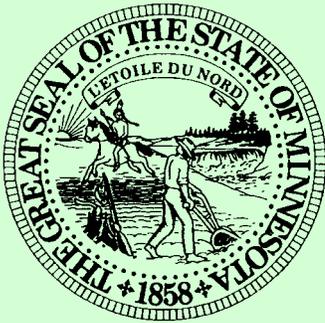
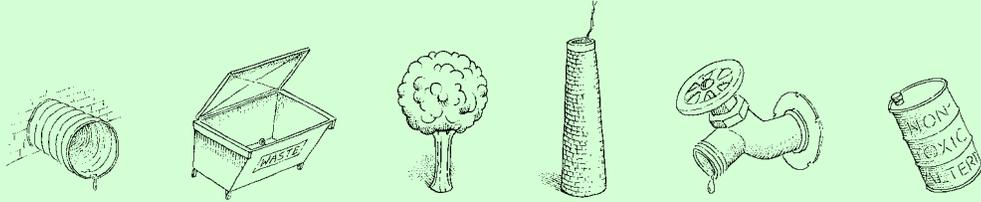


INTERAGENCY POLLUTION PREVENTION ADVISORY TEAM [IPAAT]



Pollution Prevention Summary Report

Consolidated from reports submitted by members
of the Interagency Pollution Prevention Advisory
Team for the fiscal year 2002

March 2003

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 2002, 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. The *Pollution Prevention Summary Report* is divided into four parts.

- Part 1 describes each agency, including the number of employees, locations of the agencies, and pollution prevention training held during the last year.
- Part 2 summarizes each agency's policy and regulatory activities that have incorporated pollution prevention in its broader sense.
- Part 3 summarizes 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.
- Part 4 contains a 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.

Original signed copies of the report from each agency are 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 have had during fiscal year 2002.

Department of Administration – The Department of Administration (Admin) works to improve the quality and productivity of Minnesota government by providing an essential array of business management and administrative services, including electronic government services. The Department of Administration consists of five bureaus and 24 divisions, with support to nine separate councils. Admin is a department with diverse components yet a common commitment to serving other state departments. The department's primary customers are the executive, judicial, and legislative branches of state and local government.

With jobs as varied as maintaining government buildings and grounds, providing services to manage information technology resources for state agencies, or devising technology policy to meet the needs of the new millennium, the Department of Administration's employees are customer-oriented. They are pledged to making government work better. The department's 900 employees are located in 36 locations. Admin communicates environmental and other information through the following Internet sites:

<http://www.admin.state.mn.us/>, <http://www.rro.state.mn.us>, and <http://www.mmd.admin.state.mn.us/>.

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

Department of Agriculture – The Minnesota Department of Agriculture (MDA) 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.

Department of Commerce – The department employs approximately 314 staff in downtown St. Paul and an additional 38 staff in Roseville. This report covers agency pollution prevention activities at both locations. Department of Commerce staff has not received any pollution prevention (P2) training during the past year.

Department of Corrections – Approximately 3,600 staff work at the Department of Corrections throughout 11 locations. This report is for all locations. Department of Corrections staff has received some pollution prevention training during the past year. Hazardous Waste Prevention training is given during academy/orientation for all new employees at Rush City. Approximately 40 staff at Stillwater receive annual hazardous waste training, this represents approximately half of the staff involved in pollution prevention at the facility. Physical Plant staff from both MCF-OPH and MCF-STW were trained and re-certified in asbestos handling procedures on January 11, 2002. The General Maintenance workers attended training on new, safer cleaning

products and energy savings equipment. Correctional facilities, on the whole, do not generate significant quantities of hazardous waste or use significant quantities of resources and/or toxic chemicals.

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

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

Department of Human Services – The Department of Human Services has about 6,600 employees. The department has seven regional treatment centers, 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 includes 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 thirty 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 (IRRRA) – The IRRRA is a state agency that strives to enhance the economic vitality of the Taconite Tax Relief Area (TTRA) through value-driven, cost-effective projects and programs designed for the long-range benefit of the area. The agency complement, including all departments and locations, is 87 employees, down one employee complement from fiscal year 2001. These employees staff three facilities owned and operated by IRRRA. The administration headquarters is located two miles south of Eveleth on Highway 53. This building provides office space for Accounting, Business Recruitment, Communications, Economic and Community Development, Human Resources, Information Systems, Mining & Natural Resources, Purchasing, Shop, Technology, and Tourism.

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

Ironworld is also home to the IRRRA'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. Each year, IRRRA Mineland Reclamation grows and plants 300,000 containerized seedlings on the Mesabi, Vermilion, and Cuyuna iron ranges.

The Building Demolition Division, headquartered at the Ironworld Discovery Center complex, has been an ongoing activity of the IRRRA since 1972. Dilapidated, unwanted, and hazardous structures are removed to make room for new construction and provide a cleaner, healthier environment. A hazardous materials inspection is performed on each structure prior to removal to insure that construction and demolition landfills will not receive any debris that can harm the environment. Items to be removed for recycling and all hazardous materials include, but are not limited to, wet paint, caulking tubes, mercury lamps and thermostats, ballast, oil and gas, office paper, appliances, batteries, green treated lumber, and tires. Strict guidelines enforced by MPCA and OSHA regulate the demolition industry and protect employees, general public, and environment.

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 (Minnesota's number one public golf course, *Golf Digest*, 1999). A second 18-hole championship golf course, the Quarry, is scheduled to open in June 2003. The resort's ski area is ranked number 3 in the Midwest and number one in Minnesota and features 34 alpine ski runs; 70 kilometers of groomed cross country ski trails; the Midwest's best snowboard terrain park; easy access to thousands of groomed snowmobile trails; hiking, biking and canoeing; an 18-hole disc golf course; a variety of quality lodging choices on site and in the surrounding area; great food; special events; and entertainment. Giants Ridge is committed to providing guests with premier recreational experiences through first class customer service. The facility also plays an integral role in the area's economic development through tourism.

Metropolitan Airports Commission – The Minnesota Legislature created the Metropolitan Airports Commission (MAC) 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.” MAC is governed by 15 commissioners, 13 of which are appointed by the governor and the other two are the mayors of Minneapolis and St. Paul or their designees.

MAC currently owns and operates six reliever airports and the Minneapolis/St. Paul International Airport (MSP). While MSP handles commercial air traffic, the reliever airport system handles the majority of the general aviation traffic. In 2002, MSP serviced more than 32 million passengers and supported 501,000 flight operations. The reliever airport system supports more than 757,000 flight operations per year.

MAC presently employs approximately 543 people who are 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 Director's Office, Energy Management, and Facility Management. Airside consists of Operations, Carpentry, Communications, Electrical, Fire, Police, Maintenance (field and mechanical), and the Paint Shop. Administration includes Airport Development, Environment, Commercial Management, Executive, Finance, Human Resources, Insurance/Risk, Labor Relations, Legal, IS, Public Affairs, and Purchasing.

This summary constitutes a report for the agency as a whole. Staffed facility locations include the Lindbergh and Hubert H. Humphrey terminals at MSP International, as well as Maintenance, Trades, and two administrative locations. MAC continually reevaluates and updates all pollution prevention methods and practices. Communication and topic-specific training is ongoing. All items listed in Part 3 are ongoing processes and will be reviewed and updated regularly to reflect improvements in the program/operations. This will be accomplished through increased awareness of MAC staff and its tenants of environmentally friendly products/processes that reduce waste and minimize environmental hazards.

Metropolitan Council- Environmental Services – The Metropolitan Council Environmental Services (MCES) is a division of the Metropolitan Council, the public agency which coordinates regional planning and guides development in Minnesota’s seven-county metropolitan area. The MCES operates the regional wastewater collection and treatment system in most of that same seven-county Twin Cities metropolitan area. Additional regional environmental responsibilities include industrial wastewater pretreatment and management, air and water quality monitoring, environmental compliance, environmental education, water resources planning, and non-point 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 710 staff (full-time equivalent positions). This report describes pollution prevention activities for the entire MCES. A separate report will cover pollution prevention for 2002 for Metro Transit, the division of the Metropolitan Council, which 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 (IPPAT). Michael Nevala, P2 contact for MCES, also has been a member of the Minnesota Office of Environmental Assistance’s Prevention, Reduction, and Recycling Advisory Council since its beginning in 1997. 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 - Transit Operations – 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.

This report will cover all of the buildings that are operated by Metro Transit. During the last year, no formal P2 training was conducted by Metro Transit, but opportunities were given to staff to attend programs put on by other agencies pertaining to 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 and healthier environment for all of its employees and customers.

Metropolitan Mosquito Control District – The Metropolitan Mosquito Control District (MMCD) controls mosquitoes and black flies in the metropolitan counties of Anoka, eastern Carver, Dakota, Hennepin, Ramsey, Scott, and Washington. The district employs 47 full-time staff and approximately 160 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 2002 fiscal reporting period.

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

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

Minnesota Pollution Control Agency – The Minnesota Pollution Control Agency (MPCA) has approximately 750 staff 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 have received pollution prevention training, but most have not.

Minnesota State Colleges and Universities (MnSCU) – MnSCU is a network of 34 two-year and four-year state colleges and universities, serving about 140,000 students each semester.

Bemidji State University – Bemidji State University includes two locations: the BSU main campus and the Center for Research and Innovation. BSU employs approximately 523 faculty and staff, and 517 student employees. This summary reports on both locations. Staff and members of the Students' for the Environment, a student organization, attended the Minnesota Sustainable Communities Conference in September.

Metropolitan State University – Metropolitan State University has 375 full-time permanent staff located on three campuses. This report includes activities for owned property located at 700 East 7th Street in St. Paul. Staff have not received P2 training in the last year.

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

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

Department of Transportation – The Minnesota Department of Transportation (Mn/DOT) has approximately 5,400 employees. Mn/DOT is a decentralized organization with one central office, seven districts, and one metropolitan division. Mn/DOT has 16 major truck stations located in each district and the metropolitan division with 135 additional truck stations. Mn/DOT has numerous remote salt sheds and gravel pits. The department maintains approximately 12,800 miles of highway (28,837 lane miles) and 4,621 bridges. This report represents Mn/DOT as a whole with respect to Mn/DOT's efforts in pollution prevention.

University of Minnesota – The University of Minnesota has 31,288 employees and 60,433 students on four major campuses: Crookston, Duluth, Morris, and Twin Cities (the Twin Cities campus, which is counted as a single campus, includes both the Minneapolis and St. Paul campuses) and operates the University Center Rochester in cooperation with MnSCU.

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

Part 2

Policy and Regulatory Activities

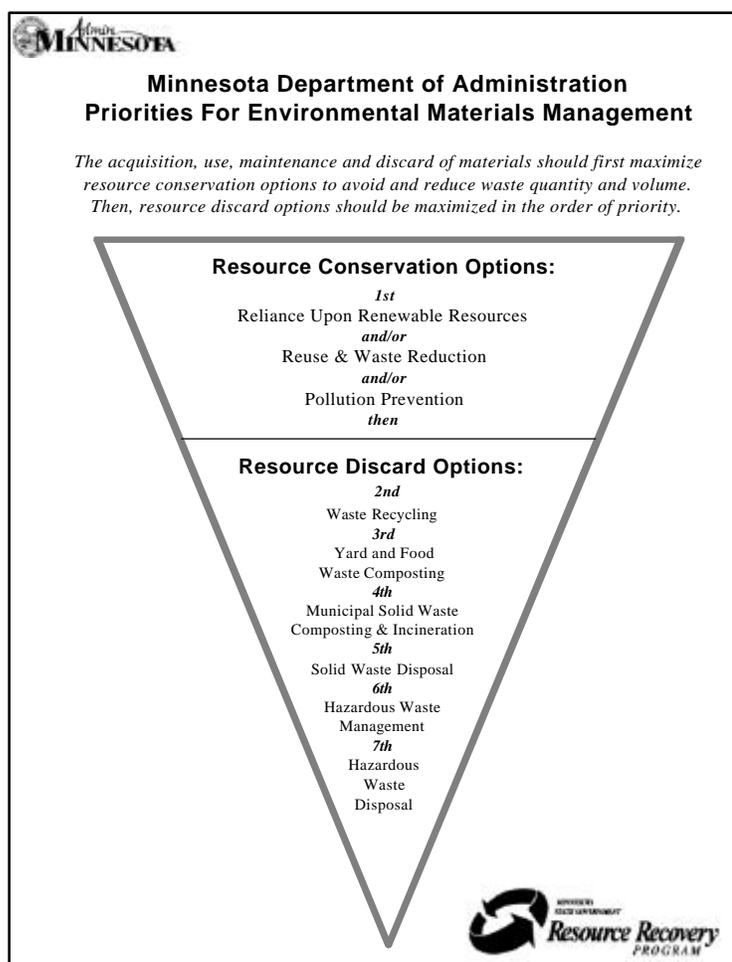
Department of Administration – The Department of Administration specifically addresses pollution prevention as a top priority in its Policy on Environmental Materials Management and its Priorities for Environmental Materials Management. The Resource Recovery Office promotes the adoption of environmental values by Plant Management, and the mission statements of both divisions specifically include leadership in environmental stewardship. Consequently, Plant Management Division employees 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.

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

The Resource Recovery Office (RRO) in the Plant Management Division encourages pollution prevention and promotes the preferred waste management practices contained in Minnesota Stat. § 155A.02 during the acquisition, use, maintenance, and discard of materials.

RRO developed Admin's Priorities for Environmental Materials Management that have been in effect since adoption in 1991 (see sidebar). The Materials Management Division and the Resource Recovery Office distribute this list of priorities to public employees during purchasing training and other opportunities. The Materials Management Division requires that vendors provide environmental codes on the goods and services they are offering to the state.

The Plant Management Division's mission statement encompasses pollution prevention and other environmental concepts (see following page). Plant Management continually revises and updates employee position descriptions, requiring each employee to be individually accountable for achieving environmental stewardship as a function of his/her job responsibilities. Employees are to follow state and federal requirements and shall identify opportunities to implement environmental values.



Plant Management Division Mission Statement

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

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

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

Our core values are:

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

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Department of Agriculture – The Minnesota Department of Agriculture's (MDA) 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, they look for alternative methods that will help in the reduction of hazardous waste streams. The department has an ongoing waste reduction program and actively looks for ways that it 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.

MDA's Agricultural Development Division nominated the Haubenschild dairy operation for the Minnesota Environmental Initiatives' (MEI) annual award for Energy Efficiency and Renewable Energy for the farm's implementation of an anaerobic manure digester. This prestigious award was presented to the Haubenschild dairy operation at the MEI awards ceremony on May 1, 2002. The complete news story can be found on the MDA's web site: www.mda.state.mn.us.

Effective February 15, 2001, the Minnesota Department of Agriculture's Dairy and Food Inspection Division and the Minnesota Pollution Control Agency (MPCA) engaged in a memorandum of understanding (MOU) to work cooperatively together to establish a stable regulatory atmosphere in order to promote growth in Minnesota's dairy industry. In the past year, the MDA's dairy inspectors and MPCA feedlot staff have worked cooperatively to help educate dairy producers in non-delegated counties and inform 1,657 dairy producers in Minnesota about the 7020 feedlot rules.

Department of Corrections – Partnerships continue at Stillwater with the Washington county hazardous waste inspector, as well as the state authorized hazardous waste contractor, our own staff, and vendors to reduce the hazardous waste generation at our facility. The facility has been downgraded from a large quantity generator to a small quantity generator, and all staff are expected to review the hazardous materials they use and recommend any changes that may be necessary.

Shakopee is active in pursuing to reduce paper usage at the facility. Thus, e-mail communication is used whenever possible. Recycled or refurbished products including paper are purchased throughout the facility. Batteries, plastics, papers, aluminum, glass, lamps, cardboard, oil, antifreeze, scrap metal, and wooden pallets are also recycled. In addition, old computers are donated to the MCF-Stillwater Recycle Program for schools. The facility requires that all windows be closed when operating the HVAC system in order to conserve energy. Lighting and HVAC equipment are scheduled to operate only when needed.

Office of Environmental Assistance – The OEA concentrates on pollution prevention policy and outreach. 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: OEA's Minnesota Technical Assistance Program (MnTAP) focuses the vast majority of its efforts on technical assistance to other organizations and companies with a goal of preventing pollution. 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.

With help from MnTAP site visits over the last two years, companies have eliminated 3.9 million pounds of waste and reduced their use of water by 77 million gallons, resulting in company savings of \$3.2 million. Highlights of the impact of MnTAP services this past year include:

- MnTAP's one-on-one services are resulting in pollution prevention and cost savings. A summer 2002 service impact survey indicated that of the industrial facilities MnTAP assisted, 70 percent reduced or reused waste and 31 percent saved money.
- Water conservation issues continue to be a large need for business and an opportune area for pollution prevention impact. MnTAP helped companies reduce 8 million gallons of water in 2002.
- Implementing pollution prevention takes time and continued efforts. MnTAP follow-up with 2000 and 2001 intern companies resulted in pollution prevention documentation of an additional 221,000 pounds of waste, 1.6 million gallons of water, and savings of \$101,000.
- Materials exchange as a reuse tool is meeting company needs. Materials exchange activities grew to 2.6 million pounds of waste exchanged, saving \$994,000.

Product stewardship: 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.

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

Iron Range Resources and Rehabilitation Agency (IRRRRA) – The IRRRA is committed to agency policies and practices that educate and encourage employees to continually strive for the prevention of pollution and conservation of energy and environmental resources. This common sense approach to achieve attainable goals has been working very well at the agency. Occasional tips regarding pollution prevention are included in the *Weekly Resourcer*, the agency's electronic employee newsletter. Under the Adopt a Highway program, IRRRA employees and their families maintain a two-mile stretch of Highway 53 south near the agency's administration building. This supports northeastern Minnesota tourism efforts by annually bagging about twenty-five 30-gallon bags of litter that motorists toss out of their automobile windows.

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

- remaining informed of environmental regulations
- obtaining environmentally friendly ideas from the staff that support pollution prevention
- demonstrating that pollution prevention must be a shared goal among government, communities, and citizens

Metropolitan Airports Commission – The Metropolitan Airports Commission (MAC) recognizes pollution prevention as an integral part of its services. 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. The commission encourages tenants to do the same. MAC also promotes taking a proactive approach to environmental protection and supports cooperation with other regulatory agencies.

Purchasing/procurement. MAC has been able to effectively prevent pollution by implementing several purchasing policies. Policy dictates that recycled content paper is used with few exceptions. Reuse is promoted internally through a policy of the purchasing department, and a procedure has been established outlining the steps to take when MAC-owned property is no longer needed by a particular department. MAC's new p-card program allows employees to purchase goods and services with a credit card, eliminating invoices in most cases, as well as the paperwork required to process thousands of payments. This program has streamlined the purchasing/accounts payable process, as well as dramatically reduced the amount of paper used. Surplus equipment was previously sold by sending lengthy descriptions, bid sheets, as well as terms and

conditions, to numerous recipients on a mailing list. More recently, the use of Internet auction sites has allowed MAC to reach many more potential bidders, eliminate the large and frequent mailings, thereby reducing paper usage. It is probable that selling prices are higher using this method. (See also items 21, 22, 28, and 30 in Part 3.)

Technology and accepted practices. With the advent of internal and external electronic mail capabilities, MAC has embraced its use for many purposes. E-mail is a quick and efficient means by which people within and outside organizations communicate. Yet, it is also an effective way, when used properly, to reduce the amount of paper consumed. It has become MAC's accepted practice to use e-mail in this manner for notices such as job postings, organizational updates, press releases, human resource announcements, etc. Before MAC had e-mail available, every organization-wide notice was sent through interoffice mail on paper to each employee. Not only was this cumbersome, but a waste of paper as well. Now with the ability to instantly send messages via e-mail, paper notices have become essentially obsolete. Similar to the use of e-mail is MAC's Intranet site, where employees can electronically access many internal documents previously only available on paper. Multiple copies become unnecessary, and employees can access them only if they need the document. Not only is this more efficient and time saving, it also saves paper.

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

Metropolitan Council - Environmental Services – The tag line of the council expresses the desire that the Twin Cities can be “one of the best places to live, work, raise a family and do business” and is a reflection of its overall Smart Growth policy. Smart Growth promotes activities and outcomes that are sustainable in development, transportation, affordable housing, and the environment. This is accomplished largely through policies, partnerships, and 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) which addresses issues relevant to the entire region. The companion Environmental Sustainability Procedure (Section 1-2a) addresses pollution prevention 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 items 11, 16, and 33 in Part 3 of this report for a complete description of IWPPS's many activities that are relevant to pollution prevention.

Metropolitan Council - Transit Operations – 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 to a minimum. By successfully preventing pollution at its source, the agency will be able to increase its operational efficiencies and provide a safer and healthier environment for all of its employees and customers. The Metropolitan Council has a general Environmental Sustainability Policy (Section 1-2) which 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.

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

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

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

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

Minnesota Pollution Control Agency – MPCA policy and planning staff are working with the Minnesota Technical Assistance Program (MnTAP) to develop a template for a Phosphorus Management Plan, to be used by wastewater treatment plant operators and industrial dischargers. This tool will help identify and reduce sources of phosphorus emissions through pollution prevention.

MPCA staff recently contracted with an outside firm to help identify, design, implement, and report on two to five pollution prevention projects of relevance to environmental regulatory programs. The process and work to be facilitated by the contractor will involve MPCA management and staff.

MPCA P2 and Policy and Planning staff are actively participating in discussions with staff who are developing future solid waste rules, in an effort to assess any opportunity to address P2 efforts. MPCA staff are currently developing presentations or panel discussions, focusing on individuals working in areas of preventative practices aimed at raising the awareness of how P2 can be used as a tool in innovative and core regulatory functions for internal and external audiences.

The MPCA will continue to provide grants to MnTAP and the Minnesota Erosion Control Association to advance energy efficiency in Minnesota business and low impact development to mitigate stormwater impacts.

Minnesota State Colleges and Universities

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

St. Cloud State University (SCSU) – 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% post-consumer fiber content. Bath tissue is 95 percent, or more, recycled/post-consumer fiber.

Department of Transportation – Mn/DOT is committed to lowering its waste disposal costs and liability and to 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:

- Lower expensive disposal costs and liability associated with the use of hazardous and problem materials/waste. Reduce and eliminate the generation of waste through research, design, and field operations.
- Identify and implement pollution prevention opportunities by involving all employees. These opportunities include new methods, technologies, and product substitution.
- Demonstrate its commitment by adhering to all environmental regulations.
- Promote cooperation and coordination between government and the public toward the shared goal of preventing pollution and conserving our environment.

UNIVERSITY OF MINNESOTA BOARD OF REGENT'S POLICY

Pollution Prevention and Waste Abatement

Adopted: June 11, 1992

Supersedes: Waste Abatement Policy 12/15/85

CONSERVATION

Pollution Prevention and Waste Abatement

The University of Minnesota is committed to excellence and leadership in protecting the environment. Our objective is to reduce all types of waste and emissions. We strive to minimize adverse impact on the air, water, and land through excellence in pollution prevention and waste abatement. By preventing pollution at the source, we can save resources, increase operational efficiencies, and maintain a safe and healthy workplace for our students and employees. By abating those wastes that cannot be eliminated at the source, we can recover useful resources and reduce the environmental and economic burden of waste disposal.

We believe that environmental protection is everyone's responsibility. Its manifestation is valued and displays commitment to the University.

The University of Minnesota will achieve pollution prevention and waste abatement under the following guidelines. We will:

- Include the reduction of both hazardous and nonhazardous wastes and emissions at the source as a prime consideration in teaching, research, service and operations. The University is committed to identifying and implementing pollution prevention opportunities through encouragement and involvement of all students and employees.
- Give top priority to technologies and methods that substitute nonhazardous materials and utilize other source reduction approaches in addressing all environmental issues.
- Vigorously pursue waste abatement programs such as recycling, reuse, and purchase of recycled materials to reduce the need for disposal of waste that cannot be reduced at the source.
- Encourage pollution prevention and waste abatement through changes in purchasing policies and specifications.

The University of Minnesota seeks to demonstrate its leadership role in the State of Minnesota by aggressively adhering to all environmental regulations. We promote cooperation and coordination among higher education, industry, government, and the public toward the shared goals of preventing pollution and abating waste.

Therefore, be it resolved, that the Board of Regents directs the President to establish effective pollution prevention programs and to develop policies, plans and resources to achieve that goal.

Part 3

Pollution Prevention Activities during the Fiscal Year 2002

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

1. Absorbents

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

Department of Corrections

MCF-Rush City (MCF-RC) – This facility has a contract with Onyx Environmental Services to dispose of all absorbents.

