

**MINNESOTA DEPARTMENT OF ADMINISTRATION  
RECYCLING PROGRAM OPERATIONAL REVIEW  
PHASE 2 ASSESSMENT**

**Submitted to:**

Minnesota Office of Environmental Assistance  
520 Lafayette Road North  
Second Floor  
St. Paul, Minnesota 55155

**Submitted by:**

Tim Goodman & Associates  
2337 Texas Avenue South  
St. Louis Park, Minnesota 55426



August 26, 2003

## **TABLE OF CONTENTS**

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>PHASE 1 REPORT SUMMARY .....</b>	<b>1</b>
<b>3.0</b>	<b>DESCRIPTION OF THE RESOURCE RECOVERY OFFICE RECYCLING PROGRAM .....</b>	<b>2</b>
<b>4.0</b>	<b>COMPARISON TO SIMILAR PROGRAMS .....</b>	<b>3</b>
<b>5.0</b>	<b>EXISTING PROGRAM ASSESSMENT .....</b>	<b>5</b>
	<b>5.1 INTRODUCTORY COMMENT ON EXISTING PROGRAM ASSESSMENT .....</b>	<b>5</b>
	<b>5.2 OPERATIONAL ANALYSIS .....</b>	<b>5</b>
	<b>5.2.1 Collection of Materials .....</b>	<b>5</b>
	<b>5.2.2 Consolidation and Preparation of Materials.....</b>	<b>9</b>
	<b>5.3 MATERIALS MARKETING/REVENUE ANALYSIS .....</b>	<b>13</b>
	<b>5.3.1 Revenue Maximization .....</b>	<b>13</b>
	<b>5.3.2 Revenue Credit.....</b>	<b>16</b>
	<b>5.4 PROGRAM MANAGEMENT AND STAFFING .....</b>	<b>17</b>
<b>6.0</b>	<b>CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>18</b>
 <b>APPENDIX A: PHASE 1 REPORT ON DEPARTMENT OF ADMINISTRATION'S RESOURCE RECOVERY OPERATION</b>		
 <b>APPENDIX B: RESOURCE RECOVERY SERVICE DELIVERY PROGRAM MODIFICATIONS AND RESULTS - JULY 2002 THRU JUNE 2003</b>		

## **1.0 INTRODUCTION**

The Minnesota Department of Administration (Admin), through its' Resource Recovery Office (RRO) operates a recycling program for state offices within the Minneapolis/St. Paul metropolitan area. This program consists of a collection component using both labor and trucks from Admin as well as a centralized consolidation facility where materials are prepared for shipment to market. As a result of state-mandated budget reductions, all State of Minnesota departments, including Admin, were asked to make adjustments in their operating budgets for FY 02. The RRO's FY 02 general fund base budget was significantly reduced by \$140,000, resulting in the loss of two full-time positions at the State Recycling Center (SRC), comprising 1/3 of the labor staff and 10 hours/week of purchased trucking services for customers. RRO implemented the mandated budget adjustment by reducing costs while continuing to maximize recycling revenues deposited in the state's General Fund, focusing on recyclables that generate the greatest revenues. To achieve this cost reduction initiative the RRO recommended discontinuing the collection of commingled food and beverage containers from all locations and fibers from some locations served by the RRO.

At the beginning of FY 03, Admin entered into discussions with the Minnesota Office of Environmental Assistance (OEA) to work with the RRO to explore ways to reinstate full recycling services for all existing locations served by the RRO within existing budget constraints. It was agreed that a comprehensive assessment of the RRO's operation was to be conducted and that this assessment needed to be completed in two phases. Phase 1 involved conducting an immediate general assessment in order to provide enough short-term efficiency improvements to allow for the continuation of the RRO's collection of both fibers and commingled containers from all locations currently served by the RRO within the modified budget restrictions. Phase 2, to be completed at a later date, was to provide further assessment of the RRO's program to identify long-term efficiency improvements and associated changes that could be made to the program.

The Phase 1 efficiency assessment (Appendix A) was completed in the July of 2002 and succeeded in identifying operational improvements for the continuation of the current program service levels. Most of the recommended efficiency improvements were implemented by the RRO and are documented in the RRO report entitled "Service Delivery Program Modifications and Results" (Appendix B). The Phase 2 assessment began in the fall of 2002 and was completed in early 2003, culminating in this report.

## **2.0 PHASE 1 REPORT SUMMARY**

As noted above, the Phase 1 efficiency assessment was to be an immediate program evaluation designed to find enough efficiency improvements to allow the program to continue at its existing service level under anticipated budget reductions. The assessment was done in the course of a week and involved spending approximately a day and a half at the SRC observing operations and talking with program staff. The RRO refers to this facility as a consolidation facility as on-site processing of materials is limited. During the on-site visit some time was spent on the collection routes to observe first hand how the collection of materials from state office buildings was conducted. A variety of program data and written information was also obtained and reviewed.

In conducting the assessment and preparing the report three general areas of program operations were addressed – materials collection, materials preparation, and delivery of materials to market. Each of these areas was examined to determine where short-term efficiencies could be attained.

A variety of efficiency improvements were identified. Implementation of these improvements would allow the program to continue serving its' clientele at the current levels. The recommended efficiency improvements included:

- Discontinue the practice of having SRC staff deliver commingled food and beverage containers to the Waste Management (WM) materials recovery facility (MRF). Instead, arrange for WM to pick these materials up at the SRC for little or no extra cost.
- Firmly enforce a call-in pickup service for all customers currently serviced by the SRC to avoid making collection runs to buildings needlessly.
- Work with those departments and agencies serviced by the SRC so that pickup calls were only made at a given location when pickup hampers are at least 80% filled to capacity.
- Where feasible, provide more containers to clientele for the aggregation of their recyclables so that service trips are less frequent.
- Discontinue the practice of weighing every hamper, palletainer, and cart delivered to the SRC and instead use average weights per hamper, palletainer, and cart to determine estimated quantities. Periodic spot checks (monthly or quarterly) could be conducted to verify weights have not changed significantly from location to location.
- Explore with Rock-Tenn (fibers market) the possibility of marketing all the fiber as a mixed paper grade rather than sorting it into different grades. If revenue generated by the sale of fibers gets credited to the program or if both available labor and time warrant it, the sorting of fibers into different grades can always be re-implemented.

