that continue into their adult lives. The U-Pass program drastically impacts the environment by reducing more than 50,000 vehicle miles traveled per day, saving more than 2,000 gallons of gasoline daily, and by eliminating over 220 tons of carbon monoxide and 4,500 tons of carbon dioxide emissions from the air annually.

The University of Minnesota-Duluth started their U-Pass program in fall 2000 in cooperation with Lake Superior College, Saint Scholastica College, and the Duluth Transit Authority (DTA). This U-Pass program provides free transit on DTA buses for students and staff. With the campus community getting used to the idea of free bus service with their U-Pass, the bus ridership has steadily increased. DTA/U-Pass numbers of rides per month for the past three years are 18,479 for September 2000; 41,714 for September 2001 and 43,316 for September 2002. The more than 2,000 riders per day is outstanding usage of this program which decreases traffic congestion, fuel consumption, air pollution, and the need for taking more open space for parking facilities.

The university administration actively promotes Twin Cities campus students living on-campus and promotes new student housing projects to entice students to live on-campus or in the campus community, rather than commuting. The university budgeted over $50 million to this effort knowing it will not only enhance the campus community but will drastically impact the environment by reducing more than 25,000 vehicle miles traveled per day, saving more than 1,000 gallons of gasoline daily, and by eliminating over 110 tons of carbon monoxide and 2,200 tons of carbon dioxide emissions from the air annually.

How do we improve the ways that we get from here to there without spending all of our resources? Not an easy question, by any means, but there are some good answers. The Center for Transportation Studies (CTS) at the University of Minnesota supports the search for those good answers through research, education, and outreach activities (http://www.cts.umn.edu). The primary goal of the Center for Transportation Studies is to initiate programs to address critical transportation issues. This process is guided by the participation of Minnesota leaders, transportation professionals, and university faculty and staff. A supporting goal is that this participation reflects the diversity of the various stakeholder groups affected by transportation. The Center's mission is as follows: (1) as part of a research and land grant university, actively create new knowledge and insight, and disseminate that knowledge and insight through teaching and service; and (2) be a focal point for strengthening knowledge in transportation. The center identifies critical issues in transportation, and uses multidisciplinary approaches to address them.

Center research, education, and outreach programs *(a)* create an environment for faculty, students, and practitioners from multiple disciplines to collaborate in transportation research and education efforts; *(b)* provide leadership and outreach efforts to government officials, private sector representatives, and the public in the application of new knowledge and the implementation of policies, programs, and technology that improve transportation.

11. Education, Communications, and Training

Department of Administration – The Resource Recovery Office's web site, www.rro.state.mn.us, is regularly updated to provide information in lieu of mailing or faxing. Resource Recovery Office (RRO) also provides educational/work opportunities to St. Paul school students in their "Transition to Independence" school year and summer school programs. RRO provides on-site building assessments of recycling and waste management systems, technical assistance and training, and regularly tracks recycling progress. As a group, Twin Cities metropolitan area public entities have recycled as much as 68 percent of their discards, with 28 agencies recycling more than 80 percent. The Resource Recovery Office prepares "Info to Know" wall postings displayed in the Capitol complex buildings regarding pollution prevention, office clean outs, electronics recycling, waste reduction, and recycling issues.

The Resource Recovery Office's State Recycling Center conducts tours of the facility and of its reusable office supplies area for customers and other interested parties including international delegations to share recycling and waste reduction successes. The Resource Recovery Office also represents the Department of Administration at Minnesota's Interagency Pollution Prevention Advisory Team meetings. Representatives from the Materials Management and Plant Management Divisions also regularly attend this meeting. The Resource Recovery Office provides Department of Administration support and representation on the Pollution, Reduction, Recycling Advisory Council of the Office of Environmental Assistance. RRO also partners with Sentencing-to-Service Programs in providing offenders with recycling-based work and training. The Resource Recovery Office provides information to state employees about waste reduction (by toxicity and amount) and recycling opportunities at annual events such as the September Office Supply Connection Product Show, the Accounting and Procurement "Spring Fling," and the Communications.Media Open House.

The Resource Recovery Office prepares environmental purchasing information, tabletop displays, "Info to Know" wall postings, and on-site presentations in response to agency requests. The Resource Recovery Office also provides conference displays and handouts at various public events, including those sponsored by the Recycling Association of Minnesota, Solid Waste Association of North America, the Minnesota Pollution Control Agency, and the Minnesota Office of Environmental Assistance.

The Plant Management Division coordinates departmental pollution prevention information through the Resource Recovery Office. At the Minnesota Governor's Awards for Pollution Prevention in October 2002, the Department of Administration-Materials Management Division and its electronics contracts committee received the MnGREAT (Minnesota Government Reaching Environmental

Achievements Together) Award for putting in place an electronics disposal contract that specifies that no component materials from used electronics are exported overseas for management.

During FY03, the Materials Management Division, as a part of its Authority for Local Purchasing Training, ALP Management Overview, and other training programs, has trained more than 520 state agency staff in pollution prevention and procurement of environmentally responsible goods and services. The Materials Management Division worked with the Office of Environmental Assistance to provide additional environmentally responsible information through the purchasing training provided to state employees. In addition, the Materials Management Division has updated the environmentally responsible purchasing section of the Authority of Local Purchasing training manual that is provided to state employees. All updates are now distributed on the MMD web site to eliminate the need to send out paper updates. The entire manual is on the MMD web site, and greatly reduces the need to print hard copy versions.

The Materials Management Division partners with OEA to identify areas where current or new contracts can be expanded with more environmentally preferable goods or services. MMD's Acquisition Management Specialists incorporate environmental considerations into solicitations whenever possible. They accomplish this in a variety of ways, such as solicitation requirements, environmental preferences, or environmental evaluation criteria. The Materials Management Division maintains a list of state contracts that contain environmentally preferable products and services. The list is available on the MMD web site at www.mmd.admin.state.mn.us/envir.htm.

The Materials Management Division has established an advisory committee called the Environmentally Responsible Work Group, which meets to foster awareness and buy-in, share knowledge, and set priorities for environmentally preferable purchases. This group works to promote environmental purchasing in state government and includes representatives from state government as well as interested nonprofit organizations. The current members are the Resource Recovery Office, Office of Environmental Assistance, Pollution Control Agency, Department of Transportation, Department of Natural Resources, Housing Finance Agency, Department of Labor and Industry, Department of Economic Security, Veterans Home Board, Recycling Association of Minnesota, and the Sierra Club. Previous education efforts in the area of recycled paper purchasing have been very successful. The purchase of recycled copy paper by state agencies has increased to over 90 percent of paper bought from Office Supply Connection, or 426,844 reams annually.

The Materials Management Division and Resource Recovery Office contributed to the development of the *Environmental Preferable Purchasing Guide: How to get the stuff you need and still be good to the environment*. The EPPG is a user-friendly resource to make green purchasing easy. It includes data on product options, sample specifications, existing Minnesota contracts, etc. The guides were distributed to all certified purchasers as well as to cities and counties. The Resource Recovery Office and the Materials Management Division promoted this guide through displays and during presentations. The guide is featured at all ALP training sessions. MMD has a link on its web site to the OEA web site from which personnel may print a copy of the guide for their personal use.

The Materials Management Division maintains a section on its web site dedicated to environmental purchasing. Featured in this section are environmentally preferable goods and services lists, the Minnesota legislative requirements, Administration's biennial report on MMD purchasing, environmental news about new products and contracts, product experience/case studies on environmentally preferable products, and links to other web sites helpful in environmental purchasing. The Materials Management Division implemented a change in MAPS that requires entry of an environmental code on the order lines for goods and services. This code is shown on state contracts so that buyers know what types of products are more environmentally responsible when making purchasing decisions. This code also allows better tracking of the environmentally preferable purchases.

The Materials Management Division presented at the 2003 MPCA Air, Water and Waste Conference at the session concerning Electronics compliance. They spoke about our computer/electronics

recycling contract and showed the shocking video, *Exporting Harm*, which is about the trashing of portions of the Far East in the name of recycling electronics. The session went very well. There were more than 50 people in attendance. After the conference, we received about a dozen e-mails asking for information. MMD has also spoken on the same subject at the Minnesota National Institute of Government Purchasers' 2002 Fall Conference, the October ITS meeting, and the October IPPAT meeting.

Bemidji State University – Bemidji State University continues to require environmental courses for satisfactory completion of the Liberal Arts core. "Focus on the Environment" is one of seven areas in the university's Liberal Education Program. Students pursuing a bachelor's degree must take a minimum of one three-credit course from this area. Members of the Students for the Environment, a student organization, attended the Minnesota Sustainable Communities Conference in October.

Department of Corrections

MCF-Oak Park Heights – Physical Plant staff from both MCF-OPH and MCF-STW were trained and re-certified in asbestos handling procedures on January 11, 2003. The General Maintenance Workers attended training on new, safer cleaning products and energy savings equipment. X-ray machine training is provided to dock and maintenance personnel.

MCF-St. Cloud – Staff receive periodic training on pollution prevention through annual continued education to remain current with new and existing legislation.

MCF-Stillwater – All employees are expected to review the hazardous materials they use and recommend changes to safer products and processes as they become available.

Office of Environmental Assistance –- OEA continues to use voluntary partnerships as a means to prevent waste, such as ongoing efforts with the Minnesota Chamber of Commerce Waste Wise program to help businesses recycle and reduce waste.

The OEA's Sustainable Communities team has been working since 1996 to promote sustainability activities at the community level. One important component of sustainability is pollution prevention. The focus of the Sustainable Communities team's activities is the Minnesota Sustainable Communities Network (MnSCN), which has over 2,600 members. The goal of MnSCN is to encourage networking, information exchange, and better access on the topic of sustainability.

MnSCN's major activities currently consist of a free bi-weekly sustainability e-mail newsletter and the NextStep sustainability web site. MnSCN's popular bi-weekly newsletter typically contains tools and resources, jobs available, events, sources of funding, and news from members. Over 160 issues of the newsletter have been published.

NextStep (www.nextstep.state.mn.us) is an interactive web-based assistance tool, which provides a convenient point of access to information about sustainability, with a Minnesota focus. It allows for entry of information by any site user. Site features include descriptions of approximately 1,000 resources, dozens of case studies, a searchable online member directory, job listings, an event calendar, an archive of past e-newsletter issues, and more. NextStep is divided into 12 major topic categories related to sustainability, each with its own volunteer "topic guide" and with a list of selected top resources.

The *Resource* quarterly newsletter is available online at the OEA web site: http://www.moea.state.mn.us/. The OEA manages the www.reduce.org and www.seek.state.mn.us web sites, both of which have information relevant to pollution prevention.

The OEA distributes the following materials through its Education Clearinghouse:

- *Source Reduction Now,* a detailed guide to implementing source reduction programs in companies and agencies

- *Retail Hardware: Best Practices for Waste Management Guidebook* and video
- *Transport Packing: Cost-effective Strategies to Reduce, Reuse, and Recycle in the Grocery Industry*
- *Mercury and the Health Professional* video for mercury reduction in the healthcare industry
- Junk Mail Campaign materials
- Waste Reduction Campaign materials
- Minnesota *GreenPrint*
- *Minnesota Report Card on Environmental Literacy*
- *Environmental Literacy Scope and Sequence*
- *Getting the lead out*, a fact sheet for sport fishermen
- *Global Warming and Climate Change in Minnesota*

OEA staff continues to work with MnTAP, representatives from the Minnesota healthcare community, and state and county environmental staff to promote pollution prevention within the healthcare sector. The Healthcare Environmental Awareness and Resource Reduction Team (HEARRT) meets quarterly, with presentations covering mercury reduction, water and energy conservation, national programs such as the Hospitals for a Healthy Environment (H2E) program and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), and local sustainability efforts in healthcare facilities.

OEA staff coordinates the Interagency Pollution Prevention Advisory Team (IPPAT), developing agendas and facilitating quarterly meetings, recording minutes, and maintaining the mailing list. IPPAT continues to implement the executive order for pollution prevention, including pollution prevention, waste reduction, and energy and resource conservation. Agencies that regulate activities that generate significant quantities of hazardous waste or use significant quantities of resources and/or toxic chemicals, or whose policies have important effects upon such activities, are required to develop policy statements indicating that pollution prevention is a priority. These agencies are further required to integrate pollution prevention into their regulatory and policy activities as a primary means of meeting standards. IPPAT meets quarterly to share successes and learn about pollution prevention initiatives others are taking.

The MnGREAT! award program, first organized in 1995, is an ongoing program, within the structure of the Governor's awards program. MnGREAT! recognizes environmental achievements by government employees in the areas of energy conservation, water conservation, toxicity reduction, and waste reduction. The Interagency Pollution Prevention Advisory Team (IPPAT), which sponsors the program, recognizes projects that show:

- benefits to the environment
- economic efficiency
- commitment and leadership in waste and pollution prevention
- employee initiative in developing the project
- innovative and/or creative approaches
- can be used as a model for others

The six 2003 MnGREAT! award winners are:

- **Ramsey County Property Management** for the deconstruction of a 1940s' era ammunitions building at the Twin Cities Army Ammunitions Plant in Arden Hills. Ramsey County Property Management worked closely with the deconstruction contractor to deconstruct the building at a cost well below the bid for standard demolition, providing savings to the county. The project made available 87 percent of the building materials for reuse or recycling, leaving only 13 percent to be sent to the landfill. End markets have been identified for all the reused and recycled building materials.
- **Independent School District 196,** also known as the Rosemount-Apple Valley-Eagan District, located in Dakota County, for implementing a project to compost the entire district's organic solid waste. Compostable waste is converted into rich, organic soil that is purchased back by the district to be used on athletic fields and in landscaping and erosion control projects in the district. The district saves on disposal costs and continues to observe a significant enhancement of its environmental education programs at all levels within the school system.
- **The Minnesota Technical Assistance Program** (MnTAP) for their work with the Hospitals for a Healthy Environment (H2E) program, a joint effort of the American Hospital Association, American Nurses Association, Health Care Without Harm, and the U.S. Environmental Protection Agency to improve environmental performance in the healthcare sector. MnTAP staff played a major role in the development of two key resource documents on chemical waste minimization and total waste reduction in healthcare facilities, and have engaged many Minnesota hospitals in the H2E project through technical assistance, outreach, and the MnTAP internship program. MnTAP received a Champions for Change Award in recognition of its leadership in promoting pollution prevention programs within the health care field.
- **Lynne Markus,** IPPAT representative from the Department of Administration's Resource Recovery Office, for demonstrating outstanding leadership and commitment to pollution prevention, waste reduction, and recycling. Lynne founded the program to set up a recycling system in state government. In addition, Lynne has been a strong and loyal supporter of IPPAT's efforts since its inception in 1991, helping design the MnGREAT! awards (serving as a judge several times) and the agency pollution prevention summary reports, and helping to revise the governor's executive order for two successive administrations.
- **Victoria Reinhardt,** Ramsey County Commissioner, who was the driving force behind an initiative to incorporate environmental attributes into the construction of the Ramsey County Law Enforcement Center in St. Paul, where demolition wastes were separated and recycled, and recycled paint and asphalt were used in construction. The building will employ district heating and energy efficient lighting and controls. Commissioner Reinhardt has also worked tirelessly to incorporate product stewardship and toxicity reduction into the policies of the Association of Minnesota Counties and the National Association of Counties. Her work promoting the resolutions at state and national meetings shows a strong commitment and dedication to the environment.
- **Donna Peterson,** Minnesota Technical Assistance Program, for providing consistently excellent service to her colleagues and Minnesota businesses over the years. As a nationally recognized pollution prevention expert in the printing industry, one of Minnesota's largest industries, Donna was a critical team member for the Great Printers Project, which prompted over 40 Minnesota printers to sign on to environmental, health and safety practices. In addition, Donna coordinated the student intern program at MnTAP for several years, supervising over ten intern projects in diverse businesses from printing to shingle manufacturing and helped eight Minnesota companies reduce solvent and cleaning wastes by 140,000 gallons per year through an EPA technical assistance project. Donna has served as IPPAT representative for many years and has often served as a judge for the Governor's Awards for Excellence in Pollution Prevention.

Metropolitan Airports Commission – MAC employees are trained annually on Spill Prevention, Control and Countermeasures (SPCC) and Storm Water Pollution Prevention (SWPP) techniques. DOT training is completed every three years. Also, a pollution prevention team monitors the outfalls and detention ponds around the airport. These employees have continuous input on how to improve the site and/or operations from the "hands on experience" point of view. There is also annual hazardous material training where basic pollution prevention methods are addressed. Recently a comprehensive recycling program was unveiled detailing how and where MAC employees can recycle a wide variety of items. A recycling guide was distributed to all employees and is included with new employee orientation materials.

Metropolitan Council Environmental Services – MCES employees volunteer to staff displays and interactive exhibits at events such as the Earth Fest, Earth Day at the Minnesota Zoo, the State Fair, the Children's Water Festival, Tooling for Teaching Watershed Education, and Farmington Pollution Prevention Days. Exhibits are also available to be loaned out and educational materials are available for distribution.

The IWPPS works in an advisory, or technical, role as well as a regulatory role with its permitted industrial users. Three additional issues of the *Open Channel News* have been mailed to industrial users in 2002. A specific P2 web site has been prepared for industries, customers, and other external users on the council's Internet site: www.metrocouncil.org/environment/PollutionPrevention.

Metropolitan Mosquito Control District – Annually, the district conducts pesticide applicator training sessions for all district employees in conjunction with the Minnesota Department of Agriculture. A portion of these training sessions is used to review source reduction, waste management, and recycling procedures employed by the district. This training includes an overview of regulatory requirements, examples of waste streams produced by the district, handling and disposal procedures, storage requirements, recycling, and emergency spill response plans. Emphasis is placed on reducing the use of hazardous materials, replacing materials with less hazardous counterparts, and recycling.

Additionally MMCD employees must go through training sessions that focus on the proper use, transport, and handling of all the pesticides used by the district. Employees who use pesticides for the control of adult mosquitoes must attend training sessions given by the MDA; they must take and pass a written exam and be licensed by MDA in order to use these control materials.

Department of Military Affairs – The DMA uses several different methods to educate and train field soldiers and state employees regarding their responsibility for implementing pollution prevention. DMA Regulation 200-3 (Hazardous and Special Waste Management Requirements) is a hands-on tool that has been provided to all DMA facilities and has been mandated by the command to be used throughout the state. This regulation has undergone review and been updated with the intent of making it as user friendly as possible. There is now a VSQG version of the document as well as an SQG version. This is a living document and is constantly undergoing review and update to stay current.

Eight-hour classroom training sessions are held to train the trainers. The sessions are used to distribute the *10 1/2 Steps to Facility Compliance With Hazardous Waste Generator Requirements* video. Firstly, the video is viewed and a question/answer period follows. Secondly, updates of regulation DMA 200-3 are distributed. And lastly, individuals responsible for hazardous waste and pollution prevention are given an opportunity to have questions answered. New DMA P2 policies are evaluated and implemented at this time. Ongoing P2 activities are also reviewed.

In addition to DMA-provided annual training, the DMA is finalizing development of a self-certification training course for personnel at VSQG facilities that are tasked with hazardous waste management and pollution prevention activities. The course will be distributed on CD-ROM. Soldiers will be allowed to review the course content, which encompasses the DMA 200-3 requirements, at

their own pace. The test question section of the course is no-fail. If the soldier answers the question wrong, they are returned to the appropriate section of the training, where they review the text and are then asked the question again. A correct answer moves them to the next question. Once the course is completed, a certificate of completion is printed out for the soldier to place in the training file. With the high turnover and deployment of soldiers as well as the widespread locations of DMA facilities, this will make it possible to always have training immediately available for newly appointed soldiers or for review by certified soldiers.

Minnesota Pollution Control Agency – MPCA has pollution prevention information available to all staff and external customers on its web sites. This information is easy to access and includes many suggestions and training tools for the staff to utilize for waste minimization at work and at home on a daily basis.

Minnesota West Community and Technical College – The goals of the college are to continue to monitor the effectiveness of our training effort.

North Hennepin Community College – Brightly colored signs and containers are prevalent in buildings and on grounds throughout campus. Plant Services staff are aware of the importance of the college's recycling effort, and new hires are trained on proper procedure before being allowed to work independently.

St. Cloud State University – The Environmental and Technological Studies Department of SCSU reflects increased opportunities for pollution prevention emphasis in the region of laboratory procedures. An internship program has expanded hazardous waste controls.

Department of Transportation – Mn/DOT continually conducts training within the department and occasionally to counties, cities, and the private sector.

University of Minnesota – Education of the current and future generations on the importance of pollution prevention, resource conservation, and sustainability is one of the most important thrusts in developing a sustainable world. The University of Minnesota offers over 500 environmental courses from 54 different departments, many of which deal directly with pollution prevention. The University of Minnesota has one of the largest environmental biology research programs in the world. At last count, it included 19 academic departments and 23 centers, whose work could be classified as sustainable. Programs are as diverse as the Minnesota Landscape Arboretum to the Minnesota Sea Grant to the Raptor Rehabilitation Center to the graduate program in microbiology, immunology, and cancer biology. The efforts of this research, teaching, and outreach not only reach every corner of the state, but also include world-class research with potential global implications. The University of Minnesota has baseline data on fields and forests that cover more than 100 years. This data will be invaluable as new plants are developed and diseases fought. Much of the university's efforts involve developing methods to maximize the state resources without depleting them.

The University of Minnesota's liberal education requirements include four designated themes focusing on issues that are important to the university, the nation, and the world. One of these is an environmental theme. Students entering the university since the fall 1994-95 academic year are required to take at least one course that satisfies the environment theme. Currently, 95 Twin Cities campus courses fulfill this requirement. These courses focus on increasing student's knowledge of the interactions and interdependence of the natural environment biophysical systems and human social and cultural systems. The environment theme has been approved, through a curriculum approval process, for a variety of courses in different disciplines. This gives faculty from all across the university the opportunity to teach environmental literacy and provides many options for students to learn about the environment.

The Campus Sustainability Network (CSN) organized a campus sustainability workshop for April 23, 2003, as part of the university's Beautiful U Day and Earth Day celebrations. The workshop included a discussion of university policies that will inform any attempt to address sustainability at the administrative level. The discussion focused on university-wide policies related to environment and sustainability including three documents: The Regents Policy on Environmental Management and Sustainability (a proposal), the Commission on Environmental Science and Policy Report, and a report related to the formation of Global Studies. Panelists included administrators and faculty who have been instrumental in the authoring of these reports. In addition to the policy information, the workshop explored various sustainability initiatives on campus. A workshop report was developed by CSN and presented to the president's office.

The University of Minnesota established the Precision Agriculture Center in 1995 (http://precision.agri.umn.edu/index.htm) to foster the use of site-specific management techniques through collaborative research, education, and outreach programs. The center's greatest contribution will be its legacy of practitioners, researchers, and educators. In development is an undergraduate minor in precision agriculture and a graduate program. Both efforts will emphasize multidisciplinary instruction in spatial and temporal variability, management, engineering, and environment protection. Research projects and internships with farmers and agribusiness will give students the practical experience and relationships they need for future success. The outreach program partners with industry, farmers, and academics to develop content for training modules. Present areas of emphasis include yield map interpretation, intensive soil sampling methods, on-farm experiment design, and precision farming profitability studies. The center also hosts the International Conference on Precision Agriculture, in cooperation with the Minnesota Extension Service. The biennial conference attracts more than 650 academics and industry representatives from 20 countries who share findings and preview technology.

The university's College of Architecture and Landscape Architecture (CALA) is working to cultivate the interest of future architects in studying and building environmentally friendly design and construction. "Greening CALA" is a project developed by a combination of faculty, staff, and students to incorporate these ideas and keep communication active among campus groups working toward a similar goal—sustainable development. CALA has implemented some of its ideas of sustainable design into the renovation of the architecture building, Ralph Rapson Hall. The new building is an opportunity to show that humans can inhabit it in a more sustainable way. The goal is to be able to use the building as a living lab to find out which methods of sustainability work the most efficiently. On the roof of Ralph Rapson Hall, three 24-panel arrays of photovoltaic solar panels provide electricity to the building. The 15 kW system was formerly on the Science Museum in St. Paul and was moved and reinstalled at the university by Xcel Energy. A new project is underway in which the energy from the PV collectors will be used to power an electrolyzer that separates water into hydrogen and oxygen. The hydrogen is used to power a fuel cell that generates electricity. One advantage of such a system is that by converting solar energy to hydrogen, it can be stored and used when needed. The generation of electricity in this manner produces no carbon emissions or air pollutants. Xcel Energy and the Minnesota Office of Environmental Assistance jointly sponsor this project. Along with physical changes to the school, "Greening CALA" has also brought new courses to the curriculum. Undergraduate and graduate students can both take classes dedicated to building and designing in an environmentally friendly manner. While no sustainable development design major is offered in the college yet, CALA is working toward this goal.

The Minnesota Sustainable Design Guide, developed by the Center for Sustainable Building Research (http://www.csbr.umn.edu), educates and assists architects, building owners, occupants, educators, students, and the general public about sustainable building design. This design tool can be used to overlay environmental issues on the design, construction, and operation of both new and renovated facilities. It can set sustainable design priorities and goals; develop appropriate sustainable design strategies for a particular project; and determine performance measures to guide the design and decision-making process. It can also organize and structure environmental concerns during design, construction, and operations phases. The goals of the Minnesota Sustainable Design Guide are to: (1)

educate designers, building owners, operations staff, and occupants about the concepts, goals, and significance of sustainable design; (2) develop an orderly decision-making process with measurable outcomes along with a database of decisions and outcomes; (3) provide flexibility in the way priorities are set and outcomes are measured within the system, so it can be adapted for different clients or agencies, regions, and building types; (4) organize information in a hierarchy that permits users to easily understand the sustainable design process; (5) create a system that can easily grow and change as more experience and new information becomes available.

The department of Environmental Health and Safety conducts annual training in hazardous waste management. The training covers the basics of pollution prevention. Approximately 2,500 employees are trained annually. The training is offered through classroom presentations and over the Web. The web-based training program is available on the Environmental Health and Safety home page (http://www.dehs.umn.edu/training/hwd/generator).