MCF-St. Cloud (MCF-SCL) – St. Cloud has eliminated disposing of oil-grease rags in trash dumpster and sends them Metro-Furnace per MPCA regulations, at a cost of \$200 in fiscal year 2002.

MCF-Shakopee (MCF-SHK) – SHK staff use absorbents in maintenance shops for oil-based products. Safety Kleen recycles the oil products in a safe way, benefiting the environment. The annual cost is approximately \$350, and this activity will continue for fiscal year 2003.

MCF-Stillwater (MCF-STW) – Absorbents are used in various industry shops. Shop supervisors regulate the use of these products in an ongoing effort to reduce their use at the Stillwater facility. If any waste is generated, it is disposed of in accordance with EPA/MPCA regulations.

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

Metropolitan Airports Commission – 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 MAC is not responsible for any aircraft fueling operations or related spills, it does provide corncob fractions to its tenants, which are used exclusively to absorb spilled jet fuel. Booms are also used as a stopgap to prevent miscellaneous debris and other contaminants from reaching the river. The sorbents are saturated as much as possible before disposal. The spent absorbent materials are managed as nonhazardous industrial waste and are burned for energy recovery.

Metropolitan Council - Environmental Services – With the change in state regulations on the disposal of used oil absorbents, MCES has switched from a clay-based inorganic product to Spill-Dri™, a material made from 100 percent reclaimed natural fiber cellulose. In many other applications, polypropylene pads are used as absorbents. Products that are absorbed are primarily hydraulic fluids, crankcase oils, and other lubricating oils.

The larger facilities send the used absorbents via OSI Environmental, Inc. to be burned as a fuel for energy recovery. Two MCES facilities have industrial wringers that squeeze the oil from the synthetic pads, allowing their frequent reuse. Another facility has analyzed its used absorbent for Toxicity Characteristic Leaching Procedure heavy metals. Since none of the listed thresholds were exceeded, the absorbent is handled along with industrial codisposal waste with the approval of the regulating county. For 2001, 1,196 gallons of used absorbents were sent for energy recovery, a reduction of 65 percent from the previous year.

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

Minnesota State Colleges and Universities

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

Department of Transportation – In 1995, Mn/DOT stopped landfilling clay-based used oil sorbent material. The sorbents currently used are used either as a waste-derived fuel for the generation of steam and electricity, or extracted and reused. Mn/DOT continues, on a small scale, to use launderable rags. Mn/DOT 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 – Vehicle fleet operations use absorbent pads to clean up small routine spills, in place of and/or in combination with floor-dri. 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 Division of State Building Construction specifies materials such as fiber-based fabrics, adhesives, carpeting, and upholstery that are free of toxins and formaldehyde.

Department of Corrections

MCF-SHK – The facility used all adhesives purchased last year and will continue to do the same for fiscal year 2003.

MCF-STW – Used primarily in the upholstery and furniture shops at Stillwater, these shops have begun using non-flammable adhesives, which along with improved monitoring and procedural changes have nearly eliminated waste. Any waste that does exist is disposed of in accordance with EPA/MPCA regulations.

Minnesota State Colleges and Universities

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.

3. Air Quality, CFCs

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

Department of Corrections

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

MCF-RC – A refrigerant reclaimer is used to reclaim freon at the Rush City facility, and a certified staff person conducts all applicable work on refrigeration and air conditioning units.

MCF-SCL – St. Cloud spends \$300 per year to limit CFC use and release of ozone-depleting chemicals to the atmosphere.

MCF-SHK – All refrigeration and air conditioning equipment at Shakopee has been converted to new refrigerants which are environmentally safer to use. Preventative maintenance is done routinely to detect leaks on all equipment and will continue for fiscal year 2003.

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 - Transit Operations – In 1995, the Minnesota Pollution Control Agency 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 submitted for 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.

Department of Military Affairs – Refrigerants are processed through a Robyne-Air technology. This technology cleans and returns CFCs to the equipment it came from or the CFCs are saved for addition to another piece of equipment compatible with the refrigerant being recycled.

Minnesota State Colleges and Universities

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

CFC refrigerants are used on campus in central plant chillers (R-22), and several smaller air-conditioning (R-22) and refrigeration units (R-12, 22). No supplies or stocks of refrigerant are kept on campus. This

type of work is performed by qualified outside contractors. Renovation of our central plant chiller plant is scheduled to start in the fall of 2002, with completion around May 2003. The new chillers will use a more environmentally friendly refrigerant.

St. Cloud State University (SCSU) – SCSU continues to go beyond recycling freon. A central chiller plant costing over \$3 million is now online. It has added capacity to existing systems and reduced CFCs by using R22 refrigerant. The university has been able to continue the retirement process for cooling towers and R12 and R113 chillers as more buildings are linked to the chilled water system.

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

University of Minnesota – The university's Twin Cities campus has remodeled two of its coal-fired steam plants to use multiple fuel types and has shut down a third. The result is a reduction of sulfur dioxide (SO₂) emissions from approximately 600 tons per year (tpy) to approximately 110-250 tpy, nitrogen oxide (NO_x) emissions from approximately 1,370 tpy to 280-310 tpy, and carbon monoxide (CO) emissions from approximately 280 tpy to 130-150 tpy. Results vary depending on the ratio of fuel types used—gas, coal, or 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.

Facilities Management Energy Systems has created an Energy Efficiency Group whose mission is to reduce the Twin Cities campus energy consumption while maintaining or improving occupant comfort. Their mission is to monitor, evaluate, and modify Heating, Ventilating and Air Conditioning (HVAC) systems to provide a comfortable indoor air environment in an energy-efficient manner that supports the teaching and research mission of the University of Minnesota. Energy consumption is monitored at each building and this information is used to identify buildings using more energy than average. These high use buildings are evaluated for energy efficiency improvement opportunities. Projects are then initiated to improve building energy efficiency and occupant comfort. Frequently projects include the replacement of pneumatic HVAC controls with electronic control systems. This permits the implementation of HVAC control strategies to improve energy efficiency that cannot be done effectively with pneumatic controls. Also included are minor equipment modifications, lighting controls and equipment scheduling. Energy Systems Energy Management Specialists assist Facilities Management operations staff to identify and correct chronic building HVAC system issues. Continuous commissioning of existing building HVAC systems is done to ensure that appropriate equipment schedules temperature set points and control strategies are maintained.

Three components of the group's Energy Efficiency Program (whose goal is to reduce steam and electrical plant air pollution by conserving energy) are:

- optimum energy management
- building system analysis, repair, and upgrade
- energy awareness campaign

Optimizing energy use requires the coordinated efforts of many Facilities Management staff, including building system technicians, engineers, pipe fitters, 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 (BSAC), which electronically monitors and controls heating, ventilation, and fire alarm systems in about 150 campus buildings. The Energy Efficiency Program has developed University Building Efficiency Recommended Guidelines to assist building managers and Building Systems Automated Control operators to maintain building energy use at the lowest level consistent with occupancy scheduling and comfort. Facilities Management employs energy management specialists who are certified commercial energy auditors to perform energy audits to identify

building system equipment and controls that need updating or calibrating. Energy-saving projects are typically funded through internal loans and paid back with the savings from the energy budget.

The energy awareness campaign promotes energy conservation practices across the Twin Cities campus. Their efforts have reduced steam use on the Minneapolis campus central steam system by 20 percent, which translates to a 20 percent reduction in steam plant air emissions. Through energy conservation and the Energy Efficiency Program, overall energy consumption has decreased 12.7 percent since 1991, with energy cost savings of \$1 million each year since 1995. An important part of the program is working with energy suppliers such as Xcel Energy and Reliant Energy to ensure that the university is taking full advantage of energy-saving programs and rebates offered by suppliers. Recently Reliant Energy presented the university with a rebate check for \$225,000 as the result of the purchase of an energy-efficient chiller for the West Bank, which also will save the university \$200,000 per year in avoided utility costs.

The university's Center for Diesel Research focuses on reduction of diesel exhaust emissions from mobile and stationary engines (<http://www.me.umn.edu/centers/cdr/index.html>). The center's mission is to:

- develop new technology to reduce occupational and environmental exposure to internal combustion engine emissions
- evaluate the application of emission control strategies in confined spaces such as mines and densely populated areas
- offer unique educational and research opportunities to students
- 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
- offer educational opportunities through outreach programs and short courses

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

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

With the heating plant modifications, there is a reduction of approximately 1,560 to 1,680 tpy of SO₂, NO_x, 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. The CFC and HCFC capture and reclamation program reduces emissions of global warming chemicals.

4. Antifreeze

Department of Administration – The Travel Management Division replaces antifreeze on an as needed basis, rather than as scheduled maintenance. Used antifreeze is collected and recycled. InterTechnologies Group uses glycol for the cooling loops for the stand-alone air conditioners for the three computer operations centers. The Plant Management Division has converted cooling coils at the Capitol Building and Duluth Government

Services Center to prevent freeze-ups using air from the air handlers rather than antifreeze. The division collects and recycles antifreeze on a voluntary program and will maximize recovery by January 1, 2000.

Department of Corrections – Most facilities take vehicles to a local automotive shop for antifreeze testing and replacement when necessary. The automotive shops recycle the antifreeze in accordance with MPCA rules and regulations. St. Cloud, for example, spent \$1,500 in fiscal year 2002 in automotive shop visits for this purpose. This activity will continue throughout the DOC.

MCF-SHK – The facility continues to recycle antifreeze and will continue to do so for fiscal year 2003.

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

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

Department of Military Affairs – The DMA continues to operate antifreeze-recycling units for vehicle maintenance. The DMA uses an ultrafiltration unit. The advantage of the ultrafiltration unit is that it will eliminate the need for additional chemical disposal. Using these systems helps reduce coolant storage, transportation requirements, and hazardous waste storage. These systems help protect the environment and reduce the amount of hazardous waste by 95 percent, saving the DMA thousands of dollars in hazardous waste disposal costs annually. This has reduced the waste stream from 6,000 pounds per year to 100 pounds per year.

Minnesota State Colleges and Universities

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 is brought to a local recycler.

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

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

University of Minnesota – The university's Fleet Services Department on the Twin Cities campus rarely removes automotive antifreeze, rather they top off radiators with fresh antifreeze, then sell vehicles after three to five years.

5. Audits

Department of Corrections – The ACA accreditation requires that qualified individuals complete monthly audits of all areas within the facility. These audits cover a wide variety of fire, safety, and sanitation items, including an inspection of hazardous materials, inventory lists, waste streams, and disposal procedures.

Metropolitan Airports Commission – MAC is continuing 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. MAC's inspections offer an opportunity to educate its tenants on the environmental impacts their actions may have and to help them improve their waste generation/disposal practices. This program is ongoing by design.

MAC staff continues to provide education/training and technical support to the reliever tenants. An example of this is the cooperative efforts between the MPCA and MAC to hold informational meetings with reliever tenants to assist tenants with the Storm Water Permitting process. Opportunities for pollution prevention are noted and incorporated in the Capital Improvement Process as indicated by 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. Outside sources, such as Minnesota Waste Wise and MnTAP assist with annual site visits followed by recommendations for waste reduction/pollution prevention.

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

DMA conducted inspections of all facilities over the past year as part of the Clean Sweep Project. Each of the facilities were visited; all hazardous waste and hazardous material was inventoried and cleaned up. Materials were taken to a centralized location and redistributed if needed. Hazardous waste was packaged and disposed of through the Defense Reutilization and Marketing Office.

Minnesota State Colleges and Universities

Bemidji State University – Otter Tail Energy Services conducted an energy audit of the campus' electrical and water utilities in fiscal year 2001, the results of which were reported in early fiscal year 2002. The suggested energy conservation measures are estimated to cost \$2.39 million to implement. The report projects a \$209,000 annual cost savings with the payback on the investment being 10 years. The cost of the audit was \$20,000. The decision to implement any or all of the suggested measures will depend on the availability of funds.

Metropolitan State University – Audits are in progress and are being conducted by Xcel Energy and Energy Services Group. The goal is to identify energy saving opportunities, infrastructure improvements, deferred maintenance needs related to electrical and mechanical equipment, and operational enhancement opportunities. Key areas that have already been identified are occupancy sensor applications, activating lighting control system, and lighting retrofits.

St. Cloud State University (SCSU) – MacNeil Environmental Inc. has performed increased environmental audit functions as part of their Environmental Health and Safety (EHS) 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 (CHO) has received specialized off-site training. He has become increasingly instrumental in hazardous waste audits, waste prevention

planning, and hazardous waste removal. Departmental support, staffing focus, and investigative activities in these areas have also increased.

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

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

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

Mn/DOT annually conducts 5 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 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 University of Minnesota's Department of Environmental Health and Safety (DEHS) does targeted audits of large and/or noncompliant departments. All departments are directed to minimize waste and prevent pollution via training and self-audit. The training and audit form is currently available on the Web through the DEHS homepage (www.dehs.umn.edu/hwd/guidebook/guidebook8.html) and in the Hazardous Chemical Waste Guidebook.

6. Automotive Fuels

Department of Administration – The state purchased 216 Ford Taurus 2002 model year cars and 101 Dodge Caravan 2002 model year bi-fuel passenger vans that use E-85 (85 percent ethanol fuel). This is a total of 317 alternative fuel vehicles. We exceed the federal requirement of 75 percent E-85 vehicles.

The Travel Management Division uses ethanol 85 fuel as an alternative energy source with reduced emissions. This facility is available to all state agencies and political subdivisions.

Department of Agriculture – The MDA continues to help promote the use of alternative fuels through their help with the farm community in the production of ethanol blended and biodiesel fuels. More information is available on the department’s web site.

Department of Commerce – Commerce especially promotes E85 use with funding and informational materials.

**E85 FUELING STATIONS AND
RETAIL CONSUMPTION DATA**

	Stations at year’s end	Gallons
1997	11	5,933
1998	11	33,855
1999	14	75,120
2000	50	468,000*
2001	61	706,380*
2002	70	1,242,360*

* Estimated

The department coordinates Minnesota state agency reporting to the U.S. Department of Energy regarding alternative fuel vehicle acquisition requirements. All 11 state agencies that fall under the federal Energy Policy Act (EPAAct) met the 75% light-duty alternative fuel vehicle acquisition requirement in FY02.

Department of Corrections

MCF-RC – All of our automotive fuel is purchased at a local station. We have four vehicles that are E85 rated, and we are encouraging staff to use E85 fuel. We are also working with the local gas stations to add E85 to their pump selection.

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

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

Metropolitan Mosquito Control District – As a pollution prevention activity for 2002, MMCD had hoped to replace some of the older fleet vehicles with new flex fuel vehicles capable of using E85 ethanol blended fuels. Due to budget concerns and the availability of the specific flex fuel vehicle required by MMCD, this activity was put on hold for 2002. MMCD hopes this activity can be renewed for the 2003 mosquito season. Currently MMCD specifies gasoline that contains ethanol for use in district vehicles.

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

Minnesota State Colleges and Universities

North Hennepin Community College – The college no longer has an underground gas storage tank. Fuel for grounds equipment is stored in an aboveground 250-gallon diesel tank which has spill containment. Gasoline for small equipment is kept in approved safety cans and stored in an approved safety cabinet.

St. Cloud State University (SCSU) – SCSU motor pool has 16 alternative fuel (ethanol E-85) autos, which produce limited carbon monoxide. Plans are underway for on-site refueling.

Department of Transportation – Mn/DOT is purchasing heavy equipment pieces that contain computer-controlled electronic ignitions that maximize vehicles' fuel efficiency. Mn/DOT is purchasing lightweight aluminum wheels for its trucks for fuel economy and vehicles that can use E85 (85% ethanol) fuel. The Cedar Truck Station is using bio-diesel in plow trucks. MnDOT is in the process of purchasing and testing electric hybrid cars.

University of Minnesota – The University of Minnesota Fleet Services is an active participant in the E85 fuel project. In the fall of 2000, the Department of Fleet Services, Twin Cities Campus, installed a 6,000-gallon E85 fueling station and purchased 47 flexible fuel vehicles 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' customers have been pumping over 1,000 gallons of E85 fuel per month. Fleet Services has also added the Toyota Prius hybrid electric/gasoline car to its rental fleet. The Prius has an electric motor, which is assisted by a clean, efficient gasoline engine (FFV) for hard accelerating, higher speeds, and battery charging. Fuel efficiency is 52 mpg city and 48 mpg highway.

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

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

7. Automotive Maintenance

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

Department of Corrections

MCF-RC— An outside vendor that handles all the appropriate recycling does all maintenance at the Rush City site.

MCF-SC— St. Cloud has all vehicle service completed off site for an annual cost of \$6,000. This activity helps to reduce the opportunity for any spills on site.

Iron Range Resources and Rehabilitation Agency (IRRRA) – All automotive maintenance, except for air conditioning systems, is performed in the IRRRA 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 items 1, 3, 4, 6, 8, 23, 25, 31, and 33 in Part 3.

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

Department of Military Affairs – Camp Ripley Training Site serves as a major training area for National Guard units from throughout the nation. The MATES serves as a facility within the training site where units can obtain equipment to use while they are here for annual training periods and weekend drills. The MATES facility is responsible for servicing all equipment used at the training site. Maintenance produces large amounts of waste oils and other liquid products that are extracted and replaced during maintenance. To reduce maintenance man-hours, work bay time consumption, and production of waste liquids, the DMA “mothballs” a portion of its fleet during times when troop activity is reduced. The Controlled Humidity Storage Facility allows the DMA to store vehicles in an environment that will keep them out of the weather elements. This facility also allows the vehicles to remain operational in the event of a large mobilization of DMA troops.

Minnesota State Colleges and Universities

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

St. Cloud State University (SCSU) – The SCSU vehicle repair shop has revamped procedures for brake pad/shoe replacement to ensure control of asbestos fiber release. Replacement pads do not contain asbestos. The shop, along with our diesel repair and locksmith shops, also has switched to a water-based parts washer that generates only a small amount of sludge to be disposed of as hazardous waste. Another department is also considering the switch.

Department of Transportation – Mn/DOT is purchasing brake cleaners that are less toxic and easier to manage as a waste. See also item 23, *Oil, Oil Filters* and item 25, *Parts Cleaning* in Part 3.

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 recently installed for evaluation 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-dri. The pads are laundered and reused. Absorbent disposal has been cut by 5 to 10 drums per year.

8. Batteries

Department of Administration – The contract for automotive batteries has provisions for all state agencies to recycle batteries. The Travel Management Division recycles automotive batteries. Materials Management Division procures only reduced or no-mercury batteries in accordance with Minnesota 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:

- (1) 600 parts per million by weight by August 1, 1993;
- (2) 250 parts per million by weight by August 1, 1994; and
- (3) 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 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. The Plant Management Division participates in a voluntary "other" internal battery collection and disposal program.

Department of Commerce – The Weights and Measures Division continues to work with the Minnesota Pollution Control Agency, mailing information to oil recycling stations about oil and lead-acid battery recycling. A battery recycling bin has been placed in the employee lunch room.

Department of Corrections – Many facilities recycle used batteries, and partnerships exist with vendors for proper handling of the batteries when new batteries are purchased.

MCF-F – In Faribault, Auto Vehicle Refurbishing is continuing to recycle car batteries through local vendors.

MCF-SHK – The facility recycles batteries and will continue to do so for fiscal year 2003.

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 Department of Administration's resource recovery program.

Iron Range Resources and Rehabilitation Agency (IRRRA) – The IRRRA 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. Nickel-cadmium, 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 (SLAB) 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 which do accumulate and are stored for recycling are from heavy equipment, electric carts, and standby emergency electric power diesel-fueled generators. In 2001, 14,148 pounds of SLABs—an increase of 69 percent over the previous year—were recycled from MCES facilities, mostly through A-Battery City in Minneapolis.

Metropolitan Council - Transit Operations – Metro Transit continues to recycle all of its spent lead acid batteries and dry cell batteries. This procedure has been in place since the 1960s.

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

- **Minnesota Pollution Control Agency** – The MPCA Alliance for Recycling and Reduction of Waste (ARROW) continues to coordinate its battery collection program in fiscal year 2002. Onyx Environmental Services picks up and recycles the agencies used batteries. The most recent shipments of lead acid, NI-CAD, mixed button, and lithium batteries were 67pounds on October 10, 2001 and 29 pounds on November 6, 2002.

Minnesota State Colleges and Universities

Bemidji State University – The university currently uses one battery-powered maintenance vehicle and will consider purchasing additional ones when fleet vehicles are replaced. The Central Stores and Receiving area operates a battery-powered forklift and self-propelled pallet jack. The ice arena's Zamboni is also battery powered.

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

St. Cloud State University (SCSU) – SCSU stores spent 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 the University of Minnesota Chemical Safety Day Program.

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

University of Minnesota – Facilities Management and the Department of Environmental Health and Safety (DEHS) collect mixed dry cell batteries from all campuses. Several types of used 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.

In fall 2000, Facilities Management and the DEHS reviewed and updated the battery collection program, purchased new, colorful collection containers, and distributed them to all office recycling sites on the Twin Cities campus. The goal is to increase participation in the proper management of dry cell batteries, and indeed the amount of batteries collected has gone up 55 percent compared to the previous year and by another 18 percent in the second year.

9. Cleaning Supplies

Department of Administration – The Materials Management Division, with assistance from other state agency staff, developed specifications for environmentally safe products that have been incorporated into a cleaning supplies contract. This contract helps safeguard the health of custodial workers, building occupants, and the environment. All products were scored for environmental attributes based on criteria established by the

Office of Environmental Assistance. The cleaning supply contract was awarded a 1998 Partnership Minnesota Cooperative Certificate Commendation for Government and Environment.

The Plant Management Division uses janitorial products that are appropriate to discard in sewers, uses chemicals packaged as concentrates to reduce packaging waste by 85 percent, and 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 – Facilities are moving toward the uniform use of Portion Pak cleaning supplies, which are fairly benign and have NFPA health, flammability, and reactivity ratings of 0 or 1.

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

Department of Military Affairs – The DMA generates approximately 2,000 pounds of shop towels (rags) per year in performing its mission. The rags were previously managed as a hazardous, special waste requiring disposal through a hazardous waste contractor. A successful rag reutilization effort has been implemented through the use of off-site rag laundering contractors. The soiled rags are collected, segregated, and stored for the contractor to pick up. Clean rags are returned when the dirty ones are collected. The program saves money and reduces waste entering landfills.

Minnesota Pollution Control Agency – The MPCA Alliance for Recycling and Reduction of Waste (ARROW) group recently implemented a plan to encourage Environmentally Preferable Purchasing. This initiative focuses on purchasing products that are nontoxic; water based, and 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.

Minnesota State Colleges and Universities

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.

University of Minnesota – Facilities Management (FM), Twin Cities Campus, in collaboration with 3M's Commercial Care Division has developed a new, safe-cleaning program for 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.

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 its employees. The goal was to optimize supply management and to enhance worker safety and environmental friendliness through a product selection process. FM custodial services 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), composed 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 from 456 products to 150 in 1999, MRB made another impressive stride in fiscal year 2001 by reducing the 150 approved products to 51. A reduction of 66 percent! The approved custodial list of 51 products represent those products that are only to be used in the custodial cleaning process, any other product not identified on the approved list is considered unapproved and not cleared for use. Each of the 51 approved products went through a stringent evaluation and testing process.

When an individual or vendor wants a new product to be considered for inclusion into the approved list, they must go through the following process. First, the vendor approaches the supervisory staff and provides 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 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 following categories:

- Operational safety looks at components such as the product's toxicological dosage levels, whether or not it is a registered carcinogen, its pH, and its flash points.
- Ecological (environmental) stressors examines what effects the product's constituent chemicals would have on the environment (based on a compiled list of products called the Minnesota Toxics Indexing System) if the product were disposed of in the waste stream. 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.
- Product delivery/packaging analyzes the product's dispensing features to determine dilution ratios to minimize handling exposure, material handling issues, and availability of product labeling to meet the specification of the Minnesota Employee Right to Know Act (MERTKA).
- 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 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, MRB has embarked 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. MRB intends to accomplish this by 2005 by annually replacing 15 percent of the current approved product list with bio-based products.

Centralized purchasing of a more select list of custodial products leads to the cost efficiency of larger purchases. The custodial product selection process is designed to minimize air and water pollution and improve worker health and safety.

10. Commuting and Transportation

Department of Commerce – The department began participation in the MetroPass program in 2000 to encourage employees to commute on MetroTransit buses. Forty-seven employees participated in the MetroPass program in 2000, 50 in 2001, and 47 in 2002. The department maintains a carpool matching program on an internal web page but participation rates continue to be low.

Department of Corrections – Video conferencing is encouraged throughout the DOC and used whenever possible to cut back on gas usage and time spent on the road. Carpooling is also encouraged for training classes, seminars, or travel out of the area.

