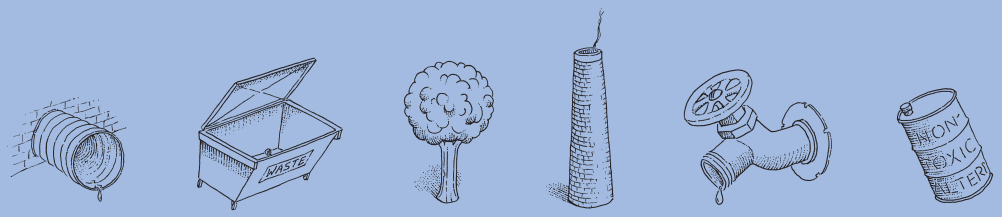

Pollution Prevention Summary Report

Consolidated from reports submitted by members of the Interagency Pollution Prevention Advisory Team for the fiscal year 2004

March 2005

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 2004, 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 2004.

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 state-owned buildings and grounds to establishing statewide technology policy. Throughout its daily and strategic work, the department is committed to offering the best possible service, enabling state government to work more efficiently. 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 (MMD) 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. The Resource Recovery 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 operation of 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 541 faculty and staff, and 615 student employees. This summary reports on both locations. No specific training was conducted in FY 2004.

Department of Commerce – The department employs 329 staff total: approximately 260 staff in downtown St. Paul, 11 staff in Roseville, and an additional 58 floating field staff. 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) – This pollution prevention summary report contains information from fiscal year 2004 for the Department of Corrections (DOC). The DOC has approximately 3,700 employees working in ten juvenile and adult facilities, field offices, a central office, and MINNCOR Industries.

Throughout the year, selected facility staff members within the DOC have received pollution prevention training. In addition, General Maintenance workers at MCF-Oak Park Heights attended training on new, safer cleaning products and energy saving equipment.

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 54 people in the St. Paul office and 10 staff in regional offices to provide local government assistance and 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 Health Sciences 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 6,500 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 SOCS 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.
- Reclaim mining impacted lands to create a diverse regional economic development resource.

The agency complement, including all departments and locations, is 73 employees as of August 2, 2004, down 2 employees from fiscal year 2003. 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 people who settled there. Over 18,600 guests visited the Ironworld Discovery Center in 2004.

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 in an onsite growth chamber and planted 150,000 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. These two golf courses hosted 35,000 golfers last year.

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. Approximately 100,000 skiers hit the slopes and cross-country trails in 2004. 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.

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 2003, MSP serviced more than 33 million passengers and supported 510,000 flight operations. The reliever airport system supports more than 630,000 flight operations per year.

The MAC presently employs 554 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, Information Systems, 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 that 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 2003, Metro Transit also took control over its first light rail line, The Hiawatha Line formally opened to the public in April 2004. This added 22 light rail train cars to the fleet inventory plus the buildings required to operate the new system and the 16 stations that are along the line. This report will cover all of the buildings that are operated by Metro Transit. During the last year, Metro Transit conducted no formal P2 training, but opportunities were given to staff to attend programs put on by other agencies pertaining to P2.

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, 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 52 full-time staff and approximately 180 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 2004 fiscal reporting period.

Department of Military Affairs (DMA) – The Department of Military Affairs is composed of the Minnesota Army National Guard (MNARNG) and the Minnesota Air National Guard (MNANG). MNARNG facilities are located throughout the state of Minnesota in approximately 80 locations, including Camp Ripley and the Arden Hills Area Training Site (AHATS). MNANG has facilities in Duluth (148th Fighter Wing), in Minneapolis (133rd Airlift Wing), and at Camp Ripley. 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.

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.

North Hennepin Community College (NHCC) – Approximately 360 staff work at our agency, which has two locations: North Hennepin Community College campus and off-campus classes at Buffalo High School, Buffalo, Minnesota. We are reporting only for North Hennepin Community College. P2 training is required of Plant Services staff and certain other staff, and is voluntary on 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 few years, the services of an outside consulting firm, MacNeil Environmental Inc., have been expanded to better address this training issue. They now provide some MS4 information/training, focusing on education about storm water pollution prevention on campus and in cooperation with the city of St. Cloud.

Southeast Technical College – Minnesota State College-Southeast Technical has 151 employees; departments include instructional, support staff, clerical, maintenance, administration, student services, financial aid, placement, custom services, marketing, and outreach departments. Minnesota State College-Southeast Technical consists of three facilities referred to as Red Wing Campus, Winona Campus, and Winona Airport Campus. This report will cover the agency as a whole.

The college has not offered any formal training to all staff on pollution prevention; however, formal policies exist on recycling, waste prevention, and hazardous waste management. Trade and Industrial faculty and maintenance personnel are provided annual training on hazardous waste management as a component of a comprehensive safety program.

Department of Transportation (Mn/DOT) – The Minnesota Department of Transportation has approximately 4,845 employees. Mn/DOT is a decentralized organization with one central office and eight districts that are subdivided into 16 regions. Mn/DOT has 16 District Management Offices with 135 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 (including part-time and student 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.

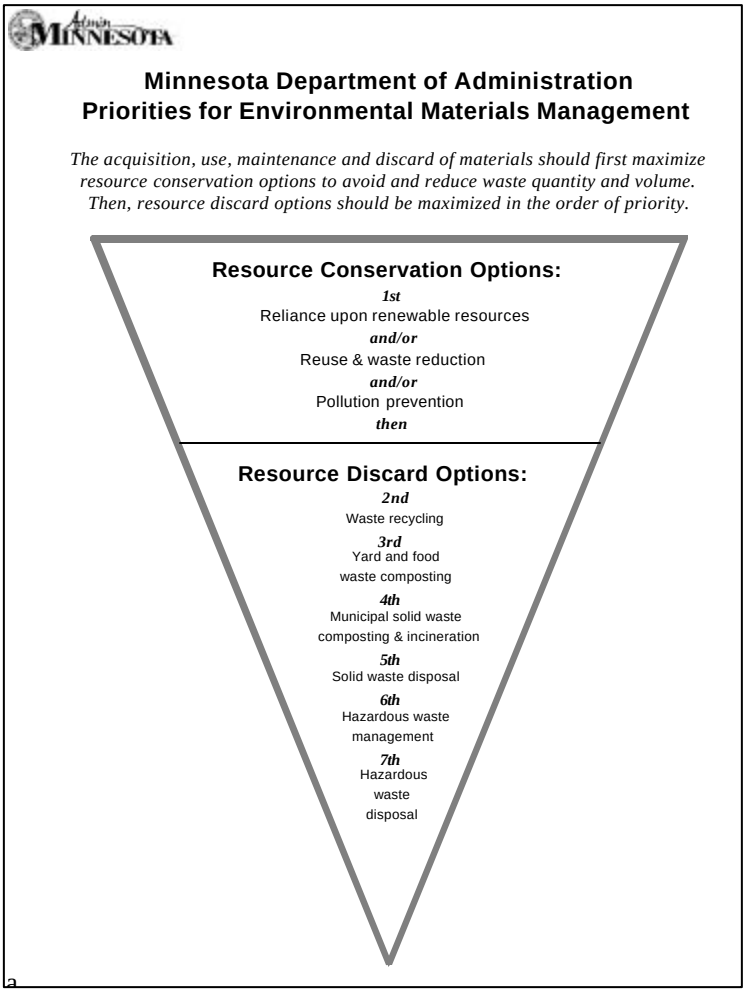
The university has approximately 22 experiment or research stations, extension agents in all 87 counties in Minnesota, and has approximately 50 EPA ID numbers for hazardous waste generator sites around the state of Minnesota. Total managed space is 28,202,000 square feet. This report covers the university 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. 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). Public employees learn about them during purchasing training.

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. The Department of Administration's pollution prevention activities include:



- Treating pollution prevention as a top priority in its "Policy on Environmental Materials Management" and its "Priorities for Environmental Materials Management" (see sidebar).
- Plant Management Division's mission statement encompassing pollution prevention and other environmental concepts (see next page).
- Resource Recovery Office encouragement of pollution prevention and promotion of the preferred waste management practices contained in Minnesota Statutes § 155A.02 during the acquisition, use, maintenance, and disposal of materials.
- The Plant Management Division and Materials Management Division requirements that each employee be held individually accountable for achieving environmental stewardship as a function of his/her job responsibilities and as a fulfillment of his/her position description. Employees are to follow state and federal requirements and shall identify opportunities to implement environmental values.
- PMD inclusion of language in lease agreements to provide both purge days and coordination services for each building on the Capitol Complex. This annual activity promotes recycling, reuse, and the correct disposal of hazardous materials.
- Materials Management Division requirement that vendors provide environmental codes on the goods and services they make available for state purchase.
- The State Architect's Office publishing and maintenance of "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, and open communication.
- **Plan for the future, considering** technology, employee development, establishment of long-term goals, and involvement of clients.
- **Environmental stewardship with** conservation of resources, prevention of pollution, promotion and education, and integration into all work places and services

Created 1/92

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, education efforts, and staff support.

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	84	2,185,905	2,335
2004*	**99**	1,434,202	2,267

* through July 2004

Within the next year, the Department of Administration hopes to develop the capability to track E85 fuel sales by agency.

Education, Communications, and Training: The department operates the Energy Information Center, which is staffed by full-time energy specialists who answer consumer inquiries and who staff outreach events.

ENERGY INFORMATION CENTER CONTACTS (FY00-04)

	2000	2001	2002	2003	2004
Contacts*	60,000	60,000	61,000	63,000	TBD
Printed	239,000	240,000	200,000	127,000	TBD
Web site	40,000	TBD	TBD	94,000	TBD
CDs	TBD	31,000	40,000	TBD	TBD

* phone, in-person, e-mail responses

Energy Production: Solar Electric Rebate Program: The department received competitive funding for and operates the Minnesota Solar Electric Rebate Program (SERP), which offers about a 20 to 25 percent buy down on grid connected solar electric systems.

MINNESOTA SOLAR ELECTRIC REBATE PROGRAM RESULTS (KILOWATTS)

	Annual	Cumulative
FY03	7.8	7.8
FY04	46.2	54.0
FY05	8.2	62.3
Pending	88.4	150.7

Legislative Commission on Minnesota Resources (LCMR) funding: The department was awarded a LCMR FY04-05 grant to implement 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. Carleton College is constructing a 1.65 MW wind turbine and the University of Minnesota-Morris is constructing two 0.95 MW wind turbines. Subject to legislative approval, the wind rebate program will have additional funding in FY06-07 for two more projects.

Conservation Improvement Programs: Electric and Natural Gas: 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 and natural gas consumption.

ELECTRIC ENERGY SAVINGS AND AVOIDED EMISSIONS DUE TO ELECTRIC CIP

	1999	2000	2001	2002	2003
Electricity (kWh)	214,160,804	302,905,644	323,267,204	361,774,831	403,570,318
CO_2 (tons)	175,612	248,383	265,079	296,655	330,928
SO_2 (tons)	533	754	805	901	1,005
NOx (tons)	421	595	635	711	793
Mercury (lbs)	6	9	9	10	11

Note: Emissions data have been reconfigured for previous years based on new emissions rates. CO_2 = carbon dioxide, SO_2 = sulfur dioxide, NOx = nitrogen dioxides

NATURAL GAS ENERGY SAVINGS AND AVOIDED EMISSIONS DUE TO GAS CIPS

	1999	2000	2001	2002	2003
Nat gas (Mcf)	1,310,255	1,349,630	1,527,548	1,338,796	1,781,059
CO2 (tons)	79,008	81,383	92,111	80,729	107,398
SO2 (tons)	0.4	0.4	0.5	0.4	0.5
NOx (tons)	1.4	1.5	1.7	1.5	2.0
Mercury	-	-	-	-	-

Note: Emissions data have been reconfigured for previous years based on new emissions rates. CO_2 = carbon dioxide, SO_2 = sulfur dioxide, NOx = nitrogen dioxides,

Tanks: 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 APPLICATIONS AND FUNDING (CY98-03)

	1998	1999	2000	2001	2002	2003
Applications approved	1,881	1,440	2,184	1,630	1,204	1,518
Funding approved (millions)	$21.4	$14.5	$18.9	$13.1	$10.6	$13.4

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.

DOC policies are in place to help reduce pollution in the areas of alternative fuel vehicle procurement and telecommuting. Department purchasing policy states: "The Travel Management Division of the Minnesota Department of Administration can help answer questions related to State of Minnesota and/or U.S. EPA act requirements regarding vehicle acquisition." In addition, the policy references the Minnesota State Statute regarding the purchasing of fuel and vehicles by state agencies. Further, DOC policy 103.235, *Telecommuting*, lists P2 as one element in the decision-making process.

DOC facilities continue to work with county hazardous waste inspectors, hazardous waste contractors, state agencies, 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 their 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 ten 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 61.5 million pounds of waste, resulting in company savings of $2.4 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 products takes responsibility for the environmental impacts at every stage of a 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.

OEA's Strategic Plan contains goals and strategies for driving changes in policies and practices within all Minnesota sectors that result in pollution prevention throughout the state. Relevant excerpts from that plan are:

VISION: Minnesotans prevent pollution and reduce toxic products and materials in our communities.

Goal 1: Reduce and prevent pollution and toxicity.

Goal 1.1. Prevent pollution by changing the way products and services are designed, manufactured, and delivered.

Strategies:
- ? Technical assistance
- ? Financial assistance
- ? Design for the Environment

Goal 1. 2. Minnesotans use nontoxic and environmentally preferable products and properly manage products with hazardous constituents.

Strategies:
- ? Education campaign
- ? Environmentally preferable purchasing
- ? Technical and financial assistance

Goal 1.3: Reduce air toxics, ozone precursors, and greenhouse gases emitted to the environment.

Strategies:
- ? Clean Air Minnesota partnership to reduce emissions of ozone precursors, including VOCs, NOx, and other pollutants.
- ? Green energy. Increase the use of renewable energy and cleaner energy technologies in fuel and electricity use in Minnesota.

VISION: We conserve resources and minimize waste.

Goal 2: Minnesotans use materials, products, and services in a manner that conserves resources and minimizes waste generation.

Goal 2.1: Improve and support integrated waste management systems while reducing waste and conserving resources.

Strategies:
- Organics reuse/recycling. Encourage the recovery of food for reuse by people or livestock and build additional resource recovery capacity for organic materials as needed.
- Regional planning. Support planning and institutional development; emphasize regional strategies.
- Market development. Build markets for recycled and reused materials; build markets for compost use to increase recovery of organics and improve techniques for stormwater management and erosion control.
- Education campaigns
- Targeted technical and financial assistance. Work with local units of government and business to provide efficient, compliant collection of household hazardous waste, waste reduction, waste processing, resource conservation, and to promote markets for recycled materials.

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 eliminating mercury-containing medical devices on all campuses. DHS continues its statewide electronic benefits transfer program that replaces paper transactions with an electronic debit card at the point of sale.

Iron Range Resources and Rehabilitation Agency – The IRRR is committed to 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 online employee newsletter. IRRR is committed to keeping northeastern Minnesota safe and healthy by encouraging its employees to:

- remain informed of environmental regulations.
- share environmental friendly ideas that support pollution prevention.
- 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. Several MAC purchasing policies have been effective in preventing pollution at the MAC. Product reuse is promoted internally through a purchasing policy, including a procedure for disposing of property that the MAC no longer needs. Internal notices are distributed offering one department's surplus to another. This strategy not only reduces waste, it also holds down costs. An office supply surplus center has also been established providing a location to store surplus office supplies. These excess supplies are available to any employee for use at the MAC.

Surplus equipment and lost and found items were previously sold by mailing lengthy descriptions, bid sheets, and terms and conditions to numerous recipients on a mailing list. Now these items are sold through the Internet and e-mail. This allows the MAC to reach more potential bidders and eliminates the large and frequent mailings, thereby reducing paper usage. (See also item numbers 21, 22, 28, and 30 in Section 3.)

Technology and accepted practices. Use of electronic mail for notices such as job postings, organizational updates, press releases, and human resource announcements has helped reduce the amount of paper used throughout the organization.