The Waste Abatement Committee, made up of members from many key departments, coordinates and monitors pollution prevention projects at the University of Minnesota. The committee communicates information to new employees through orientation programs and to existing employees through in-house vendor trade shows sponsored by the Purchasing Department. The committee is working toward a P2/resource conservation web page that will promote and provide instruction and information about self-audits and other P2/resource conservation techniques.

The Minnesota Technical Assistance Program (MnTAP) is a grant program at the University of Minnesota, School of Public Health, funded by the Minnesota Office of Environmental Assistance. MnTAP helps Minnesota businesses protect the environment and stay competitive by providing practical alternatives to prevent pollution of our land, air, and water. By reducing waste and increasing efficiency, you can save on disposal and raw material costs, decrease regulatory compliance burden, and make working conditions healthier and safer for your employees (http://www.mntap.umn.edu). MnTAP provides technical assistance to Minnesota businesses through the following services: (1) telephone assistance, (2) site visits, (3) intern programs, (4) presentations and workshops, (5) technical publications, (6) library, and (7) materials exchange.

The University of Minnesota's Center for Continuing Education (http://www.cnr.umn.edu/CCE) was created to be a world-class continuing education program, a resource network that will bring current research, new technologies, and state-of-the-art practices to resource professionals—educating professionals to face tomorrow's resource challenges. The center, originally named the Institute for Sustainable Natural Resources, grew out of the Sustainable Forest Resources Act of 1995, which developed principles for the sustainable management, use, and protection of Minnesota's forest resources. The act recognizes continuing education as one important component of this mission. The University of Minnesota's College of Natural Resources provided the matching funds to create the institute. The center provides continuing education opportunities: skill building and special topics information for foresters and other resource professionals, as well as forest-related education opportunities pertaining to fisheries biology, wildlife biology, park resource management, and other fields. The center emphasizes an integrated, systems approach–designing educational programs based on the understanding that natural resource management is part of an interdependent system. Social, economic, and ecological values must work together to sustain healthy, productive ecosystems. By focusing on emerging issues, the center will bring current research, new technologies, and state-of-the-art practices to natural resource professionals.

The University of Minnesota Extension Service (http://www.extension.umn.edu/) is the major educational outreach arm of the University of Minnesota, with offices in every county of the state. Campus-based extension specialists work with county-based extension educators to deliver educational programs through meetings, demonstrations, workshops, publications, and electronic delivery methods such as interactive TV, satellite teleconferences, and computer networks. Programs range from water quality to sustainable agriculture, from urban horticulture to youth development, from natural resource management to tourism development. Environment and natural resources educators and specialists develop and implement a broad range of programs with information on

shoreland issues, agricultural systems, residential systems, forestry/wood products, and on all aspects of environment and natural resource management, from water quality, forestry and wood products, solid waste and waste water management, to indoor environmental issues such as air quality, radon, housing materials, and systems.

The Institute for Social, Economic and Ecological Sustainability (ISEES) (http://www.fw.umn.edu/ISEES/) was initiated in July 1996 to strengthen the University of Minnesota's capacity to analyze sustainability issues and recommend options for moving toward sustainability. Our vision is based on the fundamental idea that sustainable relationships among the social, economic, and ecological spheres of the world are possible and desirable. ISEES brings together people from the natural and social sciences and practitioners to analyze sustainability issues and recommend options for moving toward sustainability. We believe that the development of options for sustainability requires integrating social, economic, and ecological factors. ISEES supports transdisciplinary research and education on sustainable environments, ranging from the urban community and watershed to the regional and global scale. In our seminars, workshops, and annual publication competition, we bridge divisions between the natural and social sciences and between scholars and practitioners. Contemporary research questions and societal debates about sustainability revolve around a number of rich and interconnected themes. To address these themes, the research, education, and outreach goals of ISEES include: (1) generate a new transdisciplinary synthesis of concepts and methods for research on sustainability issues; (2) understand forces influencing sustainability at local, regional, and global scales; (3) develop and evaluate techniques for assessing conditions for sustainability; (4) generate policy options for moving communities toward sustainable conditions; and (5) facilitate information exchange among scholars, practitioners, and citizens.

12. Electronics

Department of Administration – The Materials Management Division electronic equipment contracts provide Energy Star compliant computers, copiers, fax machines, monitors, and printers. In the new information technology hardware contract, MMD requires that all energy efficient equipment be identified.

The Materials Management Division promotes the reuse of computers and other electronics through its Surplus Services program. Computers are provided to Minnesota K-12 schools in collaboration with the Department of Corrections. The program accepts personal computers no longer needed by state agencies and private businesses. Through the use of prison inmate labor, the computers are refurbished and distributed throughout K-12 schools. Surplus computers are also distributed to township government offices, a program which earned a 1997 Partnership Minnesota Cooperative Public Award for outstanding achievement. The Materials Management Division has also established contracts for leasing computer equipment. This will reduce the amount of surplus and used equipment that requires hazardous waste management

The Materials Management Division is working with other states that are members of the Western States Contracting Alliance to develop a Request for Proposal for computer hardware, software, and maintenance that will take into consideration environmental issues such as energy efficiency and equipment disposal. The Materials Management Division, in conjunction with other agencies and Cooperative Purchasing Venture members, has established a statewide computer/electronics recycling disposal contract with Asset Recovery Corporation of St. Paul. The contract is "Hazardous Materials: Computers/Electronics: Recycling and Waste Management," contract release number H-90 (5), contract number 426359.

This contract is available to all state agencies and CPV members. Materials can be dropped off at Asset Recovery, or Asset Recovery can pick up the materials from customers. Asset Recovery can also assist with special event collections, etc. In the first year of the contract, approximately $250,000 was paid to Asset Recovery to recycle computer/electronic waste.

Department of Commerce – Computer equipment is either surplused or disposed of according to state guidelines.

Department of Corrections

MCF-Faribault – Participates in recycling of used electronic office and computer equipment. The equipment is transported to federal auctions and state surplus centers, thus avoiding the need to dispose of the units.

MCF-St. Cloud – Recycles the following electronic devices: TVs, fluorescent bulbs/lights, computers, and monitors at a cost of around $1,000 to $2,000 annually. These recycling activities help keep the facility in compliance with legislation and reduce associated landfill costs.

MCF-Stillwater – The facility runs the Computer for Schools program where organizations donate their computers rather than dispose of them. At Stillwater, many computers are rebuilt using the components received, and all non-usable components are recycled. Over the past year, 70,000 pounds of cathode ray tubes and 25,500 pounds of circuit boards were recycled through this program. Some DOC facilities donate their used computers to this program as well.

Office of Environmental Assistance – The OEA continues its leadership in state and federal environmental policy initiatives in the computers and electronics manufacturing sector. These efforts include Design for Environment (DfE), market development, and end-of-life management strategies for computers and other electronic appliances. Ongoing efforts include:

National Electronics Product Stewardship Initiative (NEPSI): In early 2001, the OEA began working with other states and the electronics industry to establish the national initiative. Minnesota's product stewardship policy and partnerships with electronics manufacturers and retailers over the last three years helped lay the groundwork for this national dialogue.

Minnesota is one of ten states participating in NEPSI. Other stakeholders include representatives from local government and the U.S. EPA, 12 electronics manufacturers, several major electronics retailers and recyclers, and national environmental organizations.

The goal of NEPSI to reach an agreement on a national program for managing certain electronic products at end of life. NEPSI is expected to conclude an agreement in the spring of 2004 but will need to be implemented by federal legislation. The agreement will articulate roles and responsibilities for NEPSI signatories as well as outline performance goals, the establishment of a third-party organization, and outline a plan for enhanced market development.

In 2003, the Minnesota Legislature did enact a disposal ban for cathode ray tubes that will be implemented in July 2005. The OEA will continue to work with local governments, manufacturers, retailers, and others to offer collection events and develop the necessary processing infrastructure in Minnesota.

Market development efforts continue for materials found in waste electronics, such as highly engineered plastics and leaded glass. In 2001, the OEA received a grant from the U.S. EPA Region 5 to aid in the development of an infrastructure in the upper Midwest to recycle flame-retardant plastics from electronics, specifically television housings. Flame retardants in TVs, decabromodiphenyl ethers, are currently under testing in Europe to determine their effect on humans and the environment. They have not been banned in California as the penta-PBDEs and octa-PBDEs recently have. An important lesson learned from the grant project is that recycling programs for certain types of plastics from electronics will likely be established in the future. These programs have the potential to decrease the production of new flame retardants by the reuse of these chemicals through the recycling process.

The State of Minnesota contract ensures proper management of used electronics discarded by government agencies and public entities. In early 2002, the Department of Administration worked with the OEA, Hennepin County, the Pollution Control Agency, and the University of Minnesota to

include a provision in the state contract specifying that no component materials from used electronics are exported overseas for management.

North Hennepin Community College – All discarded electronics are properly disposed of by a licensed local contractor. The college has started leasing much of the electronics that was once bought, used, and then discarded in the past. Leasing electronic equipment reduces NHCC's waste stream quantities of this type of material, as the leased equipment is returned to the distributor once the lease is up.

Iron Range Resources and Rehabilitation Agency – The Information Systems Department recycles outdated computer equipment as an alternative to disposing of such units as surplus property. Information Systems also recycles used printer toner cartridges and purchases recycled printer toner cartridges when available.

Metropolitan Airports Commission – MAC purchases computer equipment that is Energy Star compliant. Obsolete electronic equipment is recycled by an approved vendor.

Minnesota Pollution Control Agency – All working 486 computers and low-end Pentiums, monitors, keyboards, and mice are being delivered to the Computer for Schools program where the local correctional facilities refurbish and deliver them to area schools for student use. The agency also recycled 35.5 pounds of used computer disks in 2002. MPCA makes extra efforts to provide information for internal and external customers electronically to save paper, including putting some annual reports on our web page.

St. Cloud State University – The SCSU business office provides for the reuse of some computers, electronic equipment, and other property through the surplus property resale program. Other electronic equipment (eight shipments totaling about 40,000 pounds and net cost of about $15,000) was recycled for somewhat offsetting commodity and precious metal credits. Styrofoam from computer, electronic, and other shipping cartons was also recycled.

Department of Transportation – Mn/DOT has been continually expanding its use of light emitting diode (LED) traffic signal heads. These devices use about 10 percent of the electric power as compared to incandescent lamps. Mn/DOT has been using red LEDs for some time, but we have also expanded the use of LEDs for the red and green indications. Mn/DOT's road weather information system consists of 93 sites throughout the state that collect data from atmospheric and pavement sensors and transmit this information to servers in St. Paul, which use the Internet to deliver information to Mn/DOT staff. The system is used primarily to monitor winter road conditions to aid in more efficient use of chemicals and equipment.

The highways traffic management system was evaluated extensively in the 1970s and 1980s. Several programs were implemented as a result of these studies; the most noticeable to the traveling public are metered ramps. Mn/DOT currently conducts a traffic management and development program. This program includes evaluation of high occupancy vehicles lanes and programs, incident management research, new product evaluation, traveler information research, simulation and modeling, and traffic management studies.

University of Minnesota – The University of Minnesota statewide system collects all unwanted electronic equipment, redistributes what it can within the university, and then pays to the have the rest sent to a licensed demanufacturer. The demanufacturer markets a portion of the equipment (sells the equipment as is or as components), recycles a portion (particularly scrap and precious metals), and properly disposes of the remainder. The university recycles approximately 400,000 pounds of electronic material annually. The university has worked extensively with the Minnesota Department of Administration and other agencies to develop a statewide computer/electronics recycling contract.

The University Computer Services (UCS) (http://www1.umn.edu/ucs/pickup.htm) and Como Recycling Facility (CRF) both provide collection of unwanted computer systems. Both programs market the usable computers back to the university community employing web pages and showrooms (UCS (http://www1.umn.edu/ucs/usedcomp.htm) for a charge and CRF for free). CRF also manages a web-based exchange program (http://www1.umn.edu/reuse), referred to as the Virtual Warehouse, which allows interested parties to market or buy computers and other electronic equipment online without the middlemen.

The university offers electronics recycling service to educational institutions throughout the state via its Chemical Safety Day Program (http://www.dehs.umn.edu/csdp). The Chemical Safety Day Program, which has operated since 1981, was already providing fluorescent lamp recycling in addition to chemical waste management services to Minnesota schools.

It typically costs to recycle electronic equipment. A typical personal computer and monitor contains 6 pounds of lead and various other environmentally hazardous constituents that can be reclaimed and reused. Proper management of the electronics protects the university from future environmental liability, provides resource conservation, and avoids heavy metal contamination of soil, surface waters, and groundwater.

13. Energy – Lighting

Department of Administration – The RRO requested lighting efficiency considerations, which were implemented during the renovation of the 321 Grove building they will be moving to in FY 04. The State Architect Office specifies automatic turn-off switches for all overhead lighting in its remodeled offices. The Plant Management Division coordinates building lighting retrofits with the Division of State Building Construction and Xcel Energy to reduce energy consumption, thereby decreasing pollution levels. In addition, the division recycles incandescent bulbs to prevent solid waste disposal.

The Materials Management Division procures only reduced or no mercury fluorescent lamps. Mercury content in fluorescent lamps has been either eliminated or reduced to negligible levels due to EPA mandates in the late 1980s and early 1990s and Minn. Stat. § 115A.965, subd. 2.

In conjunction with the Pollution Control Agency, the Department of Transportation, and the University of Minnesota, the Materials Management Division has developed a statewide contract to recycle fluorescent lamps and HID (high intensity discharge) lamps and light ballasts that contain PCBs (polychlorinated biphenyls). The Materials Management Division purchased solar-powered highway warning signs for the Department of Transportation, which were subsequently added to a state contract. The Travel Management Division minimizes lighting through the use of energy efficient lights.

Bemidji State University – BSU continued an ongoing program of replacing T-12 fluorescent and incandescent lights and ballasts with T-8 and compact fluorescent lighting. During FY 2003, the replacements resulted in a net reduction of approximately 65,636 watts of lighting. The estimated annual savings is $8,100 or approximately 1.3 percent of the university's annual electric service bill. In addition to the energy savings, BSU received 13,126 in rebates for the project, through Otter Tail Power Company's participation in the Minnesota Conservation Improvement program (CIP).

Motion detectors were installed in several bathrooms and other rooms with intermittent use. The sensors automatically turn on lights when the room is entered and turn them off after a period of inactivity. The devices limit the energy used for lighting in areas that are used frequently but for short periods of time. Sensors will continue to be installed on an ongoing basis as funding and time permits.

Department of Corrections – ***MCF-Moose Lake/Willow River–***Shipped 177 pounds of PCB ballasts during FY 2003. The facility continues to replace incandescent bulbs with more efficient compact fluorescent bulbs

Office of Environmental Assistance – The OEA encourages energy conservation via its grants. Occupancy sensors have been installed in all the offices and conference rooms in the building shared by the OEA and the MPCA.

Iron Range Resources and Rehabilitation Agency – Energy-conserving bulbs are used where appropriate, and all florescent tubes are collected and recycled at Mercury Waste Solutions in Roseville. The ballast is shipped to the Clean Shop Program in Duluth.

Metropolitan Airports Commission – In addition to improvements to the airfield lighting system, the MAC Electrical Shop has been performing a number of upgrades that more efficiently light up the airport. Incandescent lamps are replaced by compact fluorescent, fluorescent fixtures use a more efficient T-8 lamp, and end-of-life ballasts shut down and don't draw current when a lamp fails. These upgrades have become standards in any new construction project.

Metropolitan Council Environmental Services – Several retrofits to energy-efficient fluorescent lamps or high intensity vapor lamps have taken place at MCES facilities. However, unlike incandescent lamps, these alternatives are considered as a special hazardous waste due to their mercury content. In 2002, 4,393 lamps were recycled through Retrofit Recycling in Little Canada, a reduction of 11 percent over the previous year. Various fluorescent lamp change-out programs have been underway to replace older lamps with the new, thinner varieties (F30T8) that contain less mercury and are even more energy efficient. Some facilities have installed motion sensor switches that turn off room lights if no motion is detected within 15 minutes.

Department of Military Affairs – The DMA contracted for energy audits for facilities on Camp Ripley, and as a result, energy conservation project plans and specifications have been developed for buildings. We are currently waiting for funding. Project specifications include lighting system replacement, or retrofit; HVAC systems repair; and HVAC controls repair or improvement. Some of these projects include energy management control systems designed to significantly improve control of energy consumption.

The department has also upgraded the electrical demand management system central control station computer and software. Improvements will enhance control of various electrical loads, providing greater demand and energy savings opportunities with existing connected loads. New uniquely addressable control switches can now be used to control occupancy status of specific buildings.

Minnesota Pollution Control Agency – A few years ago, the MPCA central building had four fluorescent lamps removed from each fixture and replaced two into each fixture. The lamps are more energy efficient and contain less mercury. Also, each fixture was converted to using one ballast rather than needing two ballasts.

The Brainerd office lease specifies that full-spectrum lighting be installed and maintained. It also calls for the installation of additional exterior windows, including some that can be opened, in order to promote day lighting. The office has specifically designed the floor plan to allow the maximum amount of light to enter the workspaces. We are going to install a revolutionary new daylighting feature known as tubular skylights in our main conference room. The tubular skylights will be installed as a test to measure performance and energy savings. If successful, tubular skylights will then be added to several other building locations to enhance daylighting and reduce electrical energy consumption.

Minnesota West Community and Technical College – Minnesota West entered into a performance contract with Johnson Controls Inc. The result of this agreement was to replace lighting at three campuses, completing a multi-year effort. All five campuses are now totally converted to T-8 lamps with electronic ballasts.

North Hennepin Community College – At present NHCC is well into construction of a new Center for Liberal Arts Building. These new buildings will have energy-efficient lamps, ballast, and motors. All used lamps are recycled by a licensed local contractor.

St. Cloud State University – As part of a $3 million energy conservation project with NSP, SCSU has shaved peak demand by about 25 percent. Occupancy sensors, LED exit lights, high efficiency fluorescent lights, and variable frequency motor drives also reduce consumption and pollution, as does the upgraded computerized energy management system. Over 10,000 florescent bulbs were recycled. Trash was burned in Elk River to produce electricity.

Department of Transportation – Mn/DOT has replaced old PCB ballasts and lights with non-PCB ballasts and energy-efficient lighting in all of its buildings. Mn/DOT also has motion detectors throughout many of its facilities to turn off lights when rooms are not in use. Most Mn/DOT computers have a sleep mode, which turns off the screen when not in use.

University of Minnesota – The university has updated its Standards and Procedures for Construction to address energy conservation (http://www.facm.umn.edu/cons/generalinfo.htm) in Lighting Systems:

- Select and design lighting systems and controls to ensure minimum consumption of energy while providing quality illumination for the visual tasks in each room or space.
- Avoid general high levels of illumination except in the most critical applications.
- Provide specialized supplementary lighting sources at the task area in lieu of uniform high level illumination throughout.
- Switching or other lighting control devices shall provide for flexible levels of lighting.
- Minimize decorative lighting.
- Consider the principles of daylighting for new buildings.

The university has an ongoing green lights program to change out older, less efficient lighting as remodeling of buildings is undertaken at all campuses and facilities. Switching from 40-watt lamps to 32-watt lamps coupled with more efficient electronic ballasts saves energy. Other energy saving lighting strategies are evaluated for use on a site-by-site basis.

14. Energy – Production

Department of Administration – The RRO requested energy efficiency measures which were implemented during the renovation of the 321 Grove building they will be moving to in FY 04

- The State Architect Office specifies and incorporates, where possible, the use of energy efficient triple-glazed windows to save on energy loss and heat gain in facilities.
- The Materials Management Division created a contract for window-mounted self-contained room air conditioners to emphasize performance, rather than design, establishing a minimum energy efficiency rating requirement for each size unit.
- The Plant Management Division is designing upgrades and expansion of the on-site chiller plant to further improve efficiencies and meet the needs of the additional facilities scheduled to open in 2005.

Bemidji State University – BSU is exploring the possibility of participating in Otter Tail Power Company's wind energy program. The program, dubbed TailWinds, gives Otter Tail Power company customers the opportunity to purchase 100 kWh blocks of wind-generated electricity. Each 100 kWh

block purchased costs an additional $2.60. The additional charge is to help cover the cost of adding wind-generated electricity to the power supply. To offset the additional cost, BSU is looking at ways to improve energy conservation on campus, seeking grants and rebates that would support the program, and discussing the possibility of establishing a wind energy endowment fund through the university foundation. The university considers the wind energy program an excellent opportunity for BSU to move towards sustainability and learn as a university community in the process.

Department of Corrections

MCF-Lino Lakes – This facility is under contract with Xcel Energy to provide peak shaving on an on-call basis using the facility diesel generator.

MCF-Moose Lake/Willow River – The facility is planning an automation project on the boiler system for FY 2004. The main goal is to provide for better fuel/air mixtures to ensure more efficient boiler operation.

MCF-Oak Park Heights – Beginning in 1996, the institution installed energy-saving equipment in various areas in an attempt to lower utility bills. For example, changing kitchen equipment from electric to gas, using lower wattage bulbs with clear lenses in lamps, etc. We continue to pursue the goal of energy-efficient equipment, while still providing adequate services to all offenders.

MCF-St. Cloud – A new generator was installed in 1992, at a cost $750,000, that allows for co-generation/power load shedding. The DOC is in the process of upgrading several emergency generators to help improve energy efficiency.

Office of Environmental Assistance – The OEA life-cycle analysis documenting resource conservation benefits associated with municipal solid waste source reduction, recycling, processing, and landfilling is available from the OEA Clearinghouse. The report includes a life-cycle inventory of resource-conservation benefits from waste management in 1996 and a life-cycle assessment of greenhouse gas benefits from 1991 to 1996.

Metropolitan Council Environmental Services – In 2002, the MCES spent $9.6 million on electricity and $2.5 million on natural gas purchases. Various improvements at the treatment plants such as fine bubble diffusion in secondary treatment and recovery of "waste" heat from incinerators always strive to improve energy efficiency and save money.

Minnesota Pollution Control Agency – The MPCA central building energy management system uses timers for regulating the temperature during the evenings and weekends. Also, the system includes thermostats located throughout the building for individual staff to monitor for energy savings.

Minnesota West Community and Technical College – In addition, energy efficient boilers were installed at three buildings on two campuses replacing equipment that dated back to the mid-1960s. Pump replacements and HVAC renovations were completed at four campuses and are planned for the last campus. The HVAC and boiler work has decreased emissions at these campuses and dramatically improved efficiency of plant operation. A new digital control system has been installed linking the energy management systems at the four campuses. This system replaces the original pneumatic control system.

Roof replacement projects at all five campuses have improved energy efficiency by increasing the amount of insulation in the buildings. Caulking and exterior shell sealing has been completed on buildings at three campuses and planned for additional buildings as funding becomes available.

North Hennepin Community College – North Hennepin Community College does not have standby generator capacity. No energy is produced at this site. Monthly usage of electricity and fuels are closely monitored to help insure efficient operation of facilities.

St. Cloud State University – As with the SCSU lighting improvements identified above in category 13, *Energy-Lighting*, NSP also conducted an audit into all other phases of energy savings. These recommended improvements have been made as well. For instance, a new boiler was installed and is now frequently operated. This boiler operates on # 2 oil, and MPCA-required air pollution testing has shown minimal (far below any action level) pollution particles being emitted from the stacks when this boiler is being operated.

Department of Transportation – Mn/DOT has installed 67 waste oil burners in its maintenance shops. The waste oil burners allow Mn/DOT to burn waste oil as a supplemental heat, resulting in lower utility bills. Some used oil sorbents are being burned to generate steam and electricity.

University of Minnesota – The University of Minnesota Initiative for Renewable Energy and the Environment (IREE) will provide the foundation for the effective use of renewable resources in Minnesota and around the globe. The initiative will draw scientists from across the university to work collaboratively on high-impact, problem-solving, deep science in critical issue areas. The College of Biological Sciences, the Institute of Technology, and the College of Agricultural, Food, and Environmental Sciences are leading this effort. The initiative will also bring together university expertise with experts from the private, public, and nonprofit sectors to foster research, discovery, technology transfer, and market development of new energy sources and products from renewable resources. The initiative will serve as a point of synergy for funding, collaboration, and communications on energy-related topics. The IREE mission is to promote statewide economic development, sustainable, healthy, and diverse ecosystems, and national energy security through development of bio-based and other renewable resources and processes.

The University of Minnesota, Morris, (UMM) has become one of the first institutions in western Minnesota to purchase wind-generated electricity through Otter Tail Power Company's TailWinds program, which allows customers to choose wind power to supply at least a portion of their electricity. UMM will purchase 614 blocks of wind power each month to fully cover the electric needs of the student center. According to the American Wind Energy Association, using this amount of wind energy reduces carbon dioxide emissions equivalent to planting 200 acres of trees. The project began in March when Otter Tail Power promoted wind power at a table in the student center and hundreds of students signed a petition to bring wind-generated electricity to the Morris campus. "Students have been very consistent in helping make environmentally responsible purchasing decisions for the campus, so we are excited to be able to power our Student Center with renewable wind energy," says Anne Olson, a junior from Falcon Heights serving on the UMM energy task force. UMM is no stranger to innovative conservation efforts. Prior to taking part in the TailWinds program, the campus implemented energy-efficient lighting and variable-speed drives on electric motors. "Because we're a large consumer of electricity, our decision to use wind power is important to advancing renewable energy resources," says UMM Associate Vice Chancellor Lowell Rasmussen. "And the University of Minnesota, Morris, always has been on the cutting edge when it comes to pursuing conservation efforts." Despite the fact that wind energy costs an additional $1,600 a month, Rasmussen says the university will not increase its spending on electricity. Instead, conservation efforts to reduce electricity usage across campus will begin, and students will be asked to come up with ways of cutting back on electricity across the campus.