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

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

Department of Human Services – DHS continues to promote telecommuting for staff who are able to work at alternate sites. The usual arrangement is one telecommuting day a week, but some staff are able to telecommute several days a week. Flexible scheduling also allows many staff to eliminate one workday per week.

Metropolitan Council - Environmental Services – Each year, MCES participates in the B-BOP (bus, bicycle, or pool) challenge in the spring for its employees and in 2002 again joined the IPPAT interagency challenge. Ninety-five employees responded as “Team MC,” saving a total of 2,307 miles (24 miles per person) in one day by taking commuting alternatives to driving alone in a car such as walking, running, bicycling, carpooling, and riding the bus.

Minnesota Pollution Control Agency – MPCA continues to promote pollution prevention through alternative transportation, including the annual BBOP Day promotion, *Bikeways* and *Bus Fare* newsletters, Guaranteed Ride Home Program, Special Off-Day parking, reserved carpool/vanpool parking, and discounted bike lockers and showers. The agency also conducts 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 three or more days per week.

Since 1999, MPCA has offered Metro Transit's MetroPass. We were the first state government agency in Minnesota to make the MetroPass available to its employees. The program offers a low-priced all-you-can-ride bus pass for agency employees. The idea is that with more transit use, fewer vehicles are on the road creating air, water, soil pollution, congestion, parking, and urban sprawl. Also, waste is generated when vehicles are shared. About 8 percent of staff are participating.

We not only have employees using it to commute from home to work, but we also encourage 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. It appears that there are 35 to 40 round trips per month on the bus using MetroPass for business travel, saving at least two state vehicles on an ongoing basis. MPCA staff has talked to several other state agencies and businesses about the benefits of this program and how it can work for them. MPCA still has 61 percent more people using the bus for state business than in 1998 before we had the MetroPass, inspite of a 12 percent loss of staff and a price increase in 2001.

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

Minnesota State Colleges and Universities

St. Cloud State University (SCSU) – SCSU subsidizes bus passes for students and faculty, including evening transportation in the campus area.

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 has an active telecommuting promotion program focused on employees in the Twin Cities metropolitan area.

Mn/DOT continues to promote various alternative transportation options such as light rail, HOV, commuter rail, bus, bicycling, and pedestrian facilities and continues to partner with other state agencies, citizens, and local officials in setting up pilot projects to encourage alternative transportation.

University of Minnesota – The Twin Cities campus, which spans almost five miles from east to west, is host to nearly 80,000 arrivals per day. 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 reduce automobile traffic to the Twin Cities campus and to more efficiently direct the flow of 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; and the Twin Cities campus uses a mass transit system to bus students, employees, and guests from parking lots to various locations on campus.

The campus bus routes and schedules have been evaluated and re-arranged 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. A major step was to eliminate deadhead miles by our supplemental buses that used to have many trips that ran only one way. Supplemental buses are used to add to our primary five-minute service fleet of buses when we experience overcrowded condition on those buses, such as at primary class end/start periods during the day. Another major move was to reduce the total number of buses on the street by designating some buses as limited stop buses. These buses would make only two of the possible five stops along Washington Avenue and Oak Street, moving them more quickly through the area and getting students from East Bank to West Bank or to St Paul campus more efficiently—less buses but better balance of passenger loads. By using the limited stop approach, these buses spend less time idling, which is when the most pollution is created and fuel wasted. In addition to limiting their stopping, it has helped increase the flow of traffic on Washington Avenue. If we don't have buses idling at stops, we also realize a secondary benefit by reducing the amount of time that cars are idling waiting for those buses. So we have reduced the number of buses in the fleet, reduced pollution, and improved traffic flow, all of which reduces fuel emissions. The last move was to replace the six 40-foot limited stop buses with four larger 60-foot articulated busses on those routes cutting congestion even further. A conservative guess is that we reduced our miles traveled by supplemental buses by 50 percent. The miles saved on those supplemental buses between September 2001 and April 2001 was 175,095. Our overall mpg in the fleet is approximately 5.1. We estimate that we have

experienced an overall fuel reduction of about 9,100 gallons over this eight month period. This translates into a significant reduction of environmental pollution.

In the fall of 2000, the University of Minnesota, Twin Cities initiated a deeply discounted student, staff, and faculty bus pass program designed to reduce traffic congestion, ease parking shortages, and improve the environment through increased bus ridership. The passes (U-Pass for students and the MetroPass for staff and faculty) make public transit affordable and allow unlimited rides anywhere, any time, on any Twin Cities bus system for a fraction of the cost.

The university has received a \$5.5 million federal Congestion Mitigation Air Quality grant administered through the Metropolitan Council to fund a two-year demonstration of the U-Pass and MetroPass programs. 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. Current fall 2001 combined U-Pass and MetroPass sales total 13,035 meaning a transit ridership increase of over 85 percent. 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.

The cost of U-Pass for university students is \$50 per semester, a 76 percent discount from the average pass price. U-Pass saved students over \$6 million during its first year. The cost of MetroPass for university faculty and staff is \$35 per month. Payroll deductions for MetroPass are taken pretax, so the actual cost is less than \$25 a month, providing a saving of 54 percent. The 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.

Since the introduction of U-Pass program, people have changed their travel mode to campus. Over 80,000 people visit our campus daily and of those we have seen many move from their cars to the bus. 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. We estimate that this translates into 50,000 less vehicle miles per day and a reduction of carbon monoxide emissions by 110 tons daily. 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. In fall 2002, over 14,500 U-Pass and MetroPass cards have been sold, meaning a transit ridership increase of over 100 percent for the program.

In partnership with six institutions, the University of Minnesota seeks federal funding to offer U-Pass on a statewide level. Statewide U-Pass Initiative partners include Minneapolis Community and Technical College; Minnesota State University at Mankato, St. Cloud State University, the University of St. Thomas, University of Minnesota-Duluth (including Lake Superior College and St. Scholastica), University of Minnesota-Morris, and University of Minnesota-Twin Cities. Initiative partners are seeking a total of \$8.9 million in federal funding to extend the multiple benefits of this program to students throughout the state.

The university administration actively promotes Twin Cities Campus students living on campus and is planning new student housing projects to entice students to live on campus or in the campus community, rather than commuting. Student housing projects in Frontier and Middlebrook Halls added a total of 330 dormitory beds for fall 2001. The university has budgeted over \$50 million to develop 2,500 more beds through university and cooperative public-private projects in the next few years. Riverbend Commons, which opened fall 2002, provides another 424 dormitory beds and cooperative projects have added 924 beds in Stadium Village and 124 beds in Dinkytown in fall 2002. Two other cooperative projects under discussion for the East Bank will provide 1,100 beds in the near future. The shift of students from commuters to campus community residents 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 University's Center for Transportation Studies (<http://www.cts.umn.edu/>) supports education, research, and outreach services in the area of transportation. 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. This participation reflects the diversity of the various stakeholder groups affected by transportation. The center's mission is to:

- 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
- be a focal point for strengthening knowledge in transportation

The Center for Transportation Studies identifies critical issues in transportation, and uses multidisciplinary approaches to address them. The center's research, education, and outreach programs create an environment for faculty, students, and practitioners from multiple disciplines to collaborate in transportation research and education efforts. The center also provides 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 represents the Department of Administration at Minnesota's Interagency Pollution Prevention Advisory Team meetings. Representatives from the Divisions of Materials Management and Plant Management also regularly attend this meeting. The Resource Recovery Office provides Department of Administration support and representation on the Pollution, Reduction, Recycling Advisory Council of the Office of Environmental Assistance.

The Resource Recovery Office:

- conducts tours of the State Recycling Center's facility and of its reusable office supplies area for customers and other interested parties such as international delegations to share recycling and waste reduction successes.
- prepares wall displays for the Capitol Complex buildings regarding waste reduction and recycling issues.
- provides information to state employees about waste reduction (by toxicity and amount) and recycling opportunities at annual events such as the October Central Stores Product Show, the Accounting and Procurement Spring Fling, and the Communications.Media open house.
- prepares environmental purchasing information, tabletop displays, "Info to Know" wall postings, and on-site presentations in response to agency requests.
- 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.
- partners with Sentencing-to-Service Programs in providing offenders with recycling-based work and training.

The Plant Management Division coordinates departmental pollution prevention information through the Resource Recovery Office. Communications.Media informs customers of environmentally preferred alternatives to reduce pollution through its *Fast Facts* newsletter, the Annual Paper Fair and Design event, training classes, and its Internet web site: <http://www.comm.media.state.mn.us>. Communications.Media, the Materials Management Division, and the Resource Recovery Office support Minn. Stat. § 16B.122 by providing state agencies with guidelines for the use of recycled papers and environmentally preferred inks.

During fiscal year 2002, the Materials Management Division, as a part of its Authority for Local Purchasing Training and ALP Management Overview programs, trained more than 200 state agency staff in pollution prevention and procurement of environmentally responsible products 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. The division has updated the environmentally responsible purchasing section of the Authority of Local Purchasing training manual that is provided to state employees. All updates are now distributed on the MMD web site to eliminate the need to send out paper updates. The entire manual is on the MMD web site and greatly reduces the need to print hard copy versions.

The Materials Management Division maintains a list of state contracts that contain environmentally preferable products. The list is available on the MMD web site at www.mmd.admin.state.mn.us/envir.htm. 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. The Materials Management Division'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 participated in trade shows and conferences to promote environmentally preferable purchasing, including the annual Quality Conference, the Central Stores Product Show, the Minnesota Minority Suppliers Development Council, the Corporate Minority Business Exchange, and others. The Materials Management Division has established an advisory committee called the Environmentally Responsible Work Group which meets to foster awareness and buy-in, share knowledge, and set priorities for environmentally preferable purchases. This group works to promote environmental purchasing in state government and includes representatives from state government as well as interested nonprofit organizations. The current members are the Resource Recovery Office, Office of Environmental Assistance, Minnesota Pollution Control Agency, Department of Transportation, Department of Natural Resources, Housing Finance Agency, Department of Labor and Industry, Department of Economic Security, Veterans Home Board, Recycling Association of Minnesota, and the Sierra Club.

Previous education efforts in the area of recycled paper purchasing have been very successful. The purchase of recycled copy paper by state agencies has increased to over 90 percent of paper bought from Central Stores, or 465,000 reams annually. The Materials Management Division and Resource Recovery Office contributed to the development of the *Environmental Preferable Purchasing Guide: How to get the stuff you need and still be good to the environment*. The EPPG is a user-friendly resource to make green purchasing easy. It includes data on product options, sample specifications, existing Minnesota contracts, etc. The guides were distributed to all certified purchasers as well as to cities and counties. The Resource Recovery Office and the Materials Management Division promoted this guide on displays and during presentations. The guide is featured at all ALP training sessions. MMD has a link on its web site to the OEA web site from which personnel may print a copy of the guide for their personal use.

The Materials Management Division maintains a section on its web site dedicated to environmental purchasing. Featured in this section are environmentally preferable goods and services lists, the Minnesota legislative requirements, the Admin Biennial Report on MMD Purchasing, environmental news about new products and contracts, product experience/case studies on environmentally preferable products, and links to other web sites helpful in environmental purchasing.

The Materials Management Division implemented a change in MAPS that requires entry of an environmental code on the order lines for goods and services. This code is shown on state contracts so that buyers know what types of products are more environmentally responsible when making purchasing decisions. This code also allows better tracking of the environmentally preferable purchases.

The Materials Management Division is heightening awareness and knowledge of environmentally preferable purchasing to state agencies and CPV members through the use of environmental codes, product documentation, product disclosure (e.g. mercury), and expanded information on contract releases. The Materials Management Division has modified its solicitation documents, the contract release announcement, and the agency and vendor correspondence needed to use the new environmental codes. The Contract Release Announcement shows the environmental codes on the products so that the purchaser can make an informed decision about environmentally preferable goods and services.

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.

Department of Commerce – The department operates the Energy Information Center, which serves energy consumers and features a toll-free hotline staffed full-time by Energy Information Specialists. The Energy Information Center answers questions, provides advice, and mails publications on energy conservation and renewable energy technologies, which are printed with soy-based inks on recycled paper. The Energy Information Center responded to over 61,000 telephone, mail and trade show inquiries, distributed over 40,000 CD-ROMs, and over 200,000 printed publications during FY02.

Minnesota Energy Code. The department has transferred the majority of the Minnesota Energy Code implementation to the Building Codes division at the Department of Administration. Per Minn. Stat. § 16B.325 the Departments of Commerce and Administration have been developing sustainable building guidelines for all new state buildings to exceed the existing energy code by at least 30 percent. As part of the development, a baseline of energy use in existing buildings is also being developed.

Department of Corrections

MCF-RC – At Rush City, maintenance staff is trained on chemical use, and a recycling program has been established for all staff. Video conferencing is widely used for staff training and offender education, reducing the need for commuting. The new CAFM system, Archibus, is a paperless way to request a work order and also preventive maintenance program. To reduce paper use, all phone directories and many forms are available online, and online training is used whenever possible.

MCF-SCL – St. Cloud trains vocational teachers, safety officers, and plant operations management on pollution prevention education through annual continued education at a cost of \$1,000 per year.

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.

OEA staff continue to work with representatives from the Minnesota healthcare community to promote pollution prevention within the healthcare sector. The Healthcare Environmental Management Awareness and Resource Reduction Team (HEARRT) meets quarterly.

OEA staff coordinate Interagency Pollution Prevention Advisory Team (IPPAT), developing agendas and facilitating quarterly meetings, recording minutes, and maintaining the mailing list. IPPAT continues to implement Governor Jesse Ventura's 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 meetings during fiscal year 2002 included presentations on the following topics:

- Energy options for state government: Mike Taylor, Department of Commerce, 651-296-6830
- Using the state of Minnesota contract for used electronics: Ryan Laber, Asset Recovery Corporation, state contractor for IT equipment recycling, 651-602-0789
- Money-saving strategies for state agency vehicle fleets: Mick Jost, MnTAP, 612-624-4694
- Metropolitan Airports Commission P2 and solid waste management: Mark Wacek, 612-725-6428
- Climate change workshops: Mary Jean Fenske, Minnesota Pollution Control Agency, 651-297-5472
- Implementing the Smart Growth Initiative: Mark Wallace, Dept. of Natural Resources, 651-282-2505
- Environmental cost baseline report: Lynne Markus, Department of Administration, 651-296-9084
- Waste reuse in road construction: Bruce Johnson, Department of Transportation, 651-284-3768
- Managing green treated lumber/alternatives: Mark Vogel, Dept. of Transportation, 651-284-3790
- Flexible fuels: if we don't use them, what then?: Tim Gerlach, American Lung Assn., 651-227-8014
- Greening government initiatives: Rolf Nordstrom, Minnesota Planning, 651-297-5228 and Anne Hunt, Department of Natural Resources, 651-297-4707
- Member agency presentations of highlights from their pollution prevention summary reports. The pollution prevention summary reports are consolidated and organized under 34 categories of pollution prevention programs and activities.

The MnGREAT! Award program, first organized in 1995, is an ongoing program, within the structure of the Governor's Awards program. MnGREAT! recognizes environmental achievements by government employees. The program focuses on resource conservation, the prevention of pollution, and the reduction of waste at the source. Any Minnesota government employee or group of employees is eligible. The winners of the 2002 MnGREAT! Award were:

- ***The Downtown Minneapolis Transportation Management Organization, Minnesotans for an Energy-Efficient Economy, the St. Paul Transportation Management Organization, Metro Commuter Services, and Metro Transit*** for their promotion of employee transit benefits. This program resulted in a 30 percent increase in bus ridership at participating businesses, with an estimated annual reduction of over 1.6 million gallons of gasoline consumed. This resulted in reductions in emissions of over 16,000 tons of carbon dioxide, along with over 1,000 tons of carbon monoxide and 310 tons of ground level ozone precursors.
- ***The University of Minnesota Facilities Management Department*** for its continuous improvement approach to all departments and operations, including energy conservation, environmentally preferable purchasing, mercury reduction, and the adoption of green architectural principles.
- ***The Department of Administration's Resource Recovery Office*** for its education programs about waste reduction and for promoting the reuse of office supplies from the state recycling center, which resulted in 13 agencies obtaining free supplies 91 times from the facility.
- ***The Department of Administration's Materials Management Division*** and its electronics contracts committee for putting in place an electronics disposal contract that specifies that no component materials from used electronics are exported overseas for management.
- ***The Department of Agriculture's Dairy and Food Inspection Division*** for implementing a project to remove and replace all the mercury manometers in Minnesota dairy barns, removing more than half a ton of mercury from the environment.

- **The City of Hutchinson** for including a source-separated food waste composting program as part of its integrated solid waste management system, further reducing the amount of refuse going to the landfill and conserving a valuable resource.
- **The City of Oakdale Public Works Department** for promoting Generation Green, a voluntary energy and resource conservation program for businesses in the community, and for applying Generation Green principles when planning its public works expansion.
- **The Department of Natural Resources' Facilities and Operation Support Bureau** for employing the principles of sustainable architecture, as stated in the Minnesota Sustainable Design Guide, when designing DNR regional office buildings in Tower and Windom. The integrated approach they used included land use, site design, indoor air quality, materials selection, water, energy, and waste considerations.
- **A special recognition award** to MPCA staff member Ned Brooks and the steering committee that planned the Living Green Expo, an urban sustainability fair held on April 27, 2002. The expo provided information, resources, products, and technologies to the general public to help people reduce their environmental impact. Public, private, and nonprofit groups donated time, resources, and funding over a seven-month time period, resulting in a fair that exceeded most expectations. Over 150 vendors exhibited products and distributed information to an estimated 5,000 people who attended.

OEA's Minnesota Sustainable Communities Network (MnSCN) was started in January 1997. It has grown more than 10 percent each year, reaching 2,350 members in 2002. OEA staff facilitate networking, information exchange and better access to assistance among MnSCN members (individuals and organizations with an interest in sustainability issues). One important component of sustainability is pollution prevention. MnSCN members receive a bi-weekly e-mail update on sustainability and are increasingly listing themselves in a member directory on the MnSCN web site at www.nextstep.state.mn.us. This NextStep web site has a searchable database of over 600 resources. In October 2002, MnSCN sponsored a conference, "Be the Change," held at the St. Paul RiverCentre, attracting 650 people from business, government, and nonprofit organizations.

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*
- junk mail campaign materials
- waste reduction campaign materials
- *A GreenPrint for Minnesota*
- *Minnesota Report Card on Environmental Literacy*
- *Environmental Literacy Scope and Sequence*

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.

Department of Human Services – The DHS Central Office and the SOCS facilities have converted many paper documents into electronic formats. Time sheets, expense reports, and DHS related news articles and information are now accessed through our intranet. *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.

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 continual input on how to improve the site and/or operations from the point of view of hands-on experience.

There is also annual hazardous material training where basic pollution prevention methods are addressed. Recently a comprehensive recycling program was unveiled detailing how and where MAC employees can recycle a wide variety of items. A recycling guide was distributed to all employees and is included with new employee orientation materials. A Recycling and Waste Reduction Team meets regularly to examine and implement waste reduction opportunities.

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

The Industrial Waste and Pollution Prevention Section (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 2001. A specific P2 web site has been prepared for the Internet. An outreach is made to non-industrial users such as dental and medical clinics, furniture strippers, and radiator shops.

Metropolitan Mosquito Control District – Annually the district conducts 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 MMCD. 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 – Several different methods are used to educate and train field soldiers and state employees regarding their responsibility for implementing pollution prevention. DMA Regulation 200-3 (Hazardous, Infectious and Special Waste Management Requirements) is a hands-on tool that has been provided to all DMA facilities and has been mandated by the command to be used throughout the state. This regulation is a simple way to reference and implement pollution prevention methods at each facility. DMA 200-3 is in a constant process of revision to address new and changing policies and guidelines.

Training videos have been prepared and are being used to help educate individuals on their responsibilities. *The National Guard's Most Wanted* is a 20-minute video that is used to stress awareness. *10 1/2 Steps to Facility Compliance With Hazardous Waste Generator Requirements* is a one-hour video. This video

enhances the first tape by taking compliance issues to a greater level. Pollution prevention is presented as a full block of learning on this tape. *Spill Response/Control* is a 40-minute tape that trains every soldier on their responsibilities regarding spills.

Eight hour classroom training sessions are held to train the trainers. The sessions are used to distribute the *10 1/2 steps to Facility Compliance* video. The video is viewed and a question/answer period follows. Second, updates of regulation DMA 200-3 are distributed. Third, individuals responsible for hazardous waste and pollution prevention are given an opportunity to have questions answered. Organizational implementation of P2 activities occurs at this time as well as the evaluation of other P2 activities already in place.

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

Minnesota State Colleges and Universities

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. The Students for the Environment, a campus student organization, continued work started last year with the campus food service provider and Residential Life to heighten awareness on food waste and promote food waste reduction. Members of the group, as well as some staff, attended the Minnesota Sustainable Communities Conference in September.

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

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

Department of Transportation – Mn/DOT conducts three meetings annually with district/division personnel who have taken on the additional part-time task of waste management coordinators. 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 activities 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. One particular course, an interdisciplinary course, *Preventing Pollution: Innovative Approaches to Environmental Management*, focuses on pollution prevention. This course is offered jointly through the departments of Civil Engineering, Honors Seminar, Management, Public Affairs, and Public Health.

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's resources without depleting them.

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

The Campus Sustainability Network, CSN, is planning a campus sustainability workshop for April 23, 2003. The goal of the workshop will be to report on the sustainability initiatives that are already taking place at the University of Minnesota, and to assess gaps that are not addressed by these current activities on campus. The workshop will begin with a discussion of university policies that will inform any attempt to address sustainability at the administrative level. All workshop participants will attend this policy panel. A facilitated panel presentation will be followed by discussion focused on university-wide policies related to environment and sustainability. Discussion will focus on three documents: the Regents' Policy on Environmental Management and Sustainability, the Commission on Environmental Science and Policy Report, and a report related to the formation of Global Studies. Panelists will include administrators and faculty who have been instrumental in the authoring of these reports. In addition to our policy information, we propose to look at sustainability initiatives on campus in three different spheres. Workshop participants will attend one of these concurrent sessions; all sessions should use the policy information from the introductory session in achieving their outcomes.

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. The committee is currently working on two pilot projects that will continue through 2001-2002:

- the Sarita wetland restoration (<http://www.nwf.org/campusecology/newsletter/watershed.html>)
- ecological footprint of the Twin Cities campus (<http://www.nwf.org/campusecology/index.html> and <http://www.bio.psu.edu/Greendestiny/indicators.shtml>)

The wetland restoration began with a cleanup during Beautiful U Day in September 2000. Implementation of the restoration began in the spring of 2001 and will continue through the next few years. On September 25, 2001, students, faculty, staff and community volunteers will build the first rain garden on the university campus as a part of Beautiful U Day 2001. The rain garden will reduce the storm water and runoff pollution that flows to the Sarita wetland and eventually to the Mississippi River. The rain garden project developed out of a student research paper done for a water quality class. Through continued student involvement and hands-on projects the committee hopes to engage students as active citizens of the university. At the same time, the committee will increase teaching opportunities and achieve a more environmentally sustainable campus.

The university 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. Dr. Pierre Robert, one of the first researchers in this discipline, serves as the Center Director. The center's greatest contribution will be its legacy of practitioners, researchers, and educators. An undergraduate minor in precision agriculture and a graduate program are in development. 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. 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. Students will be able to see photovoltaics, a floatable solar collection device, in the remodeled building. A kiosk will be set up for students to see the exact amount of energy produced at any time. 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 that goal.

Pending a grant from the Office of the Executive President and Provost, CALA will develop a web site with clickable images of university buildings to find environmental information from those sources. This will help connect people across campus working toward the same goal. Part of the plan is to start a course, "Green Mapping: Tracking Sustainable Development at the U," for spring semester to help students get involved with sustainable development and identify green efforts on campus.

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:

- educate designers, building owners, operations staff, and occupants about the concepts, goals, and significance of sustainable design
- develop an orderly decision-making process with measurable outcomes along with a database of decisions and outcomes
- 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
- organize information in a hierarchy that permits users to easily understand the sustainable design process
- 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 (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 university's *2000 Pollution Prevention Report* is posted on the Web at <http://www.dehs.umn.edu/hwd/pollutionrpt.html>.

The Minnesota Technical Assistance Program (MnTAP), located in the Department of Environmental and Occupational Health, in the School of Public Health at the University of Minnesota, continues to provide technical assistance in the areas of industrial and solid waste management and pollution prevention to Minnesota's manufacturing and service industries (www.mntap.umn.edu). MnTAP provides technical assistance to Minnesota businesses through the following services: telephone assistance, site visits, intern programs, presentations and workshops, technical publications, library, and materials exchange. MnTAP averages 150 calls per month and 140 site visits a year.