In response to the findings of the assessment the RRO immediately implemented several of the recommended efficiency improvements. For example, working with WM, the RRO no longer delivers the commingled food and beverage containers to the WM MRF. Instead, when sufficient quantities of commingled food and beverage containers are accumulated the RRO calls WM who sends a truck to pickup this material for a minimal charge. This charge is less than what it costs the RRO in time and labor to deliver the materials to the MRF themselves. The RRO also began enforcing a call-in pick service for all customers and instituted a policy with their customers that hampers will not be picked up unless they are at least 80% full at the time of service. With these changes the RRO was able to adjust their operations to meet existing budget constraints. This set the stage for moving into the Phase 2 efficiency assessment.

### **3.0 DESCRIPTION OF THE RESOURCE RECOVERY OFFICE RECYCLING PROGRAM**

As noted previously, the RRO's recycling program can be broken down into three general areas – materials collection, materials preparation, and delivery to markets. A brief description of these areas are provided in this section. The Phase 1 Report (Appendix A) provides a more detailed description of the program.

Approximately 55 locations (buildings) participate in the RRO recycling program with approximately 60% of these locations serviced by the RRO's collection crews. The remaining locations are serviced directly by the paper market the RRO contracts with. Locations are provided with three different types of containers including 4-wheeled plastic hampers, 4-wheeled metal cages (palletainers), and 2-wheeled 60-gallon carts. These latter containers are for commingled food and beverage containers. Each building will have a different number of designated containers for their use depending on a variety of factors including the number of departments within each building, the type of department serviced, and the quantities of the different types of materials generated within each department or building. Recyclable materials generated at each building are generally taken to the building loading dock or a designated room in the basement by custodial staff. Collection of the material is carried out by the RRO using a panel truck and a 2-person crew.

Once delivered to the SRC the containers are off-loaded and weighed. Depending on the material type several methods of preparation are employed. Unbaled old corrugated containers (OCC) are baled in a vertical baler. Confidential documents are immediately loaded into Gaylords and sealed for shipment to the paper market. Mixed containers are aggregated into larger wheeled carts and when sufficient quantities have been accumulated WM picks them up for delivery to their MRF. Paper, representing the largest quantity of materials collected and handled, is generally hand sorted on a sorting line into different grades and to remove contaminants. Some materials, such as books, manuals and other bound documents, are set aside and labor from the Sentencing-to-Service (STS) program are used to remove the bindings and other contaminants before shipment to market.

The RRO's market for paper and OCC, Rock-Tenn, picks up a loaded tractor-trailer and leaves an empty tractor-trailer in exchange on a daily basis. Upon arrival at Rock-Tenn's facility the OCC and other papers are off-loaded for further processing. The Gaylords of confidential documents are opened and the contents are immediately dumped into a mixing vat for pulping.

#### **4.0 COMPARISON TO SIMILAR PROGRAMS**

For comparison purposes, a variety of local and regional governments were contacted to get information on how their internal recycling programs are setup and managed. About the only thing they all have in common is that building custodial staff are responsible for getting materials from desk side or centralized recycling containers down to a loading dock or storage room for easy collection access. Once at the loading dock or storage room the majority of the programs surveyed contract with private waste or recycling service providers to pick the material up and transport it either directly to market or to a privately owned MRF for processing.

The in-house recycling program managed by the RRO has some components and characteristics that many in-house recycling programs don't have. These components and characteristics include such things as:

- Collection of aggregated materials from various buildings and locations using state staff and a vehicle;
- Preparation or consolidation of materials at a facility operated by state staff prior to shipment to market;
- Direct servicing of some buildings and locations by Rock-Tenn (fibers market);

- Revenues generated by the sale of recovered materials go into the state's general fund rather than to offsetting program operating costs;
- Provision of special services such as confidential paper destruction and the operation and maintenance of vertical balers for OCC at some locations, and
- Operation of a reuse center where state employees and departments can obtain recovered, still usable office supplies.

Two public entity in-house recycling programs were identified that share many (though not all) of the same components and characteristics of the RRO's program. These entities are the University of Minnesota (University) and Hennepin County.

The similarities between the University's program and RRO's program include:

- Collection of aggregated materials from various buildings using University in-house staff and vehicles;
- Preparation of materials at the University's MRF prior to shipment to market;
- Provision of confidential paper destruction services to University departments requesting it; and
- Operation of a reuse center where University employees and students can obtain recovered, still useable office supplies.

The similarities between Hennepin County's program and RRO's program include:

- Collection of aggregated materials from various Hennepin County buildings and locations using contracted collection crews and county-owned vehicles;
- Preparation or consolidation of some recovered materials at Hennepin County's Brooklyn Park transfer station/recycling center;
- Direct servicing of some County buildings and locations by the County's fiber market (American Paper Recycling Corporation); and
- Provision of confidential paper destruction services to County departments requesting it.

One significant difference between the state's program and those of the University and Hennepin County is related to revenue application. In both latter cases all revenue generated from the sale of materials is used to offset the cost of the program. Though neither the University's program nor Hennepin County's program is completely self-sustaining there is more of a true cost/revenue accounting method applied to these programs. By state statute (MS115A.15 Subd. 6) all revenue directly generated by the RRO's operation must be deposited into the general fund and is unavailable to apply toward reducing the program's operating cost. The issues of revenue maximization and credit will be addressed further in Section 5.2.

## **5.0 EXISTING PROGRAM ASSESSMENT**

### **5.1 INTRODUCTORY COMMENT ON EXISTING PROGRAM ASSESSMENT**

The Phase 2 assessment was originally conducted in late 2002/early 2003 using FY 2002 data (both tonnage and financial data). During the course of the Phase 2 assessment a number of program changes were made effecting both program operations (i.e., staffing levels, number and locations of buildings serviced, etc.) and program costs. As a result, much of the program cost analysis conducted during Phase 2 became moot. Nonetheless, a variety of program efficiency improvements were identified, including many of the improvements recommended in the Phase 1 assessment. Recommendations coming out of the Phase 2 assessment are presented in Section 6.0.

