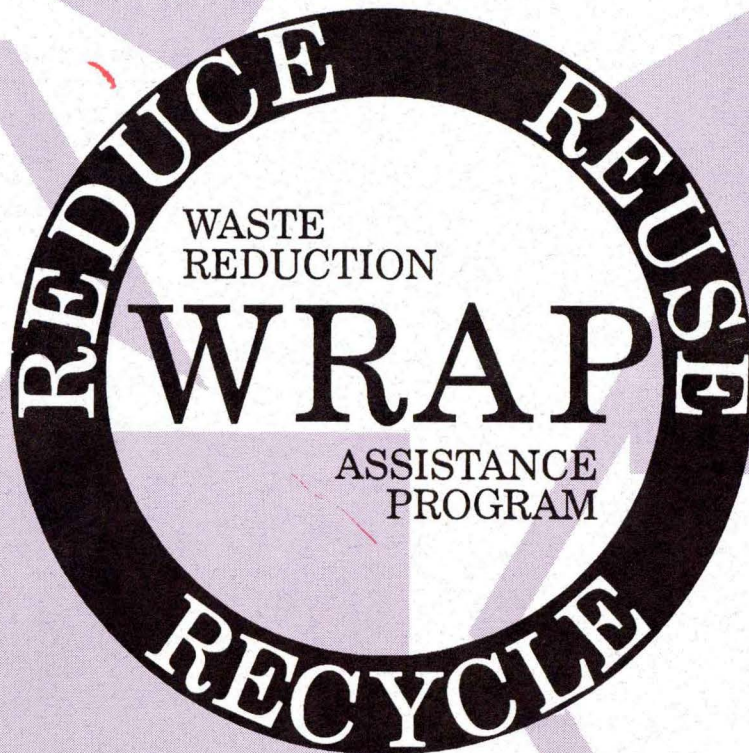


**IOWA CAPITOL COMPLEX:  
DEPARTMENT OF GENERAL SERVICES  
WASTE REDUCTION ASSESSMENT  
REPORT**

Prepared under the  
Waste Reduction Assistance Program  
Administered by  
Waste Management Assistance Division



Iowa Department of Natural Resources



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*June 1997*



REPORT SUMMARY .....	1
BUILDINGS AND GROUNDS OPERATIONS.....	3
<i>Background</i> .....	3
<i>Recommendations</i> .....	3
<i>Implementation</i> .....	5
CENTRALIZED PRINTING/MICROGRAPHICS .....	6
<i>Centralized Printing Background</i> .....	6
<i>Micrographics Background</i> .....	6
<i>Recommendations</i> .....	7
<i>Implementation</i> .....	7
VEHICLE DISPATCH.....	8
<i>Background</i> .....	8
<i>Recommendations</i> .....	8
<i>Implementation</i> .....	9
CUSTODIAL SERVICES- RECYCLING AND SOLID WASTE OPERATIONS.....	10
<i>Background</i> .....	10
<i>Recommendations</i> .....	10
Table: Waste Reduction Opportunity Assessment Summary.....	11
<i>Implementation</i> .....	12
CLEAN OUT YOUR FILES DAY EVENT .....	13
<i>Background</i> .....	13
<i>Results</i> .....	14
<i>Additional Events</i> .....	15
ADDITIONAL ENERGY AND UTILITIES OPPORTUNITIES .....	16
<i>Background</i> .....	16
<i>Recommendations</i> .....	16
Table: Additional Energy Efficiency Opportunities.....	17
<i>Implementation</i> .....	17

## ◆ REPORT SUMMARY

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This report represents the results of five waste reduction opportunity assessments performed in 1995 and 1996 by a team from the Iowa Waste Reduction Assistance Program (WRAP) at the Iowa State Capitol Complex facilities managed by the Department of General Services (DGS). A map of the Capitol Complex is included as Figure 1.

WRAP is a program within the Waste Management Assistance Division-Iowa Department of Natural Resources. WRAP assists business and industry in reducing the amount and toxicity of wastes they generate. WRAP focuses on waste reduction and pollution prevention as a means of benefiting the environment and a company's profitability. The program serves Iowa companies with 100 or more employees or Resource Conservation and Recovery Act (RCRA) large quantity generators. WRAP employs part-time industry professionals that conduct on-site facility assessments to identify waste reduction opportunities.

The assessments discussed in this report are: Building and Grounds Operations, Centralized Printing, Vehicle Dispatch, Recycling and Solid Waste Operations, and Utilities/Energy Opportunities. A summary of the Clean Out Your Files day is included in the Recycling and Solid Waste Operations section.