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 center.

The center provides continuing education opportunities including skill building and special topic 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 (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 wastewater management, to indoor environmental issues such as air quality, radon, housing materials, and systems.

The Institute for Social, Economic and Ecological Sustainability (ISEES; 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. ISEES's 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. The institute believes 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 the seminars, workshops, and annual publication competition, the institute bridges 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 strive to:

- generate a new transdisciplinary synthesis of concepts and methods for research on sustainability issues
- understand forces influencing sustainability at local, regional, and global scales
- develop and evaluate techniques for assessing conditions for sustainability
- generate policy options for moving communities toward sustainable conditions
- facilitate information exchange among scholars, practitioners, and citizens

ISEES offers an interdisciplinary course, "Population, Environment and Sustainability," for all seniors and graduate students who are interested in human population and its relationship to environmental change and sustainability. The beginning of the new millennium is a critical moment for understanding the complex relationship among human population processes, environmental change, and ecological and human sustainability, and for developing appropriate policy measures. Because knowledge about the relationship between population and sustainability is fragmented among many specialized disciplines, each with its own piece of the puzzle and its particular conceptualization of the issues, public debates and policies often work at cross purposes or are counter-productive.

ISEES addresses this problem by bringing together students and faculty from the social sciences and natural sciences to exchange information, critically evaluate the varied perspectives, and to communicate a more unified understanding of population growth, environmental change, and sustainability (<http://www.fw.umn.edu/ISEES/courses/popsyllabus.htm>).

The university hosted the 2001 Midwest Green Campus Workshop on November 3, 2001 (<http://www.cnr.umn.edu/sci/2001WorkshopIntro.html>). The workshop has been organized and run by the Sustainable Campus Initiative at the university.

The University of Minnesota Twin Cities Student Unions Programs and Activities Board, in cooperation with ISEES and others, hosted the Passport to Earth Summit 2002: Exploring Sustainable Development forum series throughout the 2001-2002 academic year (<http://www.coffman.umn.edu/earth/links.php>). Twenty years after the first Earth Summit, scientists have made limited progress in evaluating and mitigating the environmental costs to growth and development. We will use the Rio+10 Earth Summit, slated to occur in summer of 2002, as the topical focus of the series. The mission of the Passport Series is simple: to increase awareness of, participation in, and education at the University of Minnesota about the primary international effort to protect the environment through sustainable growth and development practices. Our goals for Passport to Earth Summit 2002 series are to:

- communicate the history, current status of, and controversies about the implementation of Sustainable Development Strategies based on international agreements regarding environment and development made in the past ten years (Agenda 21-Rio Earth Summit's blueprint for sustainable development).
- strike balance and show diversity in the representation of perspectives addressed within each theme.
- touch on local, national, and international scales of policy and activity in each event.
- encourage presenters to explicitly provide their definition of sustainable development.
- design events to incorporate or culminate an action item, which may be in the form of a final resolution mutually agreed upon by panelists.

12. Electronics

Department of Administration – The Materials Management Division electronic equipment contracts provide Energy Star compliant computers, fax machines, monitors, printers, and copiers. In the new Information Technology hardware contracts, the department requires all energy-efficient equipment be identified. The Materials Management Division provides for 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 and through the use of prison inmate labor, refurbishes and distributes them throughout K-12 schools. Surplus computers are also distributed to township government offices, a program which earned a 1997 Partnership Minnesota Cooperative Public Award for outstanding achievement.

The Materials Management Division awarded the Information Technology contracts for leases, rental, and seat management of computer equipment. This will reduce the amount of surplus and used equipment that requires hazardous waste management. The division has established contracts for leasing computer equipment. This will reduce the amount of surplus and used equipment that requires hazardous waste management.

The Materials Management Division, in conjunction with other agencies and Cooperative Purchasing Venture members, has established a statewide computer/electronics recycling disposal contract with Asset Recovery Corporation of St. Paul. The contract is “Hazardous Materials: Computers/Electronics: Recycling and Waste Management,” contract release number H-90(5), contract number 426359. This contract is available to all state agencies and CPV members. Materials can be dropped off at Asset Recovery, or Asset Recovery can pick up the materials from customers. Asset Recovery can also assist with special event collections, etc. In the first year of the contract, approximately \$250,000 was paid to Asset Recovery to recycle computer/electronic waste.

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

Department of Corrections

MCF-RC – Electronic toilets, showers, and sinks are used where applicable for the dual purpose of saving energy through regulation of water and reducing inmate vandalism. State contract vendors are used for picking up used electronic boards and parts.

MCF-SCL – The facility recycles electronic devices, TVs, fluorescent bulbs/lights, computers, and monitors at a cost of \$1,000 to \$2,000 annually, reducing the amount of these items sent to the landfill.

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

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

Minnesota is one of ten states participating in NEPSI. Other stakeholders include representatives from local government and the U.S. EPA, 12 electronics manufacturers, several major electronics retailers and recyclers, and national environmental organizations. Discussions continued during 2002, but no agreement

has been reached. The goal of this series of meetings among government, the electronics industry and environmental groups is an agreement by September 2002 on how to establish and fund a national program for the recovery, reuse and recycling of used electronics. Participants expect this agreement to include an implementation plan and schedule.

- **Market development efforts for materials found in waste electronics**, such as highly engineered plastics and leaded glass.
- **State contract ensuring proper management of used electronics** discarded by government agencies and public entities. In early 2002, the Department of Administration worked with the OEA, Hennepin County, the Minnesota Pollution Control Agency, and the University of Minnesota to include a provision in the state contract specifying that no component materials from used electronics are exported overseas for management.

Iron Range Resources and Rehabilitation Agency (IRRA) – In addition, the Information Systems Department soon will begin recycling outdated computer equipment as an alternative to disposing of such units as surplus property. Information Systems also recycles used printer toner cartridges and purchases recycled printer toner cartridges when available.

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

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

Minnesota State Colleges and Universities

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 (SCSU) – The SCSU business office provides for the reuse of some computers, electronic equipment, and other property through the surplus property resale program. Other electronic equipment (seven shipments totaling about 40,000 pounds and net cost of \$5,240) was recycled, somewhat offsetting commodity and precious metal credits. Styrofoam from computer, electronic, and other shipping cartons was also recycled.

Department of Transportation – 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 (HOV) 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 electronic equipment, redistributes what it can within the university, and then pays to 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's Computer Repair Service (CRS) 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/recycle/reuse.html>), referred to as the Virtual Warehouse, that 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.

The university's annual Beautiful U Day 2000 (www.facm.umn.edu/bud/BUDay.htm) featured an electronic waste collection that served to both facilitate the proper management of electronic waste and to educate the university community about end-of-life electronics management and regulations. DEHS used a newsletter article (www.dehs.umn.edu/newsletter/summer00.pdf), web site information (www.dehs.umn.edu/whatshot/beautifulu.html), a brochure (www.dehs.umn.edu/whatshot/BUDay.pdf), and listserv e-mails to promote and educate for this event. Seven drop-off sites on the Twin Cities Campus accepted end-of-life electronics and distributed information to the university community. Twenty-six tons of electronics were collected and sent for recycling.

It usually 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 and provides resource conservation and avoids heavy metal contamination of soil, surface waters, and groundwater.

13. Energy - Lighting

Department of Administration – The Division of State Building Construction participates with utility companies to retrofit existing building lighting systems to achieve energy consumption reduction. The division also specifies automatic turn-off switches for all overhead lighting in its remodeled offices.

The Plant Management Division recycles incandescent bulbs to prevent solid waste disposal, and coordinates building lighting retrofits with the Division of State Building Construction and Northern States Power Company to reduce energy consumption, thereby decreasing pollution levels.

The Materials Management Division procures only reduced or no-mercury fluorescent lamps. Mercury content in fluorescent lamps has been either eliminated or reduced to negligible levels due to EPA mandates in the late 1980s and early 1990s, per Minnesota Stat. § 115A.965, Subd. 2. The Materials Management Division in conjunction with the Minnesota Pollution Control Agency, Department of Transportation, and the University of Minnesota has a statewide contract for recycling fluorescent lamps and HID (high intensity discharge) lamps and light ballasts that contain PCBs (poly-chlorinated biphenols). The Materials Management Division purchased solar-powered highway warning signs for the Department of Transportation, which were

subsequently added to a state contract. The Travel Management Division minimizes lighting through the use of energy-efficient lights.

Department of Corrections

MCF-RC – RC uses electronic ballasts and has also programmed lighting on a timer for shutoff times.

MCF-SCL – The St. Cloud facility replaced the lighting system in 1993 via an NSP conservation lighting retrofit program at a cost of \$252,000. This energy conservation measure has a long-term cost saving of about \$2,000/month. Replacement of T-8 lights and electronic fixture/ballasts is ongoing.

MCF-SHK – The facility recycles fluorescent bulbs and will continue to do so for fiscal year 2003.

MCF-STW – Lights fixtures at Stillwater have been replaced or refitted with fluorescent bulbs and all ballasts containing PCBs have been replaced. All waste bulbs are recycled through a licensed recycler.

Office of Environmental Assistance – The OEA encourages energy conservation via its grants.

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

Metropolitan Council - Environmental Services – Several retrofits to energy-efficient fluorescent lamps or high intensity vapor lamps have taken place at MCES facilities. However, unlike incandescent lamps, these alternatives are considered as a special hazardous waste due to their mercury content. In 2001, 4,948 lamps were recycled through Superior Special Services in Bloomington, double the volume of the previous year. Various fluorescent lamp change-out programs have been underway to replace older lamps with the new, thinner varieties (F30T8) that contain less mercury and are even more energy efficient. Some facilities have installed motion sensor switches that turn off room lights if no motion is detected within 15 minutes.

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

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

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

The new 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 daylighting. MPCA has specifically designed the floor plan to allow the maximum amount of light to enter the workspaces. The agency is going to install a revolutionary new daylighting feature known as "tubular skylights" in the main conference room. The tubular skylights will be installed as a test to measure

performance and energy savings. If successful, tubular skylights will then be added to several other building locations to enhance daylighting and reduce electrical energy consumption.

Minnesota State Colleges and Universities

Bemidji State University – A number of projects completed in FY 2001 will result in energy and cost savings. A lighting retrofit project in two residence halls replaced 100,200 watts of T-12 fluorescent and incandescent lights with 80,160 watts of T-8 and compact fluorescent lighting. The 20,000 watt reduction is expected to reduce electrical costs by approximately \$4,000 annually. The expected payback time is two to four years.

Metropolitan State University – Metropolitan State University has approved a lighting retrofit that would remove twenty 300W incandescent lamps and add eight 250W Metal Halide Low Bay fixtures. The lighting retrofit would reduce energy consumption, decrease maintenance, and decrease nonregulated waste by using lamps with longer burn hours.

North Hennepin Community College – At present NHCC is completing its new science building and is in the process of starting construction of a new general education building. These new buildings will have energy-efficient lamps, ballast, and motors. All used lamps are recycled by a licensed local contractor.

St. Cloud State University (SCSU) – 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 computerized energy management system that was upgraded. Fluorescent bulbs were recycled. Trash was burned in Elk River to produce electricity.

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

University of Minnesota – The university has 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.

The university has updated its Standards and Procedures for Construction to address energy conservation in lighting systems (<http://www.facm.umn.edu/cons/generalinfo.htm>):

- 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
- provide for flexible levels of lighting through switching or other lighting control devices
- minimize decorative lighting
- consider the principles of daylighting for new buildings

14. Energy - Production

Department of Administration – The Division of State Building Construction 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 installed a new 1,000-ton chiller with high ratio turn down and high efficiency ratings. The new chiller was required for the additional cooling load of the Harold E. Stassen Building and provides improved operation and control of Capitol Complex cooling needs.

Department of Commerce – The Minnesota Energy Code interpretation and enforcement duties were transferred by statute to the Department of Administration’s Building Codes Division in FY01.

Solar Electric Rebate Program (SERP). The department received funding from Xcel Energy’s Renewable Development Fund to administer a solar electric rebate program. Xcel Energy electricity customers are eligible for between \$2,000-8,000 for installing a qualifying solar electric system on a home, business, or nonprofit, reducing the installed cost by about 20 percent.

Wind Resource Assessment Program (WRAP). The department continues to operate WRAP, expanding the program to include new sites in northeastern and southeastern Minnesota. A new version of the WRAP report was released in 2002.

Legislative Commission on Minnesota Resources (LCMR) funding. Pending full Minnesota Legislative approval, the department was also awarded a LCMR grant to implement both a Community Energy Resource Team formation for local energy planning needs and a Community Wind Rebate Program for reducing the cost of installing a utility-scale wind turbine in two to three communities outside of southwest Minnesota in the next two years.

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

ELECTRIC ENERGY SAVINGS AND AVOIDED EMISSIONS DUE TO ELECTRIC CIP

	1998	1999	2000	2001	2002 (proj.)
Electricity (kWh)	299,418,391	214,160,804	302,905,644	323,267,204	243,411,089
CO₂ (tons)	176,662	126,359	178,720	190,734	143,617
SO₂ (tons)	321	229	324	346	260
Mercury (lbs)	105	75	106	113	85
NO_x (tons)	160	114	161	172	129

CO₂ – carbon dioxide, SO₂ – sulfur dioxide, NO_x – nitrogen dioxides

Conservation Improvement Program – Gas. In addition to the electric CIP, the department oversees gas CIP projects. Six investor-owned gas utilities offer CIP projects, reviewed and evaluated by staff and subject to Commissioner approval. The utilities are required to spend 0.5 percent of their gross operating revenues on

CIP. The Commissioner uses the CIP process to promote sound, cost-effective conservation practices, which reduce or stabilize gas consumption.

NATURAL GAS ENERGY SAVINGS AND AVOIDED EMISSIONS DUE TO GAS CIPS

	1998	1999	2000	2001	2002 (proj.)
Nat Gas (Mcf)	946,034	1,310,255	1,349,630	1,527,548	1,137,377
CO₂ (tons)	56,762	78,615	80,977	91,652	68,242
SO₂ (tons)	0.28	0.39	0.41	0.5	0.4
NOx (tons)	44.46	61.58	63.43	71.8	53.5
VOC (tons)	2.60	3.60	3.71	4.2	3.1
PM (tons)	3.60	4.98	5.13	5.8	4.3
CO (tons)	18.92	26.21	27.00	30.6	22.8

CO₂ – carbon dioxide, SO₂ – sulfur dioxide, NOx – nitrogen dioxides, VOC – volatile organic compounds, PM – particulate matter, CO – carbon monoxide

Conservation Improvement Programs – Legislation. Legislation passed in 2001 increases the responsibility for municipal and cooperative electric utilities to participate in the CIP process. The department is working with key industry contacts to assist with the transition.

Biogas Digester. A 2001 legislative statute was passed giving qualifying new digester installations a \$0.015/kWh incentive for energy production that is administered by the department, although no digesters received the incentive in 2002.

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

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

MINNESOTA PETROFUND PROGRAM

	1998	1999	2000	2001	2002
Applications approved	1881	1440	2184	1630	1204
Funding approved (millions)	\$21.4	\$14.5	\$18.9	\$13.1	\$10.6

Department of Corrections

MCF-F –Faribault facility is installing pilots in high-pressure boiler to save on fuel during summer months.

MCF-LL – Lino Lakes 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. Annual cost saving are not available at this time.

MCF-ML – Moose Lake replaced the oxygen trim system on the low pressure boilers in the power plant thus creating more efficient consumption and burning of natural gas/diesel fuel resulting in a decrease in fuel demand and emissions.

MCF-OPH – During the fiscal year 2002, a new 2,000 kW generator was installed at Oak Park Heights. The generator is designed not only to be able to meet MCF-OPH’s back-up electrical requirements, but also to provide peak load shedding capabilities to Xcel Energy upon demand.

MCF-RC – The facility uses three 550-ton high-efficiency chillers that can be cycled on or off in stages

with the building's automation system. With these chillers, cooling capacities are based on actual demands, and thereby conserve electrical energy. Generation of 3,000 kW of electricity is used when necessary for peak power sharing by the utility company. This prevents the utility company from having to build additional power generation plants, which reduces pollution. The facility also makes use of alternative fuel for heating as it switches to fuel oil during times of natural gas shortages. A computerized energy management system allows the facility to monitor and control all electrical usage, enabling staff to identify and correct areas of high-energy consumption and low power factor.

MCF-SCL – A facility generator was installed at St. Cloud for a cost of \$750,000. Corresponding savings in energy consumption will result in a payback in approximately ten years and will also allow for co-generation/power load shedding.

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

Metropolitan Council - Environmental Services – In 2001, the council spent \$13.8 million on electricity and natural gas purchases (\$10.4 million on electricity and \$3.4 million on natural gas). The eight WWTPs account for about 91 percent of the dollars spent on electricity and 97 percent of the natural gas purchases.

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

Minnesota State Colleges and Universities

Metropolitan State University – Power factor correction was installed at the St. Paul campus location in fiscal year 2002. The goal of power factor correction is to increase the efficiency of equipments' energy consumption. Power factor is the ratio of real power (KW) to reactive power (KVAR) which combines to form apparent power (KVA). The real power is what creates heat, light, motion, machine output, etc. Reactive power is needed to sustain the electromagnetic field and does no useful work. Therefore, power factor measures how efficiently equipment is using the utility electricity. A higher ratio of KW to KVAR indicates more efficient use of energy. The end result of power factor correction is a decrease in operating costs to owner and a decrease in demand for utility company.

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

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 of Mn/DOT's waste is used as waste-derived fuel for cement kilns. Waste includes oil-base paint, Zecol, Trichloroethylene, diesel fuel, and parts washer solvent. Some used oil sorbents are being burned to generate steam and electricity in an environmentally sound waste-to-energy technology.

University of Minnesota – The university has installed a 15 MW co-generation steam turbine at its 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.

The University of Minnesota has installed a 15 kW photovoltaic system on the roof of the newly remodeled Architecture Building. The unit was donated by Xcel Energy and will include an education package. The unit will provide electricity to the building and be a training resource for future architects and engineers.

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

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

15. Groundwater Wells

Department of Administration – The divisions of Plant Management and State Building Construction will be upgrading the de-watering system in the Transportation Building to comply with new codes.

Department of Corrections

MCF-RC – Rush City uses one well for underground sprinkler system. The well is controlled by an electronic timer that shuts off the sprinklers during rain. It also limits sprinkling during early morning hours to derive the maximum benefit and reduce evaporation, which conserves water. Domestic water is obtained through Rush City.

Department of Military Affairs – Over the past two years, DMA has been developing a hydrologic model of the ground water in and around Camp Ripley. This model when completed will have mapped the underlying geography of the area and lead to better decision making with regards to impacts to groundwater. DMA has also finished delineating a Wellhead Protection Area for each of the existing water production wells at Camp Ripley. A plan of action has been developed to protect Camp Ripley's drinking water supply and meet the requirements of the state of Minnesota's rules governing wellhead protection.

Minnesota State Colleges and Universities

North Hennepin Community College – There is one deep well on site, which is used for irrigation purposes only. Last year the well pump was replaced with a smaller unit allowing NHCC to closely match demand, saving both the energy to run the old larger pump and the excess water that was not needed in the sprinkler distribution system.

Department of Transportation – Numerous Mn/DOT maintenance facilities have underground monitoring wells installed in order to determine if aquifers have been impacted by petroleum releases.

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.

The Materials Management Division plans to phase out the purchase of vehicles manufactured with components containing mercury. The solicitation issued in 2002 will require vehicles to be free of headlamps and convenience lighting switches containing mercury. Within the next three years, the state intends to require that all vehicles are free of mercury. MMD requires complete and accurate data about components containing mercury in all responses to solicitations for vehicles. The resulting contract release indicates the vehicles that contain mercury so that buyers can make informed decisions when purchasing their vehicles.

Department of Corrections

MCF-OPH – Studies conducted by Oak Park Heights during 2001 and 2002 indicate an amount of lead dust had accumulated over the 15 year period from the shooting range. A program of lead abatement and clean up was completed in fiscal year 2002. A new rubber bullet trap was installed in the range, which is expected to reduce lead residue significantly.

MCF-SHK – The facility recycles heavy metals and will continue to do so for fiscal year 2003.

Office of Environmental Assistance – OEA staff continues to work at the state and national level to develop policies and systems for managing mercury-containing waste and reducing the amount of mercury entering commerce. The 2001 law prohibiting the sale of mercury thermometers in Minnesota became effective January 1, 2002. OEA continues to monitor compliance with the law and provide information on the reasons for avoiding mercury-containing products.

In fiscal year 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, who was introduced to the public in October 2001, 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. During FY 2002, this program resulted in pledges from 110 schools and visits/inspections to about 30 schools. Two hundred pounds of mercury were removed and about 1,700 students were educated about mercury. The 2001 Minnesota Legislature enacted a law prohibiting the sale of nearly all types of mercury thermometers in the state. This law was based in part on a legislative proposal from OEA and took effect January 1, 2002.

OEA and Ramsey County undertook a mercury switch collection pilot project in cooperation with North Star Steel and 11 salvage yards in the county, evaluating several measures to improve recovery of mercury components from end-of-life vehicles.

OEA staff provided support to the Quicksilver Caucus–EPA Mercury Stewardship Workgroup, co-chaired by MPCA Commissioner Karen Studders and William Sanders, EPA-OPPTS, beginning in February 2002. This project is due to be completed in late 2002. OEA staff gave an opening plenary presentation at the “Breaking the Mercury Cycle” Mercury Retirement Conference held in Boston in May 2002.

Lead Sinkers. OEA again sponsored a “Let’s Get the Lead Out!” booth at the March 2002 Northwest Sportshow. The booth is part of a larger educational campaign to encourage anglers and outdoor enthusiasts to switch to non-lead, environmentally friendly fishing tackle. OEA maintains a page on its web site at <http://www.moea.state.mn.us/reduce/sinkers.cfm>, providing information on available non-lead alternatives,

scientific research and reports, and useful links to other organizations involved with this issue. Another component of this initiative was to strengthen the interagency working relationship between DNR and OEA on this issue. Substantial progress on this objective was achieved during the period of this report.

Iron Range Resources and Rehabilitation Agency (IRRRA) – The IRRRA also supports efforts to help reduce mercury contamination in our lakes and rivers by avoiding the disposal of mercury-containing material in landfills. Energy-conserving bulbs are used where appropriate, and all florescent tubes are collected and recycled at Mercury Waste Solutions in Roseville. The ballast is shipped to the Clean Shop Program in Duluth.

Metropolitan Council - Environmental Services – The MCES’s 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 these enforcement and education 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 now 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)	2001 (pounds)	Reductio n (pounds)	Reductio n (percent)
Cadmium	4,585	227	4,358	95.0%
Chromium	64,755	4,223	60,532	93.5%
Copper	66,714	9,309	57,405	86.0%
Lead	10,600	1,720	8,880	83.8%
Nickel	43,128	4,026	37,975	90.7%
Zinc	90,931	13,321	77,610	85.4%
Total	280,713	32,826	246,760	88.3%

To further the reduction in metals loading, small volume industrial and commercial users—whose aggregate pollution load may be significant—are being studied. Radiator repair shops were evaluated for potential heavy metals in wastewater discharged to the sanitary sewer. A report was completed which includes best management practices (BMPs) to prevent metals from entering the collection system. The radiator shops are currently being considered for coverage by a general permit or a BMP which would be extended to shops meeting specific waste management and P2 criteria.

Mercury discharged to the collection and treatment system is still of concern. A partnership was established with the Minnesota Dental Association in 1998 which led to two studies to evaluate mercury discharges from dental clinics. These two studies were completed in late 2001. The first study evaluated the effectiveness of advanced equipment to treat dental clinic wastewater and to quantify dental clinic loadings as measured at the clinics. Five models of amalgam removal equipment were evaluated. Seven dental clinics participated in this study for a cumulative total of 87 weeks during which sampling equipment and/or amalgam removal equipment was in place. The study showed that the amalgam removal equipment worked well and that dental clinics are capable of discharging significant quantities of mercury.

The second study, a community-wide study of dental clinics in the cities of Hastings and Cottage Grove, was also completed in late 2001. This study evaluated the loading of mercury from 13 dental clinics in the

communities of Cottage Grove and Hastings by measuring mercury levels in biosolids during time periods with and without amalgam removal equipment. Daily biosolids samples were collected at the two treatment plants from June 1999 to August 2001. Following the completion of the study in November 2001, it was found that a 44 percent reduction in mercury loading was achieved for the Hastings WWTP and 29 percent was achieved for the Cottage Grove WWTP. Therefore, significant reductions in sludge mercury concentrations can be achieved if dental clinics remove mercury wastes from the wastewater discharged to the sanitary sewer system. As a result of these studies, MCES and MDA will develop a dental amalgam reduction program for future implementation.