A 15 MW co-generation steam turbine has been installed at the university's S.E. Steam Plant. The steam production is gas fired at least 70 percent of the time. This environmentally friendly electricity will displace the need for 15 MW otherwise generated by more environmentally problematic coal and nuclear plants. A 2003 marketing agreement with XCEL Energy will allow the co-generated electricity to be sold to the grid saving the university tens of thousands dollars per month on utility costs.

The university has installed a 15 kW photovoltaic system on the roof of the newly remodeled Architecture Building. The unit is donated by Xcel Energy and will include an education package. The

unit will provide electricity to the building and be a training resource for future architects and engineers.

The university is engaged in a fuel cell pilot project with Xcel Energy. A fuel cell is a residential unit that generates electricity using either propane or natural gas. Waste heat from the production of electricity is captured and used to heat water. Fuel cells are a new technology and appear to have applications especially in rural areas with intermittent electric service. The installation is anticipated to support the Dairy Cattle Teaching and Research Center on the campus in St. Paul. The fuel cell will provide 4.5 kilowatts of power, and the waste heat will be captured and used to heat water for washing down animals and animal pens. Xcel Energy will monitor the effectiveness of this installation to determine reliability and use for residential customers. The fuel cell unit will also be a training resource for future architects and engineers.

The university, through the Department of Biosystems and Agricultural Engineering, provides research, education, and guidance in the area of anaerobic digestion of organic waste to produce methane as a fuel for energy generation (http://manure.coafes.umn.edu/research/treatment.html). There are preliminary plans for the installation of a demonstration anaerobic digester and 40 kW micro-turbine generator at the St. Paul campus farm.

15. Groundwater Wells

Department of Corrections – *MCF-Red Wing* – This facility has two deep well pumps for domestic water supply. The Wellhead Protection Rule governs the use of these wells.

Department of Military Affairs – The ongoing hydrologic mapping project of Camp Ripley continues. When completed, the hydrologic model will have mapped the underlying geography of the area that will lead to better decision-making with regards to groundwater impacts.

DMA has also finished delineating a Wellhead Protection Area for each of the existing water production wells at Camp Ripley. A plan of action has been developed to protect Camp Ripley's drinking water supply and meet the requirements of the state of Minnesota's rules governing wellhead protection.

North Hennepin Community College – There is one deep well on site, which is used for irrigation purposes only.

St. Cloud State University – SCSU has a small number of groundwater monitoring wells used for research purposes.

16. Heavy Metals

Department of Administration – All Materials Management Division bid documents now require vendors to indicate whether their products contain mercury. This information will allow us to work with customer agencies and ascertain whether future specifications should require mercury-free products or award preferences based on mercury content. Any mercury content can then be shown on the contract release document, allowing the buyer to choose the most environmentally friendly product.

Department of Corrections – *MCF-St. Cloud* – Collects old mercury switches and lead-based paint chips for proper disposal. This reduces environmental pollution to waterways, landfills, etc.

Office of Environmental Assistance

Mercury. OEA staff continues to work at the state and national level to develop policies and programs for managing mercury-containing waste and reducing the amount of mercury entering commerce. In FY 2000, OEA awarded a grant to the Institute for a Sustainable Future (ISF) to serve as project manager for the Mercury-Detecting Dog project, part of the MPCA's Mercury-Free Schools program. Clancy, a dog trained to detect hidden mercury in schools and other institutions and facilities, was introduced to the public in October 2001. He also acts as an educator and ambassador on mercury and environmental issues. During FY 2002, this program resulted in pledges from 110 schools and visits/inspections to about 30 schools. This project continued during 2003, and the grant was amended to provide additional funds from an EPA grant to support ISF's project manager activities.

OEA staff provided support to the Quicksilver Caucus–EPA Mercury Stewardship Workgroup, co-chaired by former MPCA Commissioner Karen Studders and William Sanders, EPA–OPPTS, beginning in February 2002 and continuing through June 2003 with a public listening session hosted by ECOS in Chicago. The Quicksilver Caucus Mercury Stewardship reports were revised in response to comments and finalized in October 2003. OEA and PCA staff provided comment to EPA and State Department on the United National Environment Programme (UNEP) Global Mercury Assessment between May 2002 and February 2003, when the UNEP Governing Council voted to establish a Mercury Program.

Lead sinkers. OEA again sponsored a "Let's Get the Lead Out!" booth at the March 2003 Northwest Sportshow. The booth is part of a larger educational campaign to encourage anglers and outdoor enthusiasts to switch to non-lead environmentally friendly fishing tackle. OEA maintains a page on its web site at http://www.moea.state.mn.us/reduce/sinkers.cfm, providing information on available non-lead alternatives, scientific research and reports, and useful links to other organizations involved with this issue. Another component of this initiative was to strengthen the interagency working relationship between DNR and OEA on this issue. Substantial progress on this objective was achieved during the period of this report.

In addition during the summer of 2003, the OEA and the DNR partnered with retailers and conservation and outdoors groups to offer lead tackle exchanges across the state this summer. Over 17 lead tackle exchange events were held June through August in 2003. Anglers were able to bring lead sinkers and jigs to an event to trade for non-lead ones. Thousands of anglers came to the events and almost 1,000 pounds of lead tackle was collected.

Metropolitan Council Environmental Services – The MCES' IWPP section is responsible for administering the pretreatment program for over 800 permitted industrial users of the region-wide collection and treatment system. Substantial reduction has occurred in heavy metals released to the system due to enforcement and technical assistance efforts.

Environmental benefits of heavy metals load reduction include compliance with effluent limits, compliance with receiving water quality standards, improved biosolids quality, reduced air emissions from biosolids incineration, and compliance with biosolids land application metals criteria. Economic benefits include reduced use of treatment chemicals and reduced disposal costs for biosolids that can be beneficially reused. Please refer to the following table for actual values in pounds.

METALS LOADING TO METRO WWTP FROM INDUSTRIAL USERS

Metal	1980 (pounds)	2002 (pounds)	Reduction (pounds)	Reduction (percent)
Cadmium	4,585	172	4,413	96.2%
Chromium	64,755	3,563	61,192	94.5%
Copper	66,714	5,908	60,806	91.1%
Lead	10,600	1,488	9,112	86.0%
Nickel	43,128	3,796	39,332	91.2%
Zinc	90,931	11,215	79,716	87.7%
Total	**280,713**	**26,142**	**254,571**	**90.7%**

To further the reduction in metals loading, small volume industrial and commercial users whose aggregate pollution load may be significant--are being studied.

Mercury discharged to the collection and treatment system is still of concern. A partnership was established with the Minnesota Dental Association (MDA) in 1998, which led to two dental clinic wastewater studies, which were completed in late 2001. These studies evaluated amalgam removal equipment (aka amalgam separators) and loadings to the wastewater treatment plants. The studies showed that the separators are working well and that dental clinics are a significant source of mercury to the sanitary sewers.

Upon completion of the studies, the partnership continued with the MDA. One development includes the creation of the Voluntary Dental Office Amalgam Separator Program. This program was formally adopted on December 11, 2002. The three main actions are: (1) implementation of the joint program to reduce dental mercury loadings; (2) granting of a variance from the council's local pretreatment standard for mercury to those dental offices participating in the program; and (3) approval of a grant to the MDA to cover a share of the cost to market the program to dentists.

In its own operations, MCES has adopted a Mercury Reduction Strategy and formed an interdepartmental Mercury Core Team. Specific surveys have been conducted to identify all activities using mercury and inventory all equipment containing mercury for the purposes of reducing use and for replacement with mercury-free equipment. Influent monitoring closely measures mercury coming into the treatment plants.

Department of Military Affairs – The DMA operates x-ray technology to inspect helicopter tail sections for cracks. Photographic chemicals that are generated from this process are sent off for silver recovery. The DMA contracted for the removal of lead contamination that was present on roofs at indoor firing ranges located at Training and Community Centers (formerly known as Armories) throughout the state. These projects eliminated any potential environmental or personal exposure to lead.

North Hennepin Community College – Hazardous waste disposal for instructional chemicals is handled through the University of Minnesota.

St. Cloud State University – Campus-wide efforts are underway at SCSU to minimize mercury use and mercury thermometers. This past year, we participated in the EPA/MPCA Mercury-Free Program to survey over 40 science labs and ship over 300 mercury-containing units for recycling. We also recycled over 150 pounds of mercury metal. The value of the three-day survey and

replacement instrumentation was over $5,000. Waste photographic paper and chemicals are processed off-site to render them nonhazardous and recover silver. Conversion to a bulk storage and transfer process for spent photo-fixer has cut costs. Several conventional darkrooms across campus, including ones in Environmental and Technological Studies, have been removed. (They were replaced with electronic imaging systems.)

Also, about 50 pounds of video and audio film has been recycled through Generic Media of Minneapolis thanks to MnTAP's materials exchange listings. Minor amounts of gold, silver, copper, and palladium were recovered from our electronic recycling program. Nitric acid from Art was recycled to Chemistry Department needs. Many containers of heavy metal compounds were removed from SCSU using the University of Minnesota's Chemical Safety Day Program.

Department of Transportation – Mn/DOT developed a manual (see category 33, *Technical Support)* for removal of lead paint and is researching ways to recycle lead-contaminated waste generated through various removal technologies. Mn/DOT has changed from paints and inks containing heavy metals to lead-free products. See also category 24 *Paints, Coatings, Stripping*.

University of Minnesota – Proactive programs of minimizing mercury and other heavy metals on campus and capturing heavy metal-containing waste at its source should result in a reduced potential for mercury and other heavy metal discharge to the environment.

The University of Minnesota is cooperating with MCES in a pilot study to reduce mercury in dental clinic wastewater. The Boynton Health Center Dental Clinic has installed a micro-screen system in its chairside wastewater system to capture fine particles of mercury amalgam filling material before they enter the sanitary sewer. University Facilities Management has installed a cloth filter system at the outflow of the dental school clinic's (350 chairs) central chairside wastewater collection tank to capture fine particles of mercury amalgam filling material before they enter the sanitary sewer. MCES will assist in evaluating the success of these systems in reducing the soluble mercury discharged to the sanitary sewer system. If successful, these systems would be recommended to other dental clinics.

The university's updated steam plant can burn a fuel mix which is 70 percent or more natural gas rather than the traditional mostly coal fuel mix. The displacement of coal, the major source of atmospheric mercury, as the primary fuel can eliminate several pounds of mercury from the steam plant's annual air emissions. Facilities Management's continued effort to reduce steam and electricity use at the university also reduces the amount of mercury released at the coal burning steam and power plants.

The University Purchasing Department has finalized a contract with a distributor that will provide low-mercury fluorescent lamps as the default choice for most lighting applications to university customers. This will cut down on the amount of mercury on campus. The university collects spent fluorescent lamps from all of its campuses and has them recycled for mercury recovery. In 2000, some 95,000 fluorescent lamps (8 pounds of mercury) were recycled. The university offers fluorescent lamp recycling service to educational institutions throughout the state via its Chemical Safety Day Program (http://www.dehs.umn.edu/csdp). The Chemical Safety Day Program, which has operated since 1981, provides chemical waste management services to Minnesota schools.

17. HVAC, Indoor Air Quality

Department of Administration – The State Architect Office specifies and administers proper flame spread materials for interior finishes to reduce or eliminate the spread of fire and toxic fumes. The State Architect Office also specifies indoor air quality standards of the Minnesota State Mechanical Code in state-owned facilities and additional requirements in their design guidelines.

The Building Codes and Standards Division continues to administer and enforce indoor air quality standards of the Minnesota State Mechanical Code in state-owned facilities, public schools, hospitals,

nursing homes, supervised living facilities, correctional facilities, and prefabricated construction. The Building Codes and Standards Division enforces flame spread rating for materials on interior finishes.

The Plant Management Division is coordinating with Department of Employee Relations' Industrial Hygienists to develop janitorial procedures for indoor air quality procedures and standards for statewide recommendations. The Materials Management Division, in conjunction with the Minnesota Pollution Control Agency, has developed a contract for the technical operation and maintenance of closed landfills. This contract prevents air pollution by burning off gas through flares, and helps prevent groundwater pollution near the landfills by collecting and removing condensate and leachate produced in the landfills.

The Plant Management Division recovers and recycles all refrigerants. The InterTechnologies Group uses Freon for all the stand-alone air conditioners located at three Computer Operations Centers. The Travel Management Division collects all automotive refrigerants, which are recycled on-site at the repair facility. The Materials Management Division's refrigerants contract offers environmentally friendly alternatives to Freon.

Department of Corrections

MCF-Faribault – Several temporary employees were tasked with inspecting, overhauling, and repairing steam traps in the high-pressure steam distribution system. Costs savings (minus parts and labor) amounted to an estimated $55,000 per year. Seasonal cleaning of all remote condensers and preventative maintenance on window air-conditioner are ongoing programs. In 2002, several exterior condenser units were stripped of old insulation, cleaned, and reinsulated. Beginning in 2003, we will be cleaning the interior ductwork of building ventilation systems each year on a ten-year cycle. All of these activities help to improve the efficiency of the HVAC system.

MCF-Shakopee – Energy conservation efforts require all windows to be closed when operating the HVAC system. Lighting and HVAC equipment operate on a schedule to prevent excessive use.

Metropolitan Airports Commission – A recent energy audit performed at the Lindbergh Terminal revealed that a significant reduction in energy usage could be realized with a few minor modifications. A number of adjustments were made to the software controlling the air handling units to maximize their efficiency. These changes resulted in immediate and noticeable reduction in energy consumption and related costs.

Metropolitan Council Metro Transit – Metro Transit has worked in this area since 1991 when it conducted its first study of the air handling systems at the Ruter Garage. That study focused on the new standards required by the MPCA and when changes would have to be made to meet those standards. Based on that study, a complete new system was installed in 1995 to allow the garage to operate within the required standards. Additional studies have been completed for the South and Heywood Garages (1997). Metro Transit has also installed new exhaust systems in the body shop/welding shop areas of the Overhaul Base. These changes have significantly reduced the amount of dust given off by the sand blasting and sanding processes in these areas. It also reduced the noise levels in the building while performing these jobs.

Metro Transit is currently designing a system that will use the waste heat form the Hennepin County garbage burner to supplement heat in its Heywood Garage and office building. This system would preheat all air coming into the air handling system and reduce emissions from natural gas and fuel oil by 40 percent. Currently, funds are available for this work and the final agreement is being worked out with Hennepin County so the work can proceed in 2004.

Metro Transit is also looking to install a system at its Overhaul Base in St. Paul that will take waste heat from the NRG condensate line that passes south of the building. This installation could possible as soon as 2005 if agreements with NRG can be completed.

Department of Military Affairs – The DMA has undertaken projects to identify and remove lead contamination that is present at indoor firing ranges located in Training Area and Community Centers (formerly known as Armories) throughout the state. These projects will eliminate the potential exposure to any lead that may be present from the firing of small-bore weapons in the building.

Minnesota Pollution Control Agency – At the MPCA central office, an additional fan has been installed to improve the indoor air quality on each floor. The new Brainerd office lease requires the use of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) approved minimums for fresh air intake, filter efficiency, and filter replacement to be incorporated into the heating, ventilating, and air conditioning system. Other requirements are specified to ensure that the building maintain good indoor air quality.

Minnesota West Community and Technical College – Funding is in place and design work is being completed on a total building renovation project at the Worthington campus. In addition to replacements in the HVAC system, improvements will be made to the building shell including replacement of all windows with thermo pane low-e glass. Work is scheduled to begin in the spring of 2004. The college continues to seek ways to improve the efficiency of our HVAC systems.

North Hennepin Community College – The college plans to continue its program of monitoring and testing indoor air quality. This year we will be testing our Plant Services and Activities Buildings.

St. Cloud State University – SCSU is using a carbon dioxide chart recorder to assist in ventilation troubleshooting. Custodial staff, HVAC staff, and Human Resource personnel have become much more involved in complaint and mold response. Many special forms are being used to procure and track occupant data. MacNeil Environmental Inc. has performed six air sampling surveys expanding to seven buildings. Water-based paints and varnishes and strict new carpet emission controls are used extensively to limit volatile organic compounds.

Minnesota Department of Administration, Facilities Management Bureau Building Air Quality 5/95 guidelines for building owners and facility managers have been extensively studied and implemented. High-efficiency vacuum cleaner bags and HVAC filters help. SCSU Health Services, Maintenance, Public Safety, and Lindgren Child Care Center heads are taking the lead on disaster planning. Special telephone plans, quick HVAC shutdown, and sheltering-in-place are being explored.

Department of Transportation – Mn/DOT buildings use air-to-air heat exchangers in the laboratory and rest stop areas. This is done to save energy and condition the building environment. Fresh air is controlled through building automation systems to maximize energy savings and comfort.

University of Minnesota – The university hosts an indoor air quality web page (http://www.dehs.umn.edu/iaq) and web links (http://www.dehs.umn.edu/outsidelinks) to disseminate information about various aspects of indoor air quality (design, health effects, contaminants, etc.). The information includes both chemical and microbiological agents and covers home, school, and business situations. Check these sites for terrific fungal pictures and information.

The university's 2002 legislative capital request includes a project to replace aging building chiller units on the St. Paul campus with an energy-efficient centralized chiller plant. Preliminary plans are underway and a prospective site has been determined for a centralized chiller plant on the St. Paul campus. Cost estimates for the plant, which would eventually connect all buildings and more efficiently provide cooling, are based on a prospective location: a spot south of the campus' steam plant, near the Sarita Wetland. If a plant is not built, most of the chillers on campus would have to be replaced, and that would be much more costly. Buildings on the St. Paul campus have their own chillers, but many of them are nearing or beyond their functional lifespan. Of 38 chillers used on the St. Paul campus, 32 are in dire need of replacement in the next six years. Current plans call for a plant

to house five large chillers that would be linked to campus buildings. Because of energy codes and the space existing chillers occupy, new chillers would have to be electrically powered. This is expensive and would mean those buildings would have little power for other needs.

There are efficiencies to be gained by centralizing all that cooling. Much of the efficiency would come from maintenance and operation cost savings. Without accounting for inflation, a central plant, rather than replacing the chillers, would save the university $9 million over the next 25 years. Furthermore, although the new buildings on campus have stand-alone systems, they were built so they could eventually be connected to a central plant. Funds for the first phase of the project, which would build the plant and install two chillers, total about $18.7 million. Over the next eight years in three more phases and funding requests, three more chillers would be installed and more buildings would be connected under the plan.

The HVAC system at the IWMF hazardous waste facility was tested and modified to properly balance the air flow to design specifications and to reduce or remove air flow where appropriate to make the building more energy efficient. The project was able to reduce annual energy costs/use by 15 percent with a project payback of approximately three years.

18. Ice Control, Sanding

Department of Administration – The Materials Management Division and the Department of Transportation have developed a contract for alternative blend deicer used in a mixture with alternative deicer, regular salt, and sand. This blend reduces the salt use and can be used successfully at lower temperatures. The contract will be expanded to include more plant-based alternative products. The Department of Transportation is continually reviewing new products and as approved, MMD adds them to the state contract. Some of these alternative deicers are corn-based. The Plant Management Division is currently testing various programs to reduce chemical usage during the winter season.

Bemidji State University – The Building and Grounds Department completed an evaluation of a liquid, ice control/removal product. The product was used successfully to remove and prevent snow and ice build-up at the entrances to campus buildings and reduced over-all use of sand and salt. We will continue to use the product in those areas. Salt and sand were still more effective for large-scale use, such as parking lots and sidewalks. Use on large areas would also require the purchase of additional application equipment, therefore we will continue to use salt and sand in those areas.

Department of Corrections – *MCF-St. Cloud* – The St. Cloud facility uses salt-free products on sidewalks into the facility, which helps to reduce groundwater contamination and lessens grass kill.

Metropolitan Airports Commission – MAC Field Maintenance continually evaluates ice control methods for runways, taxiways, and roads. A number of products are approved for use by the FAA on airport runways and taxiways. MAC Field Maintenance has found two that fit the delicate balance of being as environmentally friendly as possible while performing to exacting standards. Solid sodium acetate and liquid potassium acetate are applied based on a variety of conditions, including type and amount of precipitation, as well as temperature.

It has been found that mechanically removing ice and compacted snow may be more effective in some cases than the use of chemicals. Over the past six years, MAC has added runway brooms to its fleet of snow removal equipment. Starting initially with two, the fleet now boasts 14. Built almost exclusively for airports, these 32,000-pound units are powered by two 350-horsepower diesel engines. An 18-foot-wide rotating broom essentially strips the pavement bare of any ice or snow in a single pass. They can be operated at 25 to 30 mph and are staggered with plows and blowers in a “conga line” that can clear the width of a runway in two passes. The use of these “brooms” greatly reduces the need for chemical deicing, and in many cases eliminates it entirely. It is estimated that the use of chemicals for pavement deicing has been cut in half through the use of runway brooms. New snow removal equipment is being

evaluated continuously and implemented whenever possible. For the winter of 2003-2004, a plow/broom combination vehicle will be used and its performance compared to that of the two vehicles it could potentially replace.

Aircraft deicing performed by tenant airlines using glycol-based deicing fluid is another form of ice control. The MAC has a glycol containment system at MSP, which is designed to significantly reduce the amount of aircraft deicing fluid discharged to the Minnesota River. Aircraft deicing takes place on concrete deice pads located near the runway ends. Impacted run-off from the pads is collected and contained on site until it is transported for recycling or discharged to the sanitary sewer for treatment under an Industrial Discharge Permit with Metropolitan Council Environmental Services (MCES).

Glycol recovery vehicles are also used by the airlines to vacuum-sweep the surface of deicing areas. Glycol collected in this manner is highly concentrated and therefore more easily recycled than what is pumped from the containment system.

Metropolitan Council Metro Transit – Part of the supplementing heating source system would include a snow melt system around its Heywood Garage and office, thereby reducing the amount of salt that is used at the facility. The system will be installed in 2004

North Hennepin Community College – All sidewalks are cleared of snow and ice, and Ice Melt is applied as needed throughout the winter. A plowing contractor performs snow removal from parking lots. The college determines when and where to sand parking lots in order to keep sand use to only what is needed.

St. Cloud State University – Masonry sand works well by not being too abrasive on our SCSU equipment. Salt use in sanding mix was minimized by controlling salt content based on outside temperature. The small stockpile of mix was kept on a slab and covered with tarpaulins to control salt leeching.

Department of Transportation – Mn/DOT conducts extensive research annually on ice control equipment, materials, and methods. This research has shown some dramatic results. The largest success to date comes from the research into anti-icing and pre-wetting of salt or salt/sand mixes for snow and ice control. Pre-wetting methods have shown a 20 percent or more reduction in salt/sand usage. Pre-wetting has been implemented statewide to various degrees and is still expanding. Anti-icing was initiated in 2002-2003. The procedure has the potential to reduce overall snow and ice expenditure by reducing material equipment and labor.

In the past few years, new alternative deicers have entered the marketplace. Mn/DOT actively evaluates salt replacements that demonstrate lessened environmental impacts while maintaining or increasing roadway safety. Mn/DOT's metro district evaluated street sweeping sand and purchased a screening unit to reclaim sand for use in projects. It is anticipated that with equipment innovations such as zero velocity spreaders, greater use of road weather information, anti-icing and pre-wetting, as well as operator training, the use of sand and chemical deicers can be reduced even further.

University of Minnesota – The university's Facilities Management Grounds service group closes off unnecessary walkways and stairs in the winter months to reduce the snow removal and ice control efforts at the university. Less salt is used and therefore less salty runoff is generated. Less snow removal means fuel savings from snow removal machinery. Less labor, less sand, and less fuel burned are balanced against very little loss in utility or safety.

19. Laboratory

Department of Administration – The Materials Management Division continues to work to reduce mercury from products we contract for in the medical area. The Materials Management Division's hospital and medical supplies contract is consistently updated to introduce environmentally appropriate products. Recent additions include non-latex alternatives, such as gloves, syringes, bandages, and blood pressure cuffs. Sharps containers made from recycled plastic and non-PVC-produced tubing and intravenous bags are now also available.

The Materials Management Division's laboratory supplies contract provides alternatives to laboratory media containing formaldehyde and heavy metals where scientifically possible. The Materials Management Division, in conjunction with the Pollution Control Agency, has three regional contracts for environmental sampling and analysis. The Material Management Division, in conjunction with the Department of Transportation, has developed a contract for the purchase of n-propyl bromide, which is used in place of 1-1-1 trichloroethane for testing bituminous road aggregate. This is a much safer and environmentally friendly process, and produces less toxic waste and vapors. The Plant Management Division and State Architect Office are designing high-efficiency, energy-saving hoods for the laboratory floor of the proposed Bureau of Criminal Apprehension building.

Department of Agriculture – The Agronomy work unit's inductively coupled plasma mass spectrometer (ICP/MS) has helped reduce the heavy metals mercury waste stream that was created by the use of the Kjeldhal apparatus. By reduced use of this apparatus during the past year, the amount of mercury waste generated was 15 gallons, saving on the cost of hazardous waste removal this year. Method development and additional equipment is being investigated to further reduce this waste stream. The laboratory's Environmental Analysis waters section recently acquired a solid phase extraction system, which will reduce the amount of methylene chloride used within this area. Additional data shall be available next fiscal year.

Bemidji State University – The BSU Chemistry Department continues to incorporate micro-scale laboratory techniques into its courses. This reduces both the amount of hazardous wastes generated and the amount of new chemicals needed. The department also continued a project began last year to remove outdated and/or unused chemical stocks. The chemicals were removed through the University of Minnesota's Chemical Safety Day Program. The chemicals will be redistributed or properly disposed of by the University of Minnesota's waste management services. The disposal cost was approximately $9,000. The project has reduced the potential for spills and the associated liabilities, as well as improved safety. The department will continue to review and reduce chemical stocks in FY 2004.

Department of Commerce – The Weights and Measures Division receives petroleum samples from various Minnesota petroleum distributors and retailers for testing. The waste remaining after testing is either returned to the petroleum company for further refining or added to the division vehicle tanks.

Department of Corrections

MCF-St. Cloud – All biohazard products are collected and properly disposed of (incinerated) at an annual cost $2,000.