### **5.2 OPERATIONAL ANALYSIS**

The program operational analysis conducted in the Phase 1 assessment was done “on-the-fly” and without much in the way of detailed information to do an in-depth analysis. Nonetheless, the program efficiency improvements recommended at that time, if implemented, should have resulted in enough savings (either in cost or time) to continue the existing level of service.

It should be pointed out at this time that the SRC operations staff carry out the work activities in the SRC in an effective and safe manner. Providing dependable service to the various state departments and agencies they serve is a high priority. This is not to say that there isn’t room for efficiency improvements in the overall operation but to acknowledge that based on current resources and the existing procedures used to carry out day-to-day functions the operations staff are working hard to carry out the objectives of the program and provide good service to their customers.

#### **5.2.1 Collection of Materials**

The RRO, utilizing a truck and driver from the Division of Plant Management and a laborer from the SRC, directly services approximately 33 buildings either owned by the state or containing space leased by the state. A second SRC laborer may assist on occasions where large quantities of materials are known to come from or during seasonal surges in the generation of recyclables (e.g., intense legislative sessions, tax time, office cleanouts, etc.). All of these locations are serviced on an on-call basis.

Based on observations made in Phase 1 as well as financial information surmised from the FY 2002 budget, running the collection routes and unloading the route trucks take on average 35 to 36 hours per week. At a rate of \$40.25 per hour reducing the average collection and unloading time by even 30 minutes per day could result in approximately a 7% reduction in the annual cost of providing this service. A 42-minute per day reduction in the collection and unloading time could result in approximately a 10% cost reduction for providing this service. Improving collection efficiency may not only lead to savings in labor and truck rental but could also reduce fuel consumption and truck maintenance costs.

There are a couple of ways in which the collection of materials may be able to be streamlined. These include developing a more efficient routing system and reducing the frequency of service for

some buildings. This does not mean reducing the service (e.g. discontinue picking up certain materials or buildings) but rather ensuring there is adequate room and storage containers at a building to reduce the number of times per week, month, etc. that the materials must be picked up.

As there was insufficient time, data, or resources to do a complete analysis of collection routes or the specific space or resource requirements of the buildings receiving service, a more thorough assessment of the potential efficiency improvements for each building should be undertaken. Ideally, RRO staff can do this assessment. If needed, outside assistance can be brought in to help with this assessment. Several program modifications and examples follow that demonstrate the potential for efficiency improvements.

The vast majority of the approximately 33 buildings serviced by the SRC are within a couple of miles of the SRC and the time required to drive to and from the building is generally short. There are a couple locations, however, that are some distance away (up to 9 miles) and the trip to and from these locations could take a substantial amount of time especially as a result of inclement weather, traffic jams, or accidents.

One option for streamlining routes would be to make arrangements with the University of Minnesota for delivering the recyclables collected from these locations to the University's MRF. As shown in Table 1 the University's MRF is significantly closer to these locations on a mileage basis. On a travel time basis the University's MRF is closer to one of these locations and approximately the same travel time to the other.

As it stands now, when these buildings need to be serviced the SRC sends the collection crew to the building(s) where they collect the materials and drive back to the SRC for unloading. If the truck has a full load and there is still more materials to collect at the building being serviced, the crew has to make a return trip to finish the building. This could add significantly to the driving time depending on the weather, time of day the trip is made, or other traffic related conditions.

**Table 1**  
**Approximate Distance and Travel Time Between Select Buildings,**  
**the SRC, and the University of Minnesota MRF<sup>1</sup>**

<b>Building/Address</b>	<b>State Recycling Center (SRC)</b>		<b>University of Minnesota MRF</b>	
	<b>Approximate Miles (One Way)</b>	<b>Approximate Travel Time (Minutes)</b>	<b>Approximate Miles (One Way)</b>	<b>Approximate Travel Time (Minutes)</b>
1500 Highway 36 West	9	10 – 15	4	5 – 10
2455 University Avenue	6	5 – 10	2	5 - 10
<b>Distance Between SRC and the University's MRF</b>	<b>9</b>	<b>10 – 15</b>		

<sup>1</sup> Approximate miles and travel times based on the fastest route.

By utilizing the University's MRF driving time could be reduced by 25 to 35%. Additionally, it could allow the collection crew the opportunity to service another location on the way back to the SRC as a result of delivering the last pickup to the University's MRF. The collection containers (i.e., hampers, palletainers, etc.) used by the University are similar to those used by RRO. In servicing the locations in the vicinity of the University's MRF the collection crew could either use



empty University containers or keep some of the SRC's empty containers at the University's MRF for faster servicing.

Expanding on this concept further, a business arrangement where the University brings some of their loads to the SRC (those locations that are closer to the SRC) could be explored. This type of arrangement is actually quite common in the waste industry and locally both BFI and WMI have employed this concept when a particular customer or collection route was closer to the other company's landfill.

As it is not known how often the buildings in Table 1 are serviced an estimated savings (both time and cost) could not be determined. However, as the potential for reduced collection time and the financial savings associated with that are significant it's recommended that this option be more fully analyzed and implemented if warranted.

Another method for improving the efficiencies of the collection program is to increase the intervals between servicing trips to ensure that all hampers and palletainers are full (or close to full) and that the truck is fully loaded. This not only eliminates unnecessary trips but also helps maximize over-the-road payloads and reduces fuel consumption. The RRO has recently begun enforcing a call-in pickup service and requiring that hampers not be picked up unless at least 80% full.

Taking this a step further all serviced locations should be reviewed to determine what level of service they really require and what physical space they have available for on-site storage of recovered materials. All collected information and data on the servicing of each building over the last year should be reexamined to determine if there are changes in procedures, collection containers, or other equipment that would help improve efficiencies.