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 –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' vision is to lead the way in protecting and enhancing our natural and cultural resources while maintaining the highest degree of military readiness. The DMA is committed to ISO 14001, Environmental Management System (EMS). The DMA will utilize effective partnerships both within and outside the organization to show continual improvement; develop innovative solutions; to obtain command; soldier and, regulator "buy in;" and to promote success in sustaining compliance with all regulatory requirements. 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

The DMA has contracts with the Minnesota Technical Assistance Program (MnTAP) to develop a pollution prevention (P2) plan for the MNARNG. MnTAP has been tasked with identifying 20 activities for pollution prevention opportunity assessment's (PPOAs) that are to be incorporated into the P2 plan. PPOAs will address some of the following activities from the attached list: absorbents, antifreeze, fuels, vehicle maintenance, batteries, cleaning supplies, energy, heavy metals, materials exchange, paint removal, paint process, and parts cleaning. The PPOA process will look at new or better equipment options and changes to procedures, and

perform a cost benefit analysis for these proposed process changes. This will assist in determining the best pollution prevention opportunities available for the department.

Minnesota Pollution Control Agency – Several projects spearheaded by the Minnesota Pollution Control Agency (MPCA) Agency-wide Planning and Assistance Unit (unit) utilize the regulatory process, applying prevention and other non-traditional regulatory approaches that can help achieve the agency's core regulatory functions. In partnership, staff and leadership from the unit, the MPCA media programs and their external partners have identified, designed, and are now implementing eight pilot projects as part of the P2 Tools Initiative. The appropriateness and effectiveness of prevention and other non-traditional tools in achieving the core regulatory functions, including our capacity and ability to track P2 results, will be explored through this critical mass of projects. The projects are unique in their application of a Logic Model Program Evaluation Tool and Community-Based Social Marketing Tools, which are both systematic project management tools aimed at ensuring better measurement, documentation of results, and commitment to more environmentally friendly behaviors.

The projects are: Feedlot Environmental Results Program; Process-based Inspections; Vegetative Buffer Technical Assistance and Outreach in the Red River Basin; Sucker River Watershed Protection Plan; Stormwater Management Training, Education and Outreach for Construction Impacts; Conservation Design Toolkit (Internet); Construction Stormwater Compliance Calendar; and Low-Impact Development Technical Assistance and Outreach. Positively MN Biz-Nice is a program initiated through the Governor's Office to promote business development in JOBZ designated areas. In a partnership between the Department of Employment and Economic Development, and other agencies, MPCA staff is providing technical assistance to businesses interested in sustainable development.

The Phosphorus Management Plan Development Resources packet, finalized in March 2003, has been successfully deployed through a partnership with Minnesota Technical Assistance Program. This compliance tool assists cities and other POTW operators with reducing phosphorus effluent. The MPCA Water Quality staff is in the process of devising a Phosphorus Management Plan (PMP) review checklist based on the PMP Template contained in the packet.

The 2004 Minnesota Air, Water and Waste Conference focused on prevention strategies within its program sessions. The MPCA sponsored two workshops led by Doug McKenzie-Mohr, author of "Fostering Sustainable Behavior: Community Based Social Marketing," during the year. His methodology promotes analysis that results in more environmentally protective behavior change through educational and other outreach strategies. In March of 2004, the solid waste utilization rules were finalized. These amendments to Minn. Rules ch. 7035 are designed to help solid waste generators identify alternatives to landfilling. In the first few months of the program, the MPCA has issued 12 case-specific beneficial use determinations or demonstration research projects that will allow the use of coal ash, wood ash, mixed ash, and municipal solid waste incinerator ash. The rules will help to further the concept of seeing waste as a resource.

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 recovered, 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.

University of Minnesota

University of Minnesota
Board of Regents Policy
Sustainability and Energy Efficiency

Adopted: July 9, 2004
Supersedes: Pollution Prevention and Waste Abatement dated June 12, 1992

Section I. Commitment
Sustainability is a continuous effort integrating environmental, social, and economic goals through design, planning, and operational organization to meet current needs without compromising the ability of future generations to meet their own needs. Sustainability requires the collective actions of the University of Minnesota (University) community and shall be guided by the balanced use of all resources, within budgetary constraints. The University is committed to incorporating sustainability into its teaching, research, and outreach and the operations that support them.

Section Ii. Guiding Principles
Subd. 1. Leadership. Through excellence in environmental education, research, outreach, and stewardship, the University shall strive to be a world leader by promoting and demonstrating sustainability and energy efficiency and by producing leaders and informed citizens.
Subd. 2. Modeling. The University shall strive to be a model in the application of sustainability principles to guide campus operations by:
(a) meeting and aspiring to exceed all applicable regulatory requirements;
(b) preventing pollution at its source;
(c) reducing emissions to the environment; and
(d) encouraging the use of a life-cycle cost framework.
Subd. 3. Operational Improvements. The University shall undertake a continuous improvement process that seeks to meet the operational performance targets, goals, and objectives designed to achieve sustainability.
Subd. 4. Energy Efficiency. The University shall undertake a process to increase energy efficiency, reduce dependence on non-renewable energy, and encourage the development of energy alternatives through research and innovation.
Subd. 5. Research. The University shall (a) promote innovative, high visibility research projects focused on sustainability and energy efficiency to inform campus operations as a whole as well as the broader community; and (b) promote collaborative projects that include faculty research undertaken in partnership with operations staff, students, public entities, community organizations, and industry.
Subd. 6. Education and Outreach. The University shall promote educational and outreach activities that are linked to operational improvements and innovation principles.

Section Iii. Implementation.
Subd. 1. Administration. The University shall have sustainability goals that inform administrative policies and procedures in the areas of planning, decision-making, execution, assessment, reporting, and alignment. These policies and procedures shall rely on scientific analysis and support the efforts described in subds. 2-4 of this section.
Subd. 2. Operations. Each University campus shall develop specific sustainability objectives and targets in the areas of:
(a) physical planning and development, including buildings and infrastructure;
(b) operations;
(c) transportation;
(d) purchasing; and
(e) waste management and abatement.
Subd. 3. Accountability. The president or delegate shall develop indicators and measures of success in the implementation of the principles outlined in this policy in consultation with appropriate faculty, staff, students, and experts in the broader community.
Subd. 4. Reporting. The president or delegate shall report to the Board annually on progress toward established targets and standards, using this information to identify opportunities for subsequent improvement.

Part 3
Pollution Prevention Activities during the Fiscal Year 2004

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 Materials Management has a contract for MnDOT for *Hazardous Materials: Used Oil Sorbent and Filter Management for Energy Recovery*. One contractor burns the burnable sorbents for energy recovery. The other handles non-burnable used oil sorbent materials that are generally clay and diatomaceous earth. The clay and diatomaceous earth are reused by extracting the used oil with the oil burned for energy recovery. This contract is available to other state agencies and members of the Cooperative Purchasing Venture.

Department of Corrections – Multiple facilities utilize a state-approved vendor for disposal and recycling of these materials to help ensure proper handling.

MCF-St. Cloud –St. Cloud recycles rags at a cost of $148 dollars per year. This eliminates oil-grease rags from trash dumpster, preventing the material from entering the landfill.

MCF-Stillwater –Shop supervisors regulate the use of these types of products in an ongoing effort to reduce the amount used. In FY04, 605 gallons was generated, down from 770 gallons in FY03.

MCF-Moose Lake/Willow River– Absorbents continue to be collected and disposed of via an appropriate waste hauler.

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, and then managed as a nonhazardous industrial waste and burned for energy recovery.

Metropolitan Council Environmental Services –MCES uses absorbents primarily on hydraulic fluids, crankcase oils, and other lubricating oils. The larger facilities send used bulk paper-based or polypropylene pad absorbents via OSI Environmental, Inc. to be burned as a fuel for energy recovery. Two MCES facilities have industrial wringers that squeeze the oil from the synthetic pads, allowing their frequent reuse. Two facilities send clay-based absorbent to CRI Recycling Service for cleaning and 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 waste (grit) with the approval of the regulating county. For 2003, 715 gallons of used absorbents were sent for energy recovery or recycling, an increase of 105% from 2002.

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 current absorbent is collected in 55-gallon drums after use and sent to a processing company that removes the oils from the absorbent and returns the "cleaned" product to the garage. The change has eliminated over 8,000 pounds of clay from the waste stream.

Department of Military Affairs – The P2 study will address absorbent usage and different types of absorbents.

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.

Southeast Technical College – Absorbents are used in the Aviation Maintenance Technology, Industrial Maintenance, Auto Body Technology, Automotive Technology, Machine Tool and Die, and Truck Driving programs, as well as the maintenance department. Absorbents used include pads, socks, and spill sorb. All used products are incinerated.

Department of Transportation – The sorbents currently used are used either disposed of 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 and 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.

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-Lino Lakes – An in-house refrigeration mechanic certified by the MPCA does all of the servicing on equipment that contains CFCs. This prevents the release of CFCs during servicing.

MCF-Rush City – A refrigerant reclaimer is used for the capture of Freon. A certified staff person performs all service on applicable refrigeration and air conditioning units using the reclaimer.

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.

Also, in late 2003 Metro Transit acquired its first electric hybrid car for staff use. Metro Transit has started a program to burn low sulfur fuels in its fleet. Currently about half of the bus fleet is fueled with low sulfur diesel.

Department of Military Affairs – The MNARNG has CFC reclamation equipment in place and certified personnel operating the equipment.

North Hennepin Community College – NHCC considers indoor air quality a high priority. Air quality sampling has been performed on problem/suspect areas, and corrective action is 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 increase 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-12) and refrigeration units (R-408, 22). No supplies or stocks of refrigerant are kept on campus. Refrigeration units that are found to be leaking are repaired and retrofitted with a more ozone friendly replacement refrigerant. 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.

Southeast Technical College – All work involving refrigerants is performed by licensed contractors on physical plant equipment. In our Automotive Technology and HVAC technician programs, students learn to work with refrigerants under direct supervision of the instructor following all regulatory guidelines using proper equipment and reclaimers.

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. 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 energy managers 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 optimization practices across the Twin Cities campus. Their efforts have reduced steam use on the Twin Cities campus central steam system by 24.6 percent, which translates to a 24.6 percent reduction in steam plant air emissions. Through energy optimization and the Energy Efficiency Program, overall energy consumption has decreased 17 percent since 1994, with energy cost savings of $2.8 million. 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.

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 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, and 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.

The campus bus routes and schedules routinely evaluated and optimized by the Department of Parking and Transportation Services in an effort to more effectively serve the riders while minimizing congestion on the urban campus streets, 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 air pollution.

The Department of Parking and Transportation Services received the 1997 Minnesota Government Reaching Environmental Achievements Together (MN GREAT) 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.

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 completed 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.

Department of Corrections – Multiple facilities recycle antifreeze with local vendors.

> ***MCF-St. Cloud –*** Antifreeze is no longer disposed of with the local municipality water department, rather it is recycled by local service stations.

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 MNARNG recycled approximately 2,000 gallons of antifreeze last year. There are two recycling options available for used antifreeze. The first is that antifreeze can be kept on site and a vendor contracted to recycle the antifreeze. The second option is that the antifreeze be sent to Camp Ripley, for a vendor to recycle. Historically, antifreeze was recycled in-house; however, due to equipment failure and the high cost to upgrade current equipment, in-house recycling is no longer being done. The P2 study will assess the antifreeze recycling process and assist department leadership in choosing the most prudent and feasible option for managing this material.

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.

Southeast Technical College – Antifreeze is used mainly in the Automotive Technology program and is recycled; no antifreeze is sewered.

Department of Transportation – Most of Mn/DOT does not produce significant amounts of 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-St. Cloud – Received a $17,000 grant from the Office of Environmental Assistance to help identify potential cost savings associated with reducing waste, increasing recycling, and identifying ways to improve the management of the waste stream. Multiple suggestions for positively impacting the facilities resources have been discovered and will be implemented in the future.

MCF-Rush City – Rush City's Safety Officer inspects monthly for a variety of fire, safety, and sanitation items, which include an inspection of hazardous materials, inventory lists, and disposal procedures.

MCF-Stillwater – Audits of waste storage areas are conducted during weekly and monthly safety inspections of. Spill prevention and containment practices are recommended/encouraged.

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 on the environmental impacts their actions may have, and to help them improve their waste management practices. 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 – Three separate audit visits occur at MNARNG facilities. The first is an Internal Performance Assessment System (IPAS) environmental audit. The IPAS audits are performed by full-time staff. The audits are designed to ensure that all regulatory requirements are met at each facility. Deficiencies are noted and immediately remedied if possible. Follow up is conducted to verify that any outstanding deficiencies were remedied in a timely fashion. Last year all MNARNG facilities were visited by IPAS inspectors. This initiative is generally referred to as Project SAVER (Site Assistance Visits Environmental Requirements).

The second audit, the Minnesota Organizational Readiness Evaluation (MORE) is conducted by the MNARNG Logistics Office. The MORE audits material procurement and shelf life. The third audit performed every four years by the National Guard Bureau (NGB), is called an Environmental Performance Assessment System (EPAS) inspection. The EPAS reviews the MNARNG's environmental program and policies to determine compliance with all regulatory requirements. The EPAS also does spot checks on environmental regulatory compliance at individual MNARNG facilities. In May of 2004, the MNARNG was inspected by the NGB EPAS staff.

Minnesota Pollution Control Agency (MPCA) – In May of 2003, the Minnesota Pollution Control Agency renegotiated its lease on the 520 Lafayette Road Building in St. Paul. As part of that lease, the agency required a commercial energy audit of the entire building. The result of this audit will be detailed in next year's report.

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.

Southeast Technical College – No formal audits have taken place for pollution prevention except for audits mandated by the MPCA, OSHA, and other regulatory agencies.

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 fuel is available to all state agencies and political subdivisions. The TMD facility has one 2,000-gallon bulk fuel tank used for dispensing E85 fuel. Vehicles at the TMD facility, as well as state vehicles operated in the vicinity of the TMD facility, used 7,736 gallons of E85 from this bulk tank in FY 2004.

While there are issues with reporting and tracking retail E85 purchases, we are committed to implementing this tracking. We believe that tracking E85 purchases will help agencies know when they are in compliance with Minnesota Statute § 16C.135, which requires the use of E85 in many circumstances.

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 has 52 vehicles in its fleet. There are no E85 vehicles in the fleet. Bemidji State University continues to operate two battery-powered maintenance vehicles that were purchased to replace two full-sized vans. Annual fuel savings are expected to be about $250.

Department of Commerce – Currently the department has 51 total vehicles, of which 14 are leased through the Department of Administration and 37 are owned directly by the department's Weights and Measures division. Two vehicles are E85 capable. The department does not fall under EPA act, and many vehicles are older (31 of the 37 department-owned vehicles are model year 2001 or older).

The department's ability to track E85 fuel use in department-owned vehicles is similar to the issues that other agencies face. The station operator can input any number of variables at the point of purchase that may or may not identify it as E85, including E85, UN+, UNa, UN, UNL, and SUa. Using the fuel card information, making some assumptions, and tabulating by hand, we calculated the following information on the department-owned E85 vehicle:

E85 Chevy Silverado Truck
July - November 2003 (5 months)
E85 fuel: 305 gallons out of 393 total
E85 fueling: 78%

Department of Corrections – Four facilities, the Central Office, and Field Services reported the use of E85 vehicles in their automobile fleets. While actual E85 fuel usage amounts could not be obtained, 83 of 216 (38%) vehicles were reported to be E85 capable.

MCF-Rush City –Rush City is working with the local gas stations to have E 85 added to the pumps.

Office of Environmental Assistance - Both of OEA's vehicles use E85, and staff is encouraged to use E85 fuel.

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. The agency leases 20 state vehicles from the Travel Management Division in St. Paul and six of these vehicles are flexible fuel vehicles. The closest service station that has E85 fuel is in Duluth, Minnesota, which is 60 miles from our agency. The agency has fuel tanks for unleaded gas and diesel fuel but does not have a state contract available for E85 fuel, because there is no bulk supplier in the vicinity that has this product available.

Metropolitan Airports Commission –MAC has a total of 202 licensed vehicles; none of these are E85 vehicles and no E85 fuel is purchased.

Metropolitan Mosquito Control District – As a pollution prevention activity for 2004, MMCD purchased new flex-fuel vehicles (FFV) capable of using E85 ethanol to replace some of the older fleet vehicles. Twenty-five percent of the new vehicles purchased by MMCD in 2004 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.

By using FFVs in the fleet, MMCD will 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 $2,076 more than the standard Chevy Silverado pickup without flex-fuel capabilities.

In 2004, MMCD used approximately 1,400 gallons of E85 fuel. MMCD owns and operates 8 flex fuel vehicles and 160 non-flex fuel vehicles. MMCD plans to continue with a program of replacing older fleet vehicles with flex fuel vehicles for 2005.