MCF-Shakopee – Fixtures from the dental lab and lead foil from x-rays are recycled by Silver Pockets. This will continue for 2004.

Minnesota Pollution Control Agency – The MPCA Air Quality Lab has a temperature and humidity controlled room for the handling of PM2.5 filters and additional refrigerator space for the storage of PM2.5 filters to meet EPA guidelines and tank tie downs in the tank/hazard storage room to comply with State Fire Marshall Code.

North Hennepin Community College – The college contracts with MacNeil Environmental on a yearly basis to provide professional technical expertise in this area.

St. Cloud State University – MacNeil Environmental Inc. (MEI) trained science staff and faculty last winter on pollution prevention and waste minimization at SCSU as part of OSHA Laboratory Standard training. MEI's role has expanded to include principal consultants and special audits. There is a bigger focus on radiation controls. Health Services is improving policies and laboratory controls as a result of voluntary OSHA Industrial Hygiene inspection partnering.

The Chemistry Safety Committee (CSC) and Chemical Hygiene Officer (CHO) and new CHO assistant have been instrumental in fostering better lab user training, labeling, eyewash/shower inspection, and hazardous waste control. They have assisted the expansion of SCSU's hazardous waste disposal and recycling program to identify and remove over 50 unknowns. A staff member (recently added to the SCSU Chemistry department) has made major progress in hazardous waste controls and arranging local city sewer system (POTW) disposal.

After hours work controls and the Chemical Hygiene Plan reviews have received special emphasis in all labs in the College of Science and Engineering Departments. Renovations have included the addition of two plumbed eyewashes, and better formaldehyde controls are being used.

Department of Transportation – Mn/DOT materials laboratories have replaced 1,1,1-trichloroethane, which is hazardous and very expensive to manage and dispose of, with n-propyl bromide used with asphalt extraction waste. N-propyl bromide waste is nonhazardous and can be recycled in-house and reused.

One Mn/DOT materials laboratory has substituted vinegar for muriatic acid. Muriatic acid was used to clean air pots and other laboratory equipment. It was found that if the equipment were allowed to soak in vinegar overnight, the equipment would wipe clean the next day.

University of Minnesota – The University of Minnesota includes pollution prevention as part of the chemical waste management training for all laboratory workers. The training manual provides suggestions, information resources, and reporting documents (http://www.dehs.umn.edu/hwd/guidebook).

The University of Minnesota Department of Environmental Health and Safety did a pilot project to identify and recycle via distillation laboratory waste solvents that are amenable to distillation and are marketable to university laboratories. Initial successes have produced marketable hexane, acetone and acetonitrile. The solvent recycling means not only that less virgin solvents must be produced but also that less waste solvents need to be disposed of. The projected cost savings to the university, if the distillation and marketing focused solely on acetonitrile, would be $800 in avoided disposal costs and $30,000 in avoided solvent purchases for the annual system capacity of 1200 liters of recycled acetonitrile. Total projected annual costs are $10,800, yielding a net annual saving of $20,000. Benefit is totally dependant on the price of virgin material that is being replaced and the quality of product from the distillation process.

20. Landscaping

Department of Administration – The Plant Management Division composts yard waste whenever practical.

Bemidji State University – The final phase of a project to restore and stabilize the Lake Bemidji shoreline was completed in October. BSU cooperated on the project with the Minnesota Department of Natural Resources and the Beltrami County Soil and Water Conservation District. A total of 645 feet of shoreline was stabilized with rock, plants, and other natural materials. Native aquatic plants

were planted to replace lawn and return the shoreline to a more natural condition. The total cost of the project was approximately $119,000. BSU contributed approximately $15,000 in funds and $43,300 of in-kind services to the project.

The recently constructed American Indian Resources Center will incorporate native wildflower and grass plantings into the landscaping around the building. These perennial plants are expected to grow well in their natural habitat and require less water, fertilizer, and pesticides to maintain than do domesticated species. The local Master Gardeners Club has volunteered to do the planting. Native perennials may be incorporated into more areas on campus, if this project proves to be successful. In addition, the Building and Grounds Department continued its moratorium on herbicide and fertilizer application to lawns around a single-parent family-housing dormitory.

Department of Corrections

MCF-St. Cloud – Planted a five-acre area of native grasses/wildflowers. Not only does this enhance the aesthetics of the area, it will result in a cost saving of $525 a year in reduced water usage.

MCF-Shakopee - All landscaping is done in-house, and fertilizer/herbicides are used sparingly. This effort will continue for the coming fiscal year.

Minnesota Pollution Control Agency – The central office landscaping committee has established a natural garden area in the front of the building in place of mowed grass. This garden meets several goals: less watering, fewer pesticides, colorful/attractive seasonal entrance, and an extra benefit for wildlife (butterflies, birds, and insects). The new Brainerd office will be reviewing and approving all exterior landscaping plans. They have requested that native, drought-tolerant landscape plants be used around the building.

St. Cloud State University – SCSU has joined with the city of St. Cloud on many of their storm water control plan initiatives. Many involve landscaping, catch basin overflow, and construction project runoff controls.

Department of Transportation – Mn/DOT uses wood mulch in and around various plantings to conserve water and help control weeds, which reduces, if not eliminates, the need for a pesticide. Mn/DOT's specification for wood mulch promotes the use of locally generated non-treated wood waste. Mn/DOT uses an integrated vegetation management approach for managing roadside vegetation that combines the use of appropriate herbicides, biocontrol organisms, precision mowing, and ongoing training through internal workshops and conferences. This limits the use of herbicides.

MnDOT uses native plant materials in storm water ponds, vegetative swales, micro-detention cells for mechanical and biological capture of transportation-origin solids and chemicals. Several handbooks for field personnel have been developed for erosion control during construction. MnDOT is developing environmental standards for wetland restoration, storm water treatment technologies including infiltration recharge basins, ditches, belowground storage, and for bay treatment. MnDOT has installed the first living wall composed of compost to increase the concentration time in a storm water pond in Golden Valley. Compost has been used successfully as an erosion control blanket. MnDOT also developed a CD-ROM titled *Woody and Herbaceous Plants for Minnesota Landscapes and Roadsides*, which is now available interactively online.

University of Minnesota – CUES, Center for Urban Ecosystems and Sustainability (http://www.entomology.umn.edu/cues) was created in 1995 with a grant from the Minnesota Extension Service. CUES is an interdisciplinary program with participants from the Colleges of Agriculture, Food, and Environmental Sciences; Biological Sciences; Natural Resources; and Landscape Architecture. The CUES resource center is located in the Andersen Library at the Minnesota Landscape Arboretum. CUES mission is to educate landscape managers and urban residents about ways to embrace environmental stewardship by practicing sustainable management. A landscape

managed through sustainable methods requires low inputs of labor, fertilizers, herbicides, insecticides, and fungicides. Excessive use of these chemicals can pollute surface and ground water and disturb natural ecosystem processes. Sustainable management embraces four major principles:

- **Conserving bio-diversity.** The naturally diverse landscape discourages outbreaks of disease or insects. Such a landscape also attracts birds and butterflies.
- **Restoring native vegetation.** Consider using native vegetation in landscapes. Restore native vegetation to shorelines to reduce nutrient enrichment through stabilizing sediments and shorelines.
- **Promoting nutrient recycling through composting.** Backyard and community composting is an ecologically sound way of disposing of yard wastes and increasing nutrients in urban soils.
- **Using integrated pest management to control insects and diseases.** Inspect and monitor your plants' health on a regular basis, before problems are out of control. Instead of routinely spraying for insects, use spot treat problems of soft pesticides such as soaps, oils, and bio-rational products such as Bt (commercial formulations of Bacillus thuringiensis). Adopt these bio-rational practices, which target the pest and not the naturally occurring biological control agents such as parasitoids and predatory insects. Use naturally resistant plants. When necessary use hard pesticides, timed to the vulnerable stage of the insect, so the application has a major impact on the pest.

The Sustainable Urban Landscape Information Series (SULIS) has developed a Sustainable Lawn Care Information Series (http://www.sustland.umn.edu/maint) to assist homeowners to create a sustainable lawn. According to one estimate, 40 million acres of land is devoted to turfgrass in the United States with nearly 75 percent in home lawns and more than 30 billion dollars spent on annual lawn maintenance. It is no wonder that the large amount of resources allocated to lawn care and the impact that they have on the environment has called the sustainability of lawns into question. This critical attention has challenged lawn managers and turfgrass research programs across the country to develop and work toward more sustainable, lower input turf/lawn ecosystems. While SULIS defines sustainability in a general way, sustainability as it relates to lawns can be defined as a lawn area that requires few material inputs while having a positive impact on the environment. Creating and maintaining a more sustainable lawn begins with proper selection of the best adapted grass species and varieties. Proper site preparation, lawn installation, and appropriate follow-up care will help reduce the need for inputs of the established lawn.

In 1999, a small group of faculty, staff, and students started the Sustainable Campus Initiative Committee (http://www.cnr.umn.edu/sci), an ad hoc committee with a mission to use the campus and its physical facilities as a tool for environmental learning. One of the pilot projects is the Sarita Wetland restoration on the Twin Cities campus. The wetland restoration began with a cleanup during Beautiful U Day in September 2000. Implementation of the restoration began in the spring of 2001 and will continue through the next few years. On September 25, 2001, students, faculty, staff, and community volunteers built the first raingarden on the university campus as a part of Beautiful U Day 2001. The raingarden will reduce the stormwater and runoff pollution that flows to the Sarita wetland and eventually to the Mississippi River. The raingarden project developed out of a student research paper done for a water quality class. More raingardens and other pollution preventing landscape stormwater management projects will be championed by the committee as future new construction and building renovation projects provide opportunities to change the landscaping of the campus (see http://www.stormwatercenter.net and http://www.dakotaswcd.org).

The proposed St. Paul campus project to replace aging building chiller units with an energy efficient central chiller plant also provides the opportunity to make this campus a national model for storm water management. The Sustainable Campus Initiative is collaborating with Facilities Management and other departments to implement a plan that would improve storm water management on the St. Paul campus without increasing the cost of the chiller plant project. When large storms come through the area, up to four feet of water rushes through the wetland in a short period of time, washing out

most of the wildlife. This storm water "bounce" prohibits the wetland from sustaining natural animal and plant life. According to Environmental Protection Agency regulations, the university must implement a storm water management plan by November 2002. Therefore, the university must correct storm water runoff that flows through the Sarita Wetland. If water infiltration gardens and other storm water management facilities were installed in the northern part of campus, the storm water runoff in the Sarita Wetland would be reduced. Connecting all the buildings to the chiller plant through underground piping, will require much of the campus to be dug up. When those holes are filled, grading on the landscape could be altered or rain gardens could be installed, redirecting, slowing down and reducing campus runoff. The university needs to replace lost vegetation, so putting in plants to alleviate the storm water runoff would be a practical solution. Sarita Wetland and the storm water infiltration gardens throughout the campus can be used for teaching as well as research. The storm water management infrastructure throughout the campus might become an important teaching and research tool for faculty and students.

The University of Minnesota Extension maintains a web site entitled Sustainable Urban Landscape Information Series (http://www.sustland.umn.edu/). This outstanding site offers a detailed guide to designing, creating, and maintaining sustainable urban landscapes. Aimed at both the public and the horticulture/ landscape industry, the site is composed of four main sections. The first, *Design,* takes users on a detailed trip through the process of envisioning, planning, and designing landscapes that are cost effective, visually pleasing, and easy on the environment. The next section, *Plant Selection,* overviews the basics of selecting plants for landscapes and includes an excellent plant selection database. With detailed information and photos of over 1,200 plants, the database is worthy of an annotation in itself. The *Implementation* section covers preparation, planting, installation, and construction of urban landscapes, with several illustrated how-to projects. The final section, *Maintenance,* offers a comprehensive guide to lawn care, with additional features on tree, shrub, and plant care planned for the future. A collection of links to related land-grant university and extension sites rounds out the site.

The University of Minnesota's College of Architecture and Landscape Architecture provides landscape training and research (http://www.cala.umn.edu/landscape_architecture/default.html). Landscape architecture is the design, planning, and management of the landscape to create environments that embody ecological function and realize human aspirations for community, health and safety, and beauty. Landscape architects are concerned with a wide range of projects: large-scale regional landscape planning; design of exterior environments for working, living, and recreation; commercial, institutional, and industrial development; transportation systems; and multiple-use areas. Professional services include studies of land-use feasibility, suitability, and capability; site selection studies; proposals for site layout and regional land use allocation and management; detail grading; construction drawings; and planting plans. Landscape architects often interact with other professionals such as architects, planners, engineers, geographers, physical scientists, social scientists, and others in developing projects.

The cornerstone of the university's Landscape Architecture program is design informed by ecological understanding. National leadership in research and active testing of design ideas locally and nationally give the department a powerful springboard for innovation in design. Collaborative opportunities within the college and university offer a further means of realizing the potentials of landscape architecture as well as a means of asserting the necessity for ecological responsibility in design and planning. The mission of the Department of Landscape Architecture is to foster sustainable relationships between people and their environment. Fundamental to this commitment is the belief that design skills forged from a deep understanding of the intrinsic physical and aesthetic characteristics of natural processes is the best way to help people conserve, rebuild, and steward the natural and cultural places within which their lives and communities unfold. The department pursues this mission through teaching, carrying out research, and actively working with communities to develop and apply place-based solutions to local and regional landscape issues. Specifically, the department:

- Teaches students to be professional landscape architects who use ecological thinking as the basis for artistic design.
- Develops new knowledge about the interrelationships between human and natural systems through scholarly and applied research.
- Helps communities and public groups understand, shape, and manage local places using participatory thinking and incremental planning.
- Collaborates with other professionals within and outside of the university to seek effective design solutions to landscape issues.
- Fosters design literacy based on ecology, technology, history, behavior, place theory, and art.
- Teaches students a working knowledge of Minnesota's natural and cultural ecosystems.

21. Materials Exchange

Department of Administration – The Materials Management Division through its Surplus Services administers Minn. Stat. §16C.23, subd. 6, which directs the commissioner of Administration to dispose of state surplus, obsolete, and recyclable property to obtain optimum property utilization within all state agencies and governmental units or nonprofit organizations in Minnesota. Any remaining property is subsequently sold by public auction, sealed bid, pre-priced sale, or by negotiation as deemed most advantageous to the state and in accordance with State law and guidelines. Property that has outlasted its effective usefulness and is considered beyond economical repair with no further utility value to the state, governmental unit, or nonprofit organization in Minnesota is recycled in accordance with OEA's Product Stewardship policy proposal.

The Travel Management Division's material exchange is accomplished through Surplus Property when property has useful life remaining. The State Architects Office writes recycling and reusing materials and proper handling of hazardous materials into all building construction specifications.

Department of Corrections

MCF-Faribault – The laundry and power plant participate in exchanging 30- and 50-gallon chemical storage barrels. The manufacturer picks up the empty barrel upon next delivery.

MCF-Oak Park Heights – This facility is considered a VSQG by Washington County and the MPCA, shipping only approximately 100 gallons of hazardous waste each year. With the closure of the Industry program and change to a Canteen, printing waste will end, and the gallons should drop for the remainder of Fiscal 2003. In FY 2002-2003 there was no hazardous waste shipped.

MCF-St. Cloud – Recycles cardboard (credit $2,966), wooden pallets (500 pallets recycled), and scrap metal (scrap iron, $2,725), resulting in less waste to landfill and savings on disposal costs.

MCF-Shakopee – Surplus materials (e.g., furniture, washing machines, etc.) are donated to State Surplus Operations, reducing the amount of waste generated. This was done a few times during FY 2003 and will continue for FY 2004.

Office of Environmental Assistance – In 1993, the OEA formed the Minnesota Materials Exchange Alliance, a group composed of counties and agencies interested in maximizing materials exchange opportunities. The mission of the alliance is to develop an effective materials exchange infrastructure in Minnesota and to foster coordination and greater utilization of the state's potential for reuse.

MATERIALS EXCHANGE PROGRAMS IN MINNESOTA - CONTACT NUMBERS

Minnesota Technical Assistance Program	612-624-1300 or toll free 800-247-0015
Chisago County Materials Exchange	651-213-0879
Northcentral Materials Exchange	218-547-7428
Northeast, St. Louis County	218-749-0648 or 800-450-9278
Northeast, WLSSD	218-740-4786
Otter Tail County Materials Exchange	218-998-8598 or 218-998-8597
Southeast Minnesota Recyclers Exchange (SEMREX)	507-529-4526
Southwest Minnesota Materials Exchange	507-532-8210
West-Central Materials Exchange	218-299-7329

During 2003, a total of 2,382 businesses and organizations registered on the Materials Exchange web site, seeking to exchange solid and hazardous waste materials for reuse. Successful exchanges resulted in saving businesses, and organizations approximately $967,370 in avoided purchase and disposal costs and keeping more than 2.3 million pounds of materials out of the landfill, exceeding the annual goal of 2 million pounds. Catalog, web, and e-mail listings resulted in a total of 432 exchanges, exceeding the annual goal of 120.

MnTAP staff worked with local alliance sites providing needed information to help them function as part of the Minnesota Materials Exchange Alliance. MnTAP published and distributed over 6,000 catalogs to local sites, metropolitan counties, businesses, and organizations. The web site, e-mail listings, and catalog have become very effective tools in facilitating and measuring exchanges. In 2003, over 19,400 web self-referrals were made. And, by the end of 2003, over 2,000 people were receiving the newest listings by e-mail.

Eureka Recycling, which developed and maintains the Twin Cities Free Market waste exchange program, received a 2003-04 grant from the OEA to expand and update the program as part of their efforts to improve multi-family recycling in Minnesota. The service area for the program has been limited to the city of Saint Paul and Washington and Anoka Counties, but, under the grant, will be expanded to cover the additional communities.

Metropolitan Airports Commission – MAC has an ongoing reuse program for discarded pallets that would otherwise be destined for disposal. They are generated by the various tenants, as well as by MAC operations. Every month, thousands of pallets are picked up by MAC maintenance personnel at loading docks, along roadways and ramp areas and brought to a single, designated pallet staging area. They are available to anyone for reuse on site, eliminating the need to purchase pallets. Surplus pallets are hauled off site, free of charge, for reuse by a vendor.

There is no out-of-pocket expense and the cost savings is enormous for airport tenants who would otherwise purchase pallets and use them once. Annually, 10,000 plus pallets are reused, and the avoided disposal cost easily exceeds $15,000.

MAC also promotes reuse internally through a policy of the purchasing department. A procedure has been established outlining the steps to take when MAC-owned property is no longer needed by a particular department. This mechanism ensures that other departments are aware of the availability of surplus items, eliminating redundant purchases. Countless items have been kept out of the waste stream and reused in this manner.

Department of Military Affairs – Materials not being used by a unit due to mission change or other reasons are being exchanged with units that have a need for the materials. This eliminates the potential for shelf life expiration and the need to order materials that are available through other units.

Minnesota Pollution Control Agency – At least twice a year (during Earth Week and the holiday season), staff organizes a "treasure table." Usable, but unwanted, items from staff are brought in and placed on a table for others to take and reuse.

North Hennepin Community College – Used but serviceable computers and components have been given to other schools that expressed a need. Excess office equipment is given to other schools and also turned in to the state's Materials Management Division for use elsewhere.

St. Cloud State University – Glass, plastics, aluminum cans, steel, carpet, some building materials, Styrofoam, and cardboard are recycled at SCSU, as well as lard and cooking oil. A local farmer's hogs are fed leftover food.

University of Minnesota – The University Department of Environmental Health and Safety operates a chemical redistribution program (http://www.dehs.umn.edu/hwd/recycle), which finds users for unwanted but usable chemicals and laboratory glassware within the university community. The program distributes approximately 1000 kg of chemicals per year that would otherwise be disposed of as hazardous waste.

The University Facilities Management, Waste Management/Recycling operates a Reuse Program for redistribution of unwanted computers, office furniture and equipment, and laboratory furniture and equipment (http://www1.umn.edu/reuse). The target audience is the university community, nonprofits, and the general public. Available items are listed and often shown on their web page. Included on the web site is the Virtual Warehouse that lists and shows items available for sale/redistribution at their current locations. Items are marketed and exchanged without the extra handling and transportation required to bring them to the central warehouse.

22. Office Supplies

Department of Administration – The Resource Recovery Office obtains office supplies and paper from its reusable office supplies area at the State Recycling Center. The Materials Management Division's Office Supply Connection and S&T Office Products had 3,111 recycled products available in FY03, up from 3,024 products in FY02. Total sales of recycled products through June 2003 was $2,597,790 (of this total, OSC sales were $2,232,965, S&T Office Products sales were $364,825). This is down from FY02 sales figures by $258,332, but overall sales were down $477,825 in FY03

Material Management Division's OSC has 19 recycled dated products (At-A Glance) available. The products are advertised on the web site and a special spring flyer is distributed with a recycle logo identifying these recycled products containing 30 percent post-consumer waste. Also, all 35 At-A-Glance products that are offered through OSC are printed with 100 percent soy-based inks and packaged in cartons containing recycled content. These dated products can be purchased by placing a web order, or can be purchased by printing an easy-to-use web site form and faxing this form to OSC.

OSC stocks 36 recycled papers including eight white papers in various sizes and various post-consumer waste contents. In FY03, sales from these white papers were $1,332,442. One of these white papers contains 100 percent post-consumer content, is processed chlorine-free, is acid-free for a long bright life, and has outstanding opacity for two-sided copying. This product exceeds all state and federal requirements for recycled content. Because of the higher cost of this product, OSC subsidizes the price to its customers by charging a smaller markup to cost. This allows the environmentally friendly and waste-reducing paper to be competitively priced. The stocked colored papers at OSC that contain 30 percent post-consumer waste accounted for another $96,585 in sales in FY03.

OSC offers an electronic online catalog, with graphics, to reduce paper consumption by allowing customers to order online without the need to fax or mail an actual order form. A convenient, express order form allows faster order placement without the need to have a printed catalog. The goal for

FY04 is to receive at least 46 percent of the orders online and 51 percent by the end of FY05. In order to meet these goals, OSC is offering an additional one percent discount on any inventory items purchased using the web site. OSC expects this number to continue to grow as more customers realize the electronic catalog makes ordering fast and easy. By building orders online, they can be submitted quickly and easily. Since all special prices and/or discounts are automatically reflected on the online order form, all web orders are assured of getting up-to date competitive prices and information.

OSC has also added an online order form, which can be filled in by merely clicking the cursor in the appropriate area and filling in the information, moving from field to field using the tab key. The form can be e-mailed to OSC by clicking the e-mail button or printed and faxed or mailed to OSC.

The Materials Management Division's OSC changed the invoices it mails to customers from two part to one part in FY01. The invoices are printed on recycled paper and have made it easier for OSC to mail these documents to the customers in a timely manner. In addition, all newsletters and price lists are available online.

The program initiated by OSC in conjunction with S&T Office Products and General Ribbon Corporation of providing remanufactured laser toner cartridges continues. These cartridges are performance guaranteed and are put through GRC's intensive factory certification process, which ensures quality performance. Used and empty cartridges are returned to OSC, palletized, and sent back to GRC for remanufacturing.

The Materials Management Division has a contract for industrial paper with sales of approximately $2,649,406 for FY03. Of that total, 89 percent was for recycled paper towels and tissue that contain 90 to 95 percent post-consumer waste. This exceeds the federal standard of 40 percent. The Materials Management Division also has a contract for printing and business papers with FY03 sales of approximately $752,842. Of this total, 80 percent was for recycled paper. The division also has a contract for recycled continuous printer paper that had FY02 sales of approximately $91,492 for 30 percent post-consumer printer paper. This amount increased over the last fiscal year because the four largest volume corresponding products on the continuous printer paper contract were deleted. This shifted the business to the recycled paper contract where prices are lower. The Materials Management Division buys only 100 percent post-consumer recycled paper for all of its printers and copiers, and recycles laser printer cartridges and only buys remanufactured printer cartridges.

The Risk Management Division continues to request soy-based ink for printing orders, and recycles printer and typewriter toner cartridges. The InterTechnologies Group refills small spray bottles with glass/desk cleaner from gallon containers to avoid the use of aerosol cans, and uses recycled laser printer cartridges.

Bemidji State University – The university continues to purchase copy machine paper with at least 30 percent recycled content for use in all campus copy machines. This policy results in a somewhat higher cost ($1,500-$1,700 per year). In addition, remanufactured printing cartridges are available from office supply vendors, recycled content copy and computer printer paper are supplied through Central Stores, and double-sided copying is encouraged throughout campus.

Earlier this year, the Telephone Services and Residential Life Offices, agreed to limit telephone directory service to the dormitory buildings to a single provider. In previous years, as many as three different vendors distribute phonebooks to each room in the dormitories. Under the new agreement, only one directory will be delivered to each room, and the vendor will be required to collect and recycle the old directories.

Department of Corrections – DOC continues to transfer more policies and documents to an online form.

> ***MCF-Faribault –*** Participates in manufacturers' reuse of toner and printer cartridges. By returning cartridges to central warehouse for shipment to manufacturer, waste is eliminated.

MCF-St. Cloud – Document Destruction recycling is used for a large proportion of the St. Cloud facilities office products. During FY03, 26,600 pounds of paper was recycled.

Office of Environmental Assistance – The OEA uses Savin IKON copier machines, which have non-removable toner cartridges that are made of high-density polyethylene plastic. The OEA switched from 30 percent post-consumer recycled copy paper processed with chlorine to 100 percent post-consumer copy paper processed without chlorine. Just over 50 percent of the supplies purchased are reusable or contain recycled content. Examples include post-it-notes, refillable pens and pencils, file folders, 3-ring binders, note pads, etc. OEA staff visits the Resource Recovery Office on a regular basis to obtain reusable office supplies that have been discarded by other agencies.

