

# SUMTER COUNTY



## **PROCESSING MIXED CULLET FOR LOCAL ALTERNATIVE MARKETS** *Final Report*

**#IG99-09**

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**SUMTER COUNTY**  
**Processing Mixed Cullet for Local Alternative Markets**  
**Final Report**

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## **SECTION 1.0 INTRODUCTION**

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### **1.1 Background**

This project was developed by Sumter County to demonstrate the benefits of processing mixed color and low-value green glass at the local level into a marketable aggregate ranging in consistency from fine sand to gravel. Sumter County proposed the project as a solution to the lack of viable markets for mixed color glass in the state and by limited or low value markets for green glass. In addition, a rural county without a curbside recycling program, such as Sumter County, does not generate the necessary quantities of glass cullet to maximize transportation efficiency or marketing leverage. This project was designed to pursue potential local markets such as fill for landscaping projects, asphalt or concrete paving applications, concrete block production or other innovative uses.

Previous attempts to alleviate the mixed color glass problem in Florida have relied on optical color-sort technology designed to prepare the glass for traditional markets in the glass manufacturing industry. Although costly, this technology is effective; however, the effort has met with limited success due to the high levels of contamination. Often, the color-sort system will need to handle material recovery facility (MRF) residue with mixed glass content. Even the best color-sort technology is not equipped to process a highly contaminated material without a substantial investment in hand-sort labor.

In addition to developing alternative local or regional markets for mixed color glass, Sumter also visualized working with neighboring counties to assist in marketing their mixed glass or hard-to-market green glass.

### **1.2 Project Objectives**

Sumter County developed this project to demonstrate the practical and operational feasibility of using a glass crushing system to produce a highly marketable product for local use. This project was also designed to prevent a recyclable material from being disposed of. Another project objective was to eliminate the costs of transporting a low-value material to distant markets. Providing processing capabilities within the county and marketing the material in a limited geographical area was determined to be a strong economic incentive.

### **1.3 Description of Project Innovation**

This project was designed to overcome obstacles to glass recycling that are threatening the economic survival of traditional glass recycling programs in many Florida counties. In Sumter County, traditional approaches to glass recycling have proven to be cost prohibitive. As a small rural county with virtually no curbside recycling collection, the County has two means for recovering glass: drop-off recycling and MRF processing. While drop-off recycling programs generally capture good quality, color-sorted material, the County's program recovers only small quantities at the one County-operated drop-off center located at the Sumter County Solid Waste Facility (SCSWF).

The County can also recover glass from the municipal solid waste (MSW) stream during MRF processing at the SCSWF. Manual sorting can recover and color-sort unbroken glass containers and large pieces, but glass broken during mechanical processing is nearly impossible to separate from the MSW stream and cannot be color-sorted manually. Thus, the County typically recovers only small quantities of marketable color-sorted material from MRF processing and drop-off recycling.

In locations where primary end-use markets are accessible, the logical approach to improving glass recovery is to attempt to reduce breakage and improve sorting techniques to maximize recovery of color-sorted glass. But for most counties, in spite of successful collection programs and efficient sorting systems, Florida's only primary re-use markets in Jacksonville and Sarasota are too far away to be economically viable options. Thus, for Sumter County, and for many other Florida counties where transportation costs exceed market values, better collection and sorting methods offer no solution to the economic challenges associated with glass recycling.

This project reflects an innovative approach to glass recycling that reverses the process by which glass is traditionally recycled. Since primary end-use markets are not an economically viable option, the County set out to identify local alternative markets and develop products that could be economically produced and marketed to these established local markets. The County began this process by developing a list of possible alternative uses and then contacting local businesses that would be potential end-users. Local businesses were also surveyed to determine possible quantities of material needed, general product specifications, and approximate value of their current feedstock. Once probable market demand was established, the county used general product specifications to evaluate various types of machinery that could deliver the needed feedstock. The county required a turnkey system that could process mixed color cullet into

aggregate with a consistency ranging from fine sand to gravel. The equipment selected for the project is innovative because such equipment is not in use elsewhere in Florida and is only in limited use nationally.