Department of Military Affairs – In 2003, the MNARNG recycled approximately 1,200 gallons of contaminated diesel fuel. The recycled diesel fuel was reused. The Maneuver Area and Training Equipment Shop (MATES) performs this service for the MNARNG.

The MNARNG currently has no fuel points dedicated to E85, but during 2005 the fuel ration point at Camp Ripley will be expanding to incorporate an E85 fueling station. If E85 fuel is purchased by the MNARNG, it is done by credit card on an as needed basis. It is anticipated that the purchase is tracked as a fuel purchase and not an E85 fuel purchase. We are hoping to discover a method to track E-85 fuel usage in the department. Evaluation of a used oil diesel fuel blender is an additional PPOA being performed in the department. Results will be reported in next year's report.

Minnesota Pollution Control Agency (MPCA) – The Minnesota Pollution Control Agency has 59 flex-fuel vehicles and two alternative vehicles: a 2000 Toyota Prius and 2004 Honda Civic. In 2004, Commissioner Sheryl Corrigan had sent an email to all staff with a challenge and a goal, she asked staff to fill up with E85 50 percent of the time. Currently, the agency is averaging about 28 percent each month.

The agency has taken a couple steps to help encourage staff. The MPCA began auditing 10 percent of the flex-fuel vehicles to find out if staff was using regular gas when E85 was available at a gas station. If the audit shows that staff did not fuel with E85, their supervisor are contacted and asked to talk to their staff. The Alliance for Recycling and Reduction of Waste (ARROW) team was also asked by the commissioner to think of different ways to encourage staff to fuel up with E85. ARROW designed a poster that is posted by each vehicle sign-up station encouraging the use of E85. The MPCA will continue to take innovative and creative approaches to encouraging the use of alternative fuels in all of its vehicles.

North Hennepin Community College – Fuel for grounds equipment is stored in an aboveground 285-gallon diesel tank, which has spill containment. Gasoline for small equipment is kept in approved safety cans and stored in an approved safety cabinet. E85 fuels have not been used on our older vehicles.

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 E85 refueling and pumped about 13,500 gallons for motor pool use last fiscal year. The Minnesota Dept. of Commerce/State Energy Office also monitors E85 usage.

Southeast Technical College – The college has a total of 29 vehicles. Twelve are semi trucks for our Truck Driving program. The rest of the vehicles consist of four maintenance vehicles, two cars used for Driver Training, and eleven other vehicles used for staff travel and program needs. Currently, the college has no vehicles that can use E85 fuel. The Truck Driving program will use biodiesel fuel when it is available in Winona. Automotive fuels are used for college vehicles and by Maintenance, Automotive Technology, Truck Driving, and Aviation Maintenance Technology programs. Minimum amounts of fuel are stored on site in approved containers. When vehicles are purchased, fuel economy is a factor in selection. Our Truck Driving program stores trucks in a heated garage during the winter months to reduce warm-up time to improve fuel

efficiencies. The college also has installed a driving simulator, reducing student time spent in the trucks learning the basics. The savings on fuel and maintenance on the trucks cover the cost of the simulator.

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. Mn/DOT purchased 3,357 gallons of E85 fuel in FY04. Due to the locations of the E85 fuel pumps, 19 percent loss of fuel efficiency in the vehicles, and low percentage of E85 vehicles Mn/DOT owns, presently this is not a cost effective option. Mn/DOT is meeting the federal standard for purchasing 75 percent of light-duty fleet as alternative fuel vehicles. The portion of the fleet that is being operated in the designated Metropolitan Statistical Area, which includes the Twin Cities area, Duluth, and St. Cloud. 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 approximately 20,000 gallons of E85 fuel in both 2002 to 2004. In fall 2000, the Department of Fleet Services, Twin Cities campus, installed a 6,000-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.

AUTOMOTIVE FUEL: E85 PURCHASE

	FY 2003	FY 2004
Total vehicles	795	830
E85 vehicles	42	38
E85 % of fleet	5.28	4.58
Hybrid vehicles	3	4
Gallons of E85 purchased	19,867	18,636

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/labs/pp/index.shtml). 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.

7. Automotive Maintenance

Department of Administration – The Travel Management Division recovers and recycles automotive refrigerants for air conditioning units, and they are recycled on-site at the repair facility. 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 Commerce – The department-leased vehicles receive maintenance through the Department of Administration Travel Management division service schedule. Department-owned vehicles are maintained by private businesses under contract.

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.

Department of Military Affairs – Camp Ripley Training Site serves as a major training area for National Guard and other DOD units from throughout the nation. The Maneuver Area and Training Equipment Site (MATES) serves as a facility within the Camp Ripley Training Site where units can obtain equipment while they are at Camp Ripley for annual training periods and weekend drills. The MNARNG "mothballs" a portion of its fleet in controlled humidity storage buildings when not in use. These buildings allow the MNARNG to store vehicles inside, out of the elements, and allow the vehicles to remain operational.

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 oil, 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.

Southeast Technical College – Automotive maintenance is performed in the Automotive Technology program and maintenance department. All oil and oil filters are recycled.

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 in light of 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.

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 2003, 26,245 pounds of SLABs—a tenfold increase 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 1980s.

Department of Military Affairs – The MNARNG recycled approximately 2,400 lead acid automotive and truck batteries. The use of solar-powered "trickle chargers" on vehicles that are stored for long stretches of time is being evaluated. These trickle chargers help maintain a charge on batteries during periods of non-use. This has greatly reduced the number of batteries that lose their charge and/or crack during the winter.

Evaluation of the longevity and compatibility of rechargeable dry cell batteries is occurring at one of the MNARNG repair facilities. The evaluation will expand to other repair facilities. The Logistics Branch of the Department has established program policy. The Automated Target System (ATS) office is in charge of maintaining all weapons targeting systems. For small arms training, lead acid batteries are used to power "pop up" targets. The ATS has replaced 120 standard lead acid batteries with longer life sealed OPTIMA® batteries. These batteries feature two thin lead plates wound into a tight spiral cell, with an absorbent glass-mat in between to hold the electrolyte solution. The batteries have been shown to have a longer life span, and to hold a charge longer. The batteries may also be oriented in any manner during use. This flexibility is of great value

for use in powering targeting systems, reducing waste, and in reducing maintenance time spent on replacing the old style batteries.

Minnesota Pollution Control Agency – The MPCA Alliance for Recycling and Reduction of Waste (ARROW) continues to coordinate its battery collection program. Onyx Environmental Services picks up and recycles the agency's used batteries. In 2003, the MPCA recycled 45 pounds of household batteries and 600 pounds of automotive 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.

Southeast Technical College – Old batteries are turning in when the college purchases new vehicle batteries are purchased. Any other lead acid type batteries are taken to a recycling center. Small batteries purchased are the mercury-free type.

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.

Rechargeable batteries are sent to RBRC for recycling. All non-lithium button batteries are recycled with mercury and other metal recovery.

9. Cleaning Supplies

Department of Administration – The Materials Management Division works with the Office of Environmental Assistance in awarding the Cleaning Supplies Contract. Criteria used in this award will provide products to agencies that have less impact on public health and the environment. Each product has been 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 are being considered to ensure greater safety to state agencies and the environment, including aquatic toxicity, combustibility, skin sensitization, photochemical smog, tropospheric ozone production, and indoor air quality.

Each solicitation responder is required to have their formulations reviewed by an independent laboratory to verify all ingredients found in their products. The Resource Recovery Office uses state contract cleaning supplies from 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.

Office of Environmental Assistance – The OEA uses cleaning products that are more preferable, less hazardous, and bio-based.

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 – Internal audits of DMA facility cleaning supply storage include a review of shelf life. Whenever possible, the shelf life is extended and products are used up. The DMA utilizes a centralized collection point where soiled rags are exchanged for clean rags. Only rags soiled with POL products are sent off for cleaning, all other rags are managed as hazardous waste.

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, contain recycled or post-consumer material, 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.

Southeast Technical College – Cleaning supplies whenever possible are purchased from existing state purchasing contracts, which have resulted in the use of safer products.

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, 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 101—reduction of 33 percent.

The approved custodial list of 101 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 101 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.

Facilities Management, Twin Cities Campus, in collaboration with 3M's Commercial Care Division has developed a new, safe-cleaning program for U of M 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.

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.

MCF-Faribault – Faribault has limited the travel distance for offender hospitalization from the Twin Cities (60 miles from our facility) to District One Hospital (1 mile from our facility). This will reduce the amount of fuel used and emissions.

MCF-Oak Park Heights – Oak Park Heights had over 200 teleconferences for staff training, staff meetings, and offender hearings in the past year.

Office of Environmental Assistance – The OEA accommodates 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 214 passenger and light service vehicles. There are now seven 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. However due to the limited locations of E85 fueling stations in relation to MCES activities, no documentation can be provided for E85 use.

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.

Department of Military Affairs – Video conferencing stations have been placed in all DMA facilities. This has eliminated the need for personnel from greater Minnesota to have to drive to either Camp Ripley or to St. Paul for weekly, monthly, or quarterly meetings. This ability to video teleconference has also reduced travel requirements outside the state of Minnesota.

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. The program involves a low-priced all-you-can ride bus pass for agency employees. Currently, 65 MPCA employees at the St. Paul Office are enrolled in the Metropass program.

The MPCA not only has employees using the Metropass to commute from home to work, but also encourages 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. The MPCA is the first state government agency in Minnesota to make the Metropass available to its employees.

The MPCA still has 61 percent more people using the bus for state business than in 1998, before the Metropass. This is in spite of a 12 percent loss of staff and recent price increases. The MPCA has two electric bikes for business use. Yellow bikes are also available to staff at the DNR for lunchtime trips or any other travel purpose. The MPCA also has two hybrid-electric cars in the agency fleet.

St. Cloud State University – SCSU has moved beyond subsidizing bus passes for students and faculty to partnering with student government and St. Cloud Metropolitan Transit Commission to provide a new Free Ride program, a free service on 17 bus routes to current SCSU ID cardholders. This includes evening transportation in the campus area. Over 30 apartment complexes are within 20 bus minutes of campus. Clipper West route riders have increased 107 percent for January 2004 compared to January 2003, reducing parking congestion.

Southeast Technical College – The college has purchased two vans to allow larger groups to travel together whenever possible to reduce the number of vehicles used for travel. Interactive video and/or speakerphones are used for meetings between the Red Wing and Winona campuses to reduce travel.

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 – In June 2004, the University of Minnesota was designated one of the Best Workplaces for Commuters℠ by the U.S. Environmental Protection Agency (EPA) and U.S. Department of Transportation (DOT). Best Workplaces for Commuters℠, a voluntary partnership program designed to cut traffic congestion and traffic-related air pollution, recognizes employers that provide environmentally friendly commuter benefits to employees. Offering these commuter benefits identifies the university as an organization committed to reducing pollution, commuting costs, traffic congestion, and employee stress caused by single-occupant vehicle commuting. Best Workplaces for Commuters℠ (www.bwc.gov) is a public-private partnership developed by the EPA and DOT. EPA and DOT have established a voluntary National Standard of Excellence for employer-provided commuter benefits. The program challenges employers across the country to voluntarily meet the National Standard of Excellence.

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.

Does U-Pass work on the new light rail system? Yes, U-Pass is valid on the Hiawatha light rail line. 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. Due to a cooperative effort between UMD administration and the DTA, students, faculty and staff, can ride the DTA anytime, anywhere in the Twin Ports free of charge with a UMD I.D. or U-PASS. The DTA has transported more than 1,000,000 UMD students since the induction of the U-PASS in September of 2000. The "free-ride" U-PASS contract between the DTA and UMD is in service until the 2005-2006 academic year. 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 of 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.

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.

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 conducts tours of the State Recycling Center 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 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 also represents the Department of Administration at Minnesota's Interagency Pollution Prevention Advisory Team meetings. Representatives from the Materials Management and Plant Management Divisions regularly attend these meetings. 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 and the Accounting and Procurement Spring Fling.

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. During FY04, 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 614 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 continues to provide all updates of the ALP 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:

- 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
- The Sierra Club

Previous education efforts in the area of recycled paper purchasing have been very successful. State agencies continue to purchase over 90 percent recycle paper.

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
- 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
- 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. More than 50 people in attended the presentation. After the conference, we received about a dozen e-mails asking for information. MMD has also spoken on the same subject at 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 a Wind Energy Conference sponsored by U.S. Senator Byron Dorgan and the Energy and Environmental Research Center at the University of North Dakota.

A student-developed program entitled "It's Good to Be Green" was presented at the annual student scholarship day and subsequently to the members of the Environmental Advisory Committee. The PowerPoint presentation described the economic, social, and environmental benefits of implementing environmentally prudent decisions and actions into university operations and policies. The program was well received, and it is planned to make the presentation available to the entire university community during the up-coming school year.

On Earth Day (April 22, 2004) the BSU Environmental Advisory Committee passed a resolution urging the University to:

- Sign the Talloires Declaration during a public event occurring fall semester 2004.
- Continue to pursue the goals outlined on the master plan. Particularly goals associated with parking and transportation sustainability.
- Develop an endowment through the foundation, which would allow individuals and/or groups donating money to BSU to choose environmental sustainable programs.

Department of Commerce – Employee and news information is distributed via a paperless process on the department's internal website.

Department of Corrections

MCF-Moose Lake/Willow River – Moose Lake/Willow River has conducted training in the area of hazardous waste for identified staff.

MCF-Rush City – There is a recycling program for all staff. Video conferencing is widely used for staff training and offender education, reducing the need for commuting. The facilities new CAFM system, Archibus, allows for paperless work order and preventive maintenance requests. Facility phone directories and many other forms are also online to save paper. Online training is utilized whenever possible.

MCF-St. Cloud – Safety officers and plant operations management receive pollution prevention education annually to ensure they are abreast of state-of-the-art techniques for pollution prevention.

MCF-Shakopee – The Physical Plant director attended a two-day building energy and water conservation workshop.

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

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 2,700 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 bi-weekly sustainability e-mail newsletter and the NextStep sustainability web site. MnSCN's popular bi-weekly newsletter typically contains most of the following sections: tools and resources, jobs available, events, sources of funding, and news from members. Over 180 issues of the newsletter have been published.

NextStep (www.nextstep.state.mn.us) is an interactive web-based assistance tool that 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 over 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. Other websites the OEA manages are www.reduce.org and www.seek.state.mn.us, 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
- The Minnesota GreenPrint
- The Minnesota Report Card on Environmental Literacy
- ·The Environmental Literacy Scope and Sequence
- Getting the lead out – a fact sheet for sport fishermen
- Global Warming and Climate Change in Minnesota.

The OEA provides training for the Design for the Environment (DfE) toolkit, developed to help Minnesota manufacturers integrate environmental attributes into products before they are produced. DfE considers the environmental impact for the entire lifecycle of a product's life, including premanufacture, manufacture, distribution, use, and end of life. Once a product is designed, its environmental attributes are largely fixed. The DfE Toolkit allows manufacturers to address environmental impacts at the most fundamental level, product design. Through pollution prevention grants OEA helped Perfusion Systems, a Medtronic cardiac business, and the General Mills-Chanhassen facility integrate DfE into product design.

OEA staff continue 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 coordinate 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 Minnesota Government Reaching Environmental Achievements Together (MnGREAT!) Awards recognize environmental achievements by government employees in the areas of pollution prevention, toxicity reduction, waste reduction, energy conservation, water conservation, recycling, and composting. IPPAT, which sponsors the program, recognizes projects that demonstrate a high degree of commitment and leadership and provide substantial benefit to the environment.