Recycled paper is used exclusively in the office, whenever it is available. Letterhead and envelopes contain 100 percent post-consumer recycled paper content. The OEA continues to use water-based correction fluid instead of solvent-based fluid. OEA computers are cleaned with pressurized carbon dioxide instead of chlorofluorocarbons. OEA audio, video, and digital tapes are reused, as well as computer discs. For all internal meetings, staff specifies and purchases lunches and break food and beverages from vendors who offer low- or no-waste packaging and reusable dishware. This reduces waste and supply costs. The OEA and MPCA cafeteria supplies compostable dishware. Compostable flatware has been difficult to get in 2002, but staff is currently working with a vendor that supplies it to get current prices. OEA uses washable linens in the kitchen and restrooms and uses Restore the Earth products in the kitchen and in a refillable spray bottle throughout the office.

Metropolitan Airports Commission – Whenever possible, products made from recycled materials are purchased and used. Laser cartridges are returned for remanufacturing. Recycled content paper is used in the copy machines and printers. Double-sided copying is required at all times. Commission and committee meeting agendas, minutes, and information packets are made available electronically for vendors, consultants, members of the public, or other interested parties who were previously mailed large numbers of paper documents.

Minnesota Pollution Control Agency – The central office uses reusable visitor badges. The many advantages to reusable badges are that they waste less paper, provide improved security, are easily distinguishable, and do not damage clothing.

In August 1999, the state's Central Stores added a 100 percent post-consumer paper product, distributed by Badger, to the state of Minnesota contract. Purchasing staff was directed to order this paper for a majority of the agency's printing needs. The paper has been working well in fax machines and photocopiers; however, there have been problems with paper jams in many laser printers. Therefore, staff has been instructed to order 50 percent post-consumer paper for laser printers that cannot accommodate the 100 percent post-consumer paper. In FY2003 10,285 reams of 50 percent recycled paper were purchased, along with 724 reams of 100 percent post-consumer paper. The MPCA purchased a total of 11,009 reams of paper in FY2003, compared to 16,985 reams in FY1995 and 13, 901 reams in FY2000.

Efforts to reuse existing supplies whenever possible continue. Each floor has a designated storage area for reusable items such as file folders, 3-ring binders, and a variety of miscellaneous office accessories. MAPS users are encouraged to purchase writing tablets that contain the highest percentage of post-consumer content material from the Central Store state contract. The MPCA/OEA recycling rate of office materials/wastes was over 75 percent.

The MPCA Alliance for Recycling and Reduction of Waste (ARROW) continues to sponsor pad-making parties with staff who volunteer to make one-sided paper pads with "experienced" paper over their lunch hours. This event is typically scheduled once a month. Each MPCA staff member receives a one-sided paper tablet courtesy of ARROW.

ARROW recently implemented a plan to encourage environmentally preferable purchasing. This initiative focuses on purchasing products that are nontoxic; water-based, have recycled or post-consumer content, and have no odors. Products that meet these criteria are placed on a list for all individuals who order office and cleaning supplies to reference when ordering. There are 67 items on the list, including Simple Green concentrated all-purpose cleaner, Nature Saver recycled paper clips, Earth Smart recycled notebooks, and many more.

North Hennepin Community College – Central Duplicating Services section provides both new and recycled office supplies to all departments on campus.

St. Cloud State University – SCSU extensively uses paper with 30 percent recycled content and 30 percent post-consumer fiber content. Office and computer paper is recycled. Recycled photocopier toner cartridges are purchased. Ink and toner cartridges are recycled. Using e-mail to post surplus supplies for use in other departments is encouraged.

Department of Transportation – Mn/DOT recycles computers, cardboard, paper, and toner. The department copies on both sides of paper whenever possible. Mn/DOT purchases printer toner with biodegradable inks; the cartridges can be recycled.

23. Oil, Oil Filters

Department of Administration – The Materials Management Division has established statewide contracts to purchase re-refined motor oil and oil change services, which include re-refined oil as a choice. Re-refined motor oil and changing services purchased through state contracts contain a minimum of 25 percent re-refined base oil, and also contain the required additives to provide optimal engine performance.

The Materials Management Division has a contract for bulk re-refined motor oil. The division, in conjunction with the Department of Transportation, also has a contract to manage used oil sorbents and filters for processing for energy recovery. The Travel Management and Plant Management Divisions' oil filters are drained for 24 hours in order to qualify as solid waste, as opposed to hazardous waste. Re-refined oil is also used for oil changes. The Travel Management Division uses a 100 percent re-refined brand of engine oil when servicing vehicles. A vendor licensed under state contract collects the used oil for recycling. The Plant Management Division participates in a used oil recycling program.

Department of Corrections

MCF-Moose Lake/Willow River – The facility shipped 55 gallons of oil for recycling during FY 2003.

MCF-Red Wing – All waste oil and oil filters are collected and recycled.

MCF-St. Cloud – All facility vehicles are serviced at local stations that recycle the oil and filters. No oil filters are disposed of in landfills, and the potential for ground contamination is eliminated.

MCF-Stillwater – Oil and oil filters are used in most of the MCF-Stillwater vehicles and machines. They are recycled for reuse when possible, and any waste is disposed of in accordance with EPA/MPCA regulations.

Iron Range Resources and Rehabilitation Agency – The IRRR collects oil and oil filters and then sends them to Como Oil of Duluth for recycling.

Metropolitan Airports Commission – The MAC fleet/vehicle maintenance shop is equipped with an oil/fluid change pit that employs a mobile collection tray to catch spent lubricants. It is pumped directly to a large storage tank with little or no chance of spilling. Oil filters are crushed on site and recycled by the same permitted vendor that removes the used oil for re-refining. Overhead service reels provide oils and grease through hoses connected to bulk storage tanks eliminating the need to pump liquids from drums into containers and then carrying them to the service bay only to be dispensed again. Spills are rare and absorbent use is minimal.

MAC also recognizes that there is a need to collect used oil from non-commercial tenants at the reliever airports. Collecting used oil from these tenants reduces the chances of possible ground water and soil contamination from the oil being improperly managed. Used oil generated at the Reliever Airports by non-commercial tenants and MAC operations is stored in tanks provided by the MAC. It is collected periodically and re-refined by a permitted vendor.

Metropolitan Council Environmental Services – Used oil and used oil filters are handled as special hazardous wastes. The used oil is collected and stored at MCES facilities and is transported by licensed haulers for burning as fuel. Used oil filters are drained and, at the larger facilities, crushed. The residual oil is collected and the crushed metal filters are eventually recycled with scrap iron and steel by a licensed hauler such as OSI Environmental, Inc. In 2002, for all facilities, 1,695 gallons of used oil were transported, a reduction of 70 percent from the previous year. Approximately 660 pounds of used oil filters were recycled, a 43 percent reduction from 2001.

Metropolitan Council Metro Transit – All used oil and oil filters are recycled. Used oil has been sold as a fuel since 1985. Used oil filters have been eliminated from the waste stream and recycled since 1993.

Metropolitan Mosquito Control District – MMCD uses re-refined oil in the district's light duty vehicles to help create a market for re-refined products. MMCD continues to follow a fleet maintenance procedure of extending the mileage between oil changes for district-owned vehicles. Currently, oil changes are every 5,000 miles for light duty vehicles, and 3,000 miles for heavy use vehicles. On an annual basis, MMCD has reduced the amount of used oil generated by its fleet by 110 gallons. In the three years that this program has been in place, MMCD has not experienced any problems with the truck fleet related to the extended mileage program. All used oil and used oil filters generated by MMCD are recovered and recycled through a recovery vendor.

Department of Military Affairs – All DMA-generated used oil is collected at larger DMA facilities and sold to licensed used oil recyclers. Used oil filters are crushed, and the collected oil is added to used oil. The filters are sold as scrap iron.

North Hennepin Community College – The college stores used oil and filters in approved containers and recycles them through a local recycling vendor.

St. Cloud State University – SCSU oil filters are drained for over 24 hours to qualify as special hazardous waste. Motor oil is collected and recycled.

Department of Transportation – Mn/DOT recycles all used oil and oil filters.

University of Minnesota – The University of Minnesota collects its used oil and oil filters for energy recovery and materials reclamation.

24. Paints, Coatings, Stripping

Department of Administration – The Materials Management Division specifies no-lead paint for traffic marking and equipment paint. The Materials Management Division has added reprocessed and reblended latex paint to the contract for indoor painting. The Materials Management Division worked with the Plant Management Division to expand the use of reprocessed and reblended paint throughout the capital complex.

The Plant Management Division makes solvent-free paint available to state agencies and political subdivisions through its state contract, and tests the use of latex-based duct sealant compounds. The Plant Management Division uses nut chips with shot-peening equipment to remove paint and gasket materials.

Bemidji State University – BSU maintenance procedures continue to use electrostatic painting and low VOC paints whenever possible. A moratorium on the use of organic solvent-based wood sealers continues. Water-based paints and finishes are used whenever possible.

Department of Corrections

MCF-Moose Lake/Willow River – This activity continues; 165 gallons shipped during FY 2003.

MCF-St. Cloud – Painting, coating, and stripping sludge are collected/reduced properly. This practice keeps hazardous products out of the landfill and ditches.

MCF-Stillwater – Paints and coatings are used at MCF-Stillwater, but stripping is not done at this facility. The waste is disposed of in accordance with the EPA/MPCA regulations.

Metropolitan Airports Commission – The MAC Paint Department is responsible for painting/striping many acres of pavement, runways, and taxiways in addition to parking lots and roads. Annually, more than 10,000 gallons of pavement-marking paint is purchased in reusable 250-gallon totes. Once emptied, the totes are returned to the supplier for reuse, eliminating the need to manage up to 200 single-use, 55-gallon steel drums. Most interior painting and all exterior painting for buildings and pavement is done with solvent-free water-based paint. Any use of solvent-based paint is restricted to the paint booth. The paint booth uses water filtration in addition to standard paint booth filters, which actually makes the exhaust cleaner than the air taken in. Paint booth filters are managed as nonhazardous industrial waste and are burned for energy recovery. Exclusive use of high volume low pressure (HVLP) spray technology for solvent-based paints reduces overspray by 40 percent, uses less paint, and more evenly coats for a better finished product. Sandblasting has been replaced by shotblasting with a self-recycling system that filters and reuses the blasting media.

Metropolitan Council Environmental Services – The Metropolitan Wastewater Treatment Plant in St. Paul operates under many permits, including Air Emissions Permit No. 12300053-002. An air toxics review estimated that the plant's spray paint booth has the potential to emit up to 2 percent of the cumulative acute respiratory hazard index at the site. Consequently, a specific pollution prevention plan for the chemicals toluene (CASRN # 108-688-3) and xylene (CASRN # 1330-20-7) has been developed. The plan calls for baseline data development, inventory control, product substitution, and improvements in technology and equipment. A multi-disciplinary in-house team will begin implementation of the plan in the fall of 2003.

Department of Military Affairs – The ongoing P2 project will look at the paint process and the sandblasting process to determine opportunities to reduce waste generation amounts. An aerosol can puncture device has been installed in the DMA's main waste handling facility. This puncture device attaches to the larger bunghole on a 55-gallon drum; an air filtration cylinder is attached to the smaller bunghole. Cans are inverted and placed into the puncture device, the cans are then punctured and paint

and propellants are collected into the drum. Empty cans then become scrap metal. Additional puncture devices are being bought for larger DMA facilities. This eliminates disposing of aerosol cans as a hazardous waste stream.

Minnesota Pollution Control Agency – The new Brainerd office features low-VOC paint and finishes, high recycled content resilient carpeting and flooring, and recycled content or recycled Styrofoam ceiling tiles.

North Hennepin Community College – Minimal painting is done on site by in-house staff. The small quantities of paint/coatings kept on site are used for touch-ups and dried out and discarded when all of product is used up. The services of a local contractor are used for area painting.

St. Cloud State University – SCSU has converted almost all possible paint coatings to water-based products to limit volatile organic compounds.

Department of Transportation – Mn/DOT districts are using 110-gallon returnable paint totes instead of 55-gallon single-use drums, which eliminated waste 55-gallon paint drums. Mn/DOT uses lead-free latex or epoxy pavement marking/striping paint. All vehicles purchased by Mn/DOT are specified to have heavy-metal-free coatings/paints. Mn/DOT is planning to use stainless steel dump boxes and sanders to prevent future re-furbishing and sandblasting. See also category 16: *Heavy metals*.

University of Minnesota – The university's *Standards and Procedures for Construction* "recommends and supports" the use of reblended paint and has developed reblended paint specifications (http://www.facm.umn.edu/cons).

25. Parts Cleaning

Department of Administration – The Plant Management Division shares used cleaning solvent with the Travel Management Division to be reconditioned for future use. The Travel Management Division has an aqueous-based parts cleaner machine that generates no hazardous waste. The Travel Management Division has an OSHA-approved brake cleaning system to handle any possible asbestos contact or contamination.

Department of Corrections

MCF-Faribault – The maintenance department uses only biodegradable citrus degreasers.

MCF-Moose Lake/Willow River – This activity continues with 55 gallons shipped during FY 2002.

MCF-St. Cloud – The parts cleaner has been eliminated from the facility.

MCF-Stillwater – There are two types of parts cleaning operations performed at MCF-Stillwater. Paint equipment is cleaned with xylene. This is recycled in-house and the style bottoms are disposed of in accordance with the EPA/MPCA regulations. Maintenance parts cleaning is done in the various shops. The waste is fuel blended in accordance with the EPA/MPCA regulations by the state contract vendor.

Metropolitan Airports Commission – MAC continues to use recycling parts washers that employ a built-in distillation apparatus that cleans and reuses dirty solvent. The only waste is an oily by-product that tests nonhazardous and is approved for disposal under a used oil profile. Parts washer waste has been reduced from over 400 gallons annually to less than five without increasing costs.

MAC operates two spray cabinet parts washers that use a heated, water-based cleaning solution at high pressure. An auxiliary filtration system extends solution life. Spent solution is nonhazardous and is recycled. MAC's goal is to reduce and eventually eliminate the use of solvents for parts cleaning.

Metropolitan Council Environmental Services – There are over two dozen parts washers at MCES facilities and 547 gallons of solvent were recycled in 2002, an increase of 70 percent over the previous year. The solvent is petroleum-based and is serviced by Safety-Kleen, Inc. or WRR Environmental Services as a hazardous waste largely due to its low flash point. The Seneca WWTP has purchased a parts washer from Como Lube and uses a solvent from Chesterton. The solvent is not hazardous waste due to a high flash point and the parts washer uses filters to remove contaminants from the solvent. In over two years of operation, only one shipment of filters has been generated from this unit. Carburetor cleaner is no longer in widespread use due to the increase in vehicles that are now fuel injected.

Department of Military Affairs – As part of the ongoing P2 project, the P2 contractor will do a pollution prevention opportunity assessment (PPOA) of solvent distillation machines located in one of DMA's facilities. These machines are filled with a contracted service company's high flashpoint solvent. The distillers are designed to be used daily, resulting in a very clean solvent. However, recurring mechanical problems have caused the distillers to not work for very long. The PPOA will look at what is causing the problem, how much will it cost for a permanent fix to the problem, how much time and effort is being wasted on trying to work with dirty solvent, and how much would it cost to do away with the dirty solvent and replace the distillers with ultrafiltration machines. The DMA will include the trial of an aqueous parts washing water filtration system into a PPOA at one or more larger DMA facilities.

The DMA currently operates an Equipment Cleaning Facility designed to clean all weaponry used by the DMA. This includes small caliber such as the 5.56mm M-16s up to the 155mm Howitzers (long-range artillery). A combination of petroleum solvent baths and aqueous steam washers are used to clean these weapons. This process replaced the F-listed solvent rags that were previously used to clean weapons.

St. Cloud State University – SCSU has experimented with more environmentally friendly brake cleaner and parts washer fluids in the auto repair shop. The Art Department and print shop use a solvent recycling service, which provides them pollution prevention "We Care"® training.

Department of Transportation – Mn/DOT has replaced non-recyclable vehicle parts washers with aqueous-based vehicle parts washers and high flash point petroleum vehicle parts washers. The vehicle parts washers are retrofitted with filtration systems so the product can be used over and over again. These recyclable parts washers can go three to five years without a change out, compared to every two weeks to a month with the old non-recyclable parts washer.

University of Minnesota – The University of Minnesota Studio Arts department has installed a parts washer system, for paintbrush cleaning, that uses a naphtha-based proprietary solvent that is non-flammable and is perpetually cleaned by a re-circulating filter system. Filters periodically need to be disposed of but the solvent does not need to be shipped off site for recycling/disposal. This system eliminates 120 gallons of solvent waste per year.

Fleet Services has installed a parts washer system using a proprietary solvent that is non-flammable and is perpetually cleaned by a recirculating filter system. Filters periodically need to be disposed of but the solvent does not need to be shipped off site for recycling/disposal. This system eliminates 240 gallons of solvent waste per year.

University of Minnesota-Duluth Facilities Management switched from a solvent recycling service to a product (ZEP Z-143) that is non-flammable and is perpetually cleaned by a recirculating filter system.

Filters periodically need to be disposed of but the solvent does not need to be shipped off site for recycling/disposal. They have been able to eliminate 120 gallons of solvent waste per year.

26. Personal Care

Department of Human Services – St. Peter continues to use washable diapers instead of disposable diapers.

27. Pesticides, Fertilizers

Department of Administration – The Plant Management Division follows pollution prevention practices during the planting and care of landscaping by its Grounds Services staff. The Plant Management Division participates in a Public Land Task Force addressing integrated pest management practices.

In conjunction with the Department of Agriculture, the Materials Management Division has a contract for the handling of hazardous materials, pesticide packaging, transportation, and disposal. This contract primarily involves collection of waste pesticides in the rural areas of the state, but it also provides for the transportation and disposal of pesticides from household hazardous waste facilities throughout the state.

The Materials Management Division has undertaken a process change in the area of pest control services by moving to integrated pest management, to achieve long-term, environmentally sound pest suppression and prevention through the use of a wide variety of technological and management practices. The Resource Recovery Office has not needed to use pest control services at the State Recycling Center by ensuring clean facilities that do not attract vermin.

Department of Agriculture – The Agronomy /Plant Protection Division has ongoing projects that are instrumental in educating rural, suburban, and urban Minnesota in the proper best management practices of pesticide use and disposal. The ongoing empty pesticide container and pesticide waste programs within the Agronomy/Plant Protection Division have educated many rural farmers on the best use and proper disposal of pesticides.

The Sustainable Agriculture program, now in its 15th year, continues to help farmers learn alternative practices to pesticide application. A copy of this year's *Greenbook* can be obtained from the Minnesota Department of Agriculture. The Agronomy/Plant Protection information can be obtained from the MDA's web site.

Bemidji State University – The Building and Grounds Department continued its moratorium on herbicide and fertilizer application to lawns around a single-parent family-housing dormitory.

Department of Corrections

MCF-St. Cloud – Only trained personnel apply pesticides and fertilizers. Trained personnel use less of the product, which also minimizes soil/water contamination.

MCF-Stillwater – Pesticides and fertilizers are used on the grounds and lawn. They are applied under supervision of licensed employees.

Department of Human Services – St. Peter continues to use half of the manufacturer's recommended amount of pesticides and fertilizers on its campus.

Metropolitan Mosquito Control District – For the control of mosquitoes and black flies, MMCD is committed to using pesticides that have the highest safety characteristics for district employees, have

low environmental impact, and show selectivity for target species. Evaluation of control materials has shown that the pesticides selected by MMCD for use in controlling pest insects do not display any hazardous characteristics regarding employee safety and environmental impact. The materials used by MMCD to control larval mosquitoes in wetland areas and black fly larvae in the rivers and streams are safe enough to be used in fish bearing waters. Additionally MMCD employees must go through several training sessions that focus on the proper use, transport, and handling of all the pesticides used by MMCD. Employees who use materials for the control of adult mosquitoes must attend training sessions given by the Minnesota Department of Agriculture, they must also pass an exam and be licensed in order to use these control materials.

By selecting control materials that rate high in environmental compatibility, MMCD has reduced the risk of environmental pollution and has eliminated significant costs associated with storing, transporting, and disposing of materials as hazardous wastes.

Department of Military Affairs – A new pesticide management plan has been put in place. Pesticides and fertilizers are now purchased as needed and if not completely used, are stored and used up prior to the purchase of any additional products.

North Hennepin Community College – All herbicides, pesticides, and fertilizers for pest and weed control and lawn fertilizing are applied by licensed private contractors.

St. Cloud State University – At SCSU, we try to use the minimum levels of pesticides and fertilizers necessary to maintain attractive grounds. Application staff is trained to properly and safely use these products. Special emphasis is given to proper mixing quantities and cleanup in the event of an accidental spill.

Department of Transportation – MnDOT has developed specifications on the use of natural base fertilizers, low-content phosphate fertilizers, and slow release and water insoluble forms of nitrogen. The metro district recommendation includes options for zero chloride-based forms of fertilizer. Several new herbicides have been tested against wild parsnip and Grecian foxglove. Both these plants have the potential to harm employees and the public.

University of Minnesota – The University of Minnesota is a world leader in agriculture research and education that includes extensive efforts in the development of and safe and environment-friendly use of pesticides and fertilizers. Special areas of expertise are integrated pest management (http://www.ipmworld.umn.edu), sustainable agriculture (http://www.misa.umn.edu) and precision agriculture (http://precision.agri.umn.edu/index.htm).

The Elwell Agroecology Farm (http://swroc.coafes.umn.edu/eaf.html) is a 160-acre parcel in Lamberton Township, Minnesota that has a 30+ year history of minimal pesticide and fertilizer application, and limited tile drainage. These characteristics present researchers with unique opportunities for developing cropping systems studies, as well as studies on fertility, water quality, low input and organic input, management and tile drainage—all in close proximity to the University of Minnesota's Southwest Research and Outreach Center.

Agroecology is the study of relationships between organisms (including humans) and their environment, involving landscapes that are defined by a significant presence of agricultural activity. The main distinctions of agroecosystems, compared to natural ecosystems, are deliberate human intervention to modify the spatial and temporal species composition, altered energy and resource dynamics, and greater levels of disturbance. Agricultural ecosystems are defined by environmental, biological, and sociological factors and can be described using properties such as productivity, stability, sustainability, and equity.

The management of the Elwell Agroecology Farm (EAF), will emphasize a team-based planning process that includes researchers, farmers, SWROC staff, extension faculty, and others interested in

agriculture. Research and education activities will foster an environment that respects and rewards individuals and teams, and enhances the communities in which people live. Efforts will be made to develop an ongoing research and educational environment that has opportunities for people with diverse interests to participate. Current and future research projects conducted on the EAF emphasize the development of cropping systems that efficiently cycle water, nutrients, and energy, while at the same time enhancing profitability. Multi-disciplinary approaches to research and educational activities will be encouraged, and projects will be designed to further our understanding of systems properties and processes.

Current studies at EAF include:

- There are two on-going, long-term cropping systems research studies on the EAF. The Variable Input Crop Management Systems (VICMS) study was established in 1989 to evaluate the productivity and profitability of a corn-soybean rotation, as well as a corn-soybean-oat-alfalfa rotation under different management systems including high purchased chemical inputs, low purchased chemical inputs, organic inputs, and minimum inputs. Native prairie strips were also established in conjunction with the minimum input plots in order to compare changes in soil conditions in the other management systems with these two conditions. A companion study, located on the SWROC, evaluates the same systems but from an initially high fertility status.
- The Organic Rotation Plots (ORP) were established in 1990 to study the effect of both fertility and crop rotation on corn production under organic management. Composted turkey manure is used to supply nutrients, and weeds are controlled mechanically. The four crop rotations evaluated are continuous corn, corn-soybean, corn-soybean-oats, and corn-soybean-oats/alfalfa-alfalfa. Unfertilized companion plots are maintained in order to allow comparisons of crop yields and soil conditions resulting from both the manure applications as well as the different crop rotations.
- In 1994, a study was established in a poorly drained soil on the eastern portion of the EAF to evaluate the quantity and quality of water entering surface tile inlets and subsurface tile drains. Sediment, nitrogen, and phosphorus contents are monitored in tile drained water from treatments that compare moldboard plowing vs. ridge-tilling, and synthetic vs. organic forms of fertilizer. The information gained from this study will aid our understanding of surface and subsurface tile drainage effects on crop production and water quality in the Minnesota River watershed. Approximately one-third of the EAF acreage is not currently in research plots. This acreage is being preserved under previous minimal input management for future research.

The university's College of Agriculture, Food and Environmental Sciences (http://www.coafes.umn.edu), Extension Services (http://www.extension.umn.edu), and Biosystems and Agricultural Engineering (http://www.bae.umn.edu) are major providers of training, research, and outreach services to Minnesota and the world in the area of safe and environment-friendly use of pesticides and fertilizers and other sustainable agriculture practices.

The university's Precision Agriculture Center (http://precision.agri.umn.edu/index.htm) in St. Paul was the first of its kind when it was founded in 1995. The new agriculture was born in Minnesota more than 20 years ago when Control Data and other companies began developing the technology. In 1993, tech-savvy farmers in the Red River Valley were among the first to use what's called precision agriculture. The goal of precision agriculture is to help farmers gain more value per acre while leaving a lighter footprint on the earth.

A combine rolled over a dying patch of Canada thistle, the purple-flowered weed that farmers fight. Reaching to his right, the farmer tapped a button on a small computer linking him to the global positioning system. That tap recorded the precise location of the thistle patch in his Red River Valley navy bean field. Next spring, he'll use that information when his computer-generated maps guide him in spraying herbicide. For six years, the farmer has been using GPS to map patterns of crabgrass, wild oats, or the fast-spreading thistle. That's just one of the ways this Minnesota farmer is using technology to increase profits while reducing chemicals that can leach into the environment.