#### **1.4 Formal Presentation of Project Results**

This subject area will likely be the focus of numerous presentations in the future due to the recent challenges counties are facing when marketing glass in Florida and in light of an industry announcement that the Owens-Brockway plant in Lakeland, Florida will close its doors at the end of the year 2000. The plant closing is a recent development that was not foreseen when this project was initiated; however, it reinforces the importance of developing sustainable local alternative markets for glass.

Sumter County plans to request presentation time at the 2001 RecycleFlorida Today, Inc. annual conference scheduled for June 5-8 at the Tradewinds Resort in St. Petersburg, Florida. The county will also consider other appropriate forums to discuss project activities and results in order to facilitate information and technology transfer.

## SECTION 2.0 Project Implementation

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### 2.1 Equipment Purchase and Utilization

Based on anticipated product specifications determined from a survey of local businesses, Sumter researched manufacturers of glass crushing and pulverizing equipment with the capability of producing an aggregate less than 3/8 inches. The selection process resulted in the review of two manufacturing companies with equipment engineered to produce the desired product. An intense review was conducted of each unit's suitability for the project based on past installations, maintenance requirements, performance characteristics, end-product analysis and price. Attachment A, *System Comparisons*, provides comparisons of Andela and Glass Aggregate Manufacturing & Engineering (G.A.M.E.) systems according to important factors necessary for this project. The equipment selected was manufactured by G.A.M.E. of Faribault, Minnesota. Figure 2-1, *Glass Processing System*, shows the selected glass processing system installed in Sumter County during the grant project.



**Figure 2-1. Glass Processing System**

G.A.M.E.'s model GM-1 system produces a consistently sized aggregate product in a “one-pass” operation which promotes efficiency and lowers maintenance costs. The unit also has safety features, such as protective guards over all moving parts and an emergency shut-off. Sumter County's unit has interchangeable screens (3/8 and 3/16 inch) to control product size. RPM adjustments to the sander unit shaft allow for additional size control. In addition, quick adjustments or repairs are made possible with service doors and a roll-out drawer in the sander unit.

The glass processing system included:

- One 4 cubic yard hopper
- One in-feed conveyor with magnetic head and self-cleaning roller
- One bottle pre-crusher
- One in-feed conveyor with magnetic head
- One trommel screen
- One G.A.M.E. GM-1 sanding unit
- One out-take conveyor from the sanding unit
- One electrical control panel/3 phase
- One dust collector with cyclone body, support stand, drum and drum cover assembly

Other equipment and project-specific items purchased were:

- Two 40-yard roll-off containers for hauling and storing glass material
- Two 20-yard roll-off containers for hauling and storing glass material
- Concrete slab base for processing system installation and equipment shelter

- Miscellaneous parts for system modifications
- Air compressor for equipment maintenance
- Roll around ladder for equipment monitoring and maintenance

The GM-1 unit is rated at 10 tons per hour but has achieved slightly higher output during selected test runs. Throughput varied, however, depending on the number of employees available to load the system and monitor material jams as the glass entered the conveyor belt. Under normal operating conditions, Sumter County has averaged a throughput of 8 to 9 tons per hour.

## **2.2 Local Cooperative Recycling Effort**

Sumter County envisioned that this project would involve cooperative agreements with surrounding counties that might be having difficulty marketing some or all of their glass. Contact was made with five neighboring counties as well as three private sector companies to determine the level of interest in alternative markets.

## **2.3 Project Elements and Timeline**

Sumter's project was comprised of three clearly defined elements. The first element of the project involved collection of Sumter County's glass as well as the procurement of quantities from outside the county. The second element involved processing material into a usable feedstock, and the third element involved marketing that feedstock to local businesses and industries. The project timeline was modified during implementation, and those changes are detailed in section 2.3.4.