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

A very successful mercury thermometer exchange program was initiated in 2000. Employees could exchange household fever mercury thermometers for digital ones. The mercury units were, in turn, recycled through county hazardous waste collection programs. The goals of the MCES program were to support the Mercury Reduction Strategy by removing mercury-containing instruments from homes and to raise the awareness of concerns of mercury in the environment among employees. In 2002 (its second year), the program was expanded to include all Metropolitan Council employees with a specific outreach to Transit employees located in Hennepin County. Once again, most of the exchanges coincided with the annual employee flu shot program, and over 300 mercury thermometers were collected and digital thermometers distributed.

Department of Military Affairs – The DMA operates both medical and public affairs operations that use various types of photographic chemicals. The National Guard disposed of 1,500 pounds per year of this material as hazardous waste. The Guard installed silver recovery technology where these waste photographic chemicals are processed. The wastes are rendered nonhazardous and the silver is sold. This method has eliminated this hazardous waste stream. Currently our public affairs operations have completely eliminated traditional cameras, by implementing digital photography.

Efforts have also been undertaken to reduce or eliminate the number of battery types that are used by soldiers. In the past, several different types of batteries were used and were not compatible with the different pieces of equipment. Changes have been made, where possible, to convert systems away from the use of batteries containing heavy metals to the use of dry-cell non-heavy metal containing batteries. This has saved considerably in the costs associated with disposing of our spent batteries.

Minnesota State Colleges and Universities

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

St. Cloud State University (SCSU) – 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 nonhazardous 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. They were replaced with electronic imaging systems.

About 50 pounds of video 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. Seven heavy metal compounds were recycled to Chemistry Department needs. More than 30 containers of heavy metal compounds were removed from the Biology Department using the University of Minnesota Chemical Safety Day Program.

Department of Transportation – Mn/DOT developed a manual (see item 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 item 24 *Paints, Coatings, Stripping* and item 30 *Procurement*.

University of Minnesota – Proactive programs for 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.

UM-Duluth is participating in the Great Lakes zero discharge project which among other chemicals focuses on mercury. Excess and waste mercury is being collected and shipped off-campus for proper reclamation or disposal. Mercury-containing devices are being systematically replaced with non-mercury devices. The university is systematically cleaning drain systems on campus, emptying traps and removing biomass buildup, to eliminate accumulated mercury from the wastewater system.

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 plans to install a cloth filter system at the out flow 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 into the environment. Facilities Management's continued effort to reduce steam and electricity use at the university also reduces the amount of mercury released at the coal burning steam and power plants.

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

University of Minnesota Stores and the Department of Environmental Health and Safety (DEHS) celebrated P2 Week 1999 by initiating a laboratory mercury thermometer exchange program. Participants received a free non-mercury thermometer for each mercury thermometer surrendered with a limit of two per customer. The purpose was to capture mercury thermometers and to create a customer base for non-mercury thermometers by placing them into labs. The goal was to exchange 500 thermometers and to collect an additional 500 mercury thermometers. The project used e-mail listserv and handbill advertising. Five drop-off collection sites on the Twin Cities campus were available for two hours each to exchange thermometers and distribute information about mercury use and management in the laboratory. The project got participation from 235 laboratories, took in 796 mercury thermometers, and distributed 518 non-mercury thermometers.

17. HVAC, Indoor Air Quality

Department of Administration – The Division of State Building Construction specifies and administers proper flame spread materials for interior finishes to reduce or eliminate the spread of fire and toxic fumes. The 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, and prefabricated construction.

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

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

Department of Corrections

MCF-RC – RC switched to high efficiency filters, which are replaced every six months. The facility uses antibacterial pads in condensate drip pans 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. Air circulation is tested annually by an independent source as required for ACA accreditation.

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

Metropolitan Council - Transit Operations – 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 completely new system was installed in 1995 to allow the garage to operate within the required standards. Additional studies have been completed for the Snelling Garage (1995) and the South and Heywood Garages (1997).

Metro Transit installed a new exhaust system in the body shop/welding shop area of the Overhaul Base. These changes have significantly reduced the amount of dust given off by the sand blasting and sanding processes in these areas. It also reduced the noise levels in the building while performing these jobs.

Metro Transit is currently designing a system that will use waste heat from the Hennepin County garbage burner to supplement heat in its Heywood Garage and office building. This system would preheat all air coming into the air handling system and reduce emissions from natural gas and fuel oil by 40 percent. If funds become available, these modifications will be installed in 2003.

Department of Military Affairs – The DMA has undertaken projects to identify and remove lead contamination that is present from the use of indoor firing ranges within the Training and Community Centers, formerly known as armories, throughout the state. These projects will eliminate the exposure to lead that is present from the firing of small bore weapons in the building.

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

Minnesota State Colleges and Universities

Metropolitan State University – Metropolitan State University supports ongoing efforts to improve efficiencies of its HVAC system and reduce energy consumption. A Chem Pak chemical pump system for chilled water loop and boilers was installed and includes on-site chemical tanks. The pumps are connected to an automated drive that regulates quantities as needed, decreasing the amount of chemicals consumed and offering hands-free chemical treatment which reduces risk of exposure and chemical spills.

Metropolitan State University has a proposal to install VFD and CO₂ sensor on Auditorium AHU. Installation of VFD will include programming drive into energy management system. The end result will be a smart system that automatically increases or decreases amount of fresh air on an as needed basis. Implementation will result in increased air quality, decrease in maintenance cost, and decreased energy consumption.

North Hennepin Community College – The college has started a program of monitoring and testing indoor air quality on an annual basis. Last year we tested the Fine Arts Building, Continuing Education Building, and the old Science Building. No indoor air quality problems were noted at this time.

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

Minnesota Department of Administration, Facilities Management Bureau's 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.

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

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

Of 38 chillers used on the St. Paul campus, 32 are in dire need of replacement in the next six years. Current plans call for a plant to house five large chillers that would be linked to campus buildings. Because of energy codes and the space existing chillers occupy, new chillers would have to be electrically powered. This is expensive and would mean those buildings would have little power for other needs.

There are efficiencies to be gained by centralizing all that cooling. Much of the efficiency would come 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. Funds for the first phase of the project, which would build the plant and install two chillers, total about \$18.7 million and will be part of the university's 2002 legislative capital request. 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 being used in a mixture with alternative deicer, regular salt, and sand. This blend reduces the salt use and can be used successfully at lower temperatures. The contract will be expanded to include more plant-based alternative products. The Department of Transportation is continually reviewing new products and, as approved, MMD adds them to the state contract. Some of these alternative deicers are corn-based. The Plant Management Division is currently testing various programs to reduce chemical usage during the winter season.

Department of Corrections

MCF-RC – The groundskeepers use magnesium chloride ice preventer for use on walks. Sand is the principal product used in the units and on roadways when needed.

Department of Human Services – METO continues to use potash for ice control. The potash provides traction, eliminates ice, and reduces the amount of material tracked into buildings.

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

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

eliminates it entirely. It is estimated that chemical deicing has been cut in half through the use of runway brooms.

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

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

Metropolitan Council - Transit Operations – As part of the supplementing heating source system, Metro Transit is looking at installing a snow melt system around its Heywood Garage and office thereby reducing the amount of salt that is used at the facility. The system will be installed in 2003 if the funds become available. During the 1997-98 winter season, Metro Transit investigated the recycling of floor sweepings from the service garages. This would remove the sand from the streets that is tracked into the garages on buses and remove it from the waste disposal stream. This idea is still under consideration, particularly in conjunction with the removal of sand and grit from traps and sumps in the bus washes. Initial study results would require drying the sweepings before reuse, which has been found to be expensive. If an inexpensive way of drying can be found, further studies will be done.

Minnesota State Colleges and Universities

Bemidji State University – The Building and Grounds Department has purchased a liquid ice control/removal product to assess for use on campus sidewalks. If found acceptable, the product will reduce sand and salt use. Use of the product was limited due to mild winter conditions. Further assessments will be conducted this winter.

North Hennepin Community College – All sidewalks are cleared of snow and ice, and Ice Melt is applied as needed throughout the winter. No environmentally hazardous materials are used. 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 (SCSU) – Masonry sand works well by not being too abrasive on our SCSU equipment. Salt use in sanding mix is minimized by controlling salt content based on outside temperature. The small stockpile of mix was kept on a slab and covered with tarpaulins to control salt leeching.

Department of Transportation – Mn/DOT conducts extensive research annually on ice control equipment, materials, and methods. This research has shown some dramatic results. The largest success to date comes from the research into 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.

In the past few years, new non-salt deicers have entered the marketplace. Mn/DOT is interested in identifying replacements for salt that demonstrate lessened environmental impacts while maintaining or increasing roadway safety. Mn/DOT anticipates that deicing chemical and abrasive use can be reduced even further with equipment innovations such as zero velocity spreader, greater use of road weather information, anti-icing and pre-wetting methods as well as operator training. A report is available.

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

Department of Agriculture – The Agronomy work unit’s Inductively Coupled Plasma Mass Spectrometer (ICP/MS) has helped reduce the heavy metals mercury waste stream that was created by the use of the Kjeldhal apparatus. By reduced use of this apparatus during the past year, the amount of mercury waste generated has been reduced from approximately 25 gallons in 2000 to 15 gallons, saving on hazardous waste removal. Alternative method development and additional equipment is being investigated to further reduce this waste stream. Further research on methods and method development continues that can help to reduce the amount of waste methylene chloride used in the Environmental Analysis work section.

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

Department of Corrections

MCF-RC – All biohazard lab products are collected monthly by Medical Safety Systems, Inc.

MCF-SHK – The facility has its fixtures from the dental lab and lead foil from x-rays recycled by Silver Pockets. This will continue for 2003.

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. MPCA uses tank tie downs in the Tank/Hazard Storage Room to comply with the State Fire Marshall Code.

Minnesota State Colleges and Universities

Bemidji State University – The BSU Chemistry Department continues to incorporate microscale laboratory techniques into its courses. This reduces both the amount of hazardous wastes generated and the amount of new chemicals needed. The department also conducted an extensive clean-out of outdated and/or unused chemical stocks. The chemicals were removed through the University of Minnesota’s Chemical

Safety Day Program. The chemicals will be redistributed or properly disposed of by the University of Minnesota's waste management services. The disposal cost was approximately \$4,000. The project has reduced the potential for spills and the associated liabilities as well as improved safety. The department is continuing to review and reduce chemical stocks in fiscal year 2003.

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

The Chemistry Safety Committee, new 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 more than 200 unknowns. A staff member (recently added to the SCSU Chemistry Department) has made major progress in hazardous waste controls.

After-hours work controls and the Chemical Hygiene Plan have received special emphasis in all College of Science and Engineering departments which have labs. Renovations have included the addition of three plumbed eyewashes. Better formaldehyde controls are being used.

Department of Transportation – Mn/DOT materials laboratories have replaced 1,1,1-trichloroethane with n-propyl bromide used with asphalt extraction waste. 1,1,1-trichloroethane is hazardous and very expensive to manage and dispose of. 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 both less virgin solvent produced and less waste solvent to be disposed of. The projected cost savings to the university, if the distillation and marketing focused solely on acetonitrile, would be \$800 disposal costs avoided and \$30,000 solvent purchase avoided for the annual system capacity of 1,200 liters of recycled acetonitrile. Total projected annual costs are \$10,800 that yields 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 Corrections

MCF-F – Run-off ponds for wildlife have been preserved and have created acres of wetlands. In addition, erosion control was accomplished in Faribault to prevent hillside/road erosion around storm water

dissipater. This will prevent roadways and hillsides from washing into the Straight River.

MCF-SHK – The facility does all of its own landscaping and use fertilizers/herbicides only as needed. This will continue in the coming fiscal year.

Department of Military Affairs – Earlier this spring, the DMA purchased a Gyrotrak. This piece of equipment is used to clear trails and land areas. The Gyrotrak is equipped with a rotating drum that is used to reduce trees as large as 18 inches in diameter to mulch. There is less impact on the underlying soil and no need to remove stumps or burn brush. This piece of equipment has also reduced the number of man hours required to complete the task.

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, insects). The new Brainerd office will be reviewing and approving all exterior landscaping plans. They have requested that native, drought-tolerant landscape plants be used around the building.

Minnesota State Colleges and Universities

Metropolitan State University – Metropolitan State University is currently working with landscape architects, master planning architects, and neighborhood organizations to design and install a rain garden to be located on St Paul campus. The rain garden will improve urban ecological health and minimize erosion and water pollution by managing storm water.

Bemidji State University – A moratorium on herbicide and fertilizer application to lawns around a single parent family housing dormitory continued. BSU continued for a second year to cooperate with the Minnesota Department of Natural Resources and Beltrami County to restore and stabilize the Lake Bemidji shoreline. This spring, a 640-foot section of campus shoreline was stabilized with rock, plants, and other natural materials. Native aquatic plants were planted to replace the lawn and return the shoreline to a more natural condition. BSU contributed approximately \$15,000 to the project in fiscal year 2002 and will supply the labor to erect a fence. To date, more than 850 feet of shoreline has been restored. The final segment of shoreline to be restored along campus property will be completed in fiscal year 2003.

Department of Transportation – Mn/DOT uses an integrated vegetation management approach for managing roadside vegetation. This limits the use of herbicides. 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. Erosion control slope stabilization that uses compost applied by air blowers has been performed with excellent results.

Mn/DOT offers a CD-ROM, *Woody and Herbaceous Plants for Minnesota Landscapes and Roadsides*. Mn/DOT developed this program to aid in selecting plants for challenging roadside landscaping in Minnesota. Many cities, counties, and consultants use the landscaping specifications and details (such as plant selection, compost material, and mulch) developed by Mn/DOT. The design/build process has been aided by this expertise.

University of Minnesota – Center for Urban Ecosystems and Sustainability (CUES) was created in 1995 with a grant from the Minnesota Extension Service. CUES (www.entomology.umn.edu/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's 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 University of Minnesota Extension maintains a web site, Sustainable Urban Landscape Information Series (SULIS; <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 section, 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.

SULIS has developed a Sustainable Lawn Care Information Series (www.sustland.umn.edu/maint/maint.htm) 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 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 Twin Cities campus. The wetland restoration began with a cleanup during Beautiful U Day in September 2000. Implementation of the restoration began in the spring of 2001 and will continue through the next few years. On

September 25, 2001, students, faculty, staff, and community volunteers will build the first rain garden on the university campus as a part of Beautiful U Day 2001. The rain garden will reduce the storm water and runoff pollution that flows to the Sarita wetland and eventually to the Mississippi River. The rain garden project developed out of a student research paper done for a water quality class. More rain gardens and other pollution preventing landscape storm water management projects will be championed by the committee as future new construction and building renovation projects provide opportunities to change the landscaping of the campus (see <http://www.stormwatercenter.net> and <http://www.dakotaswcd.org>).

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

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

The University of Minnesota’s College of Architecture and Landscape Architecture provides landscape training and research (http://gumby.arch.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. Chapter 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.

Department of Corrections

MCF-RC – Cardboard is recycled, and RC contracts with a vendor to pick up and reuse the pallets. Cooking oil and lard is picked up and recycled by an outside vendor. Food waste is picked up by a pig farmer twice weekly. RC has also set up a recycling program for plastic, paper, tin, and aluminum.

MCF-SCL – The facility recycles cardboard (credit \$1,600); pallets (500 pallets recycled); scrap metal (scrap iron, credit \$1,625), thereby reducing waste going to landfills and eliminating disposal costs for these materials. The facility plans to continue its recycling efforts.

MCF-SHK – Shakopee donates surplus materials (e.g., furniture, washing machines) to State Surplus Operations rather than discarding them. This was done twice in fiscal year 2002, and will be done again a few times in fiscal year 2003.

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

MATERIALS EXCHANGE PROGRAMS IN MINNESOTA:

Minnesota Technical Assistance Program (MnTAP)	612-624-1300 or toll free 800-247-0015
Chisago County Materials Exchange	651-213-0879
Northcentral Materials Exchange	218-547-7428
Northeast Minnesota Materials Exchange	800-247-0015
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	218-299-7333

During 2002, a total of 1,830 businesses and organizations registered on the Materials Exchange web site seeking to exchange solid and hazardous waste materials for reuse. Successful exchanges resulted in saving businesses and organizations approximately \$990,000 in avoided purchase and disposal costs and keeping more than 2.6 million pounds of materials out of the landfill, exceeding the annual goal of 880,000 pounds. Catalog, web, and e-mail listings resulted in a total of 414 exchanges, exceeding the annual goal of 120.

MnTAP staff worked with local alliance sites providing needed information to help them function as part of the Minnesota Materials Exchange Alliance. MnTAP published and distributed almost 12,000 catalogs to local sites, metropolitan counties, businesses, and organizations. The web site, e-mail listings, and catalog have become very effective tools in facilitating and measuring exchanges. In 2002, over 9,000 web self-referrals were made, and, by the end of 2002, over 1,000 people were receiving the newest listings by e-mail.

Metropolitan Airports Commission – MAC has an ongoing reuse program for discarded pallets that would otherwise be destined for disposal. They are generated by the various tenants, as well as by MAC operations. Every month, MAC maintenance personnel pick up thousands of pallets at loading docks, along roadways and ramp areas and bring them to a single, designated pallet staging area. The pallets are available to anyone for reuse on site, eliminating the need to purchase pallets. Surplus pallets are hauled off site, free of charge, for reuse by a vendor. There is no out of pocket expense and the cost savings is enormous for airport tenants who would otherwise purchase pallets and use them once. Annually, 10,000 plus pallets are re-used, and the avoided disposal cost easily exceeds \$15,000.

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

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

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

Minnesota State Colleges and Universities

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 (SCSU) – Glass, plastics, aluminum cans, steel, carpet, some building materials,

styrofoam, and cardboard are recycled at SCSU, as well as lard and cooking oil. A local farmer's hogs are fed leftover food.

University of Minnesota – The University Department of Environmental Health and Safety operates a chemical redistribution program (<http://www.dehs.umn.edu/hwd/recycle>) which finds users for unwanted but usable chemicals within the university community. The program distributes approximately 1,000 kilograms 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/recycle/reuse.html>). The target audience is the university community, nonprofits, and the general public. Available items are listed and often shown on their web page. A web-based program called the Virtual Warehouse 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 take them to the central warehouse.

22. Office Supplies

Department of Administration – The Division of State Building Construction specifies the purchase of soy-based inks for all writing instruments, if available. Also, the division purchases water soluble, non-toxic marking instruments, whenever available. 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 Central Stores and S&T Office Products had 3,024 recycled products available in fiscal year 2002, up from 3,005 products in fiscal year 2001. Sales totals of recycled products through June 2002 were \$2,856,122 (Central Stores, \$2,414,242 and S&T Office Products, \$441,880). In fiscal year 2002, 37.2 percent of stock and non-stock sales was for recycled content products while in fiscal year 2001 that amount was 36.55 percent.

In April 2000, Material Management Division's Central Stores increased the recycled dated products available from At-A-Glance from five to 19. The products marked with a recycle logo are made from 30 percent post-consumer waste. Furthermore, all At-A-Glance products are printed with 100 percent soy-based inks and packaged in cartons of recycled content. These products are advertised in a six-page flyer, which is mailed to all customers in the spring of each year. The products are also advertised on the Central Stores web site, can be purchased over the Web or by printing an easy to use web site form and faxing it to Central Stores.

Central Stores stocks thirty-six recycled papers including eight white papers in various sizes and various post-consumer waste contents. Sales from these white papers, in FY02, were \$1,427,454. Colored paper sales with 30 percent post-consumer waste accounted for another \$133,380. One of these 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, Central Stores 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. Two new recycled papers were added in FY02. Central Stores now stocks a letter and legal size, white, 24 lb., 90 bright, laser guaranteed, 30 percent post-consumer paper.

In May 2000, Central Stores rolled out its new e-catalog. This electronic online catalog with graphics 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. The goal of receiving 40 percent of all eligible orders via the Internet in FY02 was exceeded by 2 percent. Central Stores expects this number to continue to grow as more customers realize the electronic catalog makes

ordering fast and easy. By building orders online, they can be submitted quickly and easily. Since all special prices and/or discounts are automatically reflected on the online order form, all web orders are assured of getting up-to-date competitive prices and information.

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

The program initiated by Central Stores in conjunction with S&T Office Products and General Ribbon Corporation of providing remanufactured laser toner cartridges will continue. These cartridges are performance guaranteed and are put through GRC's intensive factory certification process, which ensures quality performance. Since the onset of this program, not a single defective cartridge has been returned to Central Stores for replacement. Used and empty cartridges are returned to Central Stores, palletized, and sent back to GRC for remanufacturing.

The Materials Management Division has a contract for industrial paper with sales of approximately \$2,501,420 for FY02. Of that total, 89 percent was for recycled paper towels and tissue that contain 90 to 95 percent post-consumer waste. This exceeds the federal standard of 40 percent. The Materials Management Division has a contract for printing and business papers with FY02 sales of approximately \$1,915,200. Of this total, 80 percent was for recycled paper. The Materials Management Division has a contract for recycled continuous printer paper that had FY02 sales of approximately \$91,492 for 30 percent post-consumer printer paper. This amount increased over the last fiscal year because the four largest volume corresponding products on the continuous printer paper contract were deleted. This shifted the business to the recycled paper contract where prices are lower. MMD buys only 100 percent post-consumer recycled paper for all of its printers and copiers.

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.

Department of Corrections

MCF-RC – RC uses Shred-It Recycling for most of its paper products. The used toner cartridges are sent back to the manufacturer for recycling.

MCF-SCL – St. Cloud uses a similar system for Document Destruction recycling for a large proportion of its office products, at a cost of over \$10,000. As a result, over 14,000 pounds of documents have been recycled. These activities will be continued.

MCF-SHK – Shakopee recycles its office supplies and will continue to do so in fiscal year 2003.

Office of Environmental Assistance – The OEA uses Savin IKON copier machines, which have non-removable toner cartridges that are made of high-density polyethylene plastic. The OEA switched from 30 percent post-consumer recycled copy paper processed with chlorine to 100 percent post-consumer copy paper processed without chlorine. Just over half 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.

Recycled paper is used exclusively in the office, whenever it is available. Letterhead and envelopes contain 100 percent post-consumer recycled paper content. The OEA continues to use water-based correction fluid instead of solvent-based fluid. OEA computers are cleaned with pressurized carbon dioxide instead of chlorofluorocarbons. OEA audio, video, and digital tapes are reused, as well as computer discs.

For all internal meetings, staff specifies and purchases lunches and break food and beverages from vendors who offer low- or no-waste packaging and reusable dishware. This reduces waste and supply costs. The OEA and MPCA cafeteria supplies compostable dishware. The OEA uses washable linens in its kitchen and in restrooms. Compostable flatware has been difficult to get in 2002, but staff are currently working with a vendor that supplies it to get current prices. OEA uses washable linens in the kitchen and restrooms and uses Restore products in the kitchen and in a refillable spray bottle throughout the office.

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

Metropolitan Airports Commission – Whenever possible, products made from recycled materials are purchased and used. Laser cartridges are returned to the manufacturer for remanufacturing. Remanufactured cartridges are being evaluated for use in office equipment and after a test period, if found effective, will be used exclusively, thereby closing the loop. Recycled content paper is used in the copy machines and printers.

Double-sided copying is required at all times. Commission and committee meeting agendas, minutes, and information packets are no longer distributed en masse. Distribution is limited to one packet per department, and the information is available electronically for vendors, consultants, members of the public, or other interested parties who were previously mailed large numbers of paper documents.

Metropolitan Council - Environmental Services – Office supplies, particularly paper goods, are frequently purchased with recycled and post-consumer recycled content material. Laser toner cartridges for personal computer printers are collected and sent to a vendor where they are prepared for reuse at MCES. In 2001, there was general dissatisfaction with the remanufactured products from a particular vendor. In order to maintain the reputation of recycled content products and to encourage the continued collection of used cartridges, a new vendor was selected and fewer problems have been reported. Used ink jet cartridges are sent to EnviroSmart Company in Franklin, Tennessee for recycling. These are mailed directly in plastic, postage-paid envelopes.

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 contract. Purchasing staff was directed to order this paper for a majority of the agency's printing needs. The paper has been working well in fax machines and photocopiers; however, there have been problems with paper jams in many laser printers. Therefore, staff has been instructed to order 50 percent post-consumer paper, distributed by Great White, for laser printers that cannot accommodate the 100 percent post-consumer paper. In fiscal year 2002, 7,184 reams of 50 percent recycled paper were purchased, along with 2,045 reams of 100 percent post-consumer paper. The MPCA purchased a total of 9,299 reams of paper in fiscal year 2002, compared to 16,985 reams in fiscal year 1995 and 13,901 reams in fiscal year 2000.