Scientists at the University of Minnesota are at the forefront of a new era in farming that is changing the way the world grows food. For centuries farmers used a pinch of soil, a keen eye, and their memory of the land. Today's farmers are turning to lasers, digital technology, and satellite images to better manage crops. A growing number of farmers are treating yards of earth individually to grow healthier plants, rather than using the traditional one-size-fits-all approach to their fields. Better management of information is helping farmers decide on the best possible use of their land as well as on seed varieties, drainage, fertilizer, fungicides, and insect control. There's no quick payback for much of this technology, which requires a few seasons before the farmer builds a reliable base of information. And for some farmers, it wouldn't pay. If, for example, a field is fairly uniform with no variability in nutrient conditions, there's no need to vary rates of fertilizer application. But for Red River Valley farmer Gary Wagner, the high-tech field practices are paying off big time. He figures that in two recent years, he applied $54,000 less in pesticide on 6,000 acres that he and his two brothers farm. The farm saves money and less pesticide is released to the environment.

28. Policy Statement

Department of Agriculture – In compliance with Executive Order 99-4, pollution prevention is a priority for the Minnesota Department of Agriculture. The department's objective is to undertake activities to reduce the generation of hazardous waste and use of toxic solvents and pesticides. The primary goal is to prevent pollution at its source and to reduce waste and emissions that can have an adverse impact on the environment.

Department of Commerce – The department considers protection of the environment to be a high priority. We provide leadership in developing, advocating, and implementing equitable, cost-effective policies regarding departmental agendas. We are committed to lead, by example, through the reduction of energy use, the use of toxic pollutants, and the generation of hazardous waste in our own department.

Department of Corrections

MCF-Faribault – A new facility recycling instruction was drafted and will be published in 2003.

MCF-St. Cloud – Has updated the Hazardous Waste Control and Pollution Prevention Plan Operating Guideline. This helps to make facility employees aware of environmental concerns and proper controls.

MCF-Stillwater – Is in the process of updating the Hazardous Waste Contingency plan to improve response to any environmental incidents.

Office of Environmental Assistance – Pollution prevention means eliminating or reducing pollution at its source. This includes using raw materials and other resources more efficiently, substituting benign substances for hazardous ones, and producing products without toxic constituents. Pollution prevention helps to protect human health, strengthen our economy, and preserve our environment.

The OEA gives priority consideration to pollution prevention in its programs and activities as required by Governor's Executive Order 91-17. The OEA is committed to excellence and leadership in preventing waste and pollution and strives to be a model for other agencies and organizations. We believe that pollution prevention in our workplace will lead to healthier and more efficient employees, saving of public funds, and less waste introduced into the environment.

The OEA stresses prevention as the preferred approach for environmental protection in its policy-making activities. In reports, testimony, and strategic planning, the OEA staff will promote pollution prevention as the top of the environmental protection hierarchy.

Each member of the OEA staff is responsible for preventing pollution by reducing their own waste generation at work. Specifically, staff are directed to give consideration and preference to pollution prevention options when purchasing supplies and equipment, traveling to meetings, using equipment in the office, photocopying documents, and in ordering office furniture. The OEA will demonstrate cost-effective alternatives that reduce all environmental impacts in its office and lease agreements. It will also work cooperatively with other tenants to promote the prevention approach building-wide.

The OEA builds partnerships with all stakeholders to promote the preventive approach to environmental protection. These stakeholders include other state agencies, local governments, businesses and business groups, schools and higher educational institutions, financial and economic development institutions, nonprofit organizations, and citizens.

In order to pursue and monitor this pollution prevention policy and as part of the OEA's participation in Minnesota Waste Wise, a coordinating team with representatives from each unit is established that will meet regularly to discuss and stimulate the increased implementation of pollution prevention activities at the OEA. This team will measure the effectiveness of its efforts and will meet with the OEA director at least quarterly for updates about the OEA's progress.

Metropolitan Airports Commission – The Metropolitan Airports Commission recognizes pollution prevention as an integral part of its services. The MAC's strategic plan reflects its commitment to environmental protection. The MAC is committed to providing excellence and leadership in protection of the environment. In keeping with this position, our objective is to reduce waste and emissions. The MAC strives to establish environmentally friendly strategies that lessen adverse environmental impacts on the natural environment and the surrounding communities. We encourage our tenants to do the same. The MAC promotes taking a proactive approach to environmental protection and supports cooperation with other regulatory agencies. The MAC is aware that meeting this commitment will require the cooperative efforts of its entire staff and tenants. (See also Part 2: *Policy/Regulatory Activities*.)

Metropolitan Council Environmental Services – Section 1-2a, *Environmental Sustainability*, of the Metropolitan Council's Administrative Policies and Procedures contains a subsection with policies that are consistent with the Governor's Executive Order 99-4.

Department of Military Affairs – The Department of Military Affairs is committed to actively protecting the environment. We intend to accomplish the following:

- provide a clean and safe environment in our community
- ensure a safe and healthy workplace for our staff
- comply with all applicable laws and regulations
- efficiently accomplish our mission
- reduce waste management costs
- reduce future liability for waste disposal

To accomplish these objectives, we will implement programs for reducing or eliminating generation of waste through source reduction and other pollution prevention methodologies. The Department of Military Affairs is committed to reducing its production of waste by weight and toxicity. Priority is given to source reduction. Where source reduction is not feasible, other pollution prevention methods such as recycling will be implemented. The wastes that are produced will be converted to useful products or used beneficially, when possible. Remaining wastes for which no pollution prevention option is warranted will be effectively treated (to decrease volume or toxicity) and responsibly managed.

A two-year P2 project has been started that will focus on equipment maintenance activities at a variety of DMA facilities. Pollution Prevention Opportunity Assessments will be implemented that will look at procedural practices, choice of products, types of equipment, and other similar issues. Based on these assessments, an overall P2 plan will be developed that will be implemented DMA facility wide.

The Minnesota Army National Guard believes strongly that it is important to continue our proactive approach in keeping with the Army National Guard Environmental Vision: *The Army National Guard is committed to promoting military readiness, national stability, and environmental stewardship. Our vision is to lead the way in protecting and enhancing our resources while maintaining the highest degree of military readiness.*

North Hennepin Community College – North Hennepin Community College strives to do its part in protecting the environment through conscientious use of supplies, materials, and equipment. NHCC recycles and reuses whenever possible, in order to make full use of the valuable resources that went into making these products.

St. Cloud State University – The leadership of St. Cloud State University recognizes the strong environmental impact it has and is therefore committed to developing the means to reduce its use of toxic materials, release of toxic pollutants, and generation of hazardous wastes. The university strives to reduce, and, where possible, eliminate toxic materials, damage, and waste, while realizing that there are limits to its ability to move toward that goal. Maximum results will be achieved through the education of its employees and clientele, continued investigation and implementation of environmentally friendly substitute products, and dedication to its recycling program.

Department of Transportation – See Part 2: *Policy and Regulatory Activities*.

University of Minnesota – See Part 2: *Policy and Regulatory Activities*.

29. Printing

Department of Administration – The Materials Management Division continues to require post-consumer recycled paper content on all printed material paper to be at least 30 percent. In addition, the Materials Management Division includes the following statement in all solicitations for printing:

> ***Environmental Health and Safety Requirements:***
> *By responding to this solicitation, the vendor certifies that it is in compliance with applicable state and federal laws related to environmental health and safety. If you have any questions, you should contact the Minnesota Technical Assistance Program (651-627-1910 or 800-247-0015). They can also provide a compliance checklist that outlines federal, state, and local environmental regulations affecting printers in Minnesota.*

MMD requires soy-based or other agra-based inks as the standard on all printing orders or contracts. Resource Recovery Office promotes the use of environmental standards such as those used by print shops that are designated to be Great Printers.

Department of Commerce – Printer and copy paper used by the department contains 30 percent post-consumer content by fiber weight. In FY02, the department used about 4.2 million sheets of paper. Efforts will continue to be made in the next year to encourage responsible printing practices and double-sided photocopying.

Office of Environmental Assistance – As part of its internal practices, the OEA uses recycled uncoated paper containing at least 20 percent and usually 100 percent post-consumer fiber. Whenever

possible, the OEA chooses paper stock manufactured using no chlorine or chlorine derivatives and specifies soy-based ink for all printing jobs.

Minnesota Pollution Control Agency – MPCA support staff print business cards on color printers or standard laser printers with black ink versus buying a box of 500 cards from the state contract vendor each time a staff person changes their position or job title. This option reduces the use of paper and saves the agency a significant amount of money.

The agency's Canon photocopiers continue to be serviceable. Since the Canon machines have been networked to the PCs of key users, savings have resulted from lower overage charges and reducing the amount of paper we use by forwarding print jobs directly to the copier. This new technology saves paper through two-sided printing and fewer jam occurrences.

North Hennepin Community College – While some of our copying is performed on departmental photo copy machines with recycling bins located nearby for disposal of copy errors, NHCC's duplicating section runs off most of the tests, quizzes, handouts, etc. needed on campus, using larger photocopying machines that are more cost efficient. Whenever possible, copying error sheets are recycled as note pads. Large printing jobs are sent off-site to commercial vendors.

St. Cloud State University – SCSU exceeds all requirements for use of soy-based inks in materials that are printed either in its campus print shop or those which are processed by a private company. Recycled paper products are used in the majority of all printing requests. We also recycle books, directories, and newsprint.

Department of Transportation – The Mn/DOT sign shop is using lead-free ink and nonhazardous screen wash. The sign shop also uses recycled signs.

University of Minnesota – Printing Services is a member of Minnesota Waste Wise. Printing Services recycles, reclaims, and reuses production materials throughout the printing process. Two initiatives have made Printing Services a greener operation. A direct-to-plate process was installed in spring 2001. It eliminates film and all the chemicals involved in the developing process. They continue to use some film, but where they formerly used up to 24 rolls a month they will now use 1 roll. On-demand printing is an initiative that allows and encourages departments to have materials scanned and stored electronically. Materials are then printed as needed. This process eliminates waste, saves money, and allows for flexibility in updating materials frequently. Several university departments, including the University of Minnesota Extension Service and Distance Learning use this process. The following initiatives have made Printing Services more environmentally responsible:

- Installed an X Rite silver recovery machine that recovers silver from photo fixer. The department recovers 28 pounds of silver annually.
- Installed a Devek system that allows recycling and reuse of developer in their film processing. The developer can be used four times instead of once as in the past.
- Migrated some presswork to Xerox machines. Use of the toner process eliminates ink and press-wash wastes.
- Metal press plates are collected and sold for scrap.
- Wood pallets are sent back to paper companies for reuse.
- Paper and cardboard are collected and recycled throughout operations.
- Recycled paper options and soy inks are made available to customers.

The university continues to replace its administrative paper systems with electronic reports, forms, and communications. Several million sheets of paper have been saved so far through these efforts.

30. Procurement

Department of Administration – The Materials Management Division (MMD) has undertaken a comprehensive effort to increase purchases of environmentally responsible products without resorting to mandates. A key strategy was development of a close working partnership with the Minnesota Office of Environmental Assistance (OEA). Our goal was to increase awareness of the need for environmentally preferable purchasing throughout state government and to educate purchasers to make green procurement a smart and easy choice from a "best value" perspective.

The Materials Management Division has been very proactive in its efforts to identify and obtain environmentally preferable goods and services that result in less waste, less pollution, and that operate more energy efficiently, reducing the demand on other pollution producing sources. The division has numerous contracts to encourage sustainability in state government daily activities. These contracts include hazardous waste management, pesticide collection, hazardous spill emergency response, used oil sorbent and filter management, fluorescent and HID lamp recycling, and waste paper sales.

The Materials Management Division implemented a modification to the Minnesota Accounting and Procurement System (MAPS) to require the buyer to code each purchase order line with the environmental code. This is a required field and can be used to generate reports that capture the types of environmental purchases made by the state. This will allow MMD to more effectively track environmental purchases made by the state. MMD with the Environmentally Responsible Work Group developed environmental definitions to code all items on purchase orders and contracts. The MMD contract solicitation documents require responding vendors to code the goods and service offered with the state's environmental codes. The codes are required when the state's buyer completes an order in MAPS. MMD has modified the contract release document used to announce state contracts to agencies and CPV members. The contract release now shows the environmental code for each item.

All Materials Management Division bid documents now require vendors to indicate whether their products contain mercury. This information will allow us to work with customer agencies and ascertain whether future specifications should require mercury-free products or award preferences based on mercury content. Any mercury content can then be shown on the contract release document, allowing the buyer to choose the most environmentally friendly product.

Through the information gained from the requirement for environmental codes, the Materials Management Division is gaining valuable information on the marketplace. This information can be used to structure future specifications so contracts will have goods and services that are more environmentally preferable. The Materials Management Division has developed environmentally preferable goods and services contracts estimated in excess of $145 million per year. The list of contracts can be viewed at http://www.mmd.admin.state.mn.us/pdf/environ.pdf. MMD works continually with state agencies and outside environmental groups to discover mutually satisfactory solutions to increase environmentally responsible purchasing. Our newest strategy is to allow agencies, vendors, and environmental advocates to review statewide contracts and make recommendations on more environmentally responsible products or services to be added or substituted. Contracts up for rebid or extension are publicized online to encourage input.

MMD has proactively developed statewide contracts in concert with a knowledgeable user committee to perform environmental services— including hazardous waste recycling and disposal—for the state and other governmental agencies. The committee has, for example, assisted with audits of end sites and transporters to reduce potential superfund liability. Last year, we developed a contract for the hazardous waste recycling of excess computers and electronic equipment. Meanwhile, we are also analyzing options that would place a greater responsibility for take-back and recycling on the manufacturers.

MMD also recently developed a more flexible approach to an existing legislative mandate. State statutes allow a price preference of up to ten percent for goods containing recycled content. Effective last year, we awarded a one percent preference for each ten percent of recycled content documented by the manufacturer. For example, a product containing 40 percent recycled content receives a four percent bid preference over a product with no recycled content. The Resource Recovery Office provides technical assistance regarding environmental purchasing.

Automobiles. The Materials Management Division plans to phase out the purchase of vehicles manufactured with components containing mercury. The solicitation issued in 2003 will require vehicles to be free of headlamps and convenience lighting switches containing mercury. MMD requires complete and accurate data about components containing mercury in all responses to solicitations for vehicles. The resulting contract release indicates the vehicles that contain mercury so that buyers can make informed decisions when purchasing their vehicles.

Carpet and vinyl flooring. The Materials Management Division, in conjunction with the Office of Environmental Assistance, has developed a contract for carpet and vinyl flooring with products containing post-consumer recycled content. The contractor is directed to not dispose of removed carpet and vinyl in landfills or by incineration. Contractors have been strongly encouraged to recycle all carpet and vinyl flooring removed from agency locations.

Furniture. The Materials Management Division developed furniture contracts featuring only those items having a longer useful life. Increasing the life cycle of items reduces solid waste. The Materials Management Division developed new specifications for the seating contract that requires contract vendors to offer fabric made from recycled product. The division has contracts for remanufactured Herman Miller and Steelcase system furniture that allows state agencies and Cooperative Purchasing Venture members to purchase refurbished products rather than new product. This allows the reuse of furniture parts. This contract requires remanufacture to meet BPIA standards for office furniture recycling (Feb. 94) and allows trade-ins of Herman Miller and Steelcase system products. The Materials Management Division has created contracts with MINNCOR for furniture refinishing, reupholstery, and refurnishing.

The Materials Management Division's systems furniture contract with MINNCOR has refurbished furniture The Materials Management Division has established contracts to clean and repair existing furniture, allowing items to stay in service longer. In addition, the cleaning products used are environmentally friendly. The Materials Management Division, through the Furniture Users Group, acts as a clearinghouse for systems furniture, notifying members of the availability of used systems furniture that other agencies may need for used systems furniture. This facilitation leads to increased reuse of on-hand furniture, reducing waste. The Materials Management Division has specified in the General and Ergonomic furniture seating contract for the products on contract to be recyclable, for the vendor to accept product stewardship, and that the products are able to be remanufactured.

Computers. The Materials Management Division is working with other states that are members of the Western States Contracting Alliance to develop a Request for Proposal for computer hardware, software, and maintenance that will take into consideration environmental issues such as energy efficiency and equipment disposal. The Materials Management Division, in conjunction with other agencies and Cooperative Purchasing Venture members, has established a statewide computer/electronics recycling disposal contract with Asset Recovery Corporation of St. Paul. The contract is "Hazardous Materials: Computers/Electronics: Recycling and Waste Management," contract release number H-90 (5), contract number 426359.

This contract is available to all state agencies and CPV members. Materials can be dropped off at Asset Recovery, or Asset Recovery can pick up the materials from customers. Asset Recovery can also assist with special event collections, etc. In the first year of the contract, approximately $250,000 was paid to Asset Recovery to recycle computer/electronic waste.

Department of Agriculture – MDA uses 20-liter nowpack containers for methylene chloride within the laboratory, which has helped in the reduction of glass waste and the release of hazardous fumes into the laboratory. Whenever possible, vendors are requested to remove or eliminate excessive shipping materials when deliveries are made. This will help in reducing the amount of waste material place in local landfills.

Bemidji State University – BSU continues to support and encourage campus departments to incorporate waste reduction and pollution prevention into their daily operations. The Purchasing Office holds office supply vendor fairs for university departments each year. The events provide an opportunity to make contacts and establish relationships with office supply vendors. Vendors who specialize in remanufactured toner cartridges are invited, and several departments on campus use their products. All used toner cartridges are either returned to the vendor or picked up by a vendor who remanufactures toner cartridges.

Department of Corrections – *MCF-St. Cloud* – The facility follows Minnesota Statutes §§ 16B.121 and 16B.122, along with Minnesota Executive Order 99-4 requirements. Elimination/reduction of waste stream through identifying and reusing recycled products.

Office of Environmental Assistance – OEA's outreach efforts include:

- participated on a Stakeholder Work Group headed up by Scot Case at the Center for a New American Dream to develop an environmental standard for industrial and institutional cleaners.
- partnered with MINNCOR Industries to create a cleaning product line that is more environmentally preferable, less toxic and as effective as less preferable formulations.
- co-sponsored a Sustainable Products Training in Minnesota, which was held by Market Transformation to Sustainability, and also helped to develop its content and organize speakers.
- revised the Environmentally Preferable Purchasing Guide (www.swmcb.org/EPPG/) in conjunction with the Metropolitan Area Solid Waste Management Coordinating Board (SWMCB) and the Department of Administration. The EPPG was developed to provide information to public entities on environmentally preferable products and how they can be purchased.
- attended nearly a dozen other procurement workshops/conferences throughout the year to promote "green" purchasing at the state and local level.
- served as a technical advisory member for San Francisco's Environmentally Preferable Purchasing Program
- switched out more hazardous general purpose petrol based cleaning products for more preferable less hazardous, bio-based products.
- continues to facilitate the Midwestern Working Group on Carpet Recycling in developing a national purchasing specification for recycled carpet.

Since the creation of its market development program, the OEA has promoted buying recycled products as a means of supporting the recycling infrastructure. Over the years, OEA staff has held "Buy Recycled" trade shows and conferences, developed fact sheets, trained state purchasers about recycled content products, and much more. The OEA strives to purchase environmental products whenever possible. The MPCA and OEA have native landscaping that requires less water and pesticide application.

The OEA's expanded procurement focus continues to include products and services that have a lesser or reduced impact on human health and the environment, such as toxicity reduction, durability, recyclability, energy efficiency, etc. This is referred to as environmental preferable purchasing. The

OEA is working with the Department of Administration to promote environmental purchases and building practices in state-leased buildings.

The OEA tracks purchases of E85 fuel used in the two flexible fuel vehicles that are assigned to the office. OEA is working closely with the Department of Administration's acquisition specialists to incorporate environmental specifications into several state purchasing contracts. Together, the two agencies have accomplished the following things:

- incorporated the Stakeholder Work Group standard into the 2003 state contract for Cleaning Supplies and Floor Care Products.
- established the first state contract for recycled latex paint in July 2000.
- established a state contract for flooring in June 2000, which included several environmental specifications. The solicitation set air quality standards for carpet, required vendors to recycle old carpet, and encouraged vendors to bid carpet, tile, and rubber flooring made with recycled materials.
- added a less toxic cleaner to the Central Stores catalog.
- have added a mercury component disclosure and phase-out requirements in the 2002 motor vehicle request for bids (RFB), in partnership with MPCA and INFORM, Inc. The RFB, issued in October 2001, includes a disclosure requirement and statement of intent to purchase only mercury-free vehicles starting in the next two to three years.

The OEA promotes environmentally preferable contracts to state agencies and local political subdivisions. The OEA has made procurement information available via its web site and links to the Department of Administration's site. When appropriate, the OEA documents and shares its results with other states as well as Minnesota businesses, schools, and general consumers. The OEA is also working with the Department of Administration to encourage the use of reusable crates, rather than disposable boxes, when state agencies contract with professional movers.

The OEA is working with architects to encourage the use of resource efficient materials and practices in new state buildings under construction. Minnesota loses 27,000 acres of farm, forest, and open space land every year to new development. In the United States, we generate an estimated 2.8 pounds of building-related construction and demolition debris per person per day. Globally, building construction consumes 25 percent of virgin wood used each year. Therefore, the OEA has focused on establishing a "green building" program in Minnesota to reduce the loss of Minnesota's natural and reusable resources.

Green building design, construction, and deconstruction can have a substantial impact on removing reusable, recyclable, and toxic materials from the construction and demolition waste stream. Green building practices also achieve reduced greenhouse gas emissions, resource and energy conservation, market development of recycled-content products, and an overall more sustainable approach to our structures and their operations. To help communities find creative environmental solutions that are economically viable and meet social needs, the OEA has created a wealth of Minnesota-specific information to guide green building efforts. The OEA defines a green building as one that is healthy and comfortable for its occupants and is economical to operate. It conserves resources (including energy, water, raw materials, and land) and minimizes the generation of toxic materials and waste in its design, construction, landscaping, and operation. A green building also considers historic preservation and access to public infrastructure systems, as well as the entire life cycle of the building and its components.

In 2003, the OEA and MPCA signed a 10-year lease that incorporates the new State of Minnesota Sustainable Building Guidelines and many specific sustainable remodeling, maintenance, and operations practices. It contains the requirement for a commercial energy audit of the building and the implementation of cost-effective recommendations derived from the audit. OEA contributed to

development and implementation of the Sustainable Building Guidelines, which are mandatory beginning with the 2004 bonding cycle.

The OEA continues to help to promote environmentally preferable chemicals via the Internet. The web site address for the Carbohydrate Economy Clearinghouse is http://www.carbohydrateeconomy.org. OEA's web site has been expanded to include information to help local purchasers buy recycled products, and OEA, along with the metropolitan counties, provides the Environmentally Preferable Purchasing Guide, a resource for state, local, and school purchasers to help them identify a variety of environmental products.

Pressure-treated wood. Plastic lumber, wood-plastic composite lumber, and nylon board products all have the potential of replacing pressure-treated wood products and often do. Minnesota is second only to Ohio regarding the number of plastic lumber manufacturers in the state. In addition, most of these companies use large amounts of post-consumer high-density polyethylene in their product. Minnesota is also home to one of the only companies in the world using old carpet to produce a nylon board product. The OEA continued its efforts to support the market development of plastic lumber, wood-plastic composite lumber, and nylon board products in 2002.

Iron Range Resources and Rehabilitation Agency – Purchasing/Accounting staff obtains agency office supplies from Central Stores. The agency staff typically uses Great White multi-purpose paper (which is 30 percent total recovered fiber), for the copiers, printers, and fax machines at all of its facilities. Waste office paper and newsprint is transported to Northern Minnesota Recycling of Virginia for processing. When the procurement staff issues printed literature solicitations, they require bidders to use paper containing at least 10 percent post-consumer material by weight. Printing contractors are required to use soy-based or other agra-based ink.

Metropolitan Airports Commission – Environmental implications are considered when procuring goods and materials for the airports. MSDSs are reviewed; durability, reuseability, and disposal costs, etc. are evaluated in addition to following policies and procedures. (See Part 2: *Policy and Regulatory Activities.*)

Metropolitan Mosquito Control District – MMCD continues to review new materials and products intended for use by MMCD staff for safety and environmental hazards, prior to purchase. If a material or product is found to have characteristics that pose safety concerns for employees or potential environmental hazards, MMCD will attempt to find a replacement material or product that does not pose a safety concern for MMCD staff or display any environmental hazards. MMCD also works with primary vendors to reduce the amount of packaging used to ship products and to use recycled materials for packaging whenever possible.

Department of Military Affairs – The P2 study is looking at opportunities to adopt better procurement practices that will eliminate or greatly reduce the purchase of excess product.

Minnesota Pollution Control Agency – During the past year, the MPCA has taken steps to reduce emissions and improve the environmental performance of its fleet of 140 vehicles. This includes developing a procurement policy giving preference to flexible fuel vehicles (FFVs). The current fleet of 131 vehicles includes 54 flex-fuel and two alternative technology vehicles. The alternative fuel vehicles are a 70-MPG Honda Insight and a Toyota Prius, rated at about 50 MPG.

The agency is instructing staff to use cleaner-burning 85 percent ethanol fuel in FFVs when feasible. The agency added two high-efficient, low-emitting hybrid gas/electric vehicles to the fleet in September. MPCA has tested alternative-fuel vehicles for possible addition to the fleet including a natural gas-powered Honda Civic and a propane-powered Ford F150 truck. The agency is working on policies and practices to purchase the most fuel-efficient, least polluting vehicle that meets needs and to keep vehicles well-maintained and using cleaner fuels.

Minnesota West Community and Technical College – The goals of the college are to continue improvement of our processes for purchasing, storing, using, and disposing of hazardous products.

North Hennepin Community College – A variety of aspects are considered when making purchasing decisions here on campus: life expectancy of the product, shelf life for chemicals, number of uses it can be put to, toxicity of chemical used in an expendable product, versatility of the product, and any special disposal requirement.

St. Cloud State University – SCSU uses toilet paper and towels of 100 percent total recycled fiber content and 40+ percent post consumer fiber content.

Department of Transportation – Mn/DOT is continually in the process of eliminating and/or reducing waste streams and finding new products and technologies that reduce toxicity and conserve the environment. Mn/DOT uses purchasing preferences for recycled content.