### **2.3.1 Collection**

Sumter's most convenient source for glass was from the county's recycling drop-off program. Collecting glass from outside the county presented some unanticipated challenges. Despite low market prices for green glass and negative values for mixed color cullet, most of those contacted were hesitant to pay Sumter County a processing fee for their mixed glass. Most considered their current arrangement with Strategic Materials, Inc. to be satisfactory. One exception was Citrus County, which generates 250 tons of glass per year and has a high level of interest in an

alternative to traditional markets. The survey of Citrus, Pasco, Marion, Lake and Hernando counties identified a potential of 57 tons of glass per month available for processing in Sumter County, with a more realistic expectation of 30 tons per month.

RecycleAmerica of Orlando was generating 40-50 tons of green glass per month but was not interested in paying a processing fee and was not sure their current contract with Strategic Materials, Inc. would allow them to divert green glass to another market. SP Recycling delivered glass to Sumter County from its Alachua County MRF; however, the contamination from other material residues significantly decreased machine throughput. Before SP Recycling could deliver additional loads of glass for evaluation by Sumter County, the facility was destroyed by fire. In addition, Ocala Recycling provided several test loads of glass at no charge during the equipment installation but expressed satisfaction with their current market arrangements. Because of inherent market fluctuations, the values of mixed color and green glass may decrease in the near future. If this happens, Sumter County is ready to accept glass from surrounding counties and businesses for processing and marketing to local alternative markets.

### **2.3.2 Processing**

The system was delivered and installed at the Sumter County Solid Waste Facility on November 18, 1999. Processing began in the 3<sup>rd</sup> quarter of the grant period, and samples were sent to a laboratory for analysis in order to provide more comprehensive information to potential markets.

The following describes the operation of the glass processing system:

- 1) Material is fed into the 4-yard in-feed hopper using a skidsteer with a bucket attachment.
- 2) The material is moved by conveyor into the pre-crusher. As material moves from the in-feed hopper onto the conveyor, large non-glass materials (such as plastic bottles) are removed by one or two hand-sorters.
- 3) Processed material is moved by conveyor to the trommel separator.
- 4) The trommel separates labels and lids from the glass material and deposits them in a container to be discarded.

- 5) The glass material is moved into the sanding unit where it is pulverized into a non-sharp sand-like material.
- 6) The processed material is then moved by conveyor into a temporary storage container.

Finished glass material was stored as necessary in roll-off containers. Figure 2-2, *Processed Material*, shows the finished material being conveyed into the temporary storage container.

### 2.3.3 Marketing

The GM-1 glass processing unit is equipped with interchangeable screens in the sanding unit to produce either a 3/8 inch or 3/16 inch sand-like product. Discussions were held with several local industries that were considered potential markets, including Middlesex, LLC (formerly Paquet Industries), an asphalt production company; Sunshine Materials, a manufacturer of



**Figure 2-2. Processed Material**

concrete blocks; Altman Sod & Landscaping Service; and the Suwannee District Central Shop of the Division of Forestry, sandblasting division. Because of the limited volume being collected, most of these potential markets were not feasible due to their need for consistently large quantities. The sandblasting use had strong potential and the quantities needed were modest so a test sample was provided. However, additional screening was needed to make the product usable and transportation to Suwannee County created an economic obstacle. Middlesex, LLC is interested in purchasing material for use in glassphalt and Sumter County is currently pursuing this option.

Currently, Sumter County is screening a portion of the material and using it in their own sandblasting operation. Other quantities have been utilized for landscaping on county property. Until economics encourage

neighboring counties to reconsider sending their glass to Sumter County, the quantity of glass generated in the county can be utilized in-house.

### 2.3.4 Project Timeline

Table 2-1, *Project Timeline*, presents a chronological account of program activities. Due to delayed installation and product testing, the project schedule was delayed, and Sumter County requested a six-month extension to the original 12-month timeline.