Efforts to reuse existing supplies whenever possible continue. Each floor has a designated storage area for reusable items such as file folders, 3-ring binders, and a variety of miscellaneous office accessories. MAPS users are encouraged to purchase writing tablets that contain the highest percentage of post-consumer content material from the Central Store state contract. The MPCA/OEA recycling rate of office materials/wastes was 84 percent.

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

The ARROW group recently implemented a plan to encourage Environmentally Preferable Purchasing. This initiative focuses on purchasing products that are nontoxic; water based, and have recycled or post-consumer content, and have no odors. Products that meet the criteria are placed on 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.

Minnesota State Colleges and Universities

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

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

Department of Transportation – Mn/DOT recycles computers, cardboard, paper, and toner. The department copies on both sides of paper whenever possible.

23. Oil, Oil Filters

Department of Administration – The Materials Management Division has established statewide contracts for the purchase of re-refined motor oil and oil change services that 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 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 division also 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. The Materials Management Division, in conjunction with the Department of Transportation has a contract for the management of used oil sorbents and filters for processing for energy recovery.

Department of Corrections – Many facilities recycle automotive oil and filters through local vendors.

MCF-SHK – Shakopee recycles its oil and filters and will continue to do so in fiscal year 2003.

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

Metropolitan Airports Commission – MAC fleet/vehicle maintenance shop is equipped with an oil/fluid change pit that employs a mobile collection tray to catch spent lubricants. It is pumped directly to a large

storage tank with little or no chance of spilling. Oil filters are crushed on-site and recycled by the same permitted vendor that removes the used oil for re-refining. Overhead service reels provide oils and grease through hoses connected to bulk storage tanks, eliminating the need to pump liquids from drums into containers and then carrying them to the service bay only to be dispensed again. Spills are rare and absorbent use is minimal.

MAC also recognizes that there is a need to collect used oil from non-commercial tenants at the reliever airports. Collecting used oil from these tenants reduces the chances of possible ground water and soil contamination from the oil being improperly managed (dumped on the ground or in a dumpster). Used oil generated at the reliever airports by non-commercial tenants and MAC operations is stored in tanks provided by MAC. It is collected periodically by a permitted vendor who then re-refines it.

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 2001, for all facilities, 5,733 gallons of used oil were transported, about the same volume at 2000. Approximately 1,150 pounds of used oil filters were recycled, a 55 percent reduction from the previous year.

Metropolitan Council - Transit Operations – 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 – Re-refined oil is being used in the district's light duty vehicles to help create a market for re-refined products. MMCD continues to follow a fleet maintenance procedure of extending the mileage between oil changes for district-owned vehicles. Currently oil changes are every 5,000 miles for light duty vehicles which is most of the fleet, and 3,000 miles for heavy use vehicles. This fleet maintenance procedure has been in effect for a number of years. There has been an annual 30 percent reduction in the amount of used oil generated by MMCD's fleet, which translates into a 110 gallon reduction in used oil. In the two years that this program has been in place, MMCD has not experienced any problems with the truck fleet related to the extended mileage program. Used oil and used oil filters are recovered and recycled through a recovery vendor.

Department of Military Affairs – The DMA has continued to administer its Oil Analysis Program (OAP), a statewide effort to detect impending equipment component failures and determine lubricant conditions through periodic analytical evaluation of oil samples. It has become a mandatory maintenance tool for all DMA vehicles. The Oil Analysis Program evaluates the residue suspended in the oil system. This residue indicates the parts that are wearing out and the degree of wear. A sample can provide the maintenance community with information about the condition of the equipment and the quality of its maintenance.

The federal equipment reliability has improved through OAP, as well as increased safety factors. By detecting the signs of impending failure at an early stage, maintenance can be performed at a lower level. This has decreased maintenance support costs and also improved readiness by reducing the number of items not operationally ready due to maintenance. There has also been a reduction in the amount of oil being used.

Oil filter presses remove the majority of the free liquid held in the filter. TCLP tests performed on crushed filters allow the waste stream to be managed as a recyclable metal. There are two direct benefits from this technology: the DMA sees a cost savings in the amount of hazardous waste it disposes, and there is a decrease in the amount of storage area required. DMA is now using 14 oil filter presses. These units have reduced the waste stream from 5,000 pounds yearly to a recyclable metal.

Minnesota State Colleges and Universities

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

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

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

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

24. Paints, Coatings, Stripping

Department of Administration – The Materials Management Division specifies no-lead paint for traffic marking and equipment paint. The Materials Management Division participated in the Solid Waste Management Coordinating Board's Latex Paint Solutions Task Force with cities, counties, state agencies, vendors, the Metropolitan Council, and the Green Institute. MMD and the Office of Environmental Assistance then developed a contract for recycled paint. Two products are available, reprocessed paint is 20 percent post-consumer recycled paint, and rebled paint is 80 percent post-consumer recycled content. The recycled paint is obtained from the household hazardous waste collection programs, helping to get discarded paint out of the waste system and reduce the processing of hazardous materials. Volunteers are still being sought to participate in the recycled paint pilot project, which will test the efficacy of procuring and using recycled paint. The current contract became effective in July 2000.

The Materials Management Division has added reprocessed and rebled latex paint to the contract for indoor painting and worked with the Plant Management Division to expand the use of reprocessed and rebled paint throughout the Capital Complex. The Plant Management Division makes solvent-free paint available to state agencies and political subdivisions through its state contract. The division also tests the use of latex-based duct sealant compounds and uses nut chips with shot-peening equipment to remove paint and gasket materials.

Department of Corrections

MCF-RC – RC has set up a contract with Onyx Environmental for all hazardous waste disposal.

MCF-STW – A recycling system, manufactured by Finish Thompson Inc., was recently installed in the paint shop at Stillwater. This will cut down on the amount of solvents used by several hundred gallons annually.

Metropolitan Airports Commission – MAC Paint Department is responsible for painting/stripping acres upon acres of pavement, runways, and taxiways in addition to parking lots and roads. The 10,000+ gallons of pavement-marking paint used annually is purchased in reusable 250-gallon totes. Once emptied, the totes are returned to the supplier for reuse, eliminating the need to manage 200 single-use, 55-gallon steel drums.

Most interior painting and all exterior painting for buildings and pavement is done with solvent-free, water-based paint. Any use of solvent-based paint is restricted to the paint booth. The paint booth uses water filtration in addition to standard paint booth filters, which actually makes the exhaust cleaner than the air taken in. Paint booth filters are managed as nonhazardous industrial waste and are burned for energy recovery. Exclusive use of high volume low pressure 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 – DMA performed a pilot project to compare its existing paint removal operation: silica sand blasting vs. sodium bicarbonate. The pilot project found that silica sand blasting used eight 25-pound bags per hour compared with sodium bicarbonate, which used four 25-pound bags per hour. Since the pilot project was completed, sodium bicarbonate technology has replaced silica sand blasting as the method for stripping products prior to painting. With this change, the DMA has eliminated the need to dispose of large quantities of spent silica sand contaminated with lead paint chips.

Sodium bicarbonate technology allows for complete solubilization of the normal blast media with the addition of water. The undissolved material, which typically represents 13 percent of the total process effluent, includes only paint chips, aluminum oxide, grease, and oil, and is disposed of as hazardous waste. This material is proposed to be removed from the effluent using a filtration system. The first filter removes the heavies and the second filter removes the soluble metals. The remainder of the effluent is sewered. This should reduce the waste stream from four tons per year to 400 pounds per year.

In 1998, soda blasting treatment unit was installed and a new paint booth was also constructed at the CSMS in Camp Ripley. The DMA is also purchasing paints in smaller quantities so they are used before their shelf-life expiration date. This avoids the necessity of disposing of paints as hazardous waste.

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

Minnesota State Colleges and Universities

Bemidji State University – BSU maintenance procedures still include the use of electrostatic painting and low VOC paint whenever possible. A moratorium on the use of organic solvent-based wood sealers was continued. The use of water-based products was expanded in fiscal year 2002.

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) – SCSU has converted all possible coatings to water-based products to limit VOCs, including paint, varnish, and traffic stripping paints.

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/stripping paint. This eliminated an entire hazardous waste stream (lead, chrome, and toluene) generated during pavement marking and striping operations. All vehicles purchased by Mn/DOT are specified to have heavy metal free coatings/paints. See item 16 *Heavy metals* in Part 3. Mn/DOT is planning to use stainless steel sanders to prevent future re-furbishing and sandblasting.

University of Minnesota – The university's updated Standards and Procedures for Construction recommends and supports the use of rebled paint (<http://www.facm.umn.edu/cons/DIVpdf/Div9a.pdf>) and has developed rebled paint specifications (http://www.facm.umn.edu/cons/APPpdf/O_APPA.pdf).

In 1999 as a result of a collaborative decision by university officials and a host of other agencies, the interior walls of the new \$35 million University Gateway Center were coated with recycled used paint. The project was part of a green building initiative spawned by the Minnesota Office of Environmental Assistance, the university's Waste Abatement Committee, Hirshfield's Painting Mfg., and the Minnesota Painting and Wallpapering Employers Association.

A one-day paint drive collected more than 1,000 gallons of different color, gloss, and quality paints from members of the Minnesota Painting and Wallpapering Employers Association. The paint was inspected, mixed, and tested by Hirshfield's Painting Mfg. Approximately 2,000 gallons of recycled paint were used to coat a majority of the Gateway interior walls. The only areas exempt from the paint are ceilings and doorframes, which require a different product.

Though recycled paint is not new to Minnesota, the Gateway venture signifies the largest commercial use of recycled paint thus far in the state. The Gateway project illustrates to the university and greater community that recycled paint isn't just a raw concept but a quality alternative to virgin paint. From an application standpoint, it demonstrates that it's an industry-grade paint that can be purchased by contractors and used effectively.

25. Parts Cleaning

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

Department of Corrections

MCF-F – Faribault facility has converted to citrus-based part cleaners in maintenance, thereby eliminating the solvent-based cleaners.

Iron Range Resources and Rehabilitation Agency (IRRRA) – The IRRRA collects parts cleaning fluid and then sends it to Como Oil of Duluth for recycling.

Metropolitan Airports Commission – MAC has converted all parts washers to recycling type units that employ a built-in distillation apparatus that cleans and reuses dirty solvent. The only waste is an oily nonhazardous by-product which 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 323 gallons of solvent were recycled in 2001, a reduction of 26 percent from the previous year. The solvent is petroleum-based and is serviced by Safety-Kleen, Inc. 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 more than a year of operation, no hazardous waste has been generated from this unit. Carburetor cleaner is no longer in widespread use due to the increase in vehicles that are now fuel injected.

Department of Military Affairs – The Department of Military Affairs continues the use of a toll service company on a limited basis to provide a solvent recycling service that provides one type of non-halogenated solvent that meets the specifications of the process operators. The organization continues to reduce the volume of solvent used by eliminating the unlimited combinations of solvents for disposal. Maintenance facility chiefs and TACC commanders were required to justify the use of this solvent equipment. In reviewing their need

prior to adding their shop to the contract, an additional 40 percent reduction in use was achieved. Programs have also been established to require users of the solvent service to pay for the service (cost of doing business). This attributed to an additional 20 percent.

DMA maintenance facilities have replaced many of their solvent systems with systems that use hot water and biodegradable detergent. They have installed 22 aqueous parts washers in various maintenance shops. This operation has produced less hazardous waste. (About 30 pounds per year for aqueous parts washers (sludge) compared to 800 pounds per year for solvent.) The DMA continues to purchase aqueous parts washers and make technological changes to make older parts washers more efficient through filtration.

The DMA currently operates 22 small bore weapons cleaners. With this technology, weapons can now be cleaned with high pressure steam instead of solvents. Steam, the combination of moisture, heat, and pressure provides the means for immediate removal of contaminants from a given surface, cleaning it thoroughly, coupled with immediate spotless drying. There are no hazardous wastes associated with this cleaning process. This technology has also been used by various other maintenance activities to replace solvents.

Minnesota State Colleges and Universities

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

Department of Transportation – Mn/DOT has replaced non-recyclable vehicle parts washers with aqueous based vehicle parts washers and high flashpoint 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. See item 30 *Procurement*.

University of Minnesota – The University of Minnesota has an ongoing program of using parts cleaning services, such as Safety Kleen, that recycle the dirty solvent. Evaluation of more environmentally friendly parts cleaning products is ongoing in individual shops.

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.

U of M-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.

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 division also 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 avoids the use of pest control services at the State Recycling Center by ensuring clean facilities that do not attract vermin.

Department of Agriculture – The Agronomy/Plant Protection Division has ongoing projects that are instrumental in educating rural, suburban, and urban Minnesota in the proper best management practices of pesticide use and disposal. The ongoing empty pesticide container and pesticide waste programs within the Agronomy/Plant Protection Division have educated many rural farmers on the best use and proper disposal of pesticides. The Sustainable Agriculture program, now in its 14th 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 also be obtained from the MDA's web page: www.mda.state.mn.us.

Department of Corrections – For most facilities, fertilizing is done at multiple facilities once a year and only the amount to be used is purchased, ensuring that no pesticides or fertilizers are stored on the grounds. In addition, only trained personnel apply the fertilizer.

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

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

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

Minnesota State Colleges and Universities

Bemidji State University – A moratorium on herbicide and fertilizer application to lawns around a single parent family housing dormitory continued.

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

Department of Transportation – Mn/DOT uses tons of animal manure annually as a nutrient source in the compost treatment of petroleum contaminated soils. After these soils have been treated, the soil is used as a topsoil amendment along Mn/DOT right-of-way. (See item 32 *Tanks*.) Mn/DOT is researching biological control of various weeds as an alternative to herbicides used on roadside vegetation. Flea beetles are being used to control leafy spurge in the Twin Cities metropolitan area. Biological control will hopefully reduce or eliminate the use of some herbicides.

Mn/DOT is researching state-of-the-art pesticide application machinery and pesticide formulations on Mn/DOT right-of-ways. This research project will meld cutting-edge pesticide application technology with advanced pesticide formulations to determine how Mn/DOT can more accurately deliver herbicides to target weeds and obtain better control over longer periods of time. This will reduce the number of applications needed each season.

University of Minnesota – The University of Minnesota is a world leader in agriculture research and education, which 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 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 areas 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.

Scientist Pierre Robert of the University of Minnesota and others 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 the past two years, he applied \$54,000 less in pesticide on 6,000 acres. 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. In the area of energy policy, protection of the environment through reduction of pollution associated with traditional energy sources is a major goal of the department. The Department of Commerce is committed to leading, by example, through the reduction of energy use, use of toxic pollutants, and generation of hazardous waste in our own department.

Department of Corrections

MCF-SCL – St. Cloud updates the Hazardous Waste Control and Pollution Prevention Plan Operating Guideline annually. This informs facility employees of environmental concerns and proper controls for the current year and future activities around environmental recycling and energy conservation efforts.

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. The OEA believes that pollution prevention in its workplace will lead to healthier and more efficient employees, saving of public funds, and less waste introduced into the environment. The OEA stresses the preventive approach 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 is 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 will also build 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 (MAC) recognizes pollution prevention as an integral part of its services. MAC's strategic plan reflects its commitment to environmental protection. MAC is committed to providing excellence and leadership in protection of the environment. In keeping with this position, the commission's objective is to reduce waste and emissions. MAC strives to establish sound environmental strategies that lessen adverse environmental impacts on the natural environment and the surrounding communities. MAC encourages its tenants to do the same. MAC promotes taking a proactive approach to environmental protection and supports cooperation with other regulatory agencies. MAC is aware that meeting this commitment will require the cooperative efforts of its entire staff and tenants. (See also *Part 2 Policy/Regulatory Activities*.)

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

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

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

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

To accomplish these objectives, we will implement programs for reducing or eliminating generation of waste through source reduction and other pollution prevention methodologies. This policy extends to air, wastewater, solid and hazardous wastes. In addition to meeting these objectives, there are other important benefits to pollution prevention.

The Department of Military Affairs is committed to reducing its production of waste by weight and toxicity. Priority is given to source reduction. Where source reduction is not feasible, other pollution prevention methods such as recycling will be implemented. The wastes that are produced will be converted to useful

products or used beneficially, when possible. Remaining wastes for which no pollution prevention option is warranted will be effectively treated (to decrease volume or toxicity) and responsibly managed.

The Department of Military Affairs will select waste management methods that minimize present and future effects on human health and the environment. Pollution prevention is recognized as a responsibility of all of our staff. We are committed to identifying and implementing pollution prevention opportunities through solicitation, encouragement, and involvement of all employees.

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

Minnesota State Colleges and Universities

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.

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

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

29. Printing

Department of Administration – The Materials Management Division continues to require post-consumer recycled paper content on all printed material paper to be at least 30 percent. MMD also requires soy-based or other agra-based inks as the standard on all printing orders or contracts. In addition, the Materials Management Division includes the following statement in all solicitations for printing:

Environmental Health and Safety Requirements:

By responding to this bid, the company 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, which outlines federal, state, and local environmental regulations affecting printers in Minnesota.

Communications.Media offers customers *Launch!* software that allows them to send electronic files (a 1997 Minnesota Great! Award-winning project). Communications.Media uses equipment to reduce waste including a water flow meter to reduce water use at PrintComm and silver waste recovery equipment in processing areas at both PrintComm and DocuComm. Communications.Media participates in the Great Printers Project and has a goal to complete experimentation of VOC-free replacements for litho wash and deglazer. Resource Recovery Office promotes the use of environmental standards such as those used by print shops that are designated to be Great Printers.

Department of Commerce – The department uses printer and copy paper which contains 30 percent post-consumer content by fiber weight. Over 4.2 million sheets of paper are used by the department in fiscal year 2002. Efforts will continue to be made in the next year to encourage responsible printing practices and double-sided photocopying.

Department of Corrections

MCF-F – Faribault is planning to evaluate the distribution of hard copies of our “offender locator,” which is currently sent out to approximately 25 people per week and is approximately 25 pages long. If all hard copies were eliminated and employees were required to rely on the electronic version, we could save over 30,000 sheets of paper per year.

MCF-OPH – The closure of the Industry program and change to a centralized canteen at Oak Park Heights will end printing waste, and the amount of waste will drop for fiscal 2003.

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.

Metropolitan Airports Commission – MAC continues to use printing companies that use soy-based inks and recycled content paper for items such as official letterhead, etc.

Department of Military Affairs – Printing presses have been eliminated from the inventory of DMA. All printing is done on computer printers, copy machines, or contracted out. Electronic distribution is used to disseminate information as much as possible. Now each office determines the number of copies needed, which has significantly reduced the need to print out large quantities of material.

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

The agency’s Canon photocopiers continue to be serviceable. Since the Cannon 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.

Minnesota State Colleges and Universities

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

St. Cloud State University (SCSU) – SCSU recycles books, directories, and newsprint.

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

University of Minnesota – Printing Services recently joined Minnesota Waste Wise and had a plant audit in September 2001. 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 Devtek 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 Financial Aid Office was one of the first in the nation to invest in an electronic financial aid system to replace its traditional paper-based system. The new e-system saves 1,000,000 sheets of paper annually. The first year was a success with 87 percent user rate, average financial aid application processing time reduced from six weeks to four days, projected elimination of one million sheets of paper, and a cost saving of \$80,000 through reductions in temporary employees, employee overtime, printing, and mailing. The e-system received the EduCause Award for Excellence in Administrative Information Systems for being “exemplary in its leveraging of existing resources, partnerships between contributing departments, attention to developing an effective business model, alignment with the overall strategies of the university, and the value and applicability to other higher education institutions of all sizes.”

The University Payroll Office has introduced a paperless e-system for reporting direct deposit pay statement information to employees via the university’s web site. The annual elimination of 700,000 printed pages is projected once employees adapt to the paperless system.

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 Office of Environmental Assistance. Our goal was to increase awareness of the need for environmentally preferable purchasing throughout state government and to educate purchasers to make green procurement a smart and easy choice from a “best value” perspective.

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

The Materials Management Division implemented a modification to the Minnesota Accounting and Procurement System (MAPS) to require the buyer to code each purchase order line with the environmental code. This is a required field and can be used to generate reports that capture the types of environmental

purchases made by the state. This will allow MMD to more effectively track environmental purchases made by the state. MMD with the Environmentally Responsible Work Groups developed environmental definitions to code all items on purchase orders and contracts. The MMD contract solicitation documents require responding vendors to code the goods and service offered with the state's environmental codes. The codes are required when the state's buyer completes an order in MAPS. MMD has modified the contract release document used to announce state contracts to agencies and CPV members. The contract release now shows the environmental code for each item.

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

Through the information gained from the requirement for environmental codes, the Materials Management Division is gaining valuable information on the marketplace. This information can be used to structure future specifications so contracts will have goods and services that are more environmentally preferable.

MMD 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/enviro.pdf>.

The Materials Management Division 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 on-line to encourage input.

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

MMD also recently developed a more flexible approach to an existing legislative mandate. State statutes allow a price preference of up to ten percent for goods containing recycled content. Effective last year, we awarded a one percent preference for each ten percent of recycled content documented by the manufacturer. That is, 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.

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 Materials Management Division has contracts for remanufactured Herman Miller and Steelcase system furniture that allows state agencies and Cooperative Purchasing Venture members to purchase refurbished products rather than new product. This allows the reuse of furniture parts. This contract requires remanufacture to meet BPIA standards for office furniture recycling (Feb. 94) and allows trade-ins of Herman Miller and Steelcase system products.

The Materials Management Division has created contracts with MINNCOR for furniture refinishing, reupholstery, and refurbishing, and its future systems furniture contract with MINNCOR has refurbished furniture. The division has established contracts to clean and repair existing furniture, allowing items to stay in service longer. The cleaning products used in this process are environmentally friendly.

Hospitals: The Materials Management Division is collaborating with the Environmental Protection Agency and its Environmentally Preferred Products (EPP) work group to find and establish a mechanism for selecting EPP products. The EPP work group is established as part the Environmental Protection Agency/American Hospital Association Memorandum of Understanding, the goal of which is to virtually eliminate mercury from healthcare by 2005 and to reduce medical waste from healthcare by 50 percent by the year 2010.

Carpet and 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.

Department of Agriculture – The Laboratory Services Division continues to use 20 liter nowpack containers for methylene chloride, which has helped in the reduction of glass waste and the release of fumes into the laboratory. Whenever possible, vendors are requested to remove or eliminate excessive shipping materials when deliveries are made. This will help in reducing the amount of waste material placed in local landfills.

Department of Corrections – Most facilities follow Minnesota Statute § 16B.121 and 16B.122, along with Minnesota Executive Order 99-4 requirements via their purchasing departments. This practice will eliminate and reduce the facility's waste stream through identifying and reusing recycled products. Staff have been trained on procurement, and waste is reduced by use of good purchasing techniques.

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

The OEA's expanded procurement focus continues to include other environmental characteristics, 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 OEA tracks purchases of E85 fuel used in the two flexible fuel vehicles that are assigned to the OEA. OEA is working closely with the Department of Administration's acquisition specialists to incorporate environmental specifications into several state purchasing contracts. Together, the OEA and the Department of Administration have:

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

The OEA promotes environmentally preferable contracts to state agencies and local political subdivisions. The OEA has made procurement information available via its web site and links to 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 and Department of Administration hold quarterly meetings with the Environmentally Responsible Work Group, which focused on a promotional campaign to increase the purchase of recycled copy paper and recycled latex paint in state government. For the first quarter of fiscal year 2002 (July to Sept. 2001), Central Stores reported that nearly 90 percent of the copy paper sold to state agencies and local political subdivisions is made from recycled paper, up from just 50 percent at the beginning of the year.

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 also 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.

OEA's web site has been expanded to include information to help local purchasers buy recycled products. The 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.

OEA's outreach efforts include:

- The OEA continues to help to promote environmentally preferable chemicals via the Internet. The web site address for the Carbohydrate Economy Clearinghouse is <http://www.carbohydrateeconomy.org>.
- The OEA helped develop and distribute of the Environmentally Preferable Purchasing (EPP) Guide at conferences, workshops, and presentations throughout the state.
- The OEA also attended nearly a dozen other procurement workshops/conferences throughout the year to promote "green" purchasing at the state and local level.
- The OEA has participated on a Stakeholder Work Group headed up by Scot Case at Center for a New American Dream to develop an environmental standard for industrial and institutional cleaners.
- 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.