All the nominations submitted for the 2004 MnGREAT! award were worthy of recognition for environmental improvement. Those that were selected by the judging panel fit the definition of pollution prevention and had already demonstrated a measure of success. The 2004 winners of the MnGREAT! Award are as follows:

- The City of Albert Lea for the distributed generation project at its wastewater treatment plant. The project uses methane generated by bacteria during the wastewater treatment process to power four micro turbines that generate electricity, and the exhaust heat in turn heats the water that is used in the biogas generation. The project is currently saving 6 therms of natural gas per hour or 52,560 therms per year, and the payback is expected to be 3.42 years.
- The Crow Wing County Solid Waste Office for its used oil collection program, which provides user-friendly and convenient used oil drop-off locations to residents and tourists alike, so that residents and visitors alike can continue to enjoy all that the popular recreation area has to offer. Extensive education and advertising help ensure the effectiveness and success of the program.
- Dakota County for its vision, leadership, and commitment to design and construct high performance-sustainable building projects, as exemplified by the Dakota County Lebanon Hills Regional Park Visitor Center. The visitor center demonstrates how adequate and sustainable spaces can be constructed with the smallest ecological footprint upon the site and surrounding areas, while also providing a highly energy efficient and long-lasting facility with minimal impact upon future operating costs.
- Dakota Valley Recycling, serving the cities of Burnsville, Eagan, and Apple Valley with a joint recycling program that provides economies of scale, reduces duplicate efforts, and promotes a uniform message to residents of all three cities. The program has initiated a pilot curbside organics collection program, strengthened environmental partnerships with businesses and residents, and conducted extensive outreach and education to many different audiences within the county.
- The Iron Range Resources Mineland Reclamation Program for conserving a significant amount of energy with its growth chamber lighting upgrade at the Mineland Reclamation headquarters in Chisholm. New 1,000 watt metal halide bulbs and reflectors distribute light to 150,000 tree seedlings in the two growth chambers. The heat produced by the bulbs is reclaimed through heat pumps to be used as the primary heating source for the Mineland Reclamation building. The reclaimed heat also heats 1,000 gallons of water that is used to water the tree seedlings. No supplemental heating is required when the growth chambers are operating, cutting annual energy use by 67 percent.
- Linda Schaumburg and staff at the Minnesota State Operated Community Services Northern Region for developing and marketing Northern Sparks Firestarters. Linda designed and developed the manufacturing for the firestarters, which consist of 100 percent recycled materials assembled into a waterproof firestarter that burns for 20 minutes or more, replacing liquid firestarters and kindling that is sometimes harvested illegally in parks.
- The Metro WaterShed Partners, a collaboration of water resource educators in the Twin Cities, for their "Minnesota Water – Let's Keep it Clean" storm water education program that provided consistent clean-water messages in mass media across the Twin Cities metro area and made ready-to-adapt storm water educational materials available to cities and neighborhood organizations.
- The Metropolitan Council Environmental Services Division for sustainable design in the expansion of the Eagles Point Wastewater Treatment Plant in Cottage Grove. The plant was tripled in capacity while in continuous operation on a limited-area site in a sensitive environmental location on the bluffs above the Mississippi River. Sustainable design features include building orientation, insulation, lighting and daylighting, office furnishings, recycling of demolition debris, storm water control, and landscaping. Two remarkable features are elimination of specific toxic chemicals and heating and cooling. Chlorine gas and

liquid sodium bisulfite were replaced by ultraviolet lamps to disinfect the three million gallon daily flow of effluent. Heating and cooling in the Plant Administration building is supplemented by a thermal "heat pump" exchange with the relatively year-round consistent temperature of that same effluent.

- The Metropolitan Council Environmental Services Division for its partnership with the Minnesota Dental Association to develop and implement a voluntary dental clinic amalgam recovery program. The project staff completed two research studies showing that dental clinics are a significant source of mercury to wastewater treatment plants and that cost-effective amalgam separators are available to dentists. The goal is to have all general practice dentists who place or remove amalgam install and operate a separator, significantly improving water quality in the state.
- The Rice Creek Watershed District for its comprehensive wetland management plan, covering approximately 1,200 acres of land in the growth corridor of Blaine, that consolidates and preserves large tracts of high-quality wetlands while still allowing for development. The plan promotes smart growth and natural resource-based planning, improves wetland and ecological integrity, meets storm water needs, satisfies land-owner issues, and solves a 15-year legal impasse.
- The Solid Waste Management Coordinating Board for its Community POWER (Partners on Waste Education and Reduction) program, which reaches people with waste reduction messages through organizations or institutions they already are a part of, such as churches, senior, civic, and youth groups, schools, arts organizations, neighborhood associations, and social service agencies. In its first two years, Community POWER involved over 3,100 people in waste reduction activities and reached 150,000 other people with waste reduction messages through newsletters, e-mail, direct mail, presentations, and community newsletters.
- The Steele County Detention Center for incorporating many design features that benefit the environment into its newly constructed center. A geothermal heating and cooling system reduces the need for natural gas, and daylighting reduces the need for artificial lighting and improves the general atmosphere. The building's architects carefully selected materials with recycled content that can also be recycled later, along with products that have fewer emissions of volatile organic compounds.

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. There is also annual hazardous material training where basic pollution prevention methods are addressed.

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 Living Green Expo, 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 2003. 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 MNARNG has developed its own waste management regulation plan. Regulation 200-3 (*Hazardous and Universal/Special Waste Management Requirements*) is a manual that has been provided to all MNARNG facilities throughout the state. This regulation is constantly undergoing review and being updated with current regulatory information and best management practices for items of concern.

The MNARNG has implemented a self-certification training course for personnel at VSQG facilities that are tasked with hazardous waste management and pollution prevention activities. The course is on CD-ROM as well as on the MNARNG website. With the high turnover and deployment of soldiers as well as the widespread locations of MNARNG facilities, CDs and the web site have made it possible to have training immediately available for newly appointed soldiers and for review by certified soldiers. These CDs have also cut the costs associated with the scheduling of centralized training events.

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.

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. An online degree in aviation maintenance management is now available. A Master of Science program in Environmental and Technical Studies, begun six years ago and serving a wide variety of backgrounds, finds about a third of program students are licensed teachers returning to school. Other research interests include recycling, landfills, and public perceptions of fuel cell technology. The charter class of 20 nursing students received their baccalaureate degrees on May 9.

Southeast Technical College – The college provides training to appropriate staff and students on safe handling and disposal of materials. Posters are displayed in each lab area as reminders.

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 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 electronic equipment contracts, 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. The Materials Management Division extended the contracts for leasing computer equipment. This will reduce the amount of surplus and used equipment that requires hazardous waste management.

The Materials Management Division, working with other states that are members of the Western States Contracting Alliance, developed a Request for Proposal for computer hardware. The RFP took into consideration several environmental issues.

- Take back and recycling programs
- Compliance with environmental improvement programs for reduction/minimization/avoidance of the use of toxic and hazardous constituents
- Compliance with international directives such as the European Union's directive: "Restriction of Hazardous Substances"
- Certification by independent third party eco-labeling programs such as TCO and Blue Angel
- The migration to the use of recyclable, nontoxic packaging
- Compliance with energy efficiency programs such as Energy Star

The Materials Management Division, in conjunction with other agencies and Cooperative Purchasing Venture members, maintains 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 second year of the contract, approximately $400,000 was paid to Asset Recovery to recycle computer/electronic waste.

Department of Commerce – The department ordered 142 LCD flat screen computer monitors (non-lead, low-energy) for installation during FY05. Computer equipment is either surplused or disposed of according to state guidelines.

Department of Corrections

MCF-Faribault – Faribault continues to recycle 16,015 pounds of computers through Asset Recovery Corporation. A credit of $700 was received for the PCs and monitors they were able to reuse.

MCF-Rush City – Rush City utilizes electronic toilets, showers, and sinks where applicable for dual purpose of saving energy through regulation of water and reduction in inmate vandalism.

MCF-St. Cloud – Recycles used TVs, fluorescent bulbs/lights, computers, and monitor at a cost $1,000 to $2,000 annually. These activities reduce the amount of waste sent to landfills.

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 environmentally preferable purchasing for electronic equipment, market development, and end-of-life management strategies for electronic appliances. Minnesota was one of 10 states that participated in the National Electronics Product Stewardship Initiative (NEPSI). Other stakeholders included 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 was to reach an agreement on a national program for

managing certain electronic products at end of life. NEPSI was unable to conclude an agreement in 2004 and consequently no federal legislation was agreed upon. The Minnesota legislature is now examining options for state programs.

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. California has banned the penta-PBDEs and octa-PBDEs. 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. The contract includes a provision specifying that no component materials from used electronics are exported overseas for management.

Iron Range Resources and Rehabilitation Agency – The Information/Technology 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 – In 2003, the Minnesota Pollution Control Agency (MPCA) donated or recycled the following electronic equipment:

- 55 laptops (weighing 440 pounds)
- 588 computers weighing (26,460 pounds)
- 121 monitors (4,235 pounds)
- 15 printers (600 pounds)
- 7 printers (784 pounds)
- 2 scanners (100 pounds)
- 4 modems (12 pounds)

This represents a total of 32,255 pounds of electronics that were reused or recycled in an environmentally acceptable manner. The MPCA makes extra efforts to provide information for internal and external customers electronically to reduce paper consumption, including putting some annual reports on its web page.

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.

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. E-mail announcements also help relocate electronic equipment from surplus to reuse in another department. Other electronic equipment (shipments totaling about 32,000 pounds and net cost of about $11,000) was recycled for somewhat offsetting commodity and precious metal credits. Styrofoam from computer, electronic, and other shipping cartons was also recycled.

Southeast Technical College – Old computers are first offered to other MnSCU colleges. Remaining computers are then sold to the public through advertised sales. Scrap electronic equipment is recycled through vendors from the state contract list.

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 as required by 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. Sign of this type 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 2004, the replacements resulted in a net reduction of approximately 45,000 watts of lighting. The estimated annual savings is $5,500 or approximately 0.8 percent of the university's annual electric service bill. In addition to the energy savings, BSU received $8,977 in rebates for the project, through Otter Tail Power Company's participation in the Minnesota Conservation Improvement program (CIP).

BSU continued an ongoing process of installing motion detectors in campus bathrooms and 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-Rush City*– Uses electronic ballasts and has programmed lighting on a timer for automatic shut off.

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.

The lighting upgrade in the growth chambers of the Mineland Reclamation headquarters in Chisholm has proven that not only can they grow a better crop; they can conserve a lot of energy as well. The new 1,000 watt metal halide bulbs and reflectors that distribute the light to 150,000 seedlings were installed to replace units that had been used since 1983.

Approximately 20,000 BTUs are used to heat the growth chamber; the remaining 75,000 BTUs are used to heat 1,000 gallons of water, which is circulated throughout the remaining 6,700 square feet of office space. No gas, fuel oil, etc. is required when the growth chamber is operating. The new units typically consume less than one-half of the energy of the former units. For example, in February of this year this facility consumed 22,000 KWH of electricity compared to 58,000 KWH of electricity during February 2002. These results illustrate a substantial savings in the area of energy conservation.

Metropolitan Airports Commission – 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 2003, 1,871 lamps were recycled through Retrofit Recycling in Little Canada, a reduction of almost 60 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 – Many projects undertaken by the MNARNG contributed to increased energy efficiency at our facilities. Where roof membranes were replaced, the underlying insulation was also replaced. New membrane installations typically include greater levels of insulation than what was removed. Where this work has been undertaken in previous years it has resulted in energy savings of 10 to 20 percent.

Most of the major projects described below include installation of building automation equipment enabling the Facility Management's Department of Public Works to remotely monitor the performance of the installed HVAC equipment from its central location at Camp Ripley. This equipment also provides the ability to schedule operation of the HVAC equipment resulting in the ventilation equipment only operating when it is needed and thus expending energy to temper ventilation air only when the facilities are occupied.

Sites and work undertaken:

Albert Lea Armory – As a part of a larger scale rehabilitation project at this site, the entire roof membrane and underlying insulation was replaced.

Camp Ripley Building 15-002 – Project replaced roof membrane.

Camp Ripley Building 15-073 – Project to construct a new six-room transient officer quarters included use of high efficiency Packaged Terminal Heating and Air Conditioning units. This enables individual occupant control of space temperature, avoiding use of a central thermostat controlled heating system that elsewhere results in windows being opened during heating or cooling periods by some if they were uncomfortable with the thermostat setting. This new building replaced a slightly smaller 1920s farmhouse that had been converted to house six people. Building was not insulated and was heated with a standard efficiency gas furnace.

Cloquet Armory – Project underway now will replace a steam boiler with two hot water boilers of higher efficiency and lower total gas consumption. System will be online for FY05 heating season; project will be completed summer of 2005. Water heaters will also be replaced with higher efficiency units. Project will include replacement of an inactive backup fuel oil supply system with a propane backup system. Lighting fixtures throughout the building will be replaced with higher efficiency units; this includes replacement of the incandescent fixtures in the drill hall with fluorescent fixtures using about 80 percent less energy. Concurrent with the heating system work, a separate rehabilitation project is replacing the roof membrane.

Grand Rapids Armory – Project underway now will replace a steam boiler with two hot water boilers of higher efficiency and lower total gas consumption. System will be online for FY05 heating season; project will be completed summer of 2005. Water heaters will also be replaced with higher efficiency units. Project will include replacement of a backup fuel oil supply system with a propane backup system. Lighting fixtures throughout the building will be replaced with higher efficiency units; this includes replacement of the incandescent fixtures in the drill hall with fluorescent fixtures using about 80 percent less energy. Concurrent with the heating system work, a separate rehabilitation project is replacing the roof membrane.

Luverne Armory – A major rehabilitation project, completed this summer, included replacement of all lighting fixtures in the building. In most rooms, these new fixtures replaced incandescent fixtures installed when the building was constructed in 1922.

Madison Armory – Project completed summer 2004 replaced one large steam boiler of 65 percent efficiency with two smaller hot water boilers of 85 percent efficiency. Total heat capability of the two smaller boilers is about 60 percent of the original steam unit. This work required replacement of all heat distribution piping and connected heating appliances throughout the building. Boilers were actually online for the FY04 heating season, but the gas meter failed to register any gas consumption for the entire winter period, thus no data exists to enable comparison of before and after project performance. Project also included the replacement of a domestic water heater with a higher efficiency unit and replacement of all light fixtures with higher efficiency fluorescent fixtures.

Marshall Armory – Project being completed this summer replaces one large steam boiler of 65 percent efficiency with two smaller hot water boilers of 92 percent efficiency. Total heat capability of the two smaller boilers is about 60 percent of the original steam unit. This work required replacement of all heat distribution piping and connected heating appliances throughout the building. Project also included the replacement of a domestic water heater with a higher efficiency unit and replacement of all light fixtures with higher efficiency fluorescent fixtures.

New Ulm Armory – A major rehabilitation project started fall of 2003 replaced the existing steam-based heat distribution system with a hot water distribution and heating system. Building will continue to be served by the city of New Ulm's distributed heating system. Steam heating system control was by manual control valves that were typically open, as were the windows in the winter to regulate space temperatures. The new hot water

heating system is expected to yield savings through the use of automated control valves. All lighting fixtures were replaced with higher efficiency fixtures. The roof membrane was replaced throughout the building.

Olivia Armory – Project converted two relatively new steam boilers to hot water service, and replaced all heat distribution piping and connected heating appliances.

Owatonna Armory – Similar to Albert Lea, the roof membrane and underlying insulation was replaced.

St Paul Cedar Street Armory – Project underway now will replace remaining light fixtures throughout building with new high efficiency fluorescent fixtures using approximately 25 percent less energy. Approximately 40 incandescent and mercury vapor fixtures in the drill hall were replaced two years ago with a smaller number of higher efficiency metal halide fixtures. Total demand reduction from this work alone was 20 KW.

Minnesota Pollution Control Agency – The Minnesota Pollution Control Agency's 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. In 2003, the MPCA recycled 57 cases of fluorescent light bulbs from the 520 Lafayette Road Building in St. Paul. Each case contained approximately 30 light bulbs for a total of 1,710 bulbs recycled for a total weight of 570 pounds.

The MPCA 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 floor plan is specifically designed to allow the maximum amount of light to enter the workspaces. The MPCA will have a revolutionary new day lighting feature installed and known as tubular skylights in the Brainerd main conference room. The tubular skylights will be installed to test and measure performance and energy savings. If successful, tubular skylights will then be added to several other building locations to enhance day lighting and reduce electrical energy consumption.

In 2004, all closed offices, restrooms, and conference rooms in the St. Paul building were equipped with motion detecting light switches. The installation of this technology will help the agency reduce the amount of electricity it uses.

North Hennepin Community College – At present NHCC has renovation projects taking place in several areas. These renovated areas 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. More efficient lights are planned for our main athletic facilities. Florescent bulbs were recycled. Trash was burned in Elk River to produce electricity.

Southeast Technical College – The college has installed and continues to upgrade an energy management system to monitor HVAC systems to improve efficiencies. In 1996, all campus buildings were included in the Northern States Power Company energy retrofit program for state owned buildings. Lighting retrofits included both interior and exterior fixtures. The energy savings achieved will pay for the retrofits within 8½ years for combined electric and natural gas savings. As part of the retrofit project, hot water heaters were installed to allow the boiler to be off-line during summer months and a thermo-ice storage unit was installed to allow the chiller to make ice during off-peak times from 11:00 p.m. to 6:00 a.m. and then cool the building during the day from stored ice providing chilled water circulated through HVAC coils. Other major retrofits included replacing electric fryers, steamers, and grills to natural gas units. Boiler efficiencies were also gained by installing oxygen trim control to improve combustion efficiency and turbulators to reduce heat loss through flue.