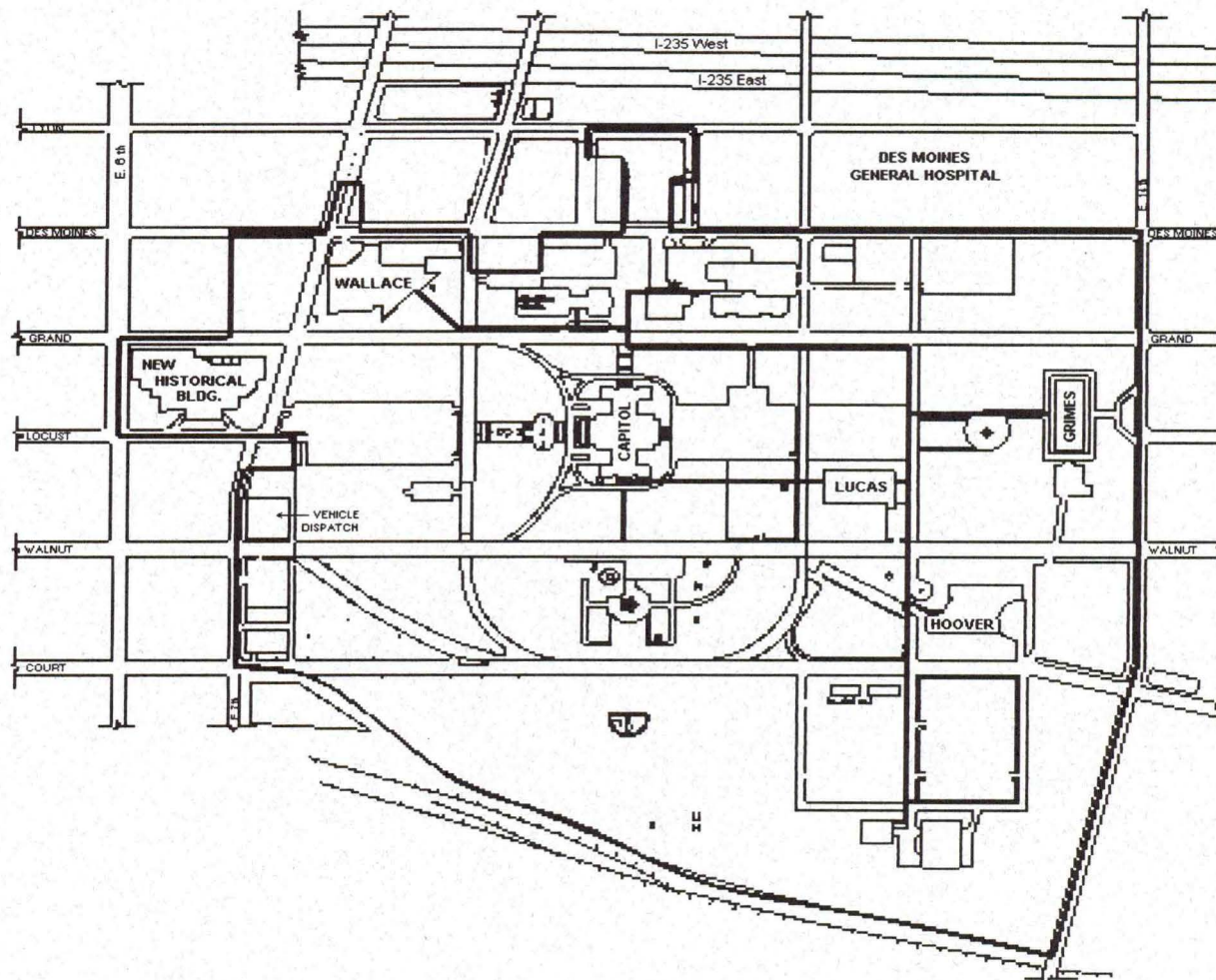
The purpose of these assessments was to identify cost effective opportunities to reduce waste at the source, recycle it more effectively, identify less toxic and hazardous substitute materials where possible, and reduce the cost of managing wastes that cannot yet be cost-effectively reduced or eliminated.

For all assessments, WRAP recommended that DGS implement a pollution prevention program into the existing organizational systems to involve a broader cross section of employees. A self-sustaining pollution prevention program will ensure that the complex continues to minimize waste and negative environmental impacts while increasing the revenue from recycled products and enhancing the complex's public image.

The assessments conducted for DGS identified many opportunities for waste reduction and cost savings. This report contains key recommendations provided by WRAP and implementation DGS conducted at the time this report was printed.