University of Minnesota – University Stores sells copy paper to the university departments. The pattern of paper sales by type for FY 2003:

Total	408,000 Reams
30% post-consumer	246,000 Reams
100% post-consumer	12,000 Reams

The University of Minnesota Facilities Management has developed revised construction standards, which include Sustainable Design Requirements and other concepts from the Minnesota Sustainable Design Guide (http://www.develop.csbr.umn.edu/msdg2/). The university's current Standards and Procedures for Construction address Energy Conservation Elements:

1) **Design objectives**
   a. Architects, Engineers, and other Design Consultants shall design energy efficient buildings in compliance with the latest version of ASHRAE 90.1 that provide the environment required by our teaching and research faculties to carry out their work in an effective manner.
   b. The A/E shall utilize the XCEL Energy Assets Custom Energy Assistance Program to assist in its efforts to design an energy efficient project. These services consist of modeling the projected energy use of proposed designs, suggesting strategies to reduce the projected energy use, and projecting the construction costs and energy savings associated with the suggested strategies. Review the suggested, project specific energy conservation strategies with the Facilities Management Energy Conservation Group.
   c. The XCEL Energy Assets Custom Energy Assistance Program shall suggest energy efficient design strategies, which consist of state-of-the-art, proven design principles and technologies. Strategies not proven under field operation conditions are not acceptable.
   d. The responsibility for choosing and incorporating energy efficient strategies into the design remains that of the design team and the university.
   e. Include the means to measure the results of the energy efficient design strategies in all projects.
2) **Glass area.** Where glass is employed, consideration shall be given to the economic feasibility of insulating glass, reflective glass, and blinds or other shading devices.
3) **Mechanical systems.** Plumbing, heating, cooling, and ventilating systems, and control strategies shall be selected and designed to insure minimum consumption of energy, consistent with necessary environmental conditions. Consider heat recovery and recycling where economically feasible.

4) **Lighting systems.** Select and design lighting systems and controls to ensure minimum consumption of energy while providing quality illumination for the visual tasks in each room or space. Avoid general high levels of illumination except in the most critical applications. Provide specialized supplementary lighting sources at the task area in lieu of uniform high level illumination throughout. Switching or other lighting control devices shall provide for flexible levels of lighting. Minimize decorative lighting. Consider the principles of daylighting for new buildings.

5) **Evidence of compliance.** The A/E shall submit calculations and other data with the Design Development Documents to demonstrate compliance with the conservation policy and the estimated cost impact on construction and operation.

The Center for Sustainable Building Research is developing sustainable building guidelines for the State of Minnesota that will be used on all new state buildings. The guidelines are a part of the Buildings, Benchmarks & Beyond (B3) Project that also includes Project Management led by LHB Engineers and Architects, Public Building Benchmarking led by The Weidt Group, and Project Delivery Process led by the Adams Group. The guide that results from the B3 project will eventually replace the existing Minnesota Sustainable Design Guide. (www.csbr.umn.edu/B3/). The purpose of sustainable building guidelines is to encourage environmentally responsible design practices by rating facility performance in areas like energy efficiency, indoor air quality and waste management.

The system provides strategies that are organized according to six environmental topics: site, water, energy, indoor air quality, human factors, materials, and waste. The strategies are phrased to achieve a specific design solution or practice, such as "Use recycled content and building materials." To integrate environmentally responsible design easily and effectively into the building process, it became important not just to indicate what to do, but what actions to take. Within each strategy are series of actions organized by design phases and a performance indicator for scoring (see http://www.sustainabledesignguide.umn.edu).

31. Remanufactured Parts

Department of Administration – The Materials Management Division has a contract for refurbished Herman Miller system furniture that allows state agencies and Cooperative Purchasing Venture members to purchase refurbished products rather than new product. This contract requires reupholstery to meet BPIA standards for office furniture recycling (Feb. 94) and allows trade-in of Herman Miller System Products. The Materials Management Division has created contracts with MINNCOR for furniture refinishing, reupholstery, and refurnishing.

The Materials Management Division specifies remanufactured automotive products. The Materials Management Division has developed contracts for remanufactured automotive products for state agencies, which included diesel engines, transmission, alternators, and starters. The Travel Management Division uses remanufactured parts for vehicle repair whenever they are available.

The Materials Management Division, in conjunction with the InterTechnologies Group Telecommunications Division, has established a contract for Lucent equipment that offers both new and refurbished telecommunications equipment. Agencies can choose to purchase refurbished equipment.

Bemidji State University – The maintenance and purchasing departments are continuing to work together to limit the need to purchase new electric motors and plumbing and steam valves by having worn and defective units reconditioned or rebuilt for reuse.

Metropolitan Airports Commission – MAC fleet/vehicle maintenance uses remanufactured starters, alternators, water pumps, calipers, turbo chargers and injectors, and relined brake shoes. Rebuildable

cores are exchanged for the newly remanufactured parts. Other parts are sent out for rebuilding/overhaul whenever it is a suitable alternative to new parts.

Department of Military Affairs – DMA uses remanufactured parts in the maintenance of vehicles at their facilities. Whenever possible, these parts are incorporated in the purchasing process.

Minnesota Pollution Control Agency – MPCA Alliance for Recycling and Reduction of Waste (ARROW) promoted a collection program for ink jet cartridges with information provided by the Recycling Association of Minnesota. The cartridges are mailed to a recycling center in Franklin, Tennessee. One agency allotment number was established for purchasing toner cartridges for fax and laser printers. The office administrators identified three vendors that provide remanufactured cartridges and provided that information to the purchasing staff. A majority of the office machines use remanufactured cartridges; however, a few laser printers have experienced problems. The vendor provides toner cartridges for the leased photocopiers. All spent cartridges are recycled or reused.

North Hennepin Community College – All departments of this college are encouraged to return copier toner cartridges to the manufacturer for reuse. Ink cartridges from NHCC's larger machines are sent in for re-inking and reuse in the duplicating section. The purchase of paper products containing some amount of recycled material is strongly encouraged.

St. Cloud State University – SCSU uses remanufactured photocopier cartridges.

Department of Transportation – Mn/DOT purchases several remanufactured parts for vehicle parts replacements.

32. Tanks

Bemidji State University – Cathodic protection was installed on three 30,000-gallon underground heating oil tanks. The cathodic protection will prevent the steel tanks from corroding and reduce the potential for leaks. The project was completed at no cost to the university as part of a cooperative agreement between the installation contractor and the Minnesota Pollution Control Agency.

Department of Corrections

MCF-Red Wing – This facility has removed all belowground storage tanks and one aboveground tank used for heating oil. We currently have two inside storage tanks for #2 heating fuel.

MCF-Oak Park Heights – The existing 10,000 fuel oil tanks will be upgraded by having a tank monitoring system and a containment sump added. This will provide early detection if a leak in the tank would occur.

MCF-Rush City – This facility has all aboveground tanks with spill containment.

MCF-St. Cloud – A number of underground and aboveground tanks have been removed. All tanks are currently reported per MPCA requirements. This reduces the risk of an oil/fuel spill and groundwater and soil contamination.

Metropolitan Airports Commission – All existing tanks are fully compliant with 1998 federal regulations. Tank monitoring systems ensure inventory control, and regular inspections prevent problems from developing that could result in a spill or release. At MSP a new fuel island was installed for all MAC vehicles and heavy equipment. This monitoring/inventory control system can track fuel usage per vehicle mile or hour. This information is incorporated into maintenance records and often assists in determining the need for making repairs.

Minnesota West Community and Technical College – An aging fuel oil storage tank at the Canby campus has been removed from service and will be excavated and removed from the property.

Department of Military Affairs – A program has been underway to meet current storage tank standards. Tanks that are outdated or have switched fuels have been removed. The majority of facilities that were using fuel oil as their backup source of heat have been converted to propane. There have also been several projects to install curbed impermeable surfaces at facilities to reduce the impact on groundwater. About 50 underground storage tanks have been removed during the last several years.

North Hennepin Community College – There are two fuel tanks located on this campus. A 10,000-gallon underground storage tank is used for #2 fuel oil for our boiler plant, and a 250-gallon aboveground tank is used for diesel fuel for the college's lawn equipment. The monitoring and secondary containment equipment on these tanks is checked frequently to ensure leaks, spills, or contamination does not occur. An Emergency Response Plan is maintained on site for any future contingency.

St. Cloud State University – Only a single unused underground storage tank remains at SCSU. It is empty and below the basement floor of an occupied house. Spill containment control was expanded outside the dike to the delivery connections of our twin #2 fuel oil aboveground storage tanks. Further action is being planned.

Department of Transportation – Salt brine tanks are used to produce and store salt brine. Currently, salt brine production systems are of double-walled fiberglass construction. This greatly reduces the possibility of a release from the system since fiberglass is resistant to degradation from salt. Mn/DOT fueling systems are composed of double-walled underground or aboveground petroleum tanks and pipes. They are equipped with leak detection, spill prevention, and overfill prevention equipment.

University of Minnesota – The university has reviewed and updated its Spill Prevention Control and Countermeasures (SPCC) plan (see http://www.epa.gov/superfund/contacts/sfhotlne/opa.htm). The university's Twin Cities campus has hundreds of fuel storage tanks, emergency generator fuel tanks, oil-filled transformers, and drums containing petroleum products that fall under this plan.

The EPA developed the Oil Spill Program as mandated by the Oil Pollution Act of 1990, which amends CWA Section 311(j). There are four main goals of the Oil Spill Program: preparedness and prevention; response; compensation and liability; and research and training. Preparedness and prevention is the best defense against mitigating the damage caused by oil spills. EPA requires high-risk facilities to prepare and implement SPCC plans to achieve the goal of preventing oil spills from reaching navigable waters.

The SPCC plan requirements have three goals: The first is to

- **Prevent oil spills.** Operating procedures, such as inspections, recordkeeping, security, personnel training, and tank specifications, address this goal (40 CFR Section 112.7(e)).
- **Prevent spills from reaching navigable waters or adjoining shoreline.** All SPCC facilities must install appropriate containment and/or diversionary structures to prevent spills from reaching waters, unless installation is impracticable (40 CFR Section 112.7(c)). In addition to the minimum requirement for appropriate containment and/or diversionary structures, other secondary containment requirements are specified in 40 CFR Section 112.7(e). For example, bulk storage tanks must have sufficient secondary containment to hold the contents of the largest single tank, allowing for precipitation.
- **Prepare for responding to an oil spill.** Facilities that cannot install appropriate containment and/or diversionary structures must be able to clearly demonstrate the impracticability of installation, and

must have a strong oil spill contingency plan and a written commitment of response manpower, equipment, and materials (40 CFR Section 112.7(d)).

33. Technical Support

Department of Administration – The Resource Recovery Office provides waste reduction and recycling technical support to government agencies, which includes referrals to Minnesota Technical Assistance Program.

Department of Corrections – *MCF-St. Cloud* – St. Cloud uses Braun Intertech and outside vendors for testing, etc.

Office of Environmental Assistance – MnTAP helps businesses implement pollution prevention by helping them become more efficient and find alternatives to using hazardous materials. Technical assistance is tailored to individual businesses through a variety of services, including site visits, student interns, materials exchange, workshops, and industry-specific resources.

Highlights of the impact of MnTAP services this past year include:

- MnTAP's one-on-one services are resulting in pollution prevention and cost savings. Site visits in 2003 resulted in companies reducing their waste by 3.6 million pounds, which saved companies $1.4 million.
- Water conservation issues continue to be a large need for business and an opportune area for pollution prevention impact. MnTAP helped companies reduce 17 million gallons of water in 2003.
- Implementing pollution prevention takes time and continued efforts. MnTAP's initial work with companies in 2003 and follow-up with 2000-2002 intern companies resulted in pollution prevention documentation of an additional 169,000 pounds of waste, 1.3 million gallons of water, and total savings to the companies of $316,140.
- Materials exchange as a reuse tool is meeting company needs. In 2003, 2.3 million pounds of materials were exchanged, saving $967,000.

Each year MnTAP works to achieve its goal of reducing one million pounds of waste (as solid/hazardous waste, air emissions, and wastewater discharge), and saving companies $1million. MnTAP exceeded its goals in 2002, documenting a reduction of 2,781,223 million pounds of waste, 820,260 pounds wastewater, 2,370 pounds air emissions, and 7,953,000 million gallons of water conserved, resulting in a cost savings of $1,659,834 to businesses.

Success stories:

- **Linking pollution prevention and energy efficiency.** MnTAP has been working in 2003 to actively integrate energy efficiency into its P2 technical assistance services. The linkages between P2 and E2 are obvious—improving procedures and processes and making changes to products or chemicals used that will conserve raw materials and energy, thus resulting in cost savings for the company. Implementing energy efficiency measures helps contribute to many environmental initiatives, including reducing greenhouse gases, reducing ozone precursors, and reducing mercury emissions.

  MnTAP developed an energy web page, fact sheet resources to flag opportunities in energy efficiencies for compressed air and motors, and organized intern resources on energy efficiency case studies, referral sources, and consultants. Finally, MnTAP has worked to establish

relationships with various utilities around the state to help channel CIP funds to industries where needed.

High energy prices have also prompted many businesses to ask MnTAP staff to include energy efficiency opportunities in site visits and student intern projects in the hope of identifying cost cutting projects. One intern project in 2003 included energy efficiency as part of the work scope, resulting in a reduction of 437,400 kWh and 85,000 therms. Six site visits have addressed energy efficiency in 2003, and MnTAP is referring some assessment opportunities to the Iowa State University Industrial Assessment Center (IAC), with the plan of having an IAC at the University of Minnesota in 2005.

- **Hospitals for a Healthy Environment.** MnTAP has advanced the H2E initiative in Minnesota significantly during 2003. Thirteen Minnesota healthcare facilities are now signed on as H2E partners. A total of 18 facilities are currently working on mercury elimination, with similar achievements in chemical waste reduction and solid and infectious waste source reduction.

  H2E is a national partnership between the U.S. Environmental Protection Agency (EPA) and the American Hospital Association (AHA) with the goals of eliminating mercury-containing waste by 2005, and reducing the total volume of all wastes by 33 percent in 2005 and 50 percent in 2010.

  Much of the support for H2E implementation in Minnesota has come from EPA Region 5, and MnTAP has met its grant goals of recruiting partners, holding a technology demonstration event, and providing technical assistance. Three technologies were demonstrated at Ridgeview Medical Center, including formalin distillation, mercury substitution, and ethylene oxide/glutaraldehyde substitution. This event attracted 25 attendees with representatives from eight different hospitals. Follow up is now being conducted with these hospitals to promote technology diffusion.

  In 2002, MnTAP placed interns at two healthcare facilities Fairview Health Services and HealthEast. Results from those projects have been implemented over the past year including six tons of waste reduced and $37,000 in cost savings.

  MnTAP and OEA put on healthcare workshops around Minnesota during the spring of 2003 in five locations (Marshall, Austin, Duluth, St. Cloud, and Detroit Lakes) promoting H2E practices. These workshops resulted in two new H2E partners and additional site visits.

- **Reducing persistent bioaccumulative toxics (PBTs)** through P2 collaboration between the insurance industry and Great Lakes industries. MnTAP has worked with the Tellus Institute and four Great Lakes states with support from the Great Lakes Protection Fund over the past two years on a pollution prevention and insurance industry collaborative. The project's goal is to identify, demonstrate, and promote environmental insurance incentives that support pollution prevention activities as a means to reduce adverse Great Lakes ecosystem impacts from PBT chemicals. MnTAP worked with Tellus and the other states to select industry sectors, identify and utilize insurance incentives to promote P2, conduct site visits to help companies document already implemented pollution prevention opportunities, and measure the insurance benefits derived from P2 implementation.

  Companies that have implemented significant pollution prevention with PBT chemicals in specific industry sectors were identified by each of the participating states. From this list, a number of companies willing to participate were selected. Tellus, the four states, and the insurance companies are collecting and reviewing company data to identify possible cost reductions for environmental insurance as a result of reduction of PBT usage.

  MnTAP, along with Tellus officials, conducted three site visits in Minnesota at electroplating shops during 2003 to collect data on compliance, pollution prevention, and risk reduction.

- **Phosphorus reduction in the Upper Mississippi River basin.** MnTAP continues to carry out a successful load reduction program using POTWs to reach industrial users and provide technical assistance to reduce phosphorus and other wastewater pollutants.

  MnTAP is currently working in the Upper Mississippi River basin to reduce phosphorus loading from industrial point sources using pollution prevention strategies, with support from The McKnight Foundation, EPA Region 5, and the MPCA. The project involves working with POTWs to inventory industrial phosphorus sources, identify pollution prevention opportunities for industrial users, assist with implementation of pollution prevention techniques, and document the results. Technical staff will work with industrial point sources of phosphorus including:

  - food processing operations
  - phosphatizing operations, prior to painting metal
  - cleaning operations, including sanitizing and janitorial cleaning

  MnTAP conducted similar work in the Lower Mississippi River basin in 2000-2002, working with POTWs and their industrial users to reduce 31,000 pounds of phosphorus, three million pounds of organic and solids loading, and 67 million gallons of water, and save $2.8 million.

  Phosphorus Management Planning (PMP) is one tool that is being used to assist POTWs with phosphorus reduction and meet the one mg/L limit, if required. The PMP will help POTWs compile and organize data from industrial and residential phosphorus sources, then identify and implement phosphorus reduction strategies. Pollution prevention is a major component of the PMP process especially from industrial sources. MnTAP, in partnership with MPCA, is conducting outreach to POTWs around the state to make them aware of the PMP Resource Development packet in a variety of ways:

  - PMP packet mailing to all POTWs
  - presentations to MWOA section meetings to share how others have developed and implemented PMPs
  - meetings with POTWs to walk through the electronic forms

  PMP is a significant component of phosphorus reduction work in the Upper Mississippi River basin and a key reason for MnTAP to conduct technical assistance with industry in this area to reduce industrial sources of phosphorus.

  As MnTAP travels the state to discuss phosphorus reduction, staff is also addressing mercury elimination in communities. Technical assistance is available to hospitals to educate them about H2E resources and assist them with identifying sources of mercury and implementing practices to eliminate mercury.

Metropolitan Airports Commission – The Environment Department provides technical support to all MAC offices/divisions, as well as airport tenants and surrounding communities whenever possible. Assistance for the MAC's tenants is accomplished through phone calls, acting as a regulatory liaison, informational meetings, and providing resources. This support assists the tenants in recognizing and understanding their obligations to the regulatory agencies.

Metropolitan Council Environmental Services – In its participation with IPPAT, MCES is part of an information network that is very useful in the P2 support offered to other public agencies. As a regulatory agency, MCES is active in P2 technical support through the Industrial Waste and Pollution Prevention Section (IWPPS). This section continues to promote P2 to its more than 800 permitted industrial users. During on-site inspections, IWPPS staff members regularly discuss P2 issues and point out process areas where P2 would result in waste reduction. Although MCES collects fees based on volumes and characteristics of wastewater through its Service Availability Charge (SAC),

wastewater reductions associated with cost savings are encouraged for its users. P2 activities by industries are routinely tracked.

Specific examples of these efforts are that when permit renewal notices are sent out, there is a written recommendation that the industrial user contact the Minnesota Technical Assistance Program (MnTAP) for assistance in reducing wastewater volumes and to address any other P2 concerns. Work on mercury reduction continues with the Minnesota Dental Association in the distribution of recycling fact sheets and the evaluation of amalgam separation equipment (see detailed discussion in Category 16. *Heavy Metals*).

The IWPPS established a new P2 team in 1997. The purpose of the team is to "initiate, support, integrate, and promote P2 through education, assistance, and partnering." This will result in a reduction of toxics, conventional loadings, and discharge volumes to the collection and treatment system. So far, the P2 team has designed and purchased a new P2 display, is developing a new educational P2 brochure for households, and has registered as a member in both the National Pollution Prevention Roundtable and the Great Lakes Regional Pollution Prevention Roundtable. It also serves as the oversight group for the "Open Channel News," a publication specifically for industrial users.

The IWPPS has participated in national, regional, and local P2 conferences and has cooperated as a member with Wakota CAER (Community Awareness and Emergency Response), North Metro CAER and MnTAP in the sharing of information and public displays. Conferences in the past year include the MPCA Waste Conference, the MPCA Collection Systems Operators' Seminar, Minnesota Wastewater Operators Association and the American Electroplaters and Surface Finishers Society.

An intranet site is in place for the Environmental Quality Assurance Department (EQAD) within MCES, which includes "P2 Pages" to promote P2 and encourage new ideas. This publicly accessible internet site can be found at www.metrocouncil.org/environment/PollutionPrevention/. Additional information, including an online version of the Waste Discharge Rules and a table of user rates and fees can be found at www.metro.council.org/environment/IndustrialWaste/.

Peer review services and technical information have been provided to the following organizations: the Massachusetts Executive Office of Environmental Affairs (STrategic Envirotechnology Partnership, or STEP), National Sanitation Foundation International/U.S. Environmental Protection Agency (Environmental Technology Verification Program), Association of Metropolitan Sewerage Agencies, OEA's Health-care Environmental Awareness & Resource Reduction Team (HEARRT), Illinois Waste Management and Research Center, and the New York Academy of Sciences.

The IWPPS conducted three new permittee workshops and two industrial waste customer forums in 2003. P2 is a part of the agenda that is presented at these sessions.

Department of Military Affairs – We have established an 800 number that allows anyone from anywhere within the state to contact the Department of Public Works or the Environmental Office in the event of an emergency.

North Hennepin Community College – Often NHCC's first contact for technical support is its contracted specialist, McNeil Environmental Services, employed by the college in a consultant capacity on environmental and other safety issues.

St. Cloud State University – Technical Support for SCSU is often provided by its Environmental Health and Safety consultant MacNeil Environmental Inc. (MEI). MEI has several Industrial Hygiene specialists on staff and has maintained a Civil and Environment Engineer on campus for six years in an office in the Buildings and Grounds Management center. The ready availability of this Certified Safety Professional/Minnesota Licensed Professional Engineer has aided SCSU's recycling and waste minimization efforts. It has also fostered close support to the contractors and

maintenance and custodial employees, supervisors, and managers most at risk on campus and most involved in pollution prevention projects and efforts.

Department of Transportation – Mn/DOT conducts three meetings annually with district/division personnel who have taken on the additional part-time task of waste management coordinators. This group actively integrates waste minimization and pollution prevention into all of the department's functions.

Mn/DOT has developed a waste management procedure manual, which incorporates general waste minimization techniques for each hazardous or problem waste generated. This manual outlines waste management procedures that are legal, practical, and cost-effective ways to minimize risk to the environment. These manuals were distributed to all Mn/DOT facilities. Mn/DOT has also developed a bridge paint removal manual, designed as a guide to comply with Minnesota Air Quality, Waste Management Regulations, and to minimize risk to the environment. This manual is available for other state agencies, counties, and cities to use on the Mn/DOT web site at www.dot.state.us/environment.html, then go into *Publications,* then into *Removing Paint from Bridge Steel Structures.*

Mn/DOT has developed an asbestos removal and building demolition manual designed as a guide, to comply with Minnesota Air Quality, Waste Management Regulations, and minimize risk to the environment. A current form of the manual is on the Mn/DOT web site at www.dot.state.us/environment.html go into *Publication,* then into *Asbestos and Regulated Waste Material Manual for Building Demolition or Relocations for Construction Projects.*

Mn/DOT is committed to studying, coordinating, and evaluating pollution prevention opportunities (as they relate to toxic reduction) within Mn/DOT. The key task is to research and evaluate new products and/or procedures as they relate to Mn/DOT and recommend changes to existing products and/or procedures when they prove to be more effective from an environmental, economical, and/or regulatory standpoint. Mn/DOT conducts workshops to assist staff in complying with federal and state environmental regulations. Mn/DOT provides on-going guidance for local communities interested in designing and/or improving bicycling, walking, and telecommuting programs or initiatives.

University of Minnesota – The Regional Sustainable Development Partnerships unite citizens and their university working together to strengthen rural Minnesota (www.regionalpartnerships.umn.edu). The mission of the Regional Sustainable Development Partnerships is to support sustainable development in greater Minnesota through community and university partnerships in outreach, education, and research. The three bedrock principles of this initiative are:

1) develop and sustain a richer and more vibrant partnership with the citizens of each region and their land grant university.
2) address agricultural, natural resources, and tourism issues consistent with sustainable development principles identified as central to our work.
3) promote the concept of active citizenship, which calls on us to think first as citizens with a commitment to working through issues and exploring opportunities in an integrated and democratic manner.

We are also guided by principles of sustainability—in other words, what can help us meet needs of the present without compromising the ability of future generations to do so. The Regional Sustainable Development Partnerships work to sustain Minnesota's natural resource-based communities and industries by addressing community-identified agriculture, natural resources, and tourism issues in partnership with the University of Minnesota.

Three core goals shape the work of the Regional Partnerships, and form the basis on which we evaluate our effectiveness. These goals are:

1) to build and strengthen effective relationships between citizens, communities, and their University of Minnesota.

2) to promote active citizen leadership in strengthening the long-term social, economic, and environmental health of greater Minnesota.

3) to invest in research, education, and outreach projects that advance the understanding and achievement of regional sustainability. Regional partnerships have been established in northwest, northeast, central, west central, and southeast Minnesota. Additional partnerships are anticipated in the future. Each Regional Sustainable Development Partnership funds research, education, and outreach projects that address issues affecting the long-term sustainability of their regions' natural resource-based industries and the communities that depend on them. Focusing on agriculture, natural resources, and tourism, regional projects reflect the concerns and interests of engaged citizens and partner those citizens with University of Minnesota faculty and students.

Each regional partnership has a board made up of citizens with backgrounds and interests in agriculture, natural resources, tourism, and sustainability as well as university faculty and staff from a wide range of departments. A Statewide Coordinating Committee composed of staff and citizens from each region, at-large citizen representatives, and representatives of the three partnership colleges provide leadership for the program's coordinated efforts. To date, the Regional Partnerships have funded over 175 projects for a total of $3,000,000.