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.cppm.umn.edu/standards.html) 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 continuing to explore the possibility of participating in Otter Tail Power Company's TailWinds, wind energy program. Through this program, the university can purchase 100 kWh blocks of wind-generated electricity for $2.60 per block above the regular cost. The additional charge goes toward the development of wind energy. 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.

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 to pick up the entire electrical load during utility curtailment. This prevents Xcel from using the additional natural resources needing to produce more energy to meet an increased demand.

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-Rush City – Our facility uses three 550 ton high efficient chillers that can be cycled on or off in stages with the building automation system. This results in only using cooling capacities based on actual demands, resulting in conserving electrical energy. 3,000 KW of electric generation is utilized when necessary for peak power sharing by the utility company. This prevents the utility company from having to generate additional power, which reduces pollution. The facility also makes use of alternative fuel for heating as we switch to fuel oil during times of natural gas shortages. A Computerized Energy

Management System allows all electrical use at the facility to be monitored and controlled, which enables us to identify and correct areas of high-energy consumption and low-power factor.

MCF-St. Cloud – A new generator was installed in 1992, at a cost $750,000, that allows for co-generation/power load shedding, preventing the power company from needing to produce more during times of heavy use.

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.

MnTAP's energy efficiency efforts have been effectively integrated with pollution prevention activities in 2004. MnTAP has formed partnerships with various organizations that will help provide resources to offer energy efficiency assistance. The Minnesota Department of Commerce supports MnTAP's efforts in DOE training courses and the Industries of the Future program. Partnering and training has helped build MnTAP's expertise in energy efficiency assistance for site visits and intern projects. MnTAP included energy efficiency opportunities in its site visits for 24 companies in 2004. MnTAP's relationship with the Retired Engineers Technical Assistance Program (RETAP) has resulted in a few joint site visits in which RETAP covers energy efficiency. Two MnTAP interns identified a potential reduction of 33,249 MM Btu.

Metropolitan Council Environmental Services – In 2003, the MCES spent $10.3 million on electricity and $4 million on natural gas purchases. The two largest treatment plants consumed the following energy:

	Electricity (kWh)	Natural gas (therms)
Metro WWTP	168,200,000	4,072,630
Seneca WWTP	18,000,000	880,000

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. $261,000 was spent to purchase fuel oil as a supplemental energy source to power boilers or standby emergency or peaking generators at facilities.

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.

North Hennepin Community College – North Hennepin Community College does not have standby generator capacity. No electrical energy is produced at this site. Monthly usage of electricity and fuels are closely monitored to help ensure 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) particulate pollution emissions from the stacks when this boiler is in operation.

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.

One of the innovative projects sponsored by IREE involves fuel cell generation of hydrogen from ethanol. The University of Minnesota's discovery appears to position corn-based ethanol as an appealing alternative. Lanny Schmidt, professor of chemical engineering, headed the project along with assistants Gregg Deluga and James Salge. The team's prototype reactor was able to produce hydrogen from ethanol after two simple adjustments to a process already used to get hydrogen from methane, natural gas, and gasoline. The first step was to use an automotive fuel injector to vaporize an ethanol-water mix. The second required altering the composition of the reactor's ceramic catalyst material, a combination of the elements rhodium and cerium, for the vaporized ethanol to pass through and be converted. Schmidt says other researchers had tried similar methods but gave up because fires often developed in the reactor. Schmidt's team adjusted the process enough to avoid the fire problem.

Why turn ethanol into hydrogen rather than burn it? The answer is efficiency, Schmidt says. "Ethanol in car engines is burned at 20 percent efficiency because you have to remove the water first. But if you use ethanol to produce hydrogen, the efficiency is 50 to 60 percent because you don't need to remove the water. Hydrogen comes from the ethanol and the water." Throw wind power into the mix, and ethanol-based hydrogen becomes an even more practical energy source.

The University Outreach Center in Morris is looking at ways of using wind-generated power in conjunction with fuel cells. Facility director Greg Cuomo explains that using wind power to collect hydrogen is one way to store the energy of the wind. Wind power is a key part of hydrogen economy research in Europe. In many rural Minnesota and other Corn Belt communities, using wind and corn, two abundant and renewable resources, could create revitalized local economies. A rural-based hydrogen energy economy would create new jobs and income for local residents. At some point, each community or business might have its own fuel cell power plant, creating a distributed power network to make communities more energy independent. The University Outreach Center in Morris has a planned wind generator that will be commissioned in 2004 to provide electricity for the University of Minnesota, Morris campus and research purposes.

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 Architecture Building. The unit will provide electricity to the building and be a training resource for future architects and engineers. A coordinate 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.

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).

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.

MCF-Rush City – Rush City utilizes one well as a supply for an underground sprinkler system. This system is controlled by an electronic timer that turns the sprinklers off during periods of rain. It also limits sprinkling to the cooler parts of the day in order to derive the maximum benefit and reduce evaporation.

Department of Military Affairs – The hydrogeologic mapping project of Camp Ripley has been completed. The model mapped the underlying geology of the area and will lead to better decision-making with regard to groundwater impacts. The Camp Ripley wellhead protection plan is under review

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

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

Southeast Technical College – The Winona campus has one well, which has required permits from MPCA and DNR and is used for once through cooling for the condenser on the chiller units. In 1997, a study was conducted on possible ways to reduce well water consumption. It was determined that a variable frequent drive motor would reduce water consumption by approximately 40 percent during times when only one chiller was needed on line.

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. In many cases, the solicitation specifications do not allow vendors to bid a product that contains mercury. MMD continues to work to reduce mercury from contracted medical products.

Department of Corrections – Very little heavy metal waste is generated at any of the DOC facilities.

Office of Environmental Assistance – OEA staff continue 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 to serve as project manager for the Mercury-Detecting Dog project, part of the MPCA's Mercury-Free Schools program. Clancy was introduced to the public in October 2001. He is a dog who is trained to detect hidden mercury in schools and other institutions and facilities. Clancy also acts as an educator and ambassador on mercury and environmental issues. This project continued during FY 2004 through an amended grant that provided for the use of EPA grant funds to support ISF's project manager activities.

OEA staff supported the ongoing work of the Quicksilver Caucus (QSC) in several areas during FY 2004. QSC sponsored a mercury workshop in October 2003 for state agency commissioners and key staff. QSC continues to address mercury stewardship, development of mercury product management and pollution prevention initiatives, and provide input to EPA and State Dept. on international mercury initiatives, including the UNEP Mercury Program.

OEA helped coordinate state and local government communication to EPA about the need for mercury standards for electric arc furnaces and foundries receiving mercury components in automotive and other scrap. OEA also supported legislation introduced in the 2004 legislative session that would have required automobile manufacturers to fund a collection and recycling program for mercury switches in end-of-life automobiles. The legislation did not pass, but automobile manufacturers entered into an agreement with Minnesota Waste Wise to fund and operate a two-year switch collection and recycling program in the state. OEA developed a list of salvage yards and scrap processors in the state and supports the program in other ways.

OEA is participating in the Product Stewardship Institute Mercury Thermostat Dialogue with PSI, Thermostat Recycling Corporation, thermostat manufacturers, HVAC wholesalers and contractors, Region V EPA, Region V states, Oregon, and Washington/King County. The goal of the dialogue is to increase mercury thermostat recovery and recycling across the country. TRC has agreed to expand the thermostat collection bin program to contractors and dialogue participants will be conducting financial incentive pilot projects in Indiana and Oregon starting in 2005. Dialogue continues on other program expansion measures.

Lead sinkers. OEA again sponsored a "Let's Get the Lead Out!" booth at the March 2004 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/sinkers 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. OEA and DNR now have a strong interagency working relationship established on this issue.

In addition during the summer of 2004, the OEA and the DNR partnered with retailers, conservation, and outdoors groups to offer lead tackle exchanges across the state. Thirty lead tackle exchange events were held from May through August in 2004. 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 were 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)	2003 (pounds)	Reduction (pounds)	Reduction (percent)
Cadmium	4,585	190	4,395	95.9%
Chromium	64,755	6,416	58,339	90.1%
Copper	66,714	6,476	60,238	90.3%
Lead	10,600	1,706	8,894	83.9%
Nickel	43,128	3,440	39,688	92.0%
Zinc	90,931	8,309	82,662	90.9%
Total	**280,713**	26,537	254,176	90.5%

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 source of up to 44 percent of the mercury presently discharged to the sanitary sewers.

In January 2003, the Metropolitan Council and the MDA established a jointly managed Voluntary Dental Clinic Amalgam Recovery Program. The goal of the program is to have all 2,700 general practice dentists install separators by February 2005. So far, 71 percent have made a commitment to do so, and separators have been installed in 24 percent of the clinics.

Department of Military Affairs – The MNARNG operates X-Ray technology to inspect helicopter tail sections for cracks. Photographic chemical waste is sent off for silver recovery. The department's other photo developmental operations have switched to digital technology.

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. Waste photographic paper and chemicals are processed off-site to render them non-hazardous and to 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 and replaced with electronic imaging systems.

Also, about 20 pounds of video and audio film has been recycled through Generic Media of Minneapolis thanks to MnTAP's Source materials exchange listings. Minor amounts of gold, silver, copper, and palladium were recovered from our electronic recycling program. 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 chair side

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 chair side 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 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 coordinated 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.

PMD recovers and recycles all refrigerants. The InterTechnologies Group uses Freon for all the standalone air conditioners located at three Computer Operations Centers. MMD's refrigerants contract offers environmentally friendly alternatives to Freon.

Department of Corrections

MCF-Lino Lakes – Lino Lakes is in the process of updating the building HVAC controls and equipment. This will lead to a more efficient system that takes less energy to run.

MCF-Rush City – Rush City switched to high efficiency air filters that are replaced every six months. Use of antibacterial pads in condensate drip pans helps to prevent any bacterial growth. Outside air intake is monitored via the computerized building automation system to ensure that fresh air intake meets the indoor air quality standards.

Iron Range Resources and Rehabilitation Agency – In 2004, a heating/cooling system upgrade was performed at the Eveleth Administration Building. They changed to a two-pump system from the water tower that supplies the heating/cooling system and that cut the cost of operating the individual heat pumps by as

much as 50 percent. Also, revamping the electrical panel that operates the heating coils in the boiler resulted in a drop in electrical consumption.

Metropolitan Airports Commission – Energy audits performed at the Lindbergh Terminal revealed that a significant reduction in energy use 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 an 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. During 2003, steam coils were added to the ductwork to reduce the operating expense to the garage while not affecting the quality of the air. Additional studies have been completed for the South and Heywood Garages (1997). In 2004, Metro Transit will upgrade the coils at these garages and improve the controls for these systems. In, 2001, Metro Transit installed new exhaust systems in the body shop/welding shop areas of the Overhaul Base to reduce the amount of dust that is produced during sanding and welding operations. 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 has looked at using the waste heat form the Hennepin County garbage burner to supplement heat in its Heywood Garage and office building. During the past year, this system project was ended when agreement with Hennepin County could not be accomplished. Metro Transit was also looking at installing a similar system at its Overhaul Base in St. Paul that would take waste heat from the NRG condensate line that passes south of the building. NRG has informed Metro Transit that the line will be abandoned in the near future so this project will not proceed

Department of Military Affairs – The MNARNG undertook lead decontamination projects at two indoor firing ranges (IFR) locations. At one location, all IFR equipment was removed as part of the remediation process and the IFR was converted to a storage room. The other IFR after being remediated was renovated and put back into use.

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 Brainerd office lease requires the use of American Society of Heating, Refrigerating and Air-Conditioning Engineers 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.

North Hennepin Community College – The college plans to continue its program of monitoring and testing indoor air quality. Last year NHCC tested its 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. The painting department not only uses water-based paints and varnishes but is also upgrading ventilation controls to improve indoor air quality. 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 and participated on campus in a large-scale simulated mustard gas release as part of a community drill. Over 100 campus volunteers also participated in the toxic gas release mock disaster simulation.

Southeast Technical College – To improve air quality in our lab areas, HVAC improvements have been implemented and exhaust systems were installed. In our Auto Body Technology lab, we have installed a vacuum system to capture sanding dust. A new paint booth was installed in FY 03 at the Red Wing campus. Plans are underway to remove all ducts lined with fiberglass, replaced with exterior lined ducts.

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 has started a project to replace aging building chiller units on the St. Paul campus with an energy-efficient centralized chiller plant. 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. The plans call for a plant to house five large chillers that would and 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 in 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, the new buildings on campus have stand-alone systems but were built so they could eventually be connected to a central plant. 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 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 – A liquid snow and ice removal product is being used, primarily on entryways to campus buildings, to reduce sand and salt use. Salt and sand is still more cost-effective for large-scale use, such as parking lots and sidewalks.

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 Federal Aviation Administration (FAA) on airport runways and taxiways. The MAC has chosen two products that are as environmentally friendly as possible while also performing to exacting standards. Solid sodium acetate and

liquid potassium acetate are applied depending on specific conditions, including the type and amount of precipitation, as well as the temperature.

Since mechanically removing ice and compacted snow can be more effective in some cases than the use of chemicals, MAC has added runway brooms to its fleet of snow removal equipment. In a single pass, an 18-foot wide rotating broom essentially strips the pavement bare of any ice or snow. The use of these "brooms" greatly reduces the need for chemical de-icing, and in many cases eliminates it entirely. It is estimated that use of chemicals for pavement de-icing has been halved by using runway brooms. Evaluation of new snow removal equipment and methods is ongoing.

Aircraft deicing 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 glycol-impacted stormwater finding its way to the Minnesota River. Most 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 airline tenants to vacuum-sweep the surface of deicing areas that are outside the de-ice pads or the designated "plug and pump" containment area.

Metropolitan Council Metro Transit – Part of the supplementing heating source system would include a snowmelt 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 2004/2005

Minnesota Pollution Control Agency – In May 2003, the Minnesota Pollution Control Agency renegotiated its lease on the 520 Lafayette Road Building in St. Paul, as part of that lease the agency required the use of deicing products that do not contain high levels of chlorides or urea.

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. An additional sanding unit allowed improved sidewalk sanding response. Very little mix is stockpiled, and the small stockpile of mix is kept on a slab and covered with tarpaulins to control salt leeching.

Southeast Technical College – Ice control for walkways is done by using a calcium chloride type ice melter. Sanding with sand/salt mixture is used on roadways and parking areas. Sanding is done when needed, and amounts vary depending on conditions.

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. The Metro district reclaims approximately 12,000 tons of sand, but only puts down approximately 2,000 tons. The screening and reuse saved nearly $1 million in disposal costs. In the past three years, Mn/DOT has cut sand usage by more than 50 percent statewide. 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'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. MMD, in conjunction with the Pollution Control Agency, has four full-service state contracts and will have four regional limited service 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:

- designed high-efficiency, energy-saving hood controls for the laboratory areas of the Department of Agriculture and Health Laboratory building presently under construction.
- are designing high-efficiency, energy-saving hoods for the laboratory floor of the proposed Bureau of Criminal Apprehension building.
- have approved the use of total heat recapturing technologies for the Department of Agriculture and Health Laboratory building presently under construction.

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 has reduced the amount of methylene chloride used within this area. The total financial cost for these solvents in FY03 was $3,265; the total cost in this fiscal year was $2,199 – a cost reduction of $1,066 was realized in solvent purchases. The safety benefit is in the reduction of employee exposure to this carcinogenic product.

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.

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 – All facilities collect and dispose of medical and biological waste as required, utilizing approved methods and vendors.

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, special audits, and having a Certified Industrial Hygienist on campus almost daily. 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. They have been very proactive in upgrading blood borne pathogen controls, and both written response plans and cleaning/disinfection schedules.

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 70 unknowns. A staff member (recently added to the SCSU Chemistry department) has made major progress in hazardous waste controls and better utilizing local city sewer system (POTW) contacts and treatment criteria to save over $7,000. Peers have teamed with the University of Minnesota to recycle surplus laboratory glassware.

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 more plumbed eyewashes, and better formaldehyde controls are being used.