Figure 1 Iowa Capitol Complex



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## ◆ BUILDINGS AND GROUNDS OPERATIONS

### *Background*

The Building and Grounds (B & G) teams' mission is to preserve, maintain and enhance the Capitol Complex buildings and grounds by providing safe, efficient and quality services to its customers. The B & G team consists of 41 employees primarily located in the maintenance building on the Capitol Complex. The primary functions of the team include construction, electrical repair, locksmith services, grounds maintenance, and mechanical maintenance.

The Capitol Complex consists of 180 acres and has 1.9 million square feet of office space located in the nine main buildings within the complex. These buildings include: Capitol, Iowa Workforce Development, Grimes, Hoover, Lucas, New Historical, Old Historical, Vocational Rehabilitation, and Wallace.

### *Recommendations*

#### **Chlorofluorocarbons (CFCs)**

- ⇒ Purchase CFC recovery and recycling equipment to allow in-house servicing of air conditioner and other CFC compressors. This will help to ensure proper handling of CFCs and result in significant maintenance contract cost savings.
- ⇒ Begin planning for a CFC-free future in complex HVAC and chilling equipment.

#### **General Waste Management**

- ⇒ Confirm Conditionally Exempt Small Quantity Hazardous Waste Generator status to facilitate utilizing the Regional Collection Center for diversion and disposal of hazardous materials where appropriate. This may result in a cost savings as well as potentially diverting wastes to beneficial reuses.
- ⇒ Insist that all contractors and vendors be responsible for removing their wastes from the complex and ensure that they manage them in a responsible manner. Incorporate language into contracts with these outside companies.
- ⇒ Increase the segregation of recyclable materials from general trash. This should substantially increase revenue for the recycling program in addition to reducing landfill costs.
- ⇒ Work to find suitable less toxic materials whenever possible in B & G operations.

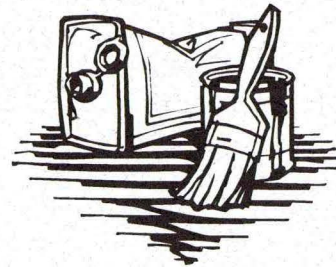


## Landscaping

- ⇒ Develop a long-range “natural” overall Complex landscaping plan to minimize the use of chemicals, synthetic fertilizers and pesticides and to minimize the disruption of established flora. Purchase new equipment suitable for more natural grounds management whenever possible.

## Paint

- ⇒ Specify acceptable paint producers/suppliers to outside contractors when they are doing Capitol Complex jobs. This will reduce paint wasted by color matching problems.
- ⇒ Minimize the use of oil-based paints to reduce the need for paint disposal, reduce the need for cleaning solvents, and minimize the air emissions of volatile organic compounds.
- ⇒ Provide training in minimizing and managing paint wastes.
- ⇒ Minimize the use of aerosols to reduce supply costs, minimize the emissions of propellants and reduce disposal costs.



## Parts Washers

- ⇒ Evaluate the potential for alternatives to petroleum-based cleaning solvents in parts washers. Consider filtering or in-house recovery to maximize solvent life and minimize wastes.

## Utilities

- ⇒ Implement a program to evaluate the “motion switches” on facility lighting. The frequent on/off cycles of certain fluorescent and high intensity lights shortens equipment life. The potential savings is at least \$2,800 per year.
- ⇒ Replace emergency lights with units utilizing less expensive batteries whenever possible. The potential savings are estimated at \$1,500 per year.

## ***Implementation***

Since the time of the assessment one 600 ton electric CFC-free chiller has been installed to replace an old 120 ton gas powered air conditioning unit. DGS policy is to turn the new (most efficient) chiller on first and turn the remaining old chillers on as demand requires. Installing the 600 ton unit has resulted in replacing the 120 ton unit and has reduced the need to use several other older units, as well. DGS has seen a dramatic decrease in gas usage after this installation and no significant increase in electrical usage.

Contract documents now require waste responsibility by the outside contractor. The contract language also dictates that the waste be handled and disposed of in accordance with all applicable regulations. An example is the Old Historical and Lucas restoration projects. Buildings and Grounds hired an environmental consultant to ensure contractors removed and disposed of lead and asbestos containing materials properly.

To decrease the number of hazardous materials used, Building and Grounds is switching from the use of enamel paints to latex paints wherever possible. In addition, the use of aerosol cans has been reduced by implementing a policy to paint with a brush whenever possible.