Neither the time nor the budget was available to do any in-depth analysis of efficiency improvements at the various locations serviced by SRC. As a result, the specifics regarding these locations, the frequency of collection at these locations, or the nuances of servicing each of these locations is not known at this time.

Table 2 is yet another set of data points to consider for possible efficiency improvements. The RRO has five (5) vertical balers located in various state office buildings. These balers are used to bale the OCC generated at those locations. When the collection crew services these buildings they check to see if there are any OCC bales that are ready for transport back to the SRC. Using an electric pallet jack the finished bales are loaded onto the truck along with the hampers, palletainers and carts of other materials. Once back at the SRC, the bales are loaded onto a trailer for delivery to Rock-Tenn.

**Table 2**  
**OCC Vertical Baler Candidate Locations**

<b>Building Number</b>	<b>Annual OCC Tons</b>			<b>Currently Has Baler?</b>
	<b>FY 2001</b>	<b>FY 2002</b>	<b>2-Year Ave.</b>	
1	14.33	11.73	<b>13.03</b>	<b>Yes</b>
2	10.37	8.25	<b>9.31</b>	<b>Yes</b>
3	9.68	7.37	<b>8.52</b>	<b>Yes</b>
4	4.85	4.35	<b>4.6</b>	<b>Yes</b>
5	NA	3.1	<b>3.1</b>	<b>Yes</b>
6	11.87	11.01	<b>11.44</b>	<b>No</b>
7	10.60	10.96	<b>10.78</b>	<b>No</b>
8	4.44	5.84	<b>5.14</b>	<b>No</b>

Having the ability to make OCC bales on-site (point of generation) makes sense in locations that generate large amounts of OCC. OCC is a high volume/low weight material weighing approximately 150 lbs/yd<sup>3</sup> loose but up to 1,2000 lbs/yd<sup>3</sup> baled. Collecting large quantities of OCC in loose form will take up a large amount of space in a collection vehicle but weight wise represents a low over-the-road payload resulting in very inefficient collection. This type of payload is often referred to as “hauling air”.

The information in Table 2 shows that of the current five locations with balers three of them generate on average between 8 ½ and 13 tons of OCC annually. The baler located at Building 4 generates on average about 4 ½ tons of OCC annually and the baler located at Building 5 generated approximately 3 tons of OCC in FY 2002. This location was not in operation in FY 2001.

Based on the data from both FY 2001 and FY 2002, there are two other locations which generate large quantities of OCC on an annual basis – Buildings 6 and 7. As these two locations generate two to almost four times the amount of OCC than either Buildings 4 or 5 it is recommended that the balers at these latter two locations be moved to Buildings 6 and 7 assuming there is available space and that neither ceiling height nor electrical hookup restrictions are big obstacles. Doing so could reduce the need for servicing these locations as often as they are now. Additionally, when these locations are serviced more materials (by weight and volume) can be put on the truck thus increasing over-the-road payloads resulting in potentially reduced servicing costs (i.e., reduced time/labor, lower fuel and truck maintenance costs, etc.).

If none of these issues are limiting factors but the state does not want to relocate these balers, then it is recommended that consideration be given to purchasing one or two more vertical balers for servicing one or both locations. The estimated cost for a vertical baler depends on whether or not it's a standard baler or a low-profile baler for buildings with low ceiling height clearances and whether or not the baler is new or used. Table 3 shows the estimated pricing for purchasing two vertical balers and includes the cost for delivery and installation. For purchasing two vertical balers the price ranges from \$10,000 to \$20,000 depending on what type of baler is purchased.

**Table 3**  
**Estimated Pricing For Vertical Balers**

<b>Baler Type</b>		<b>Pricing For One</b>	<b>Pricing For Two</b>
Standard Vertical Baler Producing a Standard Mill Size Bale	New	\$7,500	\$15,000
	Used	\$5,000	\$10,000
Low Profile Vertical Baler Producing a Standard Mill Size Bale	New	\$10,000	\$20,000
	Used	\$6,000	\$12,000

The overall point of the examples presented here is that an extensive analysis should be undertaken for all locations serviced by the SRC to identify potential program changes that could improve collection efficiencies and result in cost savings. Such an analysis should be undertaken regularly (every couple years or so) to determine what has changed in the interim and what could be done differently to once again improve collection efficiencies.

**Materials Collection Recommendations:**

- Continue enforcing a call-in pickup service for most customers currently serviced by the SRC to avoid making collection runs to buildings needlessly.
- Continue working with departments and agencies serviced by the SRC in calling for service only when the collection hampers at a given location are at least 80% filled to capacity.
- Continue to conduct detailed analysis of all service locations to determine if there are changes in procedures, collection containers, or other equipment that would help improve collection efficiencies. For example, can the interval between service calls be lengthened by providing more hampers or palletainers in those locations that have adequate on-site storage space? Are there some locations where the number of hampers or palletainers can be reduced without increasing the frequency of collection?
- Explore an arrangement with the University of Minnesota where materials collected from state office buildings located closer to the University's MRF are delivered to that facility. As part of this strategy a reciprocal arrangement could be developed with the University where some of their materials are delivered to the SRC.
- Relocate some of the vertical balers, or purchase one or two additional vertical balers, for placement in locations that generate a substantial amount of OCC but are not currently serviced by a baler.

### **5.2.2 Consolidation and Preparation of Materials**

Once recyclables are collected from the various state office buildings and locations, they're brought back to the SRC for consolidation and preparation prior to delivery to markets. During the consolidation and preparation process there are a number of operational activities that occur. These include:

- Weighing of materials;
- Sorting of paper;

- Storage of materials;
- Confidential paper management operation; and
- Mixed containers management.