Southeast Technical College – The college now has science labs on both the Red Wing and Winona campuses. Instructors and the maintenance staff have received training in the OSHA lab standards. Products are purchased only in quantities needed for experiments to reduce the amount of hazardous chemicals that need to be disposed of.

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.

Department of Corrections

MCF-Faribault- Erosion control practices were implemented to prevent hillside/road erosion around the storm water dissipater. This will prevent roadway and hillside areas from being washed into the Straight River.

MCF-Rush City- Has runoff ponds for the collection of surface water that have created acres of wetlands.

MCF-St. Cloud – Conducted a controlled burn on the five-acre area of native grasses/wild flowers thereby eliminating the need to water, resulting in a cost savings of $525 a 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 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, including community outreach/education and public meetings. Many initiatives involve landscaping, catch basin overflow and construction project runoff controls. Leaves, sand, silt, curb drains, and point outfalls are also being monitored and better controlled.

Southeast Technical College – The college received a grant to convert approximately 6.5 acres to prairie grass restoration. This project, when complete, will reduce grounds maintenance and costs in fuel, labor, and equipment.

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 building of 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 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.

As part of the university's storm water management plan the university will 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 reuse of materials and proper handling of hazardous materials into all building construction specifications.

Department of Corrections

MCF-Moose Lake/Willow River – Moose Lake/Willow River donated 30 CPR masks to a local rural volunteer fire department's First Responders rather than dispose of them.

MCF-St. Cloud –Recycled the following, resulting in lower landfill disposal costs: cardboard (credit $800), pallets (400 pallets recycled), and scrap iron metal ($1,231).

Office of Environmental Assistance – The Minnesota Materials Exchange Alliance developed an effective materials exchange infrastructure in Minnesota and foster coordination and greater utilization of the state's potential for reuse. The use of the materials exchange program resulted in a total of 481successful exchanges of 3.1 million pounds of solid and hazardous materials, saving companies $1.5 million in avoided purchase and disposal costs. Exchanges are successful across various types of organizations, with the greatest number in the commercial services sector, which includes retail, offices, real estate, recyclers, printers, dry cleaners, and others. Materials exchange staff responded to 750 calls and helped facilitate over 20,000 web self-referrals to the on-line database. Web site and database support continued (with ongoing enhancements) for the eight local exchange sites (St. Louis County, WLSSD, West Central, North Central, Chisago County, Otter Tail County, Southwest, and Southeast).

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

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 was limited to the city of Saint Paul and Washington and Anoka Counties, but, under the grant, was expanded to cover the entire metro area. The final product of the grant included materials for metro communities to promote the web site to their citizens.

Metropolitan Airports Commission – MAC has an ongoing reuse program for discarded pallets that would otherwise be destined for disposal. Generated by the various tenants, as well as by MAC operations, every month, thousands of pallets are picked up by MAC maintenance personnel at MSP 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 pallet recycling vendor.

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.

Metropolitan Council Environmental Services – MCES was able to successfully exchange 20 five-gallon containers of aluminum cleaner and brightener through MnTAP's Materials Exchange (http://www.mnexchange.org). This corrosive liquid had a pH of less than two and would have been disposed of as a hazardous waste if not exchanged.

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. In 2004, participation in this activity had increased, and the treasure table was extended for an additional week.

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.

Southeast Technical College – Materials exchange website is checked to determine if any materials listed could be used for college needs.

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 1,000 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 3,128 recycled products available in FY04, up from 3,111 products in FY03. Total sales of recycled products through June 2004 was $2,274,595 (of this total, OSC sales were $1,932,994, S&T Office Products sales were $341,601). This is down from FY03 sales figures by $323,195, but overall sales were down $877,581 in FY04.

Material Management Division's OSC has 25 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 FY04, sales from these white papers were $1,191,073. 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 $78,135 in sales in FY04.

OSC offers an electronic online catalog that reduces 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. Web (online) orders accounted for 46.6 percent of total orders for FY04, exceeding our goal of 46 percent. Our goal for FY05 is 51 percent. To help achieve this goal, OSC is offering an additional 1 percent discount on inventory items purchased using the web site. OSC expects this number to continue to grow as more customers realize the ease and speed of ordering through the electronic catalog. Also, since all special prices and/or discounts are automatically reflected on the online order form, all web customers are assured of getting up-to-date competitive pricing as well as the most current product information. OSC's invoices are printed on recycled paper. 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. MMD buys only 100 percent post-consumer recycled paper for all of its printers and copiers. MMD 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.

Administration has used:

- 321 reams of virgin paper
- 8,398 reams of 30% post-consumer recycled content paper
- 2,550 reams of 100% post-consumer recycled content paper

This represents 107,314 BTUs to manufacture for virgin paper; 741,966 BTUs for 30 percent, and 143,589 BTUs for 100%. Green house gas emission in CO_2 equivalents is 15,846 for virgin, 112,119.32 for 30%, and 23,749 for 100%. Wood in pounds is 19,344for virgin, 10, 7743 pounds for 30%, and nothing for 100%.

Department of Agriculture – The Minnesota Department of Agriculture has been using 100% recycled paper for their operations within the divisions for this fiscal year. The total reams of 100% recycled paper used both white and colored was 5,368 reams of 100% recycled white paper, 164 reams of 100% recycled colored paper, and 98 reams of virgin paper. The Information Services Division requests that all print jobs being done for the department use recycled products and non-toxic inks whenever feasible.

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.

FY04 PAPER USE AND ASSOCIATED ENVIRONMENTAL IMPACTS

Paper type	Reams	Weight (tons)	Energy (BTUs)	CO_2 emissions (pounds)	Wood use (pounds)
Virgin	8,400	21	807,700	119,270	145,599
30% post-consumer	48,000	120	4,010,629	606,050	582,398
100% post-consumer	310	75	16,243	2,686	Negligible

Department of Commerce

FY04 PAPER USE AND ASSOCIATED ENVIRONMENTAL IMPACTS

Paper type	Reams	Energy (BTUs)	CO_2 emissions (pounds)	Wood use (pounds)
Virgin	0	0	0	0
30% post-consumer	6790	567,337,000	85,730	82,384
100% post-consumer	0	0	0	0

Department of Corrections – The following data represents the impact of paper use reported for all DOC facilities, the Central Office, Field Services, and MINNCOR Industries.

FY04 PAPER USE AND ASSOCIATED ENVIRONMENTAL IMPACTS

	Reams	Weight (tons)	Energy (BTUs)	CO_2 emissions (pounds)	Wood use (pounds)
Virgin paper	8,400	21	807,700	119,270	145,599
30% post-consumer paper	48,000	120	4,010,629	606,050	582,398
100% post-consumer paper	310	75	16,243	2,686	Negligible

MCF-Stillwater – Stillwater reduced the reams of paper used at the facility from 8,470 in FY04 to 7,380 in FY03.

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 uses 100% post-consumer copy paper processed without chlorine. In 2004, OEA used 550 reams of paper, down from 750 reams of paper used in 2003. The following data represent the impact of OEA's paper use:

FY04 PAPER USE AND ASSOCIATED ENVIRONMENTAL IMPACTS

	Reams	Weight (tons)	Energy (BTUs)	CO_2 emissions (pounds)	Wood use (pounds)
Virgin paper					
30% post-consumer paper					
100% post-consumer paper	550	1.375	29,779	4,925	Negligible

No trees were used to make the paper OEA used, and 4,925 pounds of carbon dioxide were produced by the recycling process. 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 dish and flatware. 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.

Just over 50% 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 visit the Resource

Recovery Office on a regular basis to obtain reusable office supplies that have been discarded by other agencies.

Department of Human Services

FY04 PAPER USE AND ASSOCIATED ENVIRONMENTAL IMPACTS

Paper type	Reams	Energy (BTUs)	CO_2 emissions (pounds)	Wood use (pounds)
Virgin	1,430	137,508	20,305	24,787
30% post-consumer	51,977	5,080,297	737,906	9,000,773
100% post-consumer	1,132	108,852	16,073	19,621
Total	54,539			

FY03 PAPER USE AND ASSOCIATED ENVIRONMENTAL IMPACTS

Paper type	Reams	Change in paper use 2004 vs. 2003
Virgin	3,074	– 46%
30% post-consumer	51,722	+ 0.6%
100% post-consumer	780	+69%
Total	55,576	– 2%

Iron Range Resources and Rehabilitation Agency – The Purchasing/Accounting staff also obtains agency office supplies from Central Stores. The agency purchased 1,400 reams of Opaque Repro paper in FY04 (which is 30% total recovered fiber) for our copiers, printers, and fax machines. To accomplish the task of producing 3.5 tons of this paper, 16,986 pounds of wood are needed. Concerning atmospheric emissions, 17,676 pounds net greenhouse gases (CO_2 equivalents) are also produced to create 3.5 tons of 30% post consumer recycled paper.

Resource Recovery furnishes our agency with a box at each workstation to deposit recyclable office paper into. Our waste paper, which consists of 6,000 pounds of newsprint and office paper as well as 2,000 pounds of cardboard, 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% post consumer material by weight.

Metropolitan Airports Commission – Whenever possible, recycled content paper is used.

Paper type	Reams	Energy (BTUs)	CO_2 emissions (pounds)	Wood use (pounds)
Virgin paper	3,890			
30% post-consumer paper	1,930			
100% post-consumer paper	0			
Total paper	5,820	535,321	79,603	90,844

Metropolitan Council Environmental Services – In 2003, MCES used 11,154 reams or 27.88 tons of 30% recycled content office paper. Using the federal environmental executive web-based paper calculator (http://www.ofee.gov/recycled/calculat.htm) this results in 140,806 pounds of net greenhouse gases and 135,310 pounds of wood. For paper without recycled content, 5,648 reams or 14.12 tons were used in 2003. Using the calculator, this results in 80,197 pounds of net greenhouse gases and 97,898 pounds of wood.

Department of Military Affairs – The purchase of MNARNG office paper is not entirely centralized. Each of the 80 facilities makes local purchases of office paper. The exact amount of office paper that was purchased was not able to be determined.

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 30 percent post-consumer paper for laser printers that cannot accommodate the 100 percent post-consumer paper. The MPCA purchased a total of 8,995 reams of paper in FY04 compared to 9,299 reams in FY02, 13,901 reams in FY00, and 16,985 reams in FY95. Of the 8,995 reams, 8,491 (94%) were 30 percent recycled, 260 (3%) were 100% recycled, and 3% were made of non-recycled material.

Efforts continue to reuse existing supplies whenever possible. Each floor has a designated storage area for reusable items such as file folders, 3-ring binders, and a variety of miscellaneous office accessories. Recently, a team of MPCA staff laid out a plan to create a central agency supply center, which would support the use of recycled or surplus supplies. Having the supplies in one place would give agency staff better control over ordering, allowing for the ordering of environmentally preferable products. It will also be easier to manage inventory, and avoid duplication and overstocking. The central supply center will also reduce the total number of shipments of supplies to the agency.

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.

Metropolitan Mosquito Control District (MMCD) – MMCD used approximately 640 reams or 1.6 tons of office paper in 2004. The post-consumer content for all the paper used was 30%. According to the "paper calculator" on the Office of the Federal Environmental Executive web site, the energy used to make this paper was 53,475.05 BTUs. The net greenhouse gas emissions in CO_2 equivalents was 8,081pounds, while the wood used to make the paper was 7,765 pounds. To reduce the energy usage and the net greenhouse gases produced in 2005 MMCD will attempt to reduce the amount of paper used by the organization and increase the post-consumer content of the paper purchased when possible.

North Hennepin Community College – Central Duplicating Services section provides both new and recycled office supplies to all departments on campus. In 2004 the college purchased 68.4 tons of paper. The post-consumer content for the paper is 20 percent. The paper required 22,401,014 BTUs to produce, which corresponds to 359,796 pounds of CO2 equivalents. 379,390 pounds of wood were used to produce the paper.

St. Cloud State University – SCSU extensively uses paper with 50 percent recycled content and 30 percent post-consumer fiber content. Office and computer paper is recycled. An exception is most of 838 reams of colored paper used in our student union copy shop. (Whenever feasible, recycled color paper was used; and all white paper used in that copy shop was standard recycled paper included in our bulk campus supply counts.) Recycled photocopier toner cartridges are purchased. Ink and toner cartridges are recycled. Using e-mail to post surplus supplies for use in other departments has been very successful about 25 times this past year.

Southeast Technical College – Office supplies are purchased off state contracts or obtained through surplus properties whenever possible. The business office provides a central store for all college office supplies. Any supplies needed are requisitioned by staff. The college used 5,100 reams of virgin paper in FY 04. The associated energy use to produce the paper was 500,029.4 BTUs. CO2 equivalents were 73,836 and 9,013,3 pounds of wood.

Department of Transportation – Mn/DOT purchased 35,283 reams of 30% post-consumer content paper. Mn/DOT recycles computers, cardboard, paper, and toner, copies on both sides of paper whenever possible. Mn/DOT purchases printer toner with biodegradable inks; the cartridges can be recycled.

University of Minnesota – University Stores sells copy paper to the university departments. The following chart shows the pattern of paper sales by type.

PAPER USE AND ASSOCIATED ENVIRONMENTAL IMPACTS

	2002	2003
Traditional paper (reams)	150,000	143,000
30% post consumer (reams)	246,000	222,000
100% post consumer (reams)	12,000	15,000
Total usage (reams)	408,000	380,000

	2002	2003
Traditional paper (tons)	375	358
30% post consumer (tons)	615	555
100% post consumer (tons)	30	38
Total usage (tons)	1,020	950

	2002	2003
Traditional paper (reams/CPE)	2.06	1.89
30% post consumer (reams/CPE)	3.37	3.06
100% post consumer (reams/CPE)	0.16	0.20
Total usage (reams/CPE)	5.60	5.15
Full year student equivalents	56,261	58,729
Full time staff equivalents	16,653	17,012
Campus person equivalents	72,914	75,741

	2002	2003
Traditional paper (lbs CO_2/CPE)	2.92E+01	2.68E+01
30% post consumer (lbs CO_2/CPE)	4.26E+01	3.70E+01
100% post consumer (lbs CO_2/CPE)	1.47E+00	1.80E+00
Total usage (lbs CO_2/CPE)	7.33E+01	6.57E+01

	2002	2003
Traditional paper (lbs wood/CPE)	3.57E+01	3.28E+01
30% post consumer (lbs wood/CPE)	4.09E+01	3.56E+01
100% post consumer (lbs wood/CPE)	0.00E+00	0.00E+00
Total usage (lbs wood/CPE)	7.66E+01	6.83E+01

	2002	2003
Traditional paper (BTUS/CPE)	1.98E+02	1.82E+02
30% post consumer (BTUS/CPE)	2.82E+02	2.45E+02
100% post consumer (BTUS/CPE)	8.91E+00	1.09E+01

Total energy consumption (BTUS/CPE)	4.89E+02	4.38E+02

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.

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. The lubricants are pumped directly into 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.

As a service to its tenants, MAC also collects used oil from non-commercial tenants at the reliever airports. Collecting used oil from these tenants reduces the possibility of 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 2003, for all facilities, 5,265 gallons of used oil were transported, an increase of 200 percent from the previous year. Approximately 990 pounds of used oil filters were recycled, a n increase of 50 percent over 2002.

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.. In the four 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 – The MNARNG recycled approximately 11,000 gallons of used oil. All used oil filters are crushed, and any oil collected is added to the used oil. The filters are sold as scrap iron.

North Hennepin Community College – The college collects and 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.

Southeast Technical College – Oil and oil filters are recycled following all current regulations. Oil changes on customer vehicles in our Automotive Technology program are kept to a minimum to reduce amount of oil and oil filters collected.

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 non-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 – Moose Lake/ Willow River continues to change paints over to exclusively water based products. Very little solvent-based paints and coatings are still in use.

MCF-Stillwater – Stillwater is considered a Small Quantity Hazardous Waste Generator. All staff is expected to, on an ongoing basis, review the hazardous materials they use and recommend changes to safer products and processes, as they become available.

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 hundreds of 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.

Department of Military Affairs – The 133rd Airlift Wing (Minneapolis) has purchased distillation units for their paint waste. Waste paint generation amounts have decreased from 300 gallons per year to 50 gallons per year. The MNARNG will be changing from a solvent-based chemical resistant paint to an aqueous-based

chemical resistant paint. Initial testing by other Department of Defense facilities has demonstrated that reduced amounts of paint waste requiring disposal are produced as well as reducing VOCs released to the environment.