## ◆ CENTRALIZED PRINTING/MICROGRAPHICS

### ***Centralized Printing Background***

The Centralized Printing/Records Management Department (Centralized Printing) is located in the Grimes Building of the State Capitol Complex. This operation occupies one room (6000 sq. ft.) plus a storage room. There are 17 employees working one full-day shift and a partial second shift.

Approximately 17% of the printing workload is conducted in-house to meet quick "turn-around" requests. 83% of the printing workload is outsourced to local printers, particularly if color printing is involved. All printing orders (in-house and outsourced) are processed by the Centralized Printing office.

The graphic art area in Centralized Printing currently uses film and digital paper for operations. Some digitized operations, compatible with both Mac and IBM computers, are being used and expansion of this equipment is planned.

Just-in-time printing is the preferred method in Centralized Printing. The predominate type of work is letterhead material, envelopes, and bulletins. Printing equipment consists of three high speed Xerox copiers, six offset presses, binding equipment, and plate-making equipment.

To provide ease of access and response to various high volume clients among state agencies there are seven satellite printing locations. Four of these satellite locations are connected to Centralized Printing by computer and send information electronically.

### ***Micrographics Background***

The function of the Micrographic section is to produce image documents to various formats and to duplicate various microfilm formats for all state agencies that send paper documents to micrographics for this purpose.

Kodak rotary cameras are used. Some of these machines are 28 years old. They require one-at-a-time insertion. Coke Processors have been contracted since 1995 to develop all 16 and 35 mm roll film. This outsourcing eliminates the chemical intensive process formerly used by Micrographics. The process is underway to change from microfiche to CD-ROM digital set-up. This will allow 40 documents per minute to be created. The only chemical used in micrographics at this time is copier lubricant.



## **Recommendations**

### **Electronic Imaging**

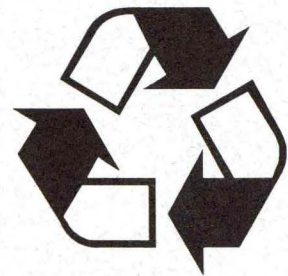
- ⇒ Investigate obtaining a Landfill Alternatives Financial Assistance Program loan or grant for electronic imaging. Electronic imaging would reduce paper waste, decrease paper purchasing costs and decrease the amount of storage space.

### **Material Substitution**

- ⇒ Investigate less hazardous blanket wash and fountain solution.
- ⇒ Investigate potential for using substitutions for silver halide film.
- ⇒ Find safer alternatives for isopropyl cleaners on duplicating machines, Eradicator, and Film Kleen\* products.

### **Recycling**

- ⇒ Establish a plastic bottle recycling program.
- ⇒ Recycle developed film.
- ⇒ Investigate local recyclers of silver film and polycarbonate film.
- ⇒ Investigate local recyclers of black spool and storage containers.
- ⇒ Talk with Coke Processors\* about returning film on black Kodak\* spools.
- ⇒ Rather than mixing all the waste film types (undeveloped silver film, developed silver film, and diazo film) segregate them as part of the process for disposal (recycling).
- ⇒ Use an Iowa Waste Exchange representative to assist in locating markets for potential recyclables.



### **Implementation**

The micrographics section began electronic imaging in April 1997. The process has not been in place long enough to calculate waste reduction. They are planning to purchase an additional station so that two employees can be converting files through electronic imaging.

Micrographics has investigated the silver film and polycarbonate film recycling and it has determined that it is not an economically feasible option. They are continuing their efforts to begin recycling black spools and storage containers. In addition, they are still investigating safer alternatives to silver halide film.



## ◆ VEHICLE DISPATCH

### *Background*

The Vehicle Dispatch/Maintenance Department (Vehicle Dispatch) operation is located at 301 E. 7th Street in Des Moines. It is a rectangular room occupying about 3,000 sq. ft. with areas dedicated to washing, lubrication, tire/wheel maintenance, and general maintenance such as air conditioning, motor and transmission repairs. There are five office and eleven shop employees.

The facility is responsible for maintaining up to 200 state-owned vehicles. No body work is conducted on site. Vehicles are replaced after 92,000 miles or four years. Fifteen to 45 cars are serviced per day.