Metropolitan Airports Commission – MAC Purchasing Department considers the environmental implications 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 – The Cottage Grove WWTP is being reconstructed into the significantly larger Eagles Point WWTP. For the first time, the capital project design guidelines and guide specifications have been written to include some aspects of sustainability in the awarding of the contract and in the actual project design and construction. Some of the potential aspects of the new building are daylighting, energy-efficient fixtures, heat exchangers, and low volatile organic compounds (VOCs) in building materials and coatings. Other possibilities exist for building design to manage run-off and storm water.

Recycling of paper, metal cans, and clear glass containers occurs at all MCES locations. At the larger facilities, plastic and metal drums, scrap metal, wood pallets, cardboard, and packing materials are reused as much as possible and eventually recycled. A new materials management information system has been installed which has the potential capability for screening purchases for P2 considerations such as environmental and health rankings and recyclability and recycled content material.

Metropolitan Mosquito Control District – The MMCD team responsible for management of hazardous materials and pollution prevention reviews new materials and products intended for use by MMCD 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, the team would recommend that a replacement material or product be purchased that's not a safety concern for MMCD staff or display any environmental hazards.

Department of Military Affairs – In an effort to further reduce the amount of potential hazardous waste, the DMA has adopted the concept of material substitution. This program works by purchasing materials that will accomplish the same desired effect but not have the hazardous waste streams associated with them. This program has helped reduce the cost of hazardous waste disposal.

Minnesota Pollution Control Agency – During the past year, the MPCA has taken steps to reduce emissions and improve the environmental performance of its fleet of 140 vehicles. This includes:

- developing a procurement policy giving preference to flexible fuel vehicles (FFVs). The current fleet of 131 vehicles includes 54 flex fuel and two alternative technology vehicles. The alternative fuel vehicles are a 70-mpg Honda Insight and a Toyota Prius, rated at about 50 mpg.
- instructing staff to use cleaner burning 85 percent ethanol fuel in FFVs when feasible.
- adding two high-efficient, low-emitting hybrid gas/electric vehicles to the fleet.
- tested alternative-fuel vehicles for possible addition to the fleet, including a natural gas-powered Honda Civic and a propane-powered Ford F150 truck.
- working on policies and practices to purchase the most fuel-efficient, least polluting vehicle that meets needs and to keep vehicles well-maintained and using cleaner fuels.

Minnesota State Colleges and Universities

Bemidji State University – BSU offices are encouraged to incorporate waste reduction and pollution prevention into their daily operations. During fiscal year 2002, the Purchasing Office held two office

supply vendor fairs for university departments to make contacts and establish relationships with office supply vendors. Two vendors who specialize in remanufactured toner cartridges were invited each time, 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.

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/year). An environmental benefit should be realized through the reduction of the environmental impacts associated with the manufacture of virgin paper. Remanufactured printing cartridges are available from office supply vendors; recycled content copy and computer printer paper are supplied through Central Stores. Double-sided copying is encouraged throughout campus.

North Hennepin Community College – A variety of aspects are considered when making purchasing decisions here on campus: life expectancy of the product, shelf life for chemicals, number of uses it can be put to, toxicity of chemical used in an expendable product, versatility of the product, and any special disposal requirement. The purchase of paper products containing some amount of recycled material is strongly encouraged.

St. Cloud State University (SCSU) – SCSU uses toilet paper and towels of 100 percent total recycled fiber content and 40 percent, or more, post-consumer fiber content.

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

University of Minnesota – The University of Minnesota Facilities Management has developed a draft of revised construction standards, which include Sustainable Design Requirements and other concepts from the Minnesota Sustainable Design Guide (<http://www.msdcg.umn.edu/2.0RFP-Labs/>). The revised construction standards should be finalized during fiscal year 2003.

The university's current Standards and Procedures for Construction to address energy conservation elements outlined below.

Design objectives

- 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.
- 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.
- 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.
- The responsibility for choosing and incorporating energy-efficient strategies into the design remains that of the design team and the university.
- Include the means to measure the results of the energy-efficient design strategies in all projects.

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.

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.

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.

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 university Waste Abatement Committee has made a concerted effort to bring green building concepts to the university. Facilities Management has agreed to a pilot project that will use a Sustainable Design Guide and Rating System to guide the specifications, bidding, and construction of the university's planned Studio Arts Building. An interdisciplinary team created the Sustainable Design Guide and Rating System for the medical, institutional, and office buildings constructed by Hennepin County, Minnesota. The purpose of this system is to encourage environmentally responsible design practices by rating facility performance in areas like energy efficiency, indoor air quality, and waste management. Hennepin County Property Services and the county's Environmental Management Division worked with a team of university researchers from the College of Architecture and Landscape Architecture and other advisors to develop the system.

The system provides approximately 45 strategies that are organized according to seven environmental topics:

- **Site:** The site-related goals of the system are to maintain and restore the ecology of the site, respond to the microclimate to improve energy efficiency and comfort, to utilize water saving and low-maintenance native plant materials, protect water quality and use biological systems to treat wastewater.
- **Water:** The water-related goals, which focus on building water consumption, are to reduce potable water consumption in the building fixture and the cooling tower design and use graywater systems to reuse water for site irrigation.
- **Energy:** The primary goal is to reduce energy consumption for heating, cooling, lighting, and other equipment and systems. A related goal is to use energy sources that are renewable and that have low environmental impacts (i.e. lower impact on air pollution or global warming).
- **Indoor air quality:** Providing a healthy indoor environment with good air quality is one important goal.
- **Human factors:** Indoor spaces must be appropriately designed to enhance the quality of the thermal, acoustical, and visual environments (including lighting and daylighting).
- **Materials:** Goals of the system are to reduce the consumption of virgin materials especially from nonrenewable sources, and to select materials that are durable, manufactured locally, have low environmental impacts in their manufacturing process, and contribute to a healthy indoor environment.
- **Waste:** Waste-related goals include the reduction and recycling of waste during construction as well as during the operating life of the building. Also, hazardous waste must be reduced and disposed of properly. A strategic design goal of the system is to reduce demolition waste by designing buildings to facilitate building disassembly and adaptability.

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 during each step of the process. Within each strategy are series of actions organized by design phases and a performance indicator for scoring (<http://www.sustainabledesignguide.umn.edu>).

University of Minnesota students craving a caffeine fix on campus will soon have the choice to kick-start their senses of consumer activism and global sustainability as well as their sleep-deprived nervous systems. The Minnesota Student Association forum unanimously approved a resolution requesting that University Dining Services (UDS) offer fair-trade coffee blends in on-campus coffee shops and residence hall cafeterias. Fair-trade for coffee farmers means community development, health, education, and environmental stewardship. The majority of fair-trade growers engage in environmentally friendly practices, such as producing shade grown coffee. Some 85 percent of all fair-trade certified coffee is organic and shade grown. Shade grown coffee is grown in the traditional manner, with coffee plants interspersed under a canopy of trees resulting in a natural balance with the canopy trees providing organic material for the soil, habitat for birds and beneficial insects. Organic coffee is grown without the use of any chemical fertilizers or pesticides and promotes sustainable farming practices resulting in healthier farmers, healthier consumers, and less pollution.

The University of Minnesota is a consumer, and as a consumer it has a lot of power. Students should have a crucial interest in how that buying power is directed. All companies the university currently has contracts with already have at least one fair-trade coffee blend and, for now, their prices will be the same as normal blends. The wholesale cost of fair-trade coffee is approximately \$1 to \$2.50 more per pound than normal coffee. UDS Catering Services will also offer a fair-trade blend at the same price as its other gourmet coffees. UDS will probably abide by decision of the Residence Hall Association student group, which voted to accept the fair-trade blends in residence hall cafeterias. It will likely be available to residence hall students with no rise in meal plan costs.

31. Remanufactured Parts

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

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. A recycling container for spent cartridges is located in the Service Center. In 2002, 35 pounds of toner cartridges were recycled.

Minnesota State Colleges and Universities

Bemidji State University – The maintenance and purchasing departments 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.

North Hennepin Community College – All departments of this college are encouraged to return copier toner cartridges to the manufacturer for reuse. Ink cartridges from NHCC's larger machines are sent in for re-inking and reuse in the duplicating section.

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

32. Tanks

Department of Administration – The Plant Management Division removed all known unused underground fuel storage tanks. Aboveground storage tanks were installed in all but one location.

Department of Corrections

MCF-RC – Rush City's aboveground tanks are all equipped with spill containment.

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

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

Minnesota State Colleges and Universities

Bemidji State University – Removal of a 560-gallon underground gasoline tank serving the BSU boathouse on Lake Bemidji began in late June. The project was completed in July at a cost of \$2,350. Its removal will mitigate potential pollution problems caused by leaks and spills.

BSU plans to test three 30,000-gallon underground heating oil tanks during fiscal year 2003. The testing will assess the tanks' structural integrity and cost approximately \$1,200. Cathodic protection will be installed if warranted by the testing.

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

St. Cloud State University (SCSU) – 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 SCSU's twin #2 fuel oil aboveground storage tanks. Further action is being planned.

Department of Transportation – Salt brine tanks are used to produce and store salt brine. Currently, salt brine production systems are of double-walled fiberglass construction. This greatly reduces the possibility of a

release from the system since fiberglass is resistant to degradation from salt. Mn/DOT fueling systems are composed of double-walled underground or aboveground petroleum tanks and pipes. They are equipped with leak detection, spill prevention, and overfill prevention equipment.

University of Minnesota – The university has reviewed and updated its Spill Prevention Control and Countermeasures (SPCC) plan (for details, visit <http://www.epa.gov/superfund/contacts/sfhotline/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, record keeping, security, personnel training, and tank specifications, address this goal (40 CFR Section 112.7(e)). The second goal is to 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. The third goal of the SPCC plan is to prepare for responding to an oil spill. Facilities who 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 MnTAP.

Department of Corrections – Many facilities use MnTAP as a resource for consultation and testing. St. Cloud alone spent in excess of \$2,000 in fiscal year 2002.

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

ENVIRONMENTAL AND ECONOMIC IMPACT RESULTS

Activity	Waste reduced (lbs)	Air emissions reduced (lbs)	Wastewater pollutant loading reduced (lbs)	Water conserved (gal)	Cost savings (\$)
Site visits			750,580	653,000	\$259,482
Student interns *	151,559	2,370	69,680	7,300,000	406,197
Materials exchange (Alliance)	2,629,664				994,155
Total	2,781,223	2,370	820,260	7,953,000	\$1,659,834

* 2002 plus additional 2000-2001 results

Activity-based goals: Activity-based goals help MnTAP meet its waste reduction and cost savings goals. During 2002, MnTAP has made significant progress toward its goals. Most company contacts begin with a phone call, many are followed by a site visit, then a smaller percentage develop into student intern projects.

MEETING MNTAP ACTIVITY-BASED GOALS

Technical assistance activity	Annual goal	2002 results
Telephone calls	1,200	*1,387
Site visits	150	157
Student interns	6	7
Materials exchange (# exchanges)	140	414
Presentations	50	47

* 25% material exchange calls

Client impact survey. The MnTAP service impact survey was sent to 503 clients in 2002. It received a 49 percent response rate. Feedback from the respondents indicated MnTAP is hitting the mark with its services. For industrial facilities that received MnTAP assistance, the survey indicated:

- 70% reduced or reused waste
- 31% saved money
- 30% are more effectively handling waste materials and are complying with the regulations

RESULTS OF MNTAP ACTIVITIES

For industrial facilities that:	Reduced waste	Saved money
Had MnTAP site visit	60%	48%
Made use of MnTAP facilitated P2 team	76%	65%
Hosted MnTAP Intern	63%	68%
Used MnTAP materials exchange service	50%	39%
Attended MnTAP workshop	58%	46%

Outreach project successes. MnTAP has been involved with outreach projects which have either reduced or have the potential to significantly reduce the environmental impact of an industry in terms of waste reduced and cost savings. Projects with results in 2002 are highlighted below.

- **Hospitals for a Healthy Environment (H2E).** H2E is a joint effort of the American Hospital Association, American Nurses Association, Health Care Without Harm, and the U.S. Environmental Protection Agency (EPA) to improve environmental performance in the healthcare sector. The goals of H2E are to eliminate

mercury-containing waste from the health care waste stream, to reduce the volume of all waste generated, and to minimize the production of persistent, bioaccumulative and toxic (PBT) pollutants.

After three years of work, the H2E effort has produced three key resource documents to eliminate waste from healthcare settings: mercury waste and total waste elimination plans and chemical waste minimization plan.

MnTAP played a major role in development of the Chemical Waste and Total Waste Minimization Plans. During 2001, three workshops were held around the state promoting the use of these resources to take steps to reduce waste, and five more workshops are planned for March and April, 2003. In addition, an outreach effort is ongoing with EPA Region 5 support to use these resources to assist hospitals in their waste reduction efforts. The outreach includes facility-based technical assistance and technology diffusion strategies during 2002-2003.

Outreach to 138 Minnesota hospitals resulted in 16 percent of the hospitals requesting more information on H2E. Six Minnesota healthcare facilities have signed on as H2E Partners, and three have implemented PBT and chemical reduction measures. These have included a mercury-free policy, resource management waste contract, reusable sharps containers, and infectious waste reduction.

Recently, the Hospitals for a Health Environment program honored MnTAP with the Champions for Change Award in recognition of its leadership in promoting pollution prevention programs within the health care field. MnTAP was one of 11 health-related organizations that H2E honored with the Champions for Change Award at the first annual ceremony on April 8, 2002 in Washington, DC. The award recognizes MnTAP for its work to promote pollution prevention in health care facilities and to bring new hospitals into the H2E program. The Champions for Change award is given annually, beginning this year, in recognition for efforts to promote the H2E program among health care facilities.

- ***Pollution prevention assistance tools for the fiberglass reinforced plastics industry.*** MnTAP, working in partnership with the Minnesota Pollution Control Agency, completed an EPA-supported study to assist fiber reinforced plastics (FRP) shops with implementation of pollution prevention strategies. These activities will help fiberglass shops meet or go beyond compliance with Clean Air Act and Occupational Safety and Health Administration requirements. The study demonstrated that fiberglass applicators can reduce styrene emissions through a variety of innovative technologies, including fluid impingement technology (FIT) (styrene reductions of 50 percent) and closed mold (styrene reductions of 90 percent).

The project involved outreach to over 100 shops in Minnesota, including 22 site visits. The highlight of the initiative was FRP Demo Days, an event which combined seminars, resource booths, and technology demonstrations. Over 170 people attended the event, with 50 percent of those being fiberglass fabricators. During the course of the project, five technologies were put into place in three companies, reducing 108,400 pounds of styrene and saving \$119,000.

- ***Paint and Powder Coating Expo.*** The Twin Cities Chapter of the Chemical Coaters Association International and MnTAP at the University of Minnesota, hosted the 5th Minnesota Paint and Powder Coating Expo on Thursday, October 17, 2002. Over 280 attendees turned out to learn about improving the efficiency of industrial finishing operations while maximizing investment returns. The expo included 15 technical seminars, a vendor show featuring 50 exhibits, and a schedule of five different hands-on demonstrations. Expo presentations included topics related to new technologies/processes, powder and liquid coating, cleaning pretreatment, cost savings, waste reduction, environmental issues, water quality and case studies.

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 MAC's tenants is accomplished through phone calls, acting as a regulatory liaison, informational meetings, and providing resources. This support assists the tenants in recognizing and understanding their obligations to the regulatory agencies.

Metropolitan Council - Environmental Services – In its participation with IPPAT, MCES is part of an information network that is very useful in the P2 support offered to public agencies. As a regulatory agency, MCES is active in P2 technical support through the Industrial Waste and Pollution Prevention (IWPP) section, which continues to promote P2 to its more than 800 permitted industrial users. During on-site inspections, IWPP staff regularly discuss P2 issues and point out process areas where P2 would result in waste reduction. Although MCES collects fees based on volumes of wastewater through its Service Availability Charge (SAC), wastewater reduction and cost-savings are encouraged for industrial users. Fees can be reduced based on lower volumes or strengths of discharges. 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 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 item 16 *Heavy Metals*). Along with the OEA, a summary report was distributed to industrial users on chemical impurities in chemicals. Possible contaminants are mercury, arsenic, cadmium, chromium, copper, lead, nickel, zinc, molybdenum, and phosphorous.

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

The IWPPS has participated in national, regional, and local P2 conferences and has cooperated with Wakota CAER (Community Awareness and Emergency Response), North Metro CAER, and the Minnesota Technical Assistance Program in the sharing of information and public displays. 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. The Internet site for the public’s viewing can be found at <http://www.metrocouncil.org/environment/PollutionPrevention/>.

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

In August of 2001, the IWPPS assisted the University of Minnesota in the installation of an advanced filter to treat the wastewater from the university’s dental school. This filter serves 370 chairs in the school.

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

Minnesota State Colleges and Universities

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

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

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

Mn/DOT has developed a waste management procedure manual, which incorporates general waste minimization techniques for each hazardous or problem waste generated. This manual outlines waste management procedures which 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 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/publications/publications.html.

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. Mn/DOT is dedicated 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 to 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 regulations associated with aboveground and underground storage tank systems. Mn/DOT also 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 (<http://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:

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

We are also guided by principles of sustainability—in other words, what can help us meet the 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: to build and strengthen effective relationships among citizens, communities, and their University of Minnesota; to promote active citizen leadership in strengthening the long-term social, economic, and environmental health of greater Minnesota; and to invest in research, education, and outreach projects that advance the understanding and achievement of regional sustainability.

Funded by the Minnesota Legislature through appropriations made in 1997 and 1999, 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 programs coordinated efforts. To date, the Regional Partnerships have funded over 175 projects for a total of \$3 million.

The five regions are also currently collaborating on three major Community/University Ventures. These ventures represent thematic clusters of projects that have emerged from the five regions. The ventures will bring together networks of partners inside and outside of the university to facilitate future program development in three key areas identified by the citizens of the five regions. Our three Community/University Ventures are:

- The 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.
- The 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) 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 the state of Minnesota, the design professions, and the building industry.

CSBR is currently involved in four pertinent Building Design Process and Evaluation research projects:

- **Building Evaluation and Design Assistance:** The Minnesota Department of Natural Resources (DNR) is in the process of designing and building a number of area offices throughout the state. These offices must perform a variety of functions and support the DNR organization in its goals. In recent years, significant new directions for managing the agency have been developed and a few area offices have been built. The purpose of this research project is to provide feedback on projects that have already been constructed and to develop an effective approach to the design of new area office facilities.

The first phase of this project consisted of a post-occupancy evaluation of two existing DNR Area Offices and the development of a guidance document for future design and construction of such facilities. The second phase includes assistance with the programming and design of two new area office facilities based on the lessons learned from past projects. In addition to improving the spatial programming and use of the buildings, this project also provides a process to ensure the sustainability of DNR buildings.

- **State Building Database (BRiDGe - Building Research Data Group):** This project is intended to be a first step in creating a constantly evolving knowledge base for building projects and a feedback loop from actual project experience back to decision makers, owners, designers, researchers, and students. The Minnesota System of Colleges and Universities (MnSCU), the University of Minnesota, and Minnesota state agencies construct and remodel dozens of major facilities every year. There is a need to document these projects in a shared database so agencies can learn from each other's experience and improve on the ways buildings are currently built.

The goal is to provide high performance buildings that represent the best investment of state money over the life cycle of each project. In addition to documenting the building design, the database will include information on the building delivery process, initial and operating costs, sustainable design strategies, improved workplace strategies, successes and failures, and lessons learned. Post-occupancy evaluations (POEs) are being conducted that focus on building energy consumption, occupant satisfaction, design and construction process, sustainable strategies employed, and materials, systems and details. The initial three projects are libraries at St. Cloud State University, Winona State, and the University of Minnesota-Duluth.

- **CSBR is developing a Sustainable Building Design Guide** for the State of Minnesota that will be used on all new state buildings. The guide is 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. The first phase of guideline development is to review existing guideline systems and collect feedback from people with familiarity or experience with sustainable guidelines. In this phase, we are inviting input from people who have used a sustainable building guideline in planning or completing a construction project. Our goal is to collect experiences of the benefits and drawbacks of various systems from the point of view of clients, design professionals, contractors, building users, and others involved in the building process.
- **CSBR** is working with the Greater Minnesota Housing Fund on a pilot project in St. Peter, Minnesota to develop affordable housing that applies sustainable design principles.

The Minnesota AIA Committee on the Environment and the Minnesota chapter of the Construction Specifier's Institute are partners with the Center for Sustainable Building Research in developing the Minnesota Sustainable Building Materials Database (MSBMD). The Internet database will include information gathered from regional sources and projects, presented in a format accessible to both the general public and more sophisticated design and construction professionals seeking information as it relates to performance, cost, and availability of materials, products, systems, and services. Evaluation criteria will be based on life-cycle concepts including extraction, production/manufacture, transportation, installation, use and maintenance, and reuse/disposal. Building development is extremely intense in its use of materials. The building industry uses three billion tons of raw materials annually—40 percent of the total material flow in the global economy. Quarrying materials can obliterate foliage and scar the earth. Using metals and plastic entails either

purification from low-grade ores or heavy chemical processes (Roodman & Lenssen, 1995). Mainly for housing construction, North America, Europe, and Japan consume more than 25 percent of the world's annual 3.5 billion cubic meters of wood production (Worldwatch Institute, 1991).

Waste is generated throughout the life of a building. During building demolition, renovation, and the construction of new buildings, brick, metals, wood, cardboard, and other waste is generated and landfilled. According to the U.S. Environmental Protection Agency, construction and demolition waste represents a quarter to a third of all waste landfilled in the U.S. The construction and demolition waste stream, once thought to total between 30 and 40 millions tons of waste materials annually in the United States, is more likely to total over three times that amount (Yost, 1999). Landfilling construction and demolition waste instead of recycling it is also a waste of material resources.

Awareness throughout the greater construction community has been raised to a level where discussion is taking place regularly on the need to address issues of sustainable design and development. Tools for setting goals and gauging progress have been developed and adopted by communities and corporations. What is lacking are the evaluative tools, specific to regions and localities, that provide explicit information on materials, products, systems, or services to implement the goals and directives.

The Minnesota Sustainable Building Materials Database (MSBMD) will provide resources that promote use of sustainable materials and systems by educating potential users on their costs, availability, and actual in-place experience, enabling potential users to make informed and timely decisions. The database evaluation process will include information on the full life-cycle implications of selected materials, products, and systems, providing users with pertinent information necessary to achieve the goal of reducing the amount and toxicity of waste generated by consumers, business, or a specific community.

The MSBMD will include evaluative information to assist users in making informed decisions that affect procurement. The MSBMD will clearly lay out the criteria used for evaluation of specific materials, products, systems, and services, the process followed, and the results of the evaluation. Understanding this process and the criteria used will enable government, communities, individuals, and businesses to procure more resource efficient, recycled content, and less toxic products, as well as encouraging them to incorporate sustainable guidelines in their RFPs for professional consulting services and pre-qualification of contractors.

As manufacturers, distributors, and investors see the criteria used to evaluate their products—as they are made aware of the use of the MSBMD by business and residential consumers—businesses will better understand their responsibilities as environmental stewards and will move forward to consider and address the human health and environmental impacts of their services, processes, and products. Increased demand for the products and services evaluated in the MSBMD will reinforce the commitment of manufacturers to decrease their use and generation of toxic and hazardous chemicals; to incorporate environmental considerations in product design and manufacture; and to take more responsibility for the environmental impacts associated with the products they develop, manufacture, or sell. The MSBMD can provide a forum, by incorporating feedback from users, that will allow manufacturers to work with government, communities, or citizen-based groups to ensure pollution prevention and the reuse, recycling, or proper disposal of those products.

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.

Research at the 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, and 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.

- **Environmental details:** Sustainable management of Minnesota's forestlands is important for current and future generations. Research conducted at the Cloquet Forestry Center has been used to better understand and manage much of the state's 17 million acres of forests. Extensive research on ruffed grouse and other game and non-game species (e.g., white-tailed deer, woodcock, butterflies) helps demonstrate the dynamic interaction between management activities and forest wildlife populations. Other studies measure the impact of different forest management practices on riparian areas, soils, and air quality.
- **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. The forest products industry alone—producing pulp and paper, reconstituted wood products (such as oriented strand board, laminated veneer lumber, etc.), dimensional lumber, windows, cabinets, and furniture—is an \$8 billion business in Minnesota. Forests also support multi-billion dollar recreation, tourism, hunting, and fishing industries. More and more they are supporting a thriving non-timber forest products industry (e.g., balsam boughs, birch bark, ginseng, mushrooms, etc.). Research conducted at the center is focused on maintaining healthy and productive forests across the state and region that support and enhance these economic activities.

Examples of research with economic benefits include genetic improvement programs that result in increased tree growth rates of 3 to 12 percent, depending on the species. Wood fiber quality improvements are also being studied. Research on timber harvesting activities is working to maximize efficiency while maintaining environmental quality.