During the Phase 1 efficiency assessment it was noted that once the hampers, palletainers, and carts are delivered to the SRC they are taken to a scale where every bin is weighed and the date, location, type of material, and weight are recorded. This procedure was instituted a number of years ago and the RRO has over 9 years of daily data on the weights of materials delivered to the SRC. With the considerable amount of historical data available, an average weight per container can be calculated and counting hampers, palletainers, and carts (a far simpler task) would be all that's required to estimate recovered tons of materials collected from each building or office. At the time of the Phase 1 efficiency study, RRO staff estimated that by eliminating the in-house weighing function approximately five hours per week could be saved. This methodology is consistent with that used at other MRFs.

Another option would be to explore ways to automate the scaling procedure resulting in a computer generated record of the weight. Doing so would still provide the exact weight of carts/materials but should reduce the time spent on this operation. A second benefit of an automated system could be a time savings in generating various spreadsheets and data sets requested by Admin or other departments.

It should be noted that in a RRO benchmarking study conducted in August of 1999 by the Management Analysis Division it was recommended that the SRC should review the usefulness of some of the data it collects on individual agencies or offices and that they should consider alternative methods for decreasing this data collection effort as a way to reduce staff time and improve efficiencies.

Over 97% of the materials handled by the SRC is paper. Therefore, it makes sense that the heart of the SRC operations is a sorting conveyor where hampers and palletainers of paper are dumped and sorted to remove trash or to upgrade the paper that falls off the end of the conveyor into a palletainer. Outside of actual collection of material it is this activity that by far takes up the most amount of time and operating labor. In the Phase 1 efficiency study it was recommended to minimize the sorting of paper and market it all as a mixed grade. Under the current scenario this still may be the most cost-effective method for handling and marketing this material.

On the other hand, if certain other recommendations discussed later in this report (i.e., baling of paper, opening up to wider markets, policy changes related to how revenue is credited, etc.) were implemented sorting the paper into higher or different grades would likely be justified. For example, the University receives approximately \$43/ton more for ledger than the RRO does yet does less sorting of other lower paper grades. If the RRO received the same price per ton, on average, as the University they would have generated approximately \$40,800 more in revenue in FY 2002. Under such a scenario returning to sorting materials to produce a higher grade of paper, and receiving greater revenue for this paper, should be reexamined.

Paper being held in storage for delivery to market is for the most part loose loaded into large shipping palletainers provided by Rock-Tenn. Once these palletainers are obtained they're loaded

on a trailer which is then picked up by Rock-Tenn. As paper is stored and shipped loose a large amount of floor space is taken up by palletainers of paper awaiting shipment. In addition, because the paper is shipped loose over-the-road payloads are very low weight leading to transportation inefficiencies and greater fuel consumption.

As an example, a typical shipping palletainer is 48" long by 40" wide by 39" high. This equals an approximate capacity of 1.6 yds<sup>3</sup>. Loose mixed paper typically weighs about 150 lbs/yd<sup>3</sup> while loose office paper weighs approximately 420 lbs/yd<sup>3</sup>. Based on this, one shipping palletainer holds approximately 240 lbs. of loose mixed paper or 670 lbs. of loose office paper.

The exact dimensions of the Rock-Tenn trailer spotted at the SRC is not known. Based on observations while at the SRC it would appear to hold approximately 24 to 28 shipping palletainers if stacked two high. If shipping mixed paper the total load capacity would be approximately 3 tons of paper. If shipping office paper the total load capacity would be approximately 8 to 9 tons of paper. The weight of an empty shipping palletainer is approximately 320 pounds. As a result, in addition to the weight of the paper the total weight of the load also includes 4 to 4 ½ tons of steel in the form of the palletainers.

Baling the paper would lead to a variety of benefits starting with product storage at the SRC. A bale of mixed paper will be approximately 72" long by 48" wide by 30" high or slightly larger dimensionally than a shipping palletainer. However, one bale of office paper could weigh up to 1,600 lbs. and one bale of mixed paper up to 1,800 pounds. It would take over 2 palletainers to make one bale of office paper and almost 8 palletainers to make one bale of mixed paper.

Up to 24 bales of paper could be loaded into the Rock-Tenn trailer resulting in a payload of up to 19 tons of baled office paper or 21 tons of mixed paper. This more than doubles the current payload of office paper transported to Rock-Tenn's facility. An approximate seven-fold increase in the shipping weight of mixed paper may be possible.

Another benefit of baling the paper instead of storing and shipping it loose is that typically baled paper will receive a greater unit price (\$/ton) than that same material loose. Additionally, with baled materials it opens up the potential for shipping to other locations and vendors. These last two items will be discussed further in the next section.

The estimated capital cost for a horizontal, single-ram, manual tie baler meeting RRO's processing needs is outlined in Table 4. An auto-tie baler would be even better but would cost approximately \$150,000 including an above ground conveyor.

The estimated annual operating costs for this baler are presented in Table 5. The estimated capital cost and first year operating cost of a horizontal baler totals approximately \$88,200. The anticipated savings in transportation fuel costs, increased floor space, marketing flexibility, and increased revenue for the material would easily offset this cost within this one-year time period (see the next section for further analysis of increased revenue potential). If the state purchased an auto-tie baler the return on investment (ROI) would take approximately 2 ½ years. Once again in the benchmarking study conducted in August of 1999 by the Management Analysis Division, it was recommended that the SRC "...should examine the component parts of its collection, packaging,

and shipping processes to find ways to maximize automation, make better use of truck space, decrease offloading, and improve the density and weight of recyclable products for transportation.”