The department is operated to obtain the best automobile maintenance program, including automobile procurement, for the money spent. Examples of this program's services include:

<b>Service Description</b>	<b>Current Annual Economic Benefit</b>
Order vehicles factory direct	<b>\$200,000</b>
Obtain reimbursement for new car preparation	<b>\$26,000</b>
Review costs for questionable outside repair	<b>\$35,000</b>
Outsource small, inexpensive jobs	undocumented/substantial
Support preventive maintenance program	very high resale value
Add on extras in-house (e.g. winches)	<b>\$100,800</b>
Provide computer CRT for repair procedures	<b>\$11,000</b>
Cannibalize power trains from wrecks	undocumented/substantial
Certify mechanics by dealership for in-warranty work	undocumented/substantial
Participate in test programs with major auto manufacturers - results in no-cost parts	undocumented/substantial
Manage auctions of all state owned cars	undocumented/substantial
<b>Total Economic Benefit</b>	<b>\$372,800</b>

The above projects represent model projects that can be used by other vehicle dispatch facilities.

### *Recommendations*

#### **General Waste Management**

- ⇒ Designate an individual to oversee all waste management activities and communicate progress to all other staff.



- ⇒ Document the cost savings of the special projects already in place. These projects are noteworthy and could help provide information exchange and incentives for other vehicle dispatch operations in the state.
- ⇒ Have a housekeeping program to ensure that the pit sludge test results never produce hazardous waste.

### **Purchasing**

- ⇒ Purchase as many products in bulk as possible.
- ⇒ Eliminate the use of aerosol cans by purchasing paint in bulk.

### **Recycling**

- ⇒ Designate a recycling container for cardboard.
- ⇒ Consider recycling additional commodities such as oil filters, plastic, colored paper.
- ⇒ Improve recyclable segregation, reducing the waste going to the landfill by 50 percent.

### **Utilities**

- ⇒ Investigate and control loss of heat through vehicle exhaust ducts and fresh air vents.
- ⇒ Audit #1 Service meter to verify readings and charges.
- ⇒ Review lighting, enhance visibility with white paint.

### **Implementation**

Vehicle Dispatch has increased their waste segregation to include computer paper, office paper and cardboard. This resulted in adding a third dumpster for cardboard. In addition, they have started to recycle oil filters and plastic bottles. As a result of these changes, Vehicle Dispatch has reduced their trash pick-up from twice per week to once per week.

Vehicle Dispatch has given the person in charge of ordering parts the additional responsibility of reducing waste. They have begun to purchase oil in bulk which is saving them \$4,200/ yr. The savings came from a better purchase price and the elimination of drum deposits. To decrease the use of aerosol cans and other hazardous materials, they are increasing the use of off-site contractors for vehicle body work.

In the area of utilities, they installed separate switches for the lighting and the HVAC system. The separate switches have improved their control of heat loss, because the HVAC system does not have to be on when the lights are on. The installation of separate switches has decreased their electrical usage 15% as compared to the previous year. In addition, the lights in the shop area have been changed to more energy efficient bulbs.



## ◆ CUSTODIAL SERVICES- RECYCLING AND SOLID WASTE OPERATIONS

### ***Background***

The Capitol Complex Recycling Program was implemented in 1989 as a joint project between the Departments of General Services and Natural Resources. Office paper and cardboard recycling are available in all Capitol Complex buildings. In addition to paper products, some buildings collect the following materials for recycling or reuse: aluminum cans, computer diskettes, computer manuals, metal, office supplies (including furniture), pallets, plastic containers, toner cartridges, and yard waste. In 1994, over 45 percent of the non-hazardous solid wastes generated by the complex were diverted to recycling and reuse programs.

### ***Recommendations***

WRAP suggests that DGS first implement a program to identify, quantify and characterize all waste streams. "Mass balance" techniques and revisions to accounting to relate waste more directly to production steps and costs may prove useful. This will serve as a starting point for further defining optimum dispositions and establishing priorities for reduction.

The following table presents a summary of key findings and recommendations by WRAP to improve recycling efficiency, provide additional recycling revenue and reduce wastes at the source.