<b>TABLE 2-1 PROJECT TIMELINE</b>		
<b>Project Activity</b>	<b>Initiation Date</b>	<b>Completion Date</b>
Project Initiation	June 1999	June 1999
Procurement of Equipment	June 1999	November 1999
Site Preparation and System Modifications	September 1999	November 2000
Equipment Installation & Acceptance Testing	November 1999	December 1999
Materials Processing	November 1999	December 2000
Product Development and Testing	January 2000	December 2000
Materials Marketing	January 2000	December 2000

### 2.4 Problems Encountered and Solutions Developed

After equipment installation, some operational problems were encountered with the GM-1 glass processing system. These included material jams in the hopper, debris falling from the conveyor, the trommel causing a glass material diversion and loss of material, dust collection system malfunctions, and excessive wear on tines and screens.

It was determined that moisture in the glass was a major problem and was causing some of the excessive wear on the equipment. Sumter County decided to construct a pole barn over the crushing unit and glass storage bunker to substantially reduce moisture problems. The manufacturer made several modifications and upgrades as well as providing additional

instruction in proper equipment maintenance. Specific modifications included the installation of ball vibrators to shake loose and prevent build up of clumps of moist crushed glass in the screens and tines. In addition, a portable compressor unit was procured for pressure cleaning the equipment as needed.

## **SECTION 3.0**

### **Project Results**

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#### **3.1 How Project Objectives Were Met**

Sumter County's objectives were to collect, process, and market glass collected in the County and/or surrounding counties. In effect, Sumter County has developed a closed-loop process for glass. Materials collected in the county are processed in the county and then re-used in sandblasting and landscaping applications. In addition, local alternative markets were identified and are still being pursued. As market conditions change, Sumter County is well-positioned to accept additional glass from surrounding counties and local recyclers and, if enough material is available, to market the product to local alternative markets requiring large quantities of material.

#### **3.2 How the Project Used Advanced Technologies or Processes**

The G.A.M.E. GM-1 glass processing system represents technology not currently in use in Florida and has an advanced integrated glass pulverizing capability. The patented pulverizer utilizes two rotating hammer/link assemblies which operate in a flailing configuration rather than traditional grinding mechanisms. Figure 3-1, *Rotating Hammer/Link Assembly in Sanding Unit of Glass System*, shows the hammer tines in the system's sanding unit that rotate to pulverize glass. This technology is more advanced than general-use crushers and hammermills and was developed to deliver a specific-sized silica product. The design helps reduce wear and maintenance costs usually associated with grinding units, which is an added economic benefit to the county. In addition, the system provides a throughput of 8-10 tons per hour.

#### **3.3 How the Project Led to Greater Quantities of Recovered Materials**

This project identified potential sources of material to be recovered in neighboring counties. As discussed in Section 1.4, changing market conditions for glass will prompt a re-evaluation of glass disposal issues and will enhance Sumter's viability as a glass processor. As this issue evolves, it is possible that economic considerations will improve to Sumter's benefit as other counties and local recyclers calculate the costs of marketing glass in an atmosphere of plant closings and declining market share for the glass industry.



**Figure 3-1. Rotating Hammer/Link Assembly in Sanding Unit of Glass System**

### **3.4 Transferability of Technology and Processes**

Many non-container applications for glass exist; for example, the material can be marketed to local public works projects for use as a drainage medium, fill material, sand blasting, or road base. In addition, pulverized glass can be used to make jewelry and crafts, decorative lawn items, paving stones, tiles, planters, sun catchers, and wind chimes. With all these options and the equipment to produce the raw material feedstock available, virtually any community has the potential to create a unique niche market locally for a glass-based product.