**Table 4**  
**Horizontal Baler Estimated Capital Cost**

<b>Item</b>	<b>Estimated Cost</b>
Baler and Above Ground Conveyor Package	\$58,500
Baler Oil Heater (optional)	\$ 700
Freight	\$ 500
Installation, Start-up and Training	\$ 1,300
<b>Total Estimated Capital Cost</b>	<b>\$61,000</b>

**Table 5**  
**Horizontal Baler Estimated Annual Operating Cost**

<b>Item</b>	<b>Estimated Cost</b>
Annual Maintenance (change filters, reshim baler, etc.)	\$ 2,100
Baling wire	\$ 2,800
Electrical Usage (approximately 31,00 kWh annually)	\$ 1,000
Labor (0.5 FTE) including 50% benefits allocation	\$20,700
Contingency (10% of O&M costs excluding labor)	\$ 600
<b>Estimated Annual Operating Cost</b>	<b>\$27,200</b>

The confidential paper management operation at the SRC involves placing hampers containing confidential paper on a hydraulic lift and emptying these into Gaylords. Once the Gaylords are full they are sealed and loaded onto the Rock-Tenn trucks with the palletainers of other papers. Once at Rock-Tenn’s facility they are immediately dumped into a mixing vat for processing. If the SRC moves forward with purchasing a horizontal baler the confidential paper could be fed into the baler in a way that it would end up in the middle of a bale. The University of Minnesota has had great success with this procedure in terms of keeping materials confidential. This would also allow the SRC to discontinue its current confidential paper handling operation and free up workers for doing other duties around the SRC including operating the horizontal baler.

To do so, however, will require buy-off from those departments generating confidential paper scrap (e.g. Department of Revenue). Switching to this method of handling confidential documents will depend upon the documentation (Certificate of Destruction) and security needs of the individual departments. In some cases this method may not be acceptable to the generating department.

Another component of the SRC operations is the management of mixed containers (i.e., glass, steel/tin cans, aluminum cans, plastic containers, etc.) collected by the crews and delivered to the SRC. The recommendation coming out of the Phase 1 efficiency study related to the management of mixed containers was to make arrangements with Waste Management, Inc. (WMI) to pick these materials up at the SRC on a regular basis and take them to WMI’s MRF located in Minneapolis rather than paying for a truck and driver from the Division of Plant Management to deliver this

material to the WMI MRF. As WMI provides the SRC with waste collection service it was believed they would be willing to provide this additional service for little or no extra charge.

As a result, it is assumed that these arrangements with WMI for this additional service are working well and there is minimum additional cost for this service. Having said this based on FY 2002 recovered tonnage data it appears that approximately 19 tons of aluminum were recovered in that fiscal year though only \$114 in revenue was received for this material. Aluminum is one of the few materials that has a high per ton value associated with its recovery and recycling (upward of \$700/ton). With a little effort it is likely that the RRO could find a market for this material that would pay them considerably more than the \$6/ton they received in FY 2002. At \$700 per ton that 19 tons of aluminum could have retrieved between \$13,000 and \$14,000 in revenue. Sorting and then storing the aluminum in palletainers until enough are amassed to make a bale (approximately 5 to 6 palletainers) could pay for itself and generate a net profit as well.

If the state is going to continue the recyclables collection and consolidation program serious consideration should be given to assessing the availability of suitable space for this operation in a state-owned building. If such space is available a significant annual cost savings to the state could be realized. This is actually one of the program changes that had been made during the Phase 2 assessment and it is anticipated that the RRO/SRC will relocate to a state-owned building in late 2003.

#### Materials Consolidation and Preparation Recommendations:

- Discontinue or automate the practice of weighing hampers, palletainers, and carts delivered to the SRC. If this practice is discontinued use average weights (based on historical data) per hamper, palletainer, and cart to determine estimated quantities (counting carts). Periodic spot checks could be conducted to verify if weights have changed significantly over time from location to location.
- If funds are available, purchase a horizontal baler for the baling of paper and possibly other recovered materials. Benefits associated with a baling operation include:
  - Transportation fuel cost savings;
  - Less floor space taken up with stored materials awaiting delivery to markets;
  - Higher per unit revenues (\$/ton) for baled materials versus loose materials; and
  - Marketing flexibility in that with baling tapping into additional markets (regional or national) becomes feasible.
- Evaluate the potential for recovering aluminum for the mixed containers stream and process/market this material versus giving it to WMI.

### **5.3 MATERIALS MARKETING/REVENUE ANALYSIS**

#### **5.3.1 Revenue Maximization**

In FY 2002 the RRO received approximately \$82,400 in revenue for the materials they recovered as compared to the University who received approximately \$191,600 for the materials that they

recycled. This represents a difference of approximately \$109,200 even though the University recycled only about 350 more tons of materials than the RRO.

Subtracting out the revenue received for the aluminum that RRO recycled (\$114) and the variety of food and beverage containers the University recycled (\$28,345), the University still received almost twice the amount of revenue for various grades of recycled paper than the RRO despite the fact that the University recovered only about 265 tons more of this material.

There are a number of reasons why the RRO is not receiving top dollar for the materials they recover and by implementing several changes in its marketing strategy the RRO could receive considerably more revenue for the materials they recycle.

As discussed in the previous section one change that would help increase the revenue received for recovered materials is to purchase a horizontal baler and begin marketing a variety of materials in baled form. In talking with materials markets or market outlets, as well as the manager of the University's recycling program, they all agree that baled materials will generate greater revenue than loose materials.

Southeast Minnesota Recyclers' Exchange (SEMREX) is a joint powers board made up of the counties of Blue Earth, Dodge, Freeborn, Mower, Olmsted, Rice, Steele, Wabasha, Waseca, and Winona. The purpose of the board is to work cooperatively in a variety of waste and recycling related areas including cooperative marketing and materials exchange programs. Based on a conversation with the Executive Director of SEMREX clearly the markets they tap into pay a premium for baled materials over loose materials. For example, in 2002 old magazines (OMG) brought in an average price of approximately \$56/ton loose and \$66/ton baled (\$10/ton difference). Aluminum brought in an average price of approximately \$681/ton loose and \$841/ton baled (\$160/ton difference). In talking with the Executive Director of SEMREX she agrees that baled materials will almost always generate more per ton revenue than marketing that material loose.

One local paper market contacted reported that typically they pay \$25 - \$35/ton more for baled ledger than loose ledger although it will also depend on the quality of the paper being marketed. Another local paper market reported that for lower-grade fibers (i.e., ONP, mixed paper, etc.) the amount they pay for baled fibers is typically \$25-\$35/ton more than for loose paper. For higher-grade papers (i.e., ledger, Sorted Office Pack, etc.) the amount they pay for baled paper is typically \$60 - \$70/ton more than for loose paper.