**Waste Reduction Opportunity Assessment Summary**

Unit Operation	P2 Action/Waste Reduction Benefit	Cost	Financial Benefit	Payback Period
Improve segregation and baling of mixed paper	Initiate mixed paper baling program to <b>improve sale value</b> (494 current tons). Better <b>segregation of trash to recycle</b> all mixed paper (150 additional tons)	\$8,000 for baler (one-time cost)	\$73,159/year based on added value of \$46,930 plus \$3,729 avoided landfill costs and \$22,500 revenue for additional material	2 months
Separation of computer paper from white paper	Locate additional collection containers at key locations to encourage <b>separation of computer paper from white paper.</b>	\$500 for containers (one-time cost)	\$15,420/year based on added value. 50% (by weight) of white paper has greater value as computer paper.	Immediate
Addition of trash compactors	<b>Provide</b> vendor <b>compactors</b> at key building locations. <b>Reduce trips</b> to landfill and improve control. <b>Eliminate</b> need for some <b>garbage liners.</b>	\$68,355/yr. for five compactors	\$126,000/year: \$56,000 for reduced personnel trip time; \$20,000 for vehicle replacement and maintenance; \$50,000 for garbage liners.	Immediate.
Use double-sided copying	Encourage employees to <b>use double-sided copying</b> when printing.	\$100,000 to \$200,000 for new equipment (one-time cost)	\$100,000/year in paper purchasing costs.	Immediate.
Replace restroom paper towel dispensers with electric hand dryers or roll cloth	<b>Purchase electric hand dryers</b> or roll cloth machines.	\$500/ dryer (one-time cost)	Reduced custodial time and avoided landfill costs. \$14,000/yr. plus reduced maintenance	
Improve employee awareness and participation	Provide <b>visual displays</b> in each department. Use department recycling coordinator to produce display of recyclables and non-recyclables. (150 tons of additional paper and 73 tons of additional cardboard).	-0-	\$16,349/year: \$10,805 in revenue from additional mixed paper and cardboard (loose) and \$5,544 in avoided landfill costs. (Savings already included in cardboard and mixed paper recycling options at top of table).	Immediate.
Governor's Incentive Program	<b>Improve participation</b> by state employees.	-0-	Increased revenue from improvement of quantity of recycled paper to sell and avoided landfill costs. Savings included in previous Item.	Immediate.
Explore having solid waste to landfill presently handled by DGS bid out on contract basis.	<b>Employ</b> the <b>expertise</b> of local solid waste disposal systems <b>with integrated recycling</b> programs. This would allow for vehicle maintenance elimination and increased personnel hours for other activities.	Explore by request of bids	DGS moved forward on this recommendation and realized a savings of 60% of their waste disposal costs and improved recycling programs.	Less than one year.
Create a position to coordinate all waste reduction and recycling efforts for the complex.	The programs implemented and information gathered would be useful to many other state and federal facilities in Iowa. The information would also be <b>useful to private business and industry.</b>	Salary/Expenses \$47,000	All projects implemented would be documented for cost savings.	We would anticipate annual payback on investment.



## ***Implementation***

In June 1996, DGS outsourced solid waste and recyclable materials to Artistic Solid Waste System, Inc. of Des Moines, Iowa. By outsourcing this operation, DGS estimates that solid waste and recycling transportation costs have been reduced by 60%. Weyerhaeuser Recycling of Des Moines handles the processing of recyclables, which is contracted out on a competitive basis.

As a result of the WRAP assessment, DGS contracted to hire a full-time Recycling Coordinator for the Capitol Complex. Doug Reed started his position with DGS in November 1996. The WMAD Landfill Alternatives Financial Assistance (LAFA) program will fund the bulk of the position costs for the first year. Recycling revenues will help fund the position in subsequent years.

The WRAP assessment has stimulated the investigation of an education program stressing the use of two sided printing and copying, a study on the cost effectiveness of sorting mixed office paper for a higher value, baling mixed office to lower collection costs, construction and demolition (C & D) recycling, reuse and recycling of hard bound law code books, a food waste pilot program, sharing recycling technology with other state offices throughout the state, a pollution prevention program, and working with the purchasing department on buying recycled products.

Following the WRAP recommendation to identify, quantify and characterize all waste streams, DGS held it's first waste and recycling sort in January of 1997. More waste sorts are planned for the future to educate custodial personnel, assess the impact of existing programs and guide DGS future plans.

DGS is in the process of installing electric hand dryers in selected Capitol Complex buildings. An education program is in place for office workers via restroom signs and department newsletters. Customer Service is tracking user satisfaction and complaints. Doug Reed leads this effort, which is also funded through the LAFA program.

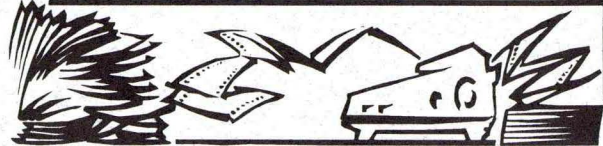
DGS expended over \$4,800 in fiscal '96-97 on recycling containers for state office workers and plans to continue these expenditures as budgets allow.



## ◆ CLEAN OUT YOUR FILES DAY EVENT

### **Background**

During the WRAP assessment conducted in 1995, it was determined that despite an established recycling program started by DGS and DNR in 1989, approximately 30% of the complex's landfilled waste consisted of recyclable paper. Education of individual employees is a key factor in maintaining a successful recycling program. By dedicating one day to focus on office paper recycling, DGS and DNR reminded employees of the program and decreased the amount of recyclable paper going to the landfill. By recycling, the State saves \$30/ton in landfill tipping fees and receives revenue for recycled materials.