- **Quality of life details:** Forests play an integral role, either directly or indirectly, in the lives of most Minnesotans. Increasingly, more and more demands are placed on forests to supply jobs, recreational opportunities, clean air and water, aesthetic beauty, and myriad ecological benefits. Many rural communities in the northern part of the state are dependent on forest for their livelihood, and many urban residents seek forested areas as place for relaxation and renewal.

34. Tires

Department of Administration – The Materials Management Division has developed contracts for tire recovery and for retread tires that use old tire casings. The Travel Management Division, Plant Management Division, Department of Transportation, and other state agencies may purchase from these contracts. The state and CPV members purchased in excess of \$700,000 in retread tires in FY2002. The Travel Management Division's used tires are recycled through a vendor licensed under state contract. 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.

Department of Corrections – Many facilities purchase tires from a vendor who recycles them.

MCF-SHK – Shakopee recycles its tires and will continue to do so in fiscal year 2003.

Iron Range Resources and Rehabilitation Agency (IRRRA) – The IRRRA 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.

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

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

Minnesota State Colleges and Universities

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.

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

Department of Transportation – Mn/DOT recycles all waste tires generated by Mn/DOT as well as the tires that the public has lost along Mn/DOT right-of-way. Mn/DOT recaps a small percentage of waste tires. However, due to the conditions under which Mn/DOT vehicles are operated, i.e. plowing snow, only a limited amount of re-capped tires can be safely used. Mn/DOT has researched the possibility of using ground tires as a base material in highway construction. This material is approved for above water applications. For most Mn/DOT projects, there is not a large enough supply of this material. However for smaller projects, there is a large enough supply. Research articles are available.

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 be improved as a result of this contract.

Department of Corrections

MCF-OPH – Oak Park Heights installed water saving shower heads in two complexes. Electronically timed showers, water saving aerators on sinks, and electronic flush controls on the individual room toilets are being installed in the various complexes. Lower water usage has been reflected in OPH's water use figures over the year. The end result should be a savings of 52 percent from the facility's pre-conservation costs. In addition, the institution is half way through replacing the toilet and sink water control valves in the

individual cells to reduce water usage.

MCF-RC – The 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. The outdoor sprinkler system is on a timer to conserve water. A salt reclaimer has been installed to increase efficiency. The new system is saving this facility 30 percent on salt used or 79,000 pounds per year for water softening.

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 generated. Restrooms in the Lindbergh Terminal are being upgraded with water conserving devices such as water saver urinals and toilets with electronic flush valves and sinks with electronic faucets and aerators. Standards for new construction require these water saving devices. The new Humphrey Terminal and the remodeled MAC General Office were built to these standards.

Metropolitan Council - Environmental Services – The MCES is the division of the Metropolitan Council which 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, 65 lift (pumping) stations, 178 metering stations, and eight treatment plants. Clean effluent is discharged to four area rivers—the Mississippi, Minnesota, St. Croix, and Vermillion. From the metro plant alone, over 74 billion gallons of treated wastewater was 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 2001, a total of 14,933 dry tons from the metro WWTP and 1,796 dry tons from the Seneca WWTP (Eagan, Dakota County) was used.

N-Viro Soil is a program that blends alkaline admixtures—previous “waste” products from lime manufacturing and coal-fired power plants—and biosolids also for use in agricultural and horticultural applications. In 2001, 165 dry tons of biosolids from the Seneca WWTP were blended with admixtures to produce approximately 1,231 wet tons of N-Viro Soil. Straight biosolids—without any blended components—are typically landspread on farm fields. A total of 11,036 tons of heat-dried biosolids and digested biosolids from MCES plants were land-applied in 2001.

Department of Military Affairs – The Camp Ripley wastewater treatment plant continues to reduce pollution and run more economically. Prior to 1995, a chlorine disinfection system was the technology method employed at the facility to control bacteria. This required approximately 500 pounds of chlorine per year. The residual chlorine resulting from this method of disinfection was treated and discharged to the Mississippi River. To meet MPCA standards for discharge, the facility changed the disinfection system to ultraviolet light (UV). UV eliminated the transportation, storage, and handling of dangerous chemicals. UV disinfection adds no chemicals to the wastewater and produces no trihalomethanes.

An effluent recycling pump was added to the waste water treatment plant. The addition of the recycling pump allows for the continuous use of wastewater, eliminating the need to pump fresh water. The plant saves \$1,000 per month on treatment cost. The closed loop wash rack allows complete recycling of wash water used for cleaning. Facilities installing closed loop wash racks attain zero discharge, and therefore eliminate any possibility for NPDES violations or need for a permit. There also is a reduction in the amount of fresh water needed to perform this mission. The MNARNG designed and installed a system at the AASF in 1995, and installed a system in 1997-1998 at the MATES facility in Camp Ripley.

Several storm water improvement projects were completed at the Duluth Air National Guard Base. The POL facility was upgraded to provide secondary containment and treatment of discharged water. The floor drains were rerouted in several buildings to discharge into the sanitary sewer system. The first phase of storm water improvement projects has begun at several Army National Guard facilities throughout the state with the installation of curbed impermeable surfaces with oil/water separators to capture petroleum products. This greatly reduces the potential of hazardous substances entering into local storm water sewers.

Minnesota Pollution Control Agency – The new Brainerd office has leased premises that will feature water conservation fixtures including low-volume flush toilets.

Minnesota State Colleges and Universities

Bemidji State University – Water conservation devices recommended in a fiscal year 2001 energy audit report were implemented this past year. Water-saving faucets and showerheads, and devices for urinal and toilets were installed throughout campus. The cost for the retrofits was approximately \$133,000. The total annual water savings is predicted to be approximately \$55,000. Actual savings will be monitored throughout the upcoming year.

North Hennepin Community College – Plumbing fixtures and supplies with lower gallon per minute ratings are used at this facility whenever possible, depending upon the application requirements. Chemically treated water systems like the college's boiler water, and cooling tower chemical treatment systems, as well as closed loop heating and cooling systems are properly isolated from potable water supply by approved anti-siphon devices.

St. Cloud State University (SCSU) – This past year, SCSU continued to make progress in replacing restroom urinal flushing systems to reduce water use. Payback was about one year. Extensive lead-in-water testing has been completed in the campus houses being used for office space. Results were all well below the action level and most were below 5.0 ug/l. An MnSCU survey resulted in some water conservation improvements.

Department of Transportation – Mn/DOT is using vacuum toilets, waterless urinals, and low-volume sinks to save thousands of gallons of water each day, reducing the size of drain fields needed to dispose of wastewater. Mn/DOT is also developing a waste trap and sediment trap management procedure when disposing of wastewater that will be 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 multidisciplinary 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 Administration – The Plant Management Division composts yard waste when practical. 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 (February 1994) and allows trade-in of Herman Miller System Products. The Materials Management Division has created contracts with MINNCOR for furniture refinishing, reupholstery, and refurbishing.

Department of Corrections – In an attempt to lessen the amount of materials being landfilled, we instituted a food recycling program with Stratton Farms through which food scraps and remains are saved and used to feed pigs in 1998. Approximately 95 tons of food waste is recycled each year in this manner. Additionally, we have lowered our trash pickups over the year to approximately one per month that can be attributed to the food recycling program.

Office of Environmental Assistance – In February 2001 the OEA started an experimental worm bin. The goals 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 two years and we are now tracking how much waste we are able to divert from the trash. In less than one year the worms have devoured over 115 pounds of food. They 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. We have educated many people on the benefits of vermicomposting. Smith and Hawkin, a local gardening store, has asked the office to hold classes on worm composting. Several schools have requested a staff person to speak on worm composting and many have started their own worm bin in the classroom. The bin has become a great education tool. Many schools and composters have been taught the benefits and easy ways of vermicomposting.

Minnesota Pollution Control Agency – Several regional MPCA offices have specific reduction programs in effect, including composting food waste, vermi-composting/leachate used as indoor plant fertilizer in office, using refillable soda bottles, promoting paper reduction initiatives, and employee-driven recycling efforts when a recycling hauling contract is not available.

The MPCA Alliance for Recycling and Reduction Of Waste (ARROW) group is recognized for maintaining an extensive composting project since September of 1999. The project allows all compostable materials to be collected and managed separately from non-compostable refuse. The material list includes cafeteria food waste, napkins, biodegradable utensils, and paper towels from restrooms. In the first eight months of the program, 28 percent of the solid waste generated was composted. The new Brainerd office is recycling all compostable food wastes to a worm farm!

Minnesota State Colleges and Universities

St. Cloud State University (SCSU) – SCSU has recycled nine 55-gallon modules of glassware from the Biology stockroom due to the ongoing initiative of a very supportive faculty member.

Department of Transportation – Mn/DOT has developed a hazard assessment procedure for incorporating waste materials into roadway infrastructure. To date Mn/DOT has approved the use of waste shingles, container glass, and tires (above water) in the infrastructure. Through extensive safety review, Mn/DOT has developed a specification approving the use of all-steel guard rail posts. Steel guard rail posts are recyclable, save installation time, and eliminate the disposal and chemical leaching concerns associate with treated woods.

A multidisciplinary team will be formed to determine the chemical composition of all materials going into a roadway, to determine the fate and transport of these chemicals within the road, beneath the road, and through the road base into the surrounding aquatic and terrestrial environment. 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

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.

The subject of environment encompasses a multitude of scientific and social issues. “Environment” is both a diffuse and powerful word. It signals a broad, major frontier of scholarship, including for example, public health issues, economic valuation of alternative agricultural practices, climate change, the protection of biodiversity, and wise stewardship of our natural resources for multiple uses, conservation, or preservation. Questions addressed range from the influence of synthetic chemicals on public health, to the long-term management of Minnesota’s land and water resources, to the vitality of Minnesota’s economies in the face of environmental change, to habitat conservation for Minnesota’s indigenous plants and animals. These questions and problems require the creative talents of both faculty and administrators, and provide opportunities for new educational efforts as well as basic and applied research.

A modern research university can provide a forum that offers society its best chance for inclusive, rigorous, and deliberative discussion and analysis of the complex environmental issues that confront us. University expertise includes not only the quantitative and qualitative development and assessment of facts, but also the thoughtful contemplation of, and meaningful reflection about, those facts. Universities also communicate the state of our current knowledge to a new generation of teachers, leaders, and decision-makers, a vital activity that is not fulfilled by any other entity.

The University of Minnesota is the premier academic institution in the region. It serves as a nexus for government, industry, academia, and citizens for non-partisan examination and deliberation on important environmental issues and policies. As Minnesota’s only autonomous, public, higher education institution, the university alone has the independence necessary to provide a safe, public forum for the honest analysis of issues and discussion of ideas. As Minnesota’s Land Grant and Sea Grant university the University of Minnesota is bound by a compact with the people of Minnesota to provide information that will improve the quality of life within the state.

The University of Minnesota is also a significant landowner in the state and manages millions of square feet of space for offices, classrooms, laboratories, etc. The university is emerging as a model for environmentally sensitive maintenance, construction, and resource-conserving techniques. Recent construction and remodeling projects have employed sustainable building practices such as the use of recycled paint and greater use of natural lighting. A reuse and recycling program is also in place within the university. The university maintains its landscapes to minimize runoff and erosion while ensuring a high level of bio-diversity.

The university is uniquely positioned to make significant advances toward four essential needs of society in relation to the environment: 1) The University of Minnesota can more broadly educate students in the multiple dimensions of environmental issues, problems, and solutions because of its wide array of colleges and departments involved in environmental and resource management research, education, and outreach. 2) The university's breadth allows a diverse array of expertise to be applied to multidisciplinary environmental issues through its research, teaching, and outreach mission. 3) The university can play a crucial role in bridging communication gaps that seriously impede decision-making efforts by policymakers, business and industry, consumers, and community-based environmental groups. 4) The university can provide society with an example of how to integrate land and building management techniques that minimize our consumption of precious natural resources while ensuring livable communities, strong economies, and ecological viability. In short, the institution can be a laboratory for studying the environmental concepts society needs to embrace.

All of these needs are fundamental roles the university plays in Minnesota society and are already strengths of the university as a whole. Few institutions have the components necessary to pursue a major initiative in environmental science and policy of equal strength and scope.

The commission has developed a set of recommendations that are intended as a starting point for further discussions. Considered as a package, these recommendations could represent a new academic initiative for the University of Minnesota. Such an initiative could enhance and bind together the initiatives already in place at the university. An environmental initiative also would tap the passions many Minnesotans possess for environmental issues, as well as the public's willingness to commit resources to address these issues both in the public and private sectors. At a minimum, these recommendations are a sensible evolution in the university's approach to environmental science and policy given recent actions taken by competing institutions across the country.

Sustainability promotion. University of Minnesota Facilities Management compiled a document (http://www.csbr.umn.edu:16080/umn_sustainability), *Sustainable Efforts at the University of Minnesota: A guide to sustainable efforts and initiatives on the Twin Cities campus*. The University of Minnesota's primary mission is to provide teaching, research, and outreach as the land grant institution for the state of Minnesota. It fulfills these functions very well. Sustainability concepts have been developed and embraced throughout the university for many years. These practices have been called many things and taken many forms. Until this document, no comprehensive listing of university's sustainable practices has existed.

Sustainable Campus Initiative. In 1999, a small group of faculty, staff, and students started the Sustainable Campus Initiative Committee (<http://www.cnr.umn.edu/sci>), an ad hoc committee with a mission to use the campus and its physical facilities as a tool for environmental learning. They are currently working on two pilot projects which will continue through 2001-2002: 1) Restoration of a degraded stream and wetland on the St Paul Campus (<http://www.nwf.org/campusecology/newsletter/watershed.html>); and 2) Develop an environmental performance baseline or ecological footprint for the Twin Cities Campus (see <http://www.bio.psu.edu/Greendestiny/indicators.shtml> and <http://www.nwf.org/campusecology/index.html>). Through continued student involvement and hands-on projects they hope to engage students as active citizens of the university. At the same time, they will increase teaching opportunities and achieve a more environmentally sustainable campus.

Water quality - field drainage research. University research hopes to find ways to plan and manage farm drainage operations in a way that doesn't affect crop yield but does improve water quality. University professor Gary Sands invented a new agriculture drainage calculator that saves users time and headaches through a partnership with Prinsco., Inc., the largest drainage pipe manufacturer in Minnesota. The calculator will help drainage system

designers determine the amount of water needed to be drained in a day based on area size and slope grade. A drainage system is a network of plastic pipes laid beneath the ground's surface to funnel water away from an area. There are millions of feet of drainage pipe in the state, most of it located on southern Minnesota farms. Sands is in the first year of 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. The ideal is if we can find ways to manage farm operations in a way that doesn't affect yield but does that improve water quality. Nitrogen is also the major contributing factor to the spread of hypoxia, oxygen depletion, in the nation's waters. Hypoxia occurs in the Gulf of Mexico, at the mouth of the Mississippi River, where aquatic life is severely compromised because of chemical runoff.

Activity Type	Department of Administration	Department of Agriculture	Department of Commerce	Department of Corrections	Office of Environmental Assistance	Department of Human Services	Iron Range Resources & Rehabilitation	Metropolitan Airports Commission	Met Council – Environmental Services	Met Council – Metro Transit	Metropolitan Mosquito Control	Department of Military Affairs	Minnesota Pollution Control Agency	Department of Transportation (MnDOT)	Board of Water & Soil Resources	Educational Institutions	Bemidji State University	Metropolitan State University	Minnesota West Comm & Tech College	North Hennepin Community College	St. Cloud State	Southeast Technical College	University of Minnesota
Absorbents																							
Ongoing	✓			✓		✓	✓	✓	✓				✓								✓		✓
FY02	✓			✓				✓	✓												✓		
Planned	✓			✓																			
Adhesives																							
Ongoing	✓			✓																✓			
FY02	✓																			✓			
Planned	✓																						
Air Quality, CFCs																							
Ongoing	✓			✓		✓	✓	✓	✓		✓	✓	✓							✓	✓		✓
FY02	✓			✓					✓		✓									✓	✓		
Planned	✓			✓																			
Antifreeze																							
Ongoing	✓			✓		✓	✓	✓	✓		✓	✓	✓							✓	✓		✓
FY02	✓			✓					✓		✓									✓	✓		
Planned	✓			✓																			
Audits																							
Ongoing	✓			✓			✓	✓			✓		✓				✓	✓			✓		✓
FY02	✓			✓			✓	✓			✓						✓	✓			✓		
Planned	✓			✓			✓																
Automotive Fuels																							
Ongoing	✓	✓	✓	✓		✓	✓				✓	✓	✓				✓			✓	✓		✓
FY02	✓		✓								✓	✓	✓				✓			✓	✓		✓
Planned	✓						✓				✓						✓			✓			
Automotive Maintenance																							
Ongoing	✓			✓		✓					✓	✓	✓							✓	✓		✓
FY02	✓			✓							✓	✓	✓							✓	✓		v
Planned	✓			✓																✓			
Batteries																							
Ongoing	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓							✓	✓		✓
FY02	✓		✓	✓	✓			✓	✓		✓									✓	✓		
Planned	✓			✓	✓																✓		
Cleaning supplies																							
Ongoing	✓			✓		✓					✓	✓								✓			✓
FY02	✓			✓							✓									✓			✓
Planned	✓			✓																			✓

Activity Type	Department of Administration	Department of Agriculture	Department of Commerce	Department of Corrections	Office of Environmental Assistance	Department of Human Services	Iron Range Resources & Rehabilitation	Metropolitan Airports Commission	Met Council – Environmental Services	Met Council – Metro Transit	Metropolitan Mosquito Control	Department of Military Affairs	Minnesota Pollution Control Agency	Department of Transportation (MnDOT)	Board of Water & Soil Resources	Educational Institutions	Bemidji State University	Metropolitan State University	Minnesota West Comm & Tech College	North Hennepin Community College	St. Cloud State	Southeast Technical College	University of Minnesota	
Commuting and Transportation																								
Ongoing	✓		✓	✓	✓	✓	✓		✓				✓	✓							✓		✓	
FY02	✓		✓		✓				✓													✓		✓
Planned	✓				✓																			✓
Education, Communication, and Training																								
Ongoing	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓			✓			✓	✓			✓
FY02	✓		✓		✓				✓		✓	✓								✓	✓			✓
Planned	✓				✓						✓													✓
Electronics																								
Ongoing	✓		✓	✓	✓		✓	✓					✓	✓						✓	✓			✓
FY02	✓			✓	✓			✓						✓						✓	✓			
Planned	✓			✓	✓																			
Energy – Lighting																								
Ongoing	✓			✓	✓		✓	✓	✓			✓	✓	✓				✓		✓	✓			✓
FY02	✓			✓	✓			✓	✓			✓					✓	✓		✓	✓			✓
Planned	✓			✓	✓							✓					✓							
Energy – Production																								
Ongoing	✓	✓	✓	✓	✓				✓				✓	✓				✓		✓				✓
FY02	✓		✓	✓	✓				✓									✓		✓				✓
Planned	✓		✓		✓																			✓
Groundwater Wells																								
Ongoing	✓											✓		✓						✓				
FY02	✓											✓								✓				
Planned	✓																							
Heavy Metals																								
Ongoing	✓	✓		✓	✓		✓		✓			✓		✓						✓	✓			✓
FY02	✓			✓	✓				✓			✓								✓	✓			✓
Planned	✓			✓	✓																			
HVAC, Indoor Air Quality																								
Ongoing	✓			✓			✓	✓		✓	✓	✓					✓	✓		✓	✓			✓
FY02	✓			✓				✓		✓	✓						✓	✓		✓	✓			✓
Planned	✓			✓					✓															✓
Ice Control, Sanding																								
Ongoing	✓			✓		✓	✓	✓		✓				✓						✓	✓			✓
FY02	✓			✓					✓					✓			✓			✓	✓			
Planned	✓			✓					✓					✓			✓							

Activity Type	Department of Administration	Department of Agriculture	Department of Commerce	Department of Corrections	Office of Environmental Assistance	Department of Human Services	Iron Range Resources & Rehabilitation	Metropolitan Airports Commission	Met Council – Environmental Services	Met Council – Metro Transit	Metropolitan Mosquito Control	Department of Military Affairs	Minnesota Pollution Control Agency	Department of Transportation (MnDOT)	Board of Water & Soil Resources	Educational Institutions	Bemidji State University	Metropolitan State University	Minnesota West Comm & Tech College	North Hennepin Community College	St. Cloud State	Southeast Technical College	University of Minnesota
Laboratory																							
Ongoing		✓	✓	✓									✓	✓			✓			✓	✓		✓
FY02	✓			✓													✓			✓	✓		
Planned				✓													✓						
Landscaping																							
Ongoing				✓							✓	✓	✓				✓	✓					✓
FY02				✓							✓						✓	✓					✓
Planned				✓																			✓
Materials Exchange																							
Ongoing	✓			✓	✓			✓			✓	✓								✓	✓		✓
FY02	✓			✓	✓			✓			✓									✓	✓		
Planned	✓			✓	✓																		
Office Supplies																							
Ongoing	✓	✓		✓	✓		✓	✓	✓			✓	✓				✓			✓	✓		
FY02	✓			✓	✓			✓	✓											✓	✓		
Planned	✓			✓	✓																		
Oil, Oil Filters																							
Ongoing	✓			✓			✓	✓	✓	✓	✓	✓	✓							✓	✓		✓
FY02	✓			✓				✓	✓	✓	✓	✓								✓	✓		
Planned	✓			✓																			
Paints, Coatings, Stripping																							
Ongoing	✓			✓				✓			✓	✓	✓				✓			✓	✓		✓
FY02	✓			✓							✓						✓			✓	✓		
Planned	✓			✓																			
Parts Cleaning																							
Ongoing	✓			✓			✓	✓	✓		✓		✓							✓			✓
FY02	✓			✓				✓	✓		✓									✓			
Planned	✓			✓				✓															
Personal Care																							
Ongoing						✓																	
FY02																							
Planned																							
Pesticides, Fertilizers																							
Ongoing	✓	✓		✓		✓					✓	✓	✓				✓			✓			✓
FY02	✓			✓							✓	✓								✓			
Planned	✓			✓																			

Activity Type	Department of Administration	Department of Agriculture	Department of Commerce	Department of Corrections	Office of Environmental Assistance	Department of Human Services	Iron Range Resources & Rehabilitation	Metropolitan Airports Commission	Met Council – Environmental Services	Met Council – Metro Transit	Metropolitan Mosquito Control	Department of Military Affairs	Minnesota Pollution Control Agency	Department of Transportation (MnDOT)	Board of Water & Soil Resources	Educational Institutions	Bemidji State University	Metropolitan State University	Minnesota West Comm & Tech College	North Hennepin Community College	St. Cloud State	Southeast Technical College	University of Minnesota
Policy Statement																							
Ongoing	✓	✓	✓	✓	✓		✓	✓		✓	✓		✓				✓			✓		✓	
FY02	✓		✓	✓	✓		✓	✓		✓	✓		✓						✓				
Planned	✓			✓	✓		✓																
Printing																							
Ongoing	✓		✓	✓	✓			✓			✓	✓	✓						✓	✓		✓	
FY02	✓			✓	✓						✓								✓	✓		✓	
Planned	✓				✓																	✓	
Procurement																							
Ongoing	✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓			✓			✓	✓		✓
FY02	✓			✓	✓			✓	✓		✓	✓					✓			✓	✓		✓
Planned	✓			✓	✓																		✓
Remanufactured Parts																							
Ongoing	✓			✓			✓	✓			✓	✓					✓			✓	✓		
FY02	✓			✓							✓									✓	✓		
Planned	✓			✓																			
Tanks																							
Ongoing	✓		✓	✓			✓	✓	✓		✓		✓						✓	✓		✓	
FY02	✓		✓	✓					✓		✓						✓			✓	✓		
Planned	✓			✓													✓						
Technical Support																							
Ongoing	✓		✓	✓	✓		✓	✓	✓		✓		✓						✓	✓		✓	
FY02	✓		✓	✓	✓			✓			✓								✓	✓			
Planned	✓			✓	✓																		
Tires																							
Ongoing	✓			✓			✓	✓			✓		✓						✓	✓			
FY02	✓			✓							✓		✓						✓	✓			
Planned	✓			✓																			
Water Treatment and Conservation																							
Ongoing	✓			✓				✓	✓		✓	✓	✓						✓	✓		✓	
FY02	✓			✓				✓	✓		✓		✓				✓			✓	✓		
Planned	✓			✓																			
Other																							
Ongoing	✓			✓	✓						✓	✓	✓							✓		✓	
FY02	✓			✓	✓						✓									✓		✓	
Planned	✓			✓	✓						✓											✓	