Of course the per ton price of materials is also going to vary with the market the material is sold to and how the contract for that material is structured. Setting those issues aside, the potential additional revenue the RRO may have received for baled ledger in FY 2002 could have been as much as \$66,570 (951 tons x \$70/ton). For baled mixed paper the additional amount could have been as much as \$20,755 (593 tons x \$35/ton). Had the aluminum recovered in FY 2002 been baled and a better outlet found the amount of additional revenue received for this material could have been as high as \$15,865 (19 tons x \$841/ton). As seen by these numbers, and as noted previously, this additional revenue generated from just baling the ledger, mixed paper, and aluminum (approximately \$103,200) would have offset the capital cost of a manual tie, horizontal baler and the first year operating costs within that one-year period.



Shipping materials loose poses another disadvantage. Because of light, over-the-road payloads it becomes financially unattractive to ship materials to all but the closest market. Currently, the RRO has a contract with Rock-Tenn for taking all the recovered paper they collect. Diversifying markets for some materials could offer the potential for increased revenue. For example, the University markets its OCC to one company but the other paper they collect is marketed to another. The same holds true for Hennepin County's recycling program. This is a very common practice and often times allow the recycling program to get the best pricing for a particular commodity.

Another method for obtaining good pricing is to work through a broker who has a variety of outlets for the materials they purchase. In talking with one local broker, he reported that typically brokers take \$5 - \$10/ton for marketing materials but can also "shop around" to get the best pricing for their customers.

The current contract has been in place with Rock-Tenn for five years and before this it appears that Rock-Tenn had the contract with the state for their waste paper as well. Under the terms of this contract, the price paid for paper is based on a percentage of the Chicago Market Price or Mean Price as reported in "Official Board Markets". The contract does not have a guaranteed floor price (e.g. a set minimum amount the state receives for their paper even if the official market price is below this) nor does it address what happens if a particular paper grade drops below \$0 in value. In this case, language protecting the state from paying to recycle their paper would be advantageous to have in the contract. Many contracts with paper markets address such issues as noted above and doing so would offer the state some added protection from the volatility of the paper markets.

The contract with Rock-Tenn was set to expire on January 31, 2003. It is my understanding that this contract was extended to the end of March and that an RFP seeking bids from various paper markets was issued late last year. Further it is my understanding that the state has received bids from other paper markets in response to the RFP (how many is not known) but that at this time no new contract has been awarded to any company.

Sorting paper into higher grades is another method of maximizing revenues. This does not necessarily mean sorting into the highest grade of paper possible but rather finding a balance between potential revenue generated and the cost of sorting. As noted previously, the University is sorting much of their paper into a Sorted Office Pack. Their particular market for this material is paying them a relatively high price (\$115/ton average) yet the amounts of non-ledger grades of paper allowable in their mix minimizes the sorting of paper they collect.

With the state marketing paper in over a dozen paper grades the quality of any particular commodity is probably very consistent. However, the cost of sorting, preparing and marketing this many grades of paper may not necessarily be offset by the small differences in per unit revenues received for this material. For example, does the annual revenue received for the Groundwood CPO (\$273) offset the cost for managing this material separate from other paper grades? Based on the waste paper market specifications included with Admin's contract with Rock-Tenn this material could be marketed along with the Mixed Paper or the ONP. The same question can be asked of the glossy ledger (\$27 for one ton of material), the ledger rolls (\$5 for two tons of this material), or the one ton of Kraft Stock that could be marketed along with the mixed paper.

One other method the RRO should consider in maximizing the revenue they receive for their materials is to partner with the University in marketing recovered materials. Much like the cooperative selling power of SEMREX the state could potentially increase their per ton revenue by piggy-backing their marketing efforts with the University or other programs in the metro area. Exploring such an arrangement with the University is recommended.

#### Revenue Maximization Recommendations:

- As previously recommended and if funds are available, purchase a horizontal baler and start baling paper, and potentially other materials such as aluminum, prior to marketing these commodities.
- Diversify markets for recovered paper and negotiate tighter contract language with those markets to help obtain higher revenues for those materials and to provide greater protection to the state from the volatility of paper markets.
- Re-examine the sorting of paper to produce a higher quality of paper and increase the revenue potential. This should, however, be balanced out with the cost of sorting the paper.
- Explore an arrangement with the University of Minnesota in marketing all or some of the state's materials with theirs to take advantage of the University's markets and cooperative selling power.

#### **5.3.2 Revenue Credit**

All revenues generated by the state's in-house recycling program, including revenues from the sale of recovered materials, are deposited in the general fund. This is a requirement under Minnesota statute (115A.15, Subd. 6) which states in part:

"All funds appropriated by the state for the resource recovery program, all revenues resulting from the sale of recyclable and reusable commodities made available for sale as a result of the resource recovery program and all reimbursements to the commissioner of expenses incurred by the commissioner in developing and administering resource recovery systems for state agencies, governmental units, and nonprofit organizations must be deposited in the general fund."

In comparison to other recycling programs examined this is a unique requirement. In other similar in-house programs (i.e., University of Minnesota, Hennepin County, etc.) revenues are returned or credited to the recycling program to partially offset the cost of program operations. Crediting revenues to program costs reflects a more accurate accounting of the net profit or cost of these programs and provides a greater incentive to improve both operational costs and revenue s.

For these reasons it is recommended that state law be amended to credit revenue from the sale of recovered materials to the SRC to defray essential capital expenditures and provide for program improvements. This will provide a greater incentive for the RRO to continue efforts to increase revenues they receive for the recyclables.

#### Revenue Credit Recommendations:

- Amend state law to allow for crediting revenue from the sale of recovered materials to the SRC as a way to defray essential capital expenditures and provide for program improvements.

#### **5.4 PROGRAM MANAGEMENT AND STAFFING**

RRO/SRC program staffing is shown in Table 6. This compliment of staffing for the program has been reduced from previous years (down from 7.75 FTEs) and is another one of the operational changes that occurred during the Phase 2 assessment. Not included in this number are the community service workers from the STS program. Based on the overall workings of the RRO/SRC, the staffing as outlined in Table 6 represents a lean yet adequate compliment of workers. The program staffing shown in Table 6 is similar to what would have been recommended had this change not been made.