WMAD staff was introduced to the concept of an organizational paper clean-out day by Darrel Brothersen of Rockwell International in Cedar Rapids. Darrel is an active board member of the Iowa Recycling Association and presented Rockwell's clean-out event success at the National Recycling Coalition Congress in Kansas City last fall. The National Office Paper Recycling Project encourages public and private sector organizations to sponsor "Recycling at Work/Clean-Out-Your-Files Day" to promote office paper recycling efforts.

### **Pilot Study**

A pilot study was conducted on February 16, 1996 from 8:00 a.m. - noon on 5th Floor West, Wallace Building (where WMAD offices are located). WMAD staff met with DGS custodial staff prior to the event to coordinate activities. The pilot study was used to evaluate collection and transportation logistics and to measure amounts of materials collected per employee office. An average of 16 pounds of mixed office paper per person was collected during the pilot study. Findings from the pilot study were used to further plan for the larger event in April 1996.

### **Clean Out Your Files Day Event**

The Clean-Out-Your-Files Day was held on Tuesday, April 23, 1996, from 8:00 a.m. - 1:00 p.m. during Earth Week. Approximately 4,600 employees in the following buildings were invited to participate: Capitol, Iowa Workforce Development, Grimes, Hoover, Lucas, Vocational Rehabilitation, and Wallace. Planning for the event was conducted on a building-by-building basis by custodial staff and agency recycling coordinators. Mixed office paper, computer paper (green bar), cardboard, and computer materials were collected in all seven buildings. Some surplus items were collected and handled by building custodial staff for internal reuse.

Lieutenant Governor Joy Corning toured two of the participating buildings to show the Governor's office support for the event.



### Governor's Kick-Off Event

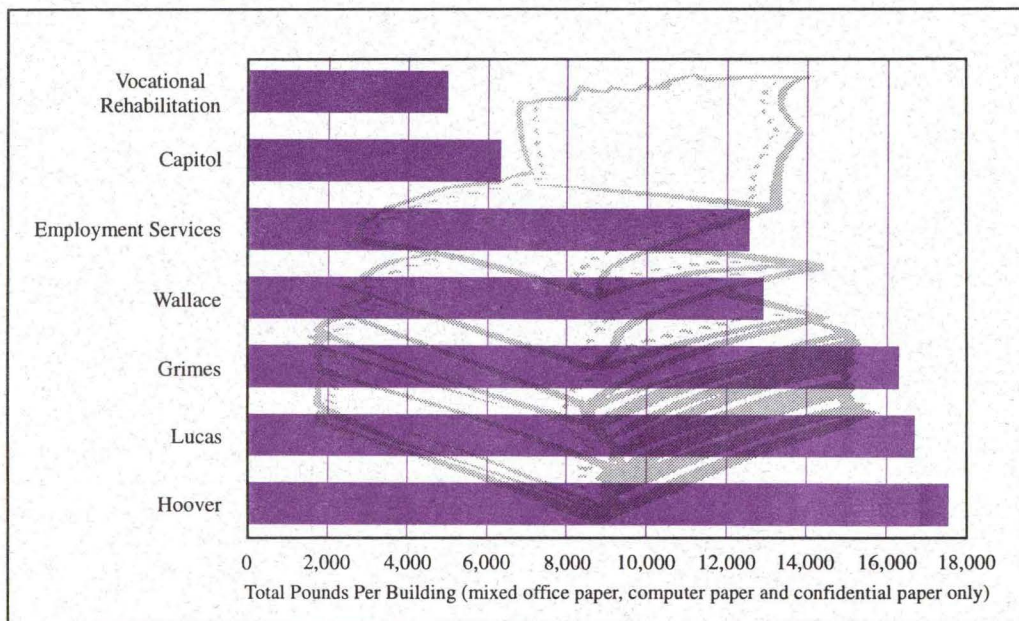
On Wednesday, April 24, 1996, Governor Terry Branstad shared recycling collection results with state employees and issued a challenge to Iowa business and industry to recycle at work during 1996. The building collecting the most recyclable materials was presented with a recycled plastic picnic table. Representatives from Artistic Solid Waste (waste and recyclable hauler), Metro Waste Authority (local solid waste planning agency), Rockwell International, and Weyerhaeuser Recycling (recycling processor) participated in the Governor's event.