The five regions are also currently collaborating on three major community/university ventures:

- Energy Self-Reliance Community/University Venture works to increase farm and community energy self-reliance through renewable fuels, energy conservation, and community ownership and governance of energy resources.
- Local Food Economies Community/University Venture works to get wholesome and delicious foods—produced locally—into the hands of consumers and to do it in a way that yields a fair profit for the producer or farmer by creating regional food systems that sustain production, distribution, and marketing opportunities.
- Appreciating Rural Assets Community/University Venture works to identify and capitalize on the natural, human, and financial resources of rural communities through community and economic development programs related to tourism, land use, rural policy, and local business development. These ventures represent thematic clusters of projects that have emerged from the five regions. The ventures will bring together networks of partners inside and outside of the university to facilitate future program development in the three key areas identified by the citizens of the five regions.

The University of Minnesota Center for Sustainable Building Research (CSBR), (http://www.csbr.umn.edu), was established as an official unit within the College of Architecture and Landscape Architecture (CALA) in 2001 although the staff has been conducting building research in CALA since 1997. There is a substantial and growing amount of building research activity in the following areas: sustainable design, energy-efficient buildings, windows and glazing research, building design process and evaluation, human factors, and building science. Sponsors of CSBR projects include the U.S. Department of Energy and state agencies such as the Minnesota Departments of Natural Resources and Transportation, and the Office of Environmental Assistance. Other sponsors include building industry sources such as Aspen Research Corporation. The interdisciplinary nature of CSBR is reflected in the staff that includes architects, mechanical engineers, and psychologists. In addition, there are several affiliated faculty in CALA as well as in other units such as the College of Natural Resources and the College of Human Ecology. The Center for Sustainable Building Research is a place for organizing and effectively growing the research and outreach missions of the college, as well as working with other units to enhance CALA's teaching mission. CSBR serves as a resource for Minnesota, the design professions, and the building industry.

Dynamics, management, and sustainable use of northern forest ecosystems

"For nearly a century, research at the Cloquet Forestry Center has provided valuable information to help guide the appropriate use and management of northern forest ecosystems." The Cloquet Forestry Center (http://www.cnr.umn.edu/cfc), founded in 1909, supports multiple research projects covering many disciplines initiated by University of Minnesota and other researchers. Research conducted at the Cloquet Forestry Center focuses on sustainable use and management of northern forest ecosystems, thus helping citizens and communities balance the ecological, economic, and social demands placed on forests. The center plays a key role in offering a secure location, logistics, and/or technical support to the projects. "The center's combination of cutting-edge and long-term projects offers insights about natural resource management unequaled in the region," said Center Coordinator Bob Stine.

While protecting ongoing research, the center is managed to maintain a variety of forest ecosystems and other sites for teaching, research, and outreach activities. Much of the research conducted at the center is aimed at developing forest management practices that integrate multiple values, including fiber, wildlife, air and water quality, recreation, aesthetics, and ecosystem function. Factors evaluated include:

- **Environmental details:** Sustainable management of Minnesota's forest lands is important for current and future generations.
- **Economic details:** Sustainable forest management includes economic benefit across all levels of society, from landowners (both the 140,000 private woodland owners and also public owners), to processors (loggers, bough buyers, gatherers, etc), to manufacturing industries. There are hundreds of small and large primary and secondary wood products firms.
- **Quality of life details:** Forests play an integral role, either directly or indirectly, in the lives of most Minnesotans.

Research at the Cloquet Forestry Center is grouped in the following categories:

1) monitoring the response of forest ecosystems to activities such as planting, thinning, harvesting, prescribed burning, genetic tree improvement, vegetation management, and natural disturbances.
2) establishing and evaluating long-term ecological studies to assess the dynamics of change and to understand natural processes.
3) developing and applying forest genetic resource management techniques, including gene conservation, selection, breeding, and deployment.
4) characterizing the hydrometeorological characteristics of watersheds on and near the Cloquet forest.
5) evaluating residential construction products and techniques in cold climate conditions.
6) expanding wilderness research capabilities in collaboration with the Wilderness Research Center.
7) using the center's data bases for development of multiple resource management models.
8) using the center and its research and management activities as a field laboratory for the training of natural resource professionals and for the demonstration and communication of research to interested publics.

34. Tires

Department of Administration – The Materials Management Division has developed contracts for tire recovery and for retread tires utilizing old tire casings. The Travel Management Division, Plant Management Division, Department of Transportation, and other state agencies may purchase from these contracts. The state and CPV members purchased in excess of $700,000 in retread tires in FY02.

The Materials Management Division's Waste Tire Pickup, Transportation, Processing, and Disposal contract recycles waste tires. The tires are processed into chips, which are then recycled for use in road surfaces. The Travel Management Division's used tires are recycled through a vendor licensed under state contract.

Department of Corrections – Multiple facilities recycle used tires to reduce the cost associated with disposal and landfills.

Metropolitan Airports Commission – High mileage tires have provided the most economical service in many applications and utilizing these tires reduces both the number of tires purchased and the number of tires requiring disposal. Tractor tires that can no longer be used by MAC Maintenance on the paved surfaces of the airport are reused in off-road (agricultural) applications instead of being disposed of. All vehicle and heavy equipment tires are transported to and recycled by a permitted vendor when no longer useable.

Department of Military Affairs – DMA recycled 130,000 pounds of tires through the Defense Reutilization Marketing Office (DRMO) in Duluth, Minnesota.

North Hennepin Community College – When possible old tires are turned in for recycling at time of new purchases. All other tires are recycled through local vendors.

Iron Range Resources and Rehabilitation Agency (IRRR) – The IRRR collects used tires, which are transported to the regional landfill in Virginia. From there, the tires are brought to R & J Tire in Meadowlands to be shredded and recycled into various rubber products such as rubber mats for truck boxes and solid fuel for burners.

St. Cloud State University – About 95 tires are recycled each year at SCSU at a cost of about $1.25 each. They are ground up and become components in other products.

Department of Transportation – Mn/DOT recycles all waste tires generated by Mn/DOT as well as the tires that the public has lost along Mn/DOT right-of-way. Mn/DOT recaps a small percentage of waste tires. However, due to the conditions under which Mn/DOT vehicles are operated, (plowing snow) only a limited amount of re-capped tires can be safely used.

35. Water Treatment and Conservation

Department of Administration – The Plant Management Division rebuilds parking lots and structures to meet water division guidelines. The Materials Management Division developed a contract for salmon and trout feed that reduces the effluent produced by excess feeding of fish. The water quality downstream from state hatcheries will improve as a result of this contract.

Bemidji State University – Water conservation devices recommended in a FY 2001 energy audit report were installed in 2002. Water-saving faucets and showerheads, and devices for urinal and toilets were installed throughout campus. The cost for the retrofits was approximately $133,000. A reduction in water use of 4,149,000 gallons (2,295,000 gallons in FY2003) has been realized since installation of the device, as compared to 2001useage. This resulted in an estimated savings of $24,510 on the university's water bill over the last two years.

Department of Corrections

MCF-Oak Park Heights – This fiscal year, water-saving showerheads were installed in two complexes. Electronically timed showers, water saving aerators on sinks and electronic flush

controls on the individual room toilets are being installed in the various complexes. Lower water usage has been reflected in our water gallon use figures over the year. The end result should be a savings of 52 percent from our pre-conservation costs. The institution has completed replacing toilet and sink water control valves in the individual cells to reduce water usage.

MCF-St. Cloud – The outdoor sprinklers are on timers, and low flow toilets have been installed during the D House and Segregation construction projects. This reduces water bills and save resources.

Metropolitan Airports Commission – The truck/equipment wash bay in the Field Maintenance building uses a complete water recycling system. This greatly reduces the amount of wastewater (gray water) generated. Restrooms in the Lindbergh Terminal are being upgraded with water conserving devices such as water saver urinals and toilets with electronic flush valves and sinks with electronic faucets and aerators. Standards for new construction require these water-saving devices. The new Humphrey Terminal and the remodeled MAC General Office were built to these standards.

Metropolitan Council Environmental Services – The MCES is the division of the Metropolitan Council that treats wastewater. The system collects and treats over 300 million gallons of wastewater per day from 103 communities and over 2 million people. The MCES operates about 600 miles of interceptor sewers, 63 lift (pumping) stations, 190 metering stations, and eight treatment plants. The current annual operating budget of the MCES is $170 million with a capital budget of $199 million. Clean effluent is discharged to four area rivers: the Mississippi, Minnesota, St. Croix, or Vermillion. From the metro plant alone, over 74 billion gallons of treated wastewater were discharged to the Mississippi last year. P2 affecting the quality of effluent was described in the section on heavy metals.

One area that clearly falls under P2 in MCES operations is the beneficial reuse of residual solids from the wastewater treatment process. Biosolids, or sewage sludge, at the two largest treatment plants are incinerated in multiple-hearth furnaces, resulting in an 80 percent reduction in volume of residual solids. The ongoing ash utilization program incorporates the ash from incinerated biosolids into flowable fill, cement/concrete, structural fill, and asphalt projects. In 2002, a total of 14,297 dry tons from the metro WWTP and 1,618 dry tons from the Seneca WWTP (Eagan, Dakota County) were utilized. Straight biosolids—without any blended components—are typically landspread on farm fields. A total of 12,531 tons of heat-dried biosolids and digested biosolids from MCES plants was land-applied in 2002.

Department of Military Affairs – Spill Prevention Control and Countermeasure Plans for several DMA facilities are being upgraded. Current plans will be reviewed and upgrades will be implemented when feasible. In 2002, oil water separators were retrofitted/installed at three Organizational Maintenance Shops. These shops perform a variety of maintenance activities for DMA equipment.

Minnesota Pollution Control Agency – The Brainerd office has leased premises that feature water conservation fixtures including low-volume flush toilets.

North Hennepin Community College – Plumbing fixtures and supplies with lower gallon per minute ratings are used at this facility whenever possible, depending upon the application requirements. Chemically treated water systems like the college's boiler water, and cooling tower chemical treatment systems, as well as closed loop heating and cooling systems are properly isolated from potable water supply by approved anti-siphon devices.

St. Cloud State University – This past year, progress continued at SCSU on replacing restroom urinal flushing systems to reduce water use. Payback was about one year. Extensive lead-in-water testing has been completed in the campus houses being used for office space. Results were all

well below the action level and most were below 5.0 ug/l. A MnSCU survey resulted in some water conservation improvements.

Department of Transportation – Mn/DOT is using vacuum toilets, waterless urinals, and low-volume sinks to save thousands of gallons of water each day, reducing the size of drain fields needed to dispose of wastewater. Mn/DOT developed a waste and sediment trap management procedure when disposing of wastewater that is legal, practical, cost-effective, and minimizes risk to the environment.

Mn/DOT practices and promotes the use of native plants such as grasses, trees, and shrubs. By using native plantings, maintenance demands are reduced which includes less watering.

University of Minnesota – The Water Resources Center (WRC) (http://wrc.coafes.umn.edu) is a multifaceted center with active programs in research, outreach, and education. The WRC works to help coordinate, conduct, and fund research and outreach related to water resources in the state of Minnesota enabling more effective delivery of research results to decision-makers and citizens; opening new avenues for multi-disciplinary and interdisciplinary partnerships; and providing a critical link between students and water-resources professionals, allowing students maximum access to the university's water programs. The graduate program in Water Resources Science also is administered by the WRC. The WRC's creation in 1996 united three long-standing University of Minnesota water programs, the Water Resources Research Center, the Center for Agricultural Impacts on Water Quality, and the Extension Water Quality Program, into a larger enterprise. The goal of the WRC is to integrate the missions of the three water programs.

36. Other

Department of Corrections – Multiple facilities have arrangements with local farmers to have food waste picked up and used for feed. This reduces the amount of waste sent to landfills.

MCF-Moose Lake/Willow River – There were two other areas of activity during FY 2002: the facility shipped out a 5-gallon pail of lead from dental x-rays and five propane tanks with the old illegal valves. The facility purchased new propane cylinders with the new overflow protection valves.

MCF-Oak Park Heights – In an attempt to lessen the amount of materials being landfilled, we instituted a food-recycling program with Yotter Food Recycling through which food scraps and remains are saved and used to feed pigs in 1998. Approximately 95 tons of food waste is recycled each year in this manner. Additionally, trash pickups have been lowered over the year to approximately one per month, which can be attributed to the food-recycling program.

MCF-Shakopee – The facility recycles batteries, plastics, papers, aluminum, glass, lamps, cardboard, oil, antifreeze, scrap metal, and wooden pallets.

MCF-Stillwater – MCF-Stillwater has prepared a Notice of Intent and summary of our Storm Water Pollution Prevention Program.

Office of Environmental Assistance – In February 2001, the OEA started an experimental worm bin. The goals of the bin were to create a bin that was inexpensive, easy to maintain, and would recycle a substantial amount of food waste from the office.

The bin has been maintained for three years, and we are now tracking how much waste we are able to divert from the trash. The worms have devoured over 300 pounds of food in the three years we have maintained a bin. However this last year we did not process as much food because one of the bins became infested with fruit flies and we had to stop using it for a while. The worms have the potential to eat more, but we are limited to the amount of food people contribute to the bin because we also have a commercial composting project in the building.

The bin has become a great education tool. Many schools and composters have been taught the benefits and ease of vermicomposting. Several schools have either requested information on vermicomposting or have been visited by a staff person who spoke on worm composting. Many teachers that contacted OEA have started their own worm bin in the classroom.

Department of Human Services – The Department of Human Services central office and the State Operated Services facilities have converted many paper documents into electronic formats. Time sheets, expense reports, and facility telephone books are now accessed through our intranet and replaces paper copy documents. The central office is implementing the Electronic Document Management System, an electronic filing and retrieval system, which will eliminate the storage of paper documents and their related Lektriever mechanical systems.

DHS Today, a department-wide daily electronic newsletter, has replaced individual paper flyers and announcements with a daily electronic bulletin board. *DHS News,* a quarterly electronic news publication, replaced its former hard-copy newspaper edition. The MSOP site eliminated Styrofoam cups and bowls and plastic silverware from their food service.

Minnesota Pollution Control Agency – Several regional MPCA offices have specific reduction programs in effect including composting food waste, vermicomposting/leachate used as indoor plant fertilizer in office, using refillable soda bottles, promoting paper reduction initiatives, and employee-driven recycling efforts when a recycling hauling contract is not available.

The MPCA Alliance for Recycling and Reduction of Waste (ARROW) group has maintained an extensive composting project since September of 1999. The project allows all compostable materials (cafeteria food waste, napkins, biodegradable utensils, and paper towels from restrooms) to be collected and managed separately from non-compostable refuse. Through the first eight months of the program, 28 percent of the solid waste generated was composted. The new Brainerd office is recycling all compostable food wastes into a worm farm!

Minnesota West Community and Technical College – The college continues to explore additional ways to reduce, reuse and recycle.

St. Cloud State University – SCSU has recycled three 55-gallon modules of glassware from the Biology stockroom due to the ongoing initiative of a very supportive faculty member.

Department of Transportation – Mn/DOT has developed a hazard assessment procedure for incorporating waste materials into roadway infrastructure. Through extensive safety review, Mn/DOT has developed a specification approving the use of all-steel guardrail posts. Steel guardrail posts are recyclable, save installation time, and eliminate the disposal and chemical leaching concerns associate with treated woods. Mn/DOT recycles approximately 1.5 million tons of asphalt and 2 million tons of concrete annually. Mn/DOT is responsible for all containers found in Mn/DOT right-of-way under 110 gallons. A procedure was developed that is safe, practical, and cost-effective. Much of the material found is recycled with the waste Mn/DOT generates.

University of Minnesota

Water quality – storm water pollution prevention plan: The university has developed a storm water pollution prevention plan and submitted to the Minnesota Pollution Control Agency a municipal separate storm sewer system permit application for the Twin Cities campus (http://www.dehs.umn.edu/iead/stormwater) in order to meet storm water regulations of the National Pollutant Discharge Elimination System permit program. This 1987 amendment to the Clean Water Act developed a program to minimize or eliminate pollutants from entering water runoff. Finalizing the storm water pollution prevention program was only the first step in protecting storm water runoff on campus. Over the next five years, the prevention plan shifts into an improvement plan that could

change a few aspects of the university environment. The improvement plan will probably change how university workers keep grass green during the summer and deice sidewalks in winter. In response to the federal requirements, a university storm water task force of six faculty and staff brainstormed, studied data and discussed strategies for protecting the environment against further pollution. The regulations required applicants to submit proposals in six areas to further minimize contaminates from entering storm water. From extending public outreach and education to controlling illicit discharges and maintaining clean construction sites, the university task force followed permit guidelines and laid groundwork to save the environment from further degradation. The task force will continue meeting to make sure the university meets the storm water pollution prevention plan.

The Commission on Environmental Science and Policy

The Commission on Environmental Science and Policy (http://www1.umn.edu/enviro/index.html) was created by Executive Vice President and Provost Robert L. Bruininks in recognition of a need to capitalize on the effort expended by the university on environmental issues by enhancing the conditions for new synergistic activities both within the university and between the university and the communities it serves. Environmental science and policy are potentially the largest single unifying subjects across the broad spectrum of administrative units and faculty of the University of Minnesota. This is a response to the great societal need to identify alternatives and inform decisions that address the serious environmental challenges facing Minnesota, the United States, and the world community. Numerous University of Minnesota components have demonstrated their commitment to address the needs of Minnesota communities through active pursuit of research, teaching, and outreach programs that address their needs at a variety of scales. Environmental science, ethics, and policy—and the concepts they embody—can be a unifying principle for a wide range of interdisciplinary problems and solutions.

The overarching goal of the commission is to enhance, foster, and make more visible our efforts in research, education, and outreach in "environment" at the University of Minnesota. We want to improve the environmental literacy of our students, of the citizens of our state, and of the world community. We also need to help society make well-informed judgments about the social and biophysical options, and associated consequences, that are critical to the decision-making process. Over the longer term, our vision is to achieve an international reputation as the recognized leader in this field. Achieving this goal will require a more cohesive, synergistic organization of the university's environmentally related resources. Creation of such a system would allow the university to transcend the mere sum of its leading programs and scholars.

Sustainable Campus Initiative

In 1999, a small group of faculty, staff, and students started the Sustainable Campus Initiative Committee (http://www.cnr.umn.edu/sci), an ad hoc committee with a mission to use the campus and its physical facilities as a tool for environmental learning. They are currently working on two pilot projects which will continue through 2001-2002: 1) Restoration of a degraded stream and wetland on the St Paul campus (http://www.nwf.org/campusecology/newsletter/watershed.html); and 2) Develop an environmental performance baseline or "ecological footprint" for the Twin Cities campus (see http://www.bio.psu.edu/Greendestiny/indicators.shtml and http://www.nwf.org/campusecology/index.html). Through continued student involvement and hands-on projects, they hope to engage students as active citizens of the university. At the same time, they will increase teaching opportunities and achieve a more environmentally sustainable campus.

Water quality – field drainage research

University research hopes to find ways to plan and manage farm drainage operations in a way that doesn't affect crop yield but does improve water quality. University professor Gary Sands invented a new agriculture drainage calculator that saves users time and headaches through a partnership with Prinsco., Inc., the largest drainage pipe manufacturer in Minnesota. The calculator will help drainage system designers determine the amount of water needed to be drained in a day, based on area size and

slope grade. A drainage system is a network of plastic pipes laid beneath the ground's surface to funnel water away from an area. There are millions of feet of drainage pipe in the state, most of it located on southern Minnesota farms.

Professor Sands is conducting a long-term study that examines the relationship between pipe depth and water quality in agricultural drainage systems. He hypothesizes more shallowly laid pipes will increase water quality by draining less water, thus allowing nitrogen to reach the saturated soil where bacteria will convert it to nitrogen gas. His study might help solve some disputes between farmers and environmentalists by lowering the amounts of nitrogen drained into drinking water but not compromising crop yields. Ever since the earliest settlers staked out their land, farmers in southern Minnesota have depended on artificial drainage systems to rid fields of excess water that prevented optimum crop production. But modern drainage systems are now combined with modern farming practices, which include adding nitrogen to the land to increase productivity. As a result, drained water is carrying high levels of the water-soluble form of nitrogen into the nation's water system. Some surface water contains 15 ppm to 40 ppm of nitrogen. Acceptable drinking water should only contain 10 ppm. Ideally, we can find ways to manage farm operations in a way that doesn't affect yield but does improve water quality. Nitrogen is also the major contributing factor to the spread of hypoxia, oxygen depletion, in nation's waters. At the mouth of the Mississippi River in the Gulf of Mexico, hypoxia occurs where aquatic life is severely compromised because of chemical runoff.

Activity type	Department of Administration	Department of Agriculture	Bemidji State	Department of Commerce	Department of Corrections	Office of Environmental Assistance	Department of Human Services	Iron Range Resources & Rehabilitation	Metropolitan Airports Commission	Met Council– Environmental Services	Met Council– Metro Transit	Metropolitan Mosquito Control	Department of Military Affairs	Minnesota Pollution Control Agency	MN West Community & Tech. College	North Hennepin Comm. College	St. Cloud State	Department of Transportation	University of Minnesota
Absorbents	FY03 O/P				FY03 O/P			O	O	O	O		O/P				O	O	O
Adhesives	FY03 O/P				FY03 O/P								O			O	O		
Air quality, CFCs	FY03 O/P				FY03 O/P		O		O	O	FY03 O/P		P			O	O	O	O
Antifreeze	FY03 O/P				FY03 O/P			O	O	O	FY03 O		O/P			O	O	O	O
Audits	FY03 O/P				FY03 O/P				FY03 O/P	O	O/P		O/P				O	O	O
Auto fuels	FY03 O/P	O		FY03 O	FY03 O/P			O	O/P	O		FY03 O/P	O			O	O	FY03 O/P	FY03 O
Auto maintenance	FY03 O/P				FY03 O/P			O	O	O		O	O/P			O	O	O	O
Batteries	FY03 O/P			FY03 O	FY03 O/P	FY03 O/P	O	O	O	O	FY03 O		O/P	O		O	O	O	O
Cleaning supplies	FY03 O/P				FY03 O/P			O		O	FY03 O		O/P	O		O	O	O	FY03 O/P
Commuting & transportation	FY03 O/P		FY03	FY03 O	FY03 O/P	FY03 O/P	O	O		FY03 O	FY03 O/P			O			O	FY03 O/P	FY03 O/P
Education, comm. & training	FY03 O/P	O	O		FY03 O/P	FY03 O/P			O	O	P	O	FY03 O/P	O	FY03 O/P	O	O	O	FY03 O/P
Electronics	FY03 O/P				FY03 O/P	FY03 O/P		O	FY03 O					O		O	O	O	O
Energy– lighting	FY03 O/P		FY03 O/P		FY03 O/P	FY03 O/P		O	FY03 O	O	FY03 O/P		O/P	O	FY03 O/P	O	O	O	O
Energy – production	FY03 O/P	O	P	FY03 O/P	FY03 O/P	FY03 O/P				O			O/P	O	FY03 O/P	O	O	O	FY03 O/P
Groundwater wells	FY03 O/P				FY03 O/P					O			O/P			O	O		
Heavy metals	FY03 O/P	O			FY03 O/P	FY03 O/P				O			FY03 O			O	O	O	FY03 O
HVAC, indoor air quality	FY03 O/P				FY03 O/P			O	FY03 O		O/P			O	FY03 O/P	O	O	O	FY03 O/P
Ice control, sanding	FY03 O/P		FY03 O/P		FY03 O/P			O	O		FY03 O/P					O	O	FY03 O/P	O

FY03 = fiscal year 2003 O = ongoing P = planned

Activity type	Department of Administration	Department of Agriculture		Department of Commerce	Department of Corrections	Office of Environmental Assistance	Department of Human Services	Iron Range Resources & Rehabilitation	Metropolitan Airports Commission	Met Council–Environmental Services	Met Council–Metro Transit	Metropolitan Mosquito Control	Department of Military Affairs	Minnesota Pollution Control Agency	MN West Community & Tech. College	North Hennepin Comm. College		Department of Transportation	
Laboratory	FY03 O/P	O	FY03 O/P	O	FY03 O/P					O				O		O	O	O	O
Landscaping	FY03 O/P		FY03 O/P		FY03 O/P									O			O	FY03 O	FY03 O/P
Materials exchange	FY03 O/P				FY03 O/P	FY03 O/P			FY03 O	O	P		FY03	O		O	O		O
Office supplies	FY03 O/P	O	O		FY03 O/P	FY03 O/P		O	FY03 O	O				O		O	O	O	
Oil, oil filters	FY03 O/P				FY03 O/P			O	O	O	O	O	O			O	O	O	O
Paints, coating, stripping	FY03 O/P		O		FY03 O/P				O	O/P	FY03 O		FY03 O	O		O	O	O	O
Parts cleaning	FY03 O/P				FY03 O/P			O	FY03 O/P	O	FY03 O		FY03 O/P				O	O	FY03 O
Personal care							O											O	
Pesticides, fertilizers	FY03 O/P	O	O		FY03 O/P		O					O					O	O	FY03 O
Policy statement	FY03 O/P	O	O	FY03 O	FY03 O/P	FY03 O/P		O	FY03 O	O	FY03 O		O			O	O	O	O
Printing	FY03 O/P					FY03 O/P								O		O	O	O	FY03 O/P
Procurement	FY03 O/P	O			FY03 O/P	FY03 O/P		O	FY03 O	O/P	FY03 O	O	P	O	FY03 O/P	O	O	O	FY03 O/P
Remanufactured parts	FY03 O/P		O					O	O		O		O	O		O	O	O	
Tanks	FY03 O/P		P	FY03 O	FY03 O			O	O	O	FY03 O/P		O		FY03 O/P	O	O	O	O
Technical support	FY03 O/P			FY03 O	FY03 O/P	FY03 O/P		O	O	O			O			O	O	O	FY03 O
Tires	FY03 O/P				FY03 O/P			O	O		FY03 O		O			O	O	O	
Water treatment	FY03 O/P		O/P		FY03 O/P				FY03 O	O	FY03 O/P		O	O		O	O	O	O
Other					FY03 O/P	FY03 O/P								O	FY03 O/P		O	O	FY03 O/P

FY03 = fiscal year 2003 O = ongoing P = planned