Aerosol can puncture devices have been installed in the MNARNG's organizational maintenance shops. Cans are punctured, and paint and propellants are collected into a drum. Empty cans become scrap metal. This has lead to a substantial reduction in waste being disposed of as a hazardous.

Paint removal: The 133rd Airlift Wing has two sandblast systems. The first is a system that utilizes aluminum oxide blast agents. The second is a plastic bead blast system. The 133rd has received approval from Hennepin County for a management plan to sell the plastic media as feedstock. These two systems have greatly reduced the amount of blast media disposed of as waste. An ongoing P2 project will look at the sandblasting process utilized at the MNARNG paint shop. The P2 assessment will determine which type of system would best fit the needs of the MNARNG. One system that shows promise is hydro-blasting. This system utilizes high-pressure water for the removal of paint. This water is then filtered and reused in the process.

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

Maintenance staff at the St. Paul Office use only low VOC paints for internal and external painting projects. In FY 2003, the agency remodeled one floor and only low VOC paints were used.

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.

Southeast Technical College – Latex paints are used whenever possible by our Maintenance department instead of oil base paint products and old paint is often used as a primer rather than purchasing primer paint. The Auto Body Technology program is using automotive paint with lower VOC ratings. Band and String Instrument Repair and Carpentry programs use strippers and refinishing products. Safer products are considered when possible. All products are stored, used, and disposed of following regulatory requirements.

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.cppm.umn.edu/standards.html).

25. Parts Cleaning

Department of Administration – The Plant Management Division does not use solvent-based parts cleaning solution. 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.

Iron Range Resources and Rehabilitation Agency – Parts cleaning fluid is temporarily stored onsite, then recycled by Como Oil of Duluth.

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 397 gallons of solvent were recycled in 2003, a decrease of 27 percent from 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.

Department of Military Affairs – The MNARNG purchased parts cleaning machines to replace contractor-owned machines. These machines have ultra filtration baffle system technology that greatly reduces the need for solvent change out. Last year, no solvent was changed out of the machines, whereas in previous years, contract vendors would change out the solvent two to four times per year per machine. The MNARNG is also in the process of replacing older aqueous parts washing machines. The P2 assessment will research and recommend appropriate replacement technology.

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.

Southeast Technical College – The Automotive Technology and Aviation Maintenance Technology programs have purchased aqueous parts washers. These units have been tested and the solution is non-hazardous. When the unit is cleaned, the remaining sludge residue is taken by Safety Kleen when they pick up used oil. The aqueous parts washers have reduced the number of solvent parts washers from four to only one. It now only requires two services per year.

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.

Southeast Technical College – Personal care products are used in the Cosmetology program. Students are taught proper usage and application methods. Material safety data sheets are kept on all products used. Past dated products are disposed of properly. Most can be sewered after receiving approval from our local wastewater official.

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 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.

Department of Corrections – DOC facilities that use pesticides or fertilizers only apply them at set times throughout the year and only use what is needed for that application.

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. Additionally MMCD employees must attend annual 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.

North Hennepin Community College – All pesticides for pest and weed control and lawn fertilizers 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 and to avoid phosphates. Special emphasis is given to proper mixing quantities and cleanup in the event of an

accidental spill. Phosphate use concerns were very prominent in MS4 actions and public community concern/outreach meetings.

Southeast Technical College – The college has reduced applications of pesticides and fertilizers from two to one per year, except for the lawn area around the main buildings.

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 – See also *Part 2 Policy and Regulatory Activities* above.

MCF-Faribault – Faribault has implemented a recycling instruction to reduce the amount of waste throughout the facility.

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 and understands this requires the cooperative efforts of both its staff and tenants. The MAC, through its strategic plan, has committed itself to providing excellence and leadership in the protection of the environment. The MAC accomplishes this by establishing environmentally friendly strategies that lessen adverse environmental impacts on the natural environment and the surrounding communities, while encouraging our tenants to do the same. The MAC also promotes a proactive approach to environmental protection and supports cooperation with other regulatory agencies. (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 MNARNG is committed to the ISO 14001 standard of Environmental Management System (EMS). In accordance with ISO 14001 standards, the MNARNG is committed to integrate innovative environmental solutions into processes and systems so that they become "a way of life" in order to prevent pollution, achieve or exceed regulatory compliance, minimize procedural burdens, reduce costs, conserve resources, enhance safety, foster community support, and increase time available for the soldier's mission.

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.

Southeast Technical College – Environmental policies exist on OSHA, MPCA, and EPA compliance. They also exist on recycling and waste prevention. Through recycling efforts the college reduced rubbish removal services from twice a week to once a week service mainly through recycling office paper and cardboard and increasing some dumpster sizes.

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

University of Minnesota – The University's Regents approved a new Board of Regents Policy: *Sustainability and Energy Efficiency*, which broadens the scope of existing policy to include positioning the institution as a leader in campus sustainability through teaching, research, outreach, and operations. The policy requires that the administration develop sustainability objectives and performance measures in the areas of physical planning and development, operations, transportation, purchasing, and waste management and abatement; develop appropriate indicators and measures of success; and report annually to the board.

The policy directs the administration to operate within the principles of balancing financial resources and constraints while trying to be good stewards of the environment and a model for society. The policy will supersede Board of Regents Policy: *Pollution Prevention and Waste Abatement*. A Sustainability and Energy Conservation Policy Work Group (SEC Work Group), appointed by the president, was charged with developing a policy framework that would translate into long-term, systematic strategies for integrating sustainability practices and energy conservation across research, teaching, operations, and outreach. The SEC Work Group consulted with university, state of Minnesota, national and international institutions on sustainability policies in place, reviewed past and present sustainability efforts, and developed policy goals and a timeline for implementation. See Part 2 for text of *Board of Regents Policy: Sustainability and Energy Efficiency*.

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 Great Printers.

Department of Commerce – Printer and copy paper used by the department contains 30 percent post-consumer content by fiber weight. In FY04, the department used about 6,800 reams of paper. See also #22 *Office Supplies*.

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 and chooses document sizes and shapes that maximize the use of press sheet. OEA communications staff do short print runs in-house on a color laser. This is a practice that reduces costs and eliminates waste and solvents associated with traditional offset printing.

Iron Range Resources and Rehabilitation Agency – Printing contractors are required to use soy-based or other agra-based ink.

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. Since 1995, the agency has reduced its paper consumption by nearly 50 percent.

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, more cost-effective photocopying machines. 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. Plastic film is recycled for silver recovery Recycled paper products are used in the majority of all printing requests. SCSU Printing Services also recycle books, directories, and newsprint.

Southeast Technical College – The college does not have a printing department; however, it is encouraged that staff make double sided copies when possible.

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 one 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 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 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 continues to require state purchasers to code each purchase order line with the environmental code. MMD with the Environmentally Responsible Work Group developed environmental definitions to code all items on purchase orders and contracts. This is a required field, which will allow MMD to more effectively track environmental purchases made by the state and can be used to generate reports that capture the types of environmental purchases made. 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 10 percent for goods containing recycled content. In most solicitations, MMD awards a one percent preference for each 10 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 purchases vehicles manufactured without mercury. The solicitations require the vendor to specify if there is mercury in the vehicle, and all responses received in FY04 have been checked that no mercury is present in the 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 allow 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 (February 1994) 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. 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.

The Materials Management Division's systems furniture contract with MINNCOR also 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.

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. Energy efficient (Energy Star) office equipment are purchased/leased when available. When available, CFC-free laboratory freezers/refrigerators are purchased by the Laboratory Services Division. 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 – All DOC facilities follow Minnesota Statutes §§ 16B.121 and 16B.122, along with Minnesota Executive Order 99-4 requirements via their purchasing departments.

MCF-Oak Park Heights – The facility's procurement process is a 90 percent paperless system, using electronic signatures to attain necessary approvals.

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

- The OEA participated on a Stakeholder Work Group headed up by Scot Case at Center for a New American Dream on environmental standards for industrial and institutional cleaners.
- The Environmentally Preferable Purchasing Guide is on line at www.swmcb.org/EPPG/. The EPPG provides information to public entities on environmentally preferable products and how they can be purchased.
- The OEA attended procurement workshops/conferences throughout the year to promote "green" purchasing at the state and local level.
- The OEA served as a technical advisory member for San Francisco's Environmentally Preferable Purchasing Program.

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

The state contract for flooring includes 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. The Stakeholder Work Group standards are incorporated into the state contract for Cleaning Supplies and Floor Care Products and added a less toxic cleaner to the Central Stores catalog, as well as maintaining the state contract for recycled latex paint.

A mercury component disclosure and phase-out requirements in the 2002 motor vehicle request for bids (RFB), in partnership with PCA 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 website 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 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 PCA 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 website address for the Carbohydrate Economy Clearinghouse is http://www.carbohydrateeconomy.org.

OEA's website 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, fiberglass-reinforced plastic 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 and one of the few companies producing fiberglass-reinforced recycled structural plastic lumber that can be used in marine applications. The OEA continues its efforts to support the market development of plastic lumber, wood-plastic composite lumber, and nylon board products.

Iron Range Resources and Rehabilitation Agency – Purchasing/Accounting staff obtains agency office supplies from Central Stores.

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 Council Environmental Services –MCES staff participated in a two-day national training session presented by the Sustain-able Products Corporation and held at the Science Museum of Minnesota. Presentations were made and products were demonstrated from linoleum flooring to hybrid vehicles. Guidelines, model specifications and life-cycle costing were emphasized throughout the session. MCES staff also participated in a one-day workshop for county and local government purchasing agents presented by Dakota County and held at the sustainably designed headquarters building of Lebanon Hills Regional Park.

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 133rd Airlift Wing and the 148th Fighter Wing in Duluth have established a "pharmacy" for material purchases. Only material from an approved product list can be purchased. Inspections of storage lockers are conducted to ensure that personnel are purchasing only approved

products. Items are distributed in the amount needed to do the job, and unused material can be redistributed when a need is expressed.

The P2 study is investigating ways to best implement a similar system with the rest of the MNARNG. The formation of a Hazardous Materials Control Committee will address how best to implement this within the organization. Representatives from the following offices will be represented: Logistics, Environmental, Purchasing, and users of the products.

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. Currently, the agency has 59 flex fuel vehicles and two alternative fuel vehicles. 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.

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 requirements.

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

Southeast Technical College – Procurement of products is done through a competitive bidding process following state contracts when possible. Materials management practices involve relocating products/equipment to other departments or MnSCU campuses, trading, or selling at public sale when possible rather than disposing of materials.

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 – 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 include 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.

North Hennepin Community College – All departments of this college are encouraged to return fax machine ink 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.

Southeast Technical College – Remanufactured parts are used when possible by our Automotive Technology, Auto Body Technology, and maintenance department.

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

32. Tanks

Bemidji State University –The university's three 30,000-gallon underground heating oil tanks are scheduled for cleaning and inspection. The estimated cost for these services is $17,000, which includes disposal of waste material from the tank bottoms. Installation of automatic leak detection monitoring is also being considered. The estimated cost of the leak detection system is approximately $8,000.

Department of Corrections

MCF-Red Wing – Red Wing uses a 1,000-gallon aboveground concrete tank for with spill containment and leak detection for its automotive fuel. In addition, the facility has removed all belowground storage tanks and one aboveground tank used for heating oil.

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

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 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.

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 285-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.

Southeast Technical College – A new underground fuel oil tank with electronic monitoring was installed at the Winona main campus in 1993 meeting all current requirements. A under ground used oil storage tank was also removed at that time. Now used oil is stored in 55-gallon drums with a secondary container for spill control. We are still waiting for funding approval to remove and replace the tank at the Red Wing Campus.

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 has received a grant from the Office of Environmental Assistance and is utilizing the OEA, city of Saint Cloud, Tri-County Waste Commission, and RETAP as technical resources to help identify and implement pollution prevention improvements.

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.

Each year MnTAP works to achieve its goal of reducing four million pounds of waste (as solid/hazardous waste, air emissions, and wastewater discharge), and saving companies one million dollars. Overall, MnTAP exceeded its goals in 2004, documenting a reduction of 64.6 million pounds of waste, 5.8 million pounds of pollution in wastewater and air, reuse of 3.1 million pounds of waste, and 12.2 million gallons of water conserved, resulting in a total cost savings of $2.6 million to businesses.

Site visits. Site visits provide companies with a one-on-one assessment of pollution prevention opportunities and serve as a practical way to help businesses get pollution prevention practices in place by promoting team formation, scoping out potential student intern projects, and identifying potential grant/loan opportunities. Approximately 120 site visits were conducted this past year, primarily with industrial facilities related to food processing, healthcare, metal finishing, and utilities. Site visits helped companies reduce 6.1 million pounds of waste, conserve 2.2 million gallons of water, and save $460,000.

Student interns. Implementing pollution prevention takes time and commitment. MnTAP worked with eight intern companies in 2004, resulting in pollution prevention documentation of 1.3 million pounds of waste, 9 million gallons of water, and savings of $232,000. Past intern projects from 2000 through 2003 documented an additional reduction of 60 million pounds (30,000 tons) of waste/wastewater loading, 942,000 gallons water, and a savings of $442,000, largely due to additional changes to recover iron ore concentrate at Hibbing Taconite (2001 intern project). Additional waste reduction from the 2004 projects is projected in the next one to two years, including 261,000 pounds of solid and hazardous waste and 9.7 million gallons of water. These additional projected reductions, if implemented, will result in additional cost savings of $419,293. The 2004 intern companies included:

- Aveda, Blaine
- Blandin, Park Rapids
- Endocardial Solutions, St. Paul
- Hutchinson Technology, Hutchinson
- Pro-Corn, Preston
- Redwood Area Hospital, Redwood Falls
- Rock-Tenn, St. Paul
- Ultra Image, Big Lake

Success Stories

Hospitals for a Healthy Environment

Implementation of the Hospitals for a Healthy Environment (H2E) initiative in Minnesota has resulted in at least 34 healthcare facilities engaged in documented pollution prevention efforts at some level. Results of this two-year project were included in the final report to the U.S. Environmental Protection Agency (EPA) Region 5 in July 2004.

H2E is a national partnership between EPA and the American Hospital Association (AHA) with the goals of eliminating mercury from the waste stream by 2005, and reducing the total volume of waste by 33% in 2005 and 50% in 2010. The H2E initiative has useful tools and provides good recognition to encourage pollution prevention in the healthcare sector.

Of the 34 facilities (22% of Minnesota hospitals) implementing pollution prevention, 13 have signed on as H2E partners, and 29 have eliminated 75% of their mercury, or are working toward that goal. These facilities have eliminated 394 pounds of mercury, 751 gallons of hazardous chemicals, and 250,000 pounds of solid waste. Documented savings to facilities is $152,600, not even considering difficult to document costs such as clean up and liability. Additional reductions and savings are expected as facilities complete implementation.

Finally, MnTAP identified at least five facilities as pollution prevention leaders in Minnesota. These facilities have been recognized as exemplary in their pollution prevention efforts and have been willing to share their success with other businesses.

A number of outreach efforts and communication techniques were used to reach the healthcare audiences. More effective were working through the University of Minnesota Academic Health Center and the health care trade associations.

Minnesota Department of Military Affairs

MnTAP is currently assisting the Minnesota Department of Military Affairs (DMA) to identify areas for improvement and to maximize pollution prevention practices and technologies. DMA oversees approximately 80 Minnesota Army National Guard facilities throughout Minnesota including maintenance facilities, training grounds (Camp Ripley), air bases (St. Paul Holman Field), and armories. These facilities have a variety of operations (i.e., vehicle maintenance, painting) that generate waste streams including oil, solvents, sludge, empty containers, and batteries. DMA uses Pollution Prevention Opportunity Assessments (PPOA) as the mechanism to identify and assess the feasibility of pollution prevention practices for various processes or activities at its facilities.

The objective of this project is for MnTAP to conduct and prepare PPOAs for approximately 20 process areas of the DMA. These PPOAs will be compiled into pollution prevention plans for each of the following seven facilities:

- Army Aviation Support Facility (AASF) – Holman Field, St. Paul
- Mobilization and Training Equipment Site (MATES) – Camp Ripley, Little Falls
- Combined Support Maintenance Shop (CSMS) – Camp Ripley, Little Falls
- Training site – Camp Ripley, Little Falls
- Organizational Maintenance Site (OMS) – New Brighton
- Organizational Maintenance Site (OMS) – Rosemount
- Training and Community Center (TACC) – Metro County Area

To date MnTAP has submitted 13 PPOAs to DMA, with five more in development. Pollution prevention plans for facilities will be developed after the first of the year.