### Results

A total of 46.5 tons of recyclable materials (20.20 lb./employee) were collected and recycled during the five hour April 23, 1996 event. The breakdown of results is as follows:

- 87,263 pounds of mixed office paper (including computer and confidential)
- 2,000 pounds of corrugated cardboard
- 3,679 pounds of computer materials

### 1996 Capitol Complex COYF Results



On an average day, approximately 0.5 lb. of paper per employee is collected for recycling. Approximately 2 tons of mixed office paper per day is collected on the Capitol Complex (not including computer paper and confidential paper).



### ***Additional Events***

DNR-DGS held a second Clean Out Your Files day on April 22, 1997. To show support, Governor Branstad participated in a surprise walk through tour of Grimes State Office Building on April 22 nd, and the Governor's Award and Recognition ceremony on April 23 rd. The Capitol Complex recycled 54.4 tons of mixed paper and cardboard. DGS plans to continue with an annual Clean Out Your Files Day. DNR plans to promote Clean Out Your Files Day to Iowa business and industry during the next fiscal year.



## ◆ ADDITIONAL ENERGY AND UTILITIES OPPORTUNITIES

### *Background*

DGS has been actively engaged in utility efficiency and associated cost savings since the early 1980's with considerable success. Between 1982 and 1995, DGS saved over \$675,000 in utility costs by reducing electric consumption by 4,541,332 kilowatts (KwH), natural gas by 50,066 metric cubic feet (MCF) and water by 1,888,166 cubic feet. DGS has additional projects planned with the potential to save \$126,515.

DGS has had a long relationship with the Energy Bureau of the DNR. In 1986, a technical engineering analysis was completed for the Capitol Complex through the State of Iowa Facilities Improvement Corporation (SIFIC) Energy Bank Program. The purpose of the study, completed by Viron Corporation, was to identify all opportunities for energy management improvements with an aggregate payback of six years or less. A summary of the study follows:

- ⇒ Reviewed 23 energy management improvements (EMIs) and recommended 18 EMIs for implementation.
- ⇒ Resulted in 14 implemented EMIs: total installed cost of \$701,066; estimated annual savings of \$137,064 through 1,515,556 KwH decrease in electric use and 25,646 MCF decrease in natural gas use.
- ⇒ Disabled EMI, oxygen trim units for boilers number 1 & 2, due to lack of sufficient maintenance funding, resulting in the loss of \$4,541 in potential annual energy savings.
- ⇒ Monitored utility data for the meters affected by the EMI and documented cumulative savings totaling \$977,397 since the implementation of these EMIs.

### *Recommendations*

DGS needs to be allowed to replace the present "deferred maintenance" culture, which has been imposed upon the Department, with a culture governed more by "preventive maintenance", "life cycle analysis" and "systems planning." This change will have a greater impact on overall energy savings than any combination of retrofitting. Retrofitting provides a "quick fix" through short term incentives.

WRAP identified additional energy efficiency opportunities in electric, natural gas and water uses that can save DGS **\$242,000** annually. In many cases, WRAP is confirming plans or proposals already being considered by DGS. The recommendations and potential savings are as follows:



### Additional Energy Efficiency Opportunities

Project Recommendation	Potential Annual Economic Benefit
<b>Electrical</b>	
Upgrade applicable incandescent lamps to T-8	\$4,968
Upgrade remaining mercury vapor lamps to HID	543
Upgrade fluorescent lamps to T-8	58,154
De-lamp taking advantage of T-8 technology	51,005
Upgrade old cooling equipment to high efficiency	33,754
Upgrade air handling motors to premium efficiency	9,459
Install VFD on air handling equipment	23,648
Upgrade motors to premium efficiency on cooling	3,149
Convert electric water heaters to gas	2,337
<b>Natural Gas</b>	
Reinstall O <sub>2</sub> trim on boilers on heat system	4,541
Operate boilers at optimum combustion efficiency	24,324
Optimize temperature rise in pass-through coolers	13,400
<b>Water</b>	
Install flow reducers on all toilets	12,735
<b>Total potential annual savings</b>	<b>\$242,012</b>

### *Implementation*

DGS has begun the request for proposal process to replace existing fluorescents with T-8 fluorescent lamps for the Hoover and Wallace buildings. In addition, several buildings have de-lamping in place.

In October 1996 O<sub>2</sub> trim was reinstalled on the boilers of the heat system. The installation will increase the boiler operation to optimum combustion efficiency.

In addition, DGS is still investigating flow reducers for all toilets and they plan to install VFD air handling equipment as remodeling occurs.



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