**Table 6**  
**RRO/SRC Staffing**

<b>Position</b>	<b>Purpose (Abbreviated Version)</b>	<b>FTE</b>	<b>Budget</b>
State Program Administrator/ Supervisor	Oversees the state's resource recovery program including the day-to-day operations at the State Recycling Center (SRC), prepares and administrates annual program budget, coordinates interagency waste reduction/recycling programs, provides legislative analysis, and makes updates to the educational program.	1.00	\$61,860
Operations Coordinator (Office & Admin Specialist Senior)	Manages program database, prepares reports, maintains web page, researches contracts and markets, and provides educational and other administrative services.	0.50	\$26,689
SRC Lead Worker (GMW Lead)	Oversees SRC operation in absence of the Supervisor, assists in the maintenance and repairs of equipment, and performs daily operations at the SRC.	1.00	\$38,836
SRC Laborers	Moves, weighs, sorts, and consolidates recyclables, operates forklifts and other equipment, provides housekeeping duties, and assists in collection of materials from buildings and departments.	3.00	126,442
Supervisor/ Manager	Supports this and other programs within the Division.	0.12	\$10,016
<b>Total</b>		<b>5.62</b>	<b>\$263,843</b>

#### Program Management and Staffing Recommendations:

- The operational staffing of the RRO/SRC as noted in Table 6 represents an adequate staffing level for the program and should remain the same. Further cuts in staffing are not recommended at this time.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

There is little question that RRO and SRC provides a valuable service to Minnesota government and the agencies and departments it serves. It allows state employees and others the opportunity to recycle while conducting the important business of state government. The recycling program is very effective when measured by the amount of materials that are recovered from the waste stream for recycling. Based on the “*2001 Recycling Recovery Rates of Metropolitan State Agency Offices and Operations*” report, in 2001 state office buildings in the metro area achieved an overall recycling rate of 61% while the Capitol Complex achieved a recycling rate of 68%.

The recycling program overseen by the RRO also provides another benefit which perhaps is not as obvious but is still important. By giving employees the opportunity to recycle on the job and promoting this program through state offices, these employees and patrons using state services are more likely to carry this behavior to their homes and engage in recycling and resource conservation activities on that front. Additionally, for over 20 years the state has been promoting the concept of waste reduction, waste recycling, and environmental stewardship or sustainable resource management. For the state to pull away from this now would send a message to other public entities and private businesses that this is no longer a priority.

A variety of inefficient and/or outdated operational procedures were observed during the course of conducting this assessment. Some of these procedures (i.e., weighing every hamper, palletainer, and cart collected from every building/location) may have had some value a few years ago but offers little in the way of valuable data at this point. Other procedures and policies (sorting papers to the highest grade possible in order to obtain the highest revenue possible) make sense on the outside but are questionable if over the course of a year the additional revenue generated is only a couple hundred dollars.

Outdated state policy is also a contributing factor to some of the inefficiencies as there is little incentive for revenue enhancement when the RRO/SRC does not benefit from the revenue they generate. This is further exacerbated by the procedures and policies employed in preparing materials for market and the marketing strategy currently in place.

Based on the assessment of the current materials collection system, SRC and RRO operations and activities, marketing tools and strategies, and state policy the following recommendations are made:

- Continue enforcing a call-in pickup service for most customers currently serviced by the SRC to avoid making collection runs to buildings needlessly.
- Continue working with departments and agencies serviced by the SRC in calling for service only when the collection hampers at a given location are at least 80% filled to capacity.
- Conduct a detailed analysis of all service locations to determine if there are changes in procedures, collection containers, or other equipment that would help improve collection efficiencies (e.g. lengthening the interval between service calls).
- Explore an arrangement with the University of Minnesota where materials collected from state office buildings located closer to the University’s MRF are delivered to that facility.

As part of this strategy a reciprocal arrangement could be developed with the University where some of their materials are delivered to the SRC.

- If funds are available, relocate some of the vertical balers, or purchase one or two additional vertical balers, for placement in locations that generate a substantial amount of OCC but are not now served by a baler.
- Discontinue or automate the practice of weighing hampers, palletainers, and carts delivered to the SRC. If this practice is discontinued, use average weights (based on historical data) per hamper, palletainer, and cart to determine estimated quantities (counting carts). Periodic spot checks could be conducted to verify if weights have changed significantly over time from location to location.
- If funds are available, purchase a horizontal baler for the baling of paper and possibly other recovered materials. Benefits associated with a baling operation include:
  - Transportation fuel cost savings;
  - Less floor space taken up with stored materials awaiting delivery to markets;
  - Higher per unit revenues (\$/ton) for baled materials versus loose materials; and
  - Marketing flexibility in that with baling tapping into additional markets (regional or national) becomes feasible.
- Evaluate the potential for recovering aluminum from the mixed containers stream and process/market this material versus giving it to WMI.
- Diversify markets for recovered paper and negotiate tighter contract language with those markets to help obtain higher revenues for those materials and to provide greater protection to the state from the volatility of paper markets.
- Re-examine the sorting of paper to produce a higher quality of paper and increase the revenue potential. This should, however, be balanced out with the cost of sorting the paper.
- Explore an arrangement with the University in marketing all or some of the state's materials with theirs to take advantage of the University's markets and cooperative selling power.
- Amend state law to allow for crediting revenue from the sale of recovered materials to the SRC as a way to defray essential capital expenditures and provide for program improvements.

## **APPENDIX A**

### **PHASE 1 REPORT ON DEPARTMENT OF ADMINISTRATION'S RESOURCE RECOVERY OPERATION**

## **APPENDIX B**

### **RESOURCE RECOVERY SERVICE DELIVERY PROGRAM MODIFICATIONS AND RESULTS – JULY 2002 THRU JUNE 2003**