Technology Diffusion - MnTAP is using the technology diffusion model developed by the University of Illinois Waste Management Resource Center (WMRC) to achieve a greater rate of pollution prevention implementation in Minnesota. Technology diffusion refers to accelerating the adoption of pollution prevention technologies in the marketplace.

There are three key elements of the technology diffusion model:

- identify pollution prevention technology needs in targeted business sectors
- conduct in-plant technology demonstration projects or pilot trials to document performance, train workers, and resolve problems
- the demonstration or pilot plant companies that adopt the technologies can then mentor other companies to achieve wider implementation

MnTAP's target sector areas are fiber reinforced plastic (FRP) and wood finishing. Information from these targets will be shared with the two partner states: University of Illinois-WMRC and University of Louisville-KPPC.

MnTAP held its two stakeholder meetings in June 2004. Both sessions were well attended and provided MnTAP with useful pollution prevention technology need information.

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.

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 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. The section participates in the Great Lakes Regional Pollution Prevention Roundtable through its web site.

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/.

New for 2003 is the Phosphorous Management Team. The National Pollutant Discharge Elimination System Permit was renewed for the Hastings WWTP. IWPPS will work with industries to identify and reduce sources of phosphorous. A survey will be conducted to be followed by a targeted sampling program. Where appropriate, non-phosphorous substitutes will be identified and recommended. The treatment plant will investigate chemical and biological phosphorous reduction technologies.

Department of Military Affairs – In the event of an environmental emergency, an 800 number has been established to contact the MNARNG Public Works department or the Environmental Office. There is also an established department web page for sharing information throughout the organization.

North Hennepin Community College – Technical support is provided through MnTAP, MPCA, and other state agencies as needed.

St. Cloud State University – Technical support for SCSU is often provided by its highly accredited Environmental Health and Safety consultant MacNeil Environmental Inc. (MEI). MEI has several Masters level O/EHS specialists on staff and has maintained a Minnesota Licensed Professional Civil and Environmental Engineer on campus for seven years in an office in the Buildings and Grounds Management center. The ready availability of this Certified Safety Professional/Certified Industrial Hygienist engineer has aided SCSU recycling, renovations, 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. This has also aided substantial reductions in costs associated with hazardous waste and battery recycling.

Southeast Technical College – The college has reduced applications of pesticides and fertilizers from two to one per year, except for the lawn area around the main buildings.

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.

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 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 $900,000 in retread tires in FY04. 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.

Iron Range Resources and Rehabilitation Agency –Used tires are transported to the regional landfill in Virginia, and 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.

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 – The MNARNG recycled 60,000 pounds of tires through the Defense Reutilization Marketing Office (DRMO) in Duluth.

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.

Southeast Technical College – Tires are installed off site. We pay to have old tires recycled. The Automotive Technology program no longer has a tire changer, which has reduced the number of old, tires we need to recycle.

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 installed in 2002 reduced water consumption by approximately three million gallons during the last year as compared to pre-installation usage. That represents a savings of approximately $25,000.

Department of Corrections

MCF-Rush City – This facility is equipped with a computerized water control system for all showers, sinks, and toilets. Ultra-low flush toilets are used with flood-control devices that prevent flooding of toilets. Outdoor sprinkler system is on a timer to conserve water. We have also installed a salt reclaimer for more efficiency. The new system is saving this facility 30 percent on salt used or 79,000 pounds per year for water softening.

Office of Environmental Assistance – Water conservation continues to be an area where businesses have an opportunity to conserve resources. MnTAP helped companies reduce 12.2 million gallons of water in 2004.

Phosphorus Reduction in the Upper Mississippi River Basin: MnTAP is in the second year of an industrial wastewater load reduction program using POTWs to reach industrial users and provide technical assistance to reduce phosphorus and other wastewater pollutants. The project involves working with cities in the Upper Mississippi River Basin to inventory industrial phosphorus sources, identify pollution prevention opportunities, assist industries with implementation of pollution prevention techniques, and document the results.

The project has three funding sources including The McKnight Foundation, U.S. EPA Region 5, and the Minnesota Pollution Control Agency (MPCA). The EPA Region 5 scope also involves identifying and minimizing mercury sources. The MPCA scope includes a focus on outreach and assistance statewide to help cities with phosphorus management planning (PMP).

Since this project began in June of 2003 MnTAP has been in contact with over 150 cities statewide. Approximately 100 of the contacts have been in the Upper Mississippi River Basin. Contacts with these cities has led to assistance with specific industries. MnTAP has provided phone assistance to approximately 50 industries and conducted 11 site visits.

A large portion of the work with cities involves assisting them with PMPs, which will eventually help them meet a 1 mg/L phosphorus limit. MnTAP's focus, as part of the PMP process, is to identify phosphorus contributing businesses and develop strategies to reduce phosphorus before it gets to the treatment plant. Key industrial sources of phosphorus include food processing, metal phosphatizing, and cleaning/sanitizing operations. Outreach to the cities has been through the Minnesota Wastewater Operators Association Section meetings and a mini-newsletter mailed directly to wastewater treatment plan operators. MnTAP has worked with most cities in the Upper Mississippi River Basin on PMPs (where needed) and an additional 50 cities outside the basin on PMP development. Mercury sources, particularly from hospitals, are also discussed with

POTWs along with phosphorus sources. MnTAP's considerable expertise in mercury elimination has been a useful source of knowledge for cities.

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 use 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 2003, a total of 14,875 dry tons from the metro WWTP and 1,634 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 11,517 tons of heat-dried biosolids from the Blue Lake WWTP in Shakopee was produced for land application in 2003.

Department of Military Affairs – Spill Prevention Control and Countermeasure Plans for all MNARNG facilities are being upgraded. Current plans will be reviewed and upgrades will be implemented when feasible.

Minnesota Pollution Control Agency – The Brainerd office has leased premises that feature water conservation fixtures including low-volume flush toilets. In May 2003, the MPCA renegotiated its lease on the 520 Lafayette Road Building in St. Paul, as part of that lease the MPCA suggested the installation of low-flow water conserving plumbing fixtures. This activity is planned and has not yet taken place

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 (RPZ).

St. Cloud State University – This past year, progress continued at SCSU on replacing restroom urinal flushing systems to reduce water use. 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.

Southeast Technical College – Some water conservation has been achieved by removing vacuum type gravity flush tanks, which ran continuously, and installing automatic flush valves on the urinals. Other conservation has included installing rain sensors on in- ground sprinkler systems.

Department of Transportation – Mn/DOT is using low consumption toilets, urinals, and sinks that use one-third of the water as compared to traditional fixtures, thereby saving thousands of gallons of water each day. 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 and the amount of water sent to the water treatment facilities.

> ***MCF-Faribault –*** Faribault is pursuing the removal of paper towels from all living units and replacing them with air dryers.

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 is 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 DHS Central Office and the State Operated Services facilities continue to convert paper documents into electronic formats. Time sheets, expense reports, facility telephone books, policies and procedures, and office forms are now accessed through our intranet and replace paper documents. Eventually many forms will be filled out and processed on-line. The central implemented the Electronic Document Management System (EDMS), an electronic filing and retrieval system. The EDMS will greatly reduce the use and storage of paper documents and their related Lektriever mechanical systems. DHS' MinnesotaCare Division is converting to a paperless document storage system for their insurance applications and processing and the Human Resource Division is converting its employee paper files into an electronic format. All new employee documents are scanned directly into electronic files.

Electronic versions of DHS publications, bulletins, news releases, reports and manuals are available to our customers on the DHS public web site. *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 DHS videoconference system (Virtual Presence) continues to link non-metro and metro sites via satellite and greatly reduces vehicle travel between facilities and Central Office locations. As an example, during the week of May 10-14, more than 1,500 Minnesota health and human service workers were able to conduct

business with almost no travel. DHS divisions hosted 24 videoconferences that linked with 172 sites across Minnesota reaching over 1,500 people.

Iron Range Resources and Rehabilitation Agency – Aluminum cans at all of the agencies facilities are collected and brought to various recycle locations.

Metropolitan Council Environmental Services – The Eagles Point WWTP in Cottage Grove was totally reconstructed and expanded over the past few years. With the completion of construction in 2003, operations staff moved into the sustainably designed administration building. Features include insulated pre-cast concrete panels with an R-value of 26 and natural daylighting with clerestory windows, and energy efficient electric lighting with room occupancy sensors. Office furnishings consist of Baltix products made of wheat board and compressed sunflower hulls. Countertops are Quartzite, a locally manufactured "stone". Landscaping was accomplished with native plants and the site is designed to retain storm water.

A unique aspect of the totally new plant is the HVAC (heating, ventilating and air conditioning) system that utilizes the thermal energy of treated effluent in a heat pump. The moderate year-round temperatures of the effluent are the predominant heat source of the administration building in winter and its sole source of cooling in summer. Hazardous chemicals used in effluent disinfection have been replaced by ultraviolet lamps. All mercury-bearing instruments in the plant have been replaced by electronic counterparts. Over 53 percent of the demolition material from the original plant was recycled. The project's design contractor presented a workshop in sustainability concepts and criteria evaluation to MCES project managers and construction staff.

Department of Military Affairs – The MNARNG has established a "recycling" account that is utilized to fund P2 and other environmental projects. Money is generated from the sale of recyclable materials and from an account established with the Defense Reutilization and Marketing Office (DRMO). The DRMO markets hazardous materials received from MNARNG facilities and returns a portion of the money to this account. The Environmental Quality Control Committee, which is made up of senior DMA staff, has control of these funds. Some of the P2 projects funded by this account were the purchase of aerosol can puncture devices for the maintenance shops and purchase of parts cleaning machines for the maintenance shops.

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 St. Paul Office poured a large concrete staircase that was made with coal fly ash amended concrete.

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 Brainerd office is recycling all compostable food wastes into a worm farm.

St. Cloud State University – SCSU has recycled 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 is constructing salt sheds made of recyclable materials, eliminating 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

Clean Air Minnesota partnership: The University of Minnesota became a partner in Clean Air Minnesota. The University's Waste Abatement Committee and Facilities Management staff has started working with Clean Air Minnesota staff to evaluate, plan and implement air pollution strategies for the university.

Clean Air Minnesota is a voluntary partnership of businesses, environmental groups, government agencies, and citizens working together to achieve significant, measurable reduction in air pollution. Clean Air Minnesota's approach unites partners to craft voluntary pollution solutions before Minnesota violates federal air-quality standards. This groundbreaking program follows a Minnesota tradition of leadership on environmental and health issues. Leveraging the resources and expertise of its partners, Clean Air Minnesota works to achieve real emissions reductions. Clean Air Minnesota's action plan centers on improving air quality by reducing emissions generated by individuals and businesses. Clean Air Minnesota's efforts are focused on four primary categories:

1. Educating the public about air quality threats and how to address them.
2. Working with industries and small businesses (point sources and area sources) to identify ways to reduce emissions.
3. Lowering emissions from mobile sources.
4. Encouraging natural landscaping as an alternative to mowing.

Among the project teams' current activities are:

- Creating educational materials, pollution-prevention resources and technical assistance information for partners, stakeholders and the general public
- Developing programs to reduce air pollution and minimize new emissions through the use of innovative landscape design and maintenance techniques, low-emitting paints and cleaner engines and fuels, among others.
- Building an email network of timely information on air quality, and how to mitigate air pollution levels during Air Pollution Alerts issued by the Minnesota Pollution Control Agency (MPCA), as well as throughout the year.

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.

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.

FY04 = fiscal year 2004
O = ongoing
P = planned

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	North Hennepin Comm. College	St. Cloud State	Southeast Technical College	Department of Transportation	University of Minnesota
Absorbents	FY04 O/P				FY04 O/P			O	FY04 O	O	FY04 O		O/P			O	O	O	O
Adhesives	FY04 O/P												O		O	O			
Air quality, CFCs	FY04 O/P				FY04 O/P		O		FY04 O		FY04 O/P		O/P		O	O	O	O	O
Antifreeze	FY04 O/P				FY04 O/P			O	FY04 O		FY04 O		FY04 O/P		O	O	O	O	O
Audits	FY04 O/P				FY04 O/P				FY04 O/P		O/P		FY04 O/P	P		O	O	O	O
Auto fuels	FY04 O/P	O		FY04 O/P	FY04 O/P	FY04 O/P		O				FY04 O/P	O	O	O	O	O	FY04 O/P	FY04 O
Auto maintenance	FY04 O/P			FY04 O/P				O	FY04 O/P				O		O	O	O	O	O
Batteries	FY04 O/P			FY04 O		FY04 O/P	O	O	FY04 O	O	FY04 O		FY04 O/P	O	O	O	O	O	O
Cleaning supplies	FY04 O/P				FY04 O/P	FY04 O/P		O			FY04 O		O	O	O	O	O	O	O/P
Commuting & transportation	FY04 O/P		O	FY04 O	FY04 O/P	FY04 O/P	O	O		FY04 O	FY04 O/P		O	O		O	O	FY04 O/P	FY04 O
Education, comm. & training	FY04 O/P		O		FY04 O/P	FY04 O/P			FY04 O	O	P	O	FY04 O	O	O	O	O	O	FY04 O/P
Electronics	FY04 O/P			FY04 O	FY04 O/P	FY04 O/P		O	FY04 O				O	FY04 O	O	O	O	O	O
Energy – lighting	FY04 O/P		FY04 O/P		FY04 O/P	FY04 O/P		O	FY04 O	O	FY04 O/P		O/P	O	O	O	O	O	O
Energy – production	FY04 O/P		O	FY04 O/P	FY04 O/P	FY04 O/P				O	O		O	O	O	O		O	FY04 O/P
Groundwater wells	FY04 O/P				FY04 O/P								O/P		O	O	O		
Heavy metals	FY04 O/P				FY04 O/P	FY04 O/P				O	O		O		O	O		O	O
HVAC, indoor air quality	FY04 O/P				FY04 O/P			O	FY04 O		O/P		O	O	O	O	O	O	FY04 O/P
Ice control, sanding	FY04 O/P		O		FY04 O/P			O	FY04 O		FY04 O/P		O		O	O	O	FY04 O/P	O

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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	North Hennepin Comm. College	St. Cloud State	Southeast Technical College	Department of Transportation	University of Minnesota
Laboratory	FY04	O	O	FY04 O	FY04 O/P									FY04	O	O	O	O	O
Landscaping	FY04 O/P				FY04 O/P								O	O		O	O	O	FY04 O/P
Materials exchange	FY04 O/P				FY04 O/P	FY04 O/P			FY04 O	O	P		FY04	FY04	O	O	O		O
Office supplies	FY04 O/P	O	O	FY04 O	FY04 O/P	FY04 O/P	O	O	FY04 O	O		O/P	O	O/P	O	O	O	O	O
Oil, oil filters	FY04 O/P							O	FY04 O	O	O	O	O		O	O	O	O	O
Paints, coating, stripping	FY04 O/P		O		FY04 O/P				FY04 O		FY04 O		FY04 O	FY04 O	O	O	O	O	O
Parts cleaning	FY04 O/P							O	FY04 O/P	O	FY04 O		O			O	O	O	O
Personal care							O						O				O		
Pesticides, fertilizers	FY04 O/P	O			FY04 O/P		O					O	O		O	O	O	O	O
Policy statement	FY04 O/P	O	O	FY04 O	FY04 O/P	FY04 O/P		O	FY04 O	O	FY04 O		O		O	O	O	O	FY04
Printing	FY04 O/P			FY04 O/P		FY04 O/P							O	O	O	O	O	O	O
Procurement	FY04 O/P	O	O		FY04 O/P	FY04 O/P		O	FY04 O	O	FY04 O	O	O/P	O	O	O	O	O	O
Remanufactured parts	FY04 O/P		O					O	FY04 O		O		O	O	O	O	O	O	
Tanks	FY04 O/P		P	FY04 O	FY04 O			O	FY04 O		FY04 O/P		O		O	O	O	O	O
Technical support	FY04 O/P				FY04 O/P	FY04 O/P		O	FY04 O	O			O		O	O	O	O	O
Tires	FY04 O/P							O	FY04 O		FY04 O		O		O	O	O	O	
Water treatment	FY04 O/P		O		FY04 O/P	FY04 O/P			FY04 O	O	FY04 O/P		O	O/P	O	O	O	O	O
Other					FY04 O/P	FY04 O/P	O			O			O	FY04 O		O		O	FY04 O/P