In other parts of the country, successful partnerships have involved non-profit organizations, local governments and private entrepreneurs in establishing small innovative manufacturing operations utilizing mixed color or hard to market glass. The transferability of this unique technology might be best demonstrated by Polk County's procurement of a G.A.M.E. system after visiting the Sumter operation. Delivery and installation for Polk County's system are expected in December 2000.

### 3.5 Detailed Analysis of Cost Effectiveness

Sumter County's current use of processed glass demonstrates an economically viable and cost-effective option to traditional markets. The use of the material for in-house sand blasting and landscaping projects saves transportation costs since the material does not have to leave the facility and saves the cost of purchasing sandblast-quality silica sand. In addition, future cost effectiveness of the program will be enhanced if surrounding counties send their material to Sumter County.

#### 3.5.1 Project Costs by Element

Table 3-1, *Costs by Project Elements*, presents a summary of all project costs by project element. In addition, Attachment B, *Grant Funds Expenditures*, shows costs itemized for project activities and equipment.

<b>TABLE 3-1 COSTS BY PROJECT ELEMENT</b>	
<b>Project Element</b>	<b>Costs</b>
Collection	\$10,600
Processing	\$138,634
Marketing	\$5,710
Project Management	\$12,064
Reports	\$11,975

#### 3.5.2 Project Expenditures by Funding Source

In addition to grant funds expended for project costs, Sumter committed substantial resources to the project in the form of in-kind contributions of operating and maintenance costs, personnel expenses, and indirect costs. Table 3-2, *Project Expenditures by Funding Source*, summarizes contributions to the project by funding source.

**TABLE 3-2  
 PROJECT EXPENDITURES BY FUNDING SOURCE**

<b>Grant Quarter</b>	<b>Grant Fund Expenditures</b>	<b>In-Kind Contributions</b>
Project Budget	\$179,000.00	\$28,900.00
First Quarter	\$44,772.50	\$2,000.00
Second Quarter	\$11,860.00	\$3,000.00
Third Quarter	\$51,942.84	\$6,600.00
Fourth Quarter	\$2,892.40	\$3,000.00
Fifth Quarter	\$10,054.83	\$7,250.00
Final Quarter	\$57,460.50	\$14,300.00
Ending Balance	\$16.93	\$0.00

### **3.5.3 Savings Through Tip Fee Avoidance**

Sumter County's current tip fee is \$49.50 per ton for disposal of solid waste at the Sumter County Solid Waste Facility (SCSWF). Because approximately 180 tons of glass per year is processed at the SCSWF, the tip fee savings would be \$8,910 annually. If another 357 tons from other counties could be collected and processed, this would result in a total savings of \$26,581.50 each year (without factoring in the processing fees paid by the counties). This amount is approximately two-thirds of the cost of the glass processing system and would be a significant savings.

### **3.5.4 Cost/Benefit Ratio for the Project**

If Sumter County shipped glass to traditional markets, the expense for transportation would be approximately \$1,800.00 annually based on an estimated \$10/ton for trucking costs. Using conservative calculations, this project is saving \$4,950 per year for sandblasting medium if 50 percent of the glass collected is used for this purpose (90 tons multiplied by \$55/ton). Applying a \$3 per ton value for the remainder being used in landscaping applications adds an additional

\$270 in added value. With the disposal cost avoidance of \$8,910, a total benefit of \$14,130 is achieved.

The following calculations show when the benefits will match the cost of the system and the cost of the grant project, respectively:

\$90,000 (Capital Costs) divided by \$14,130/year (Cost Recovery Rate) equals 6.4 years.

\$179,000 (Grant Funds) divided by \$14,130/year (Cost Recovery Rate) equals 12.7 years.

At this recovery rate, capital costs utilizing only glass from Sumter County will be recovered in just over 6 years and grant funds will be fully recovered in under 13 years. However, the recovery periods would be substantially accelerated if market conditions change so that counties surrounding Sumter County have more incentive to send their glass to Sumter.

## SECTION 4.0

### How the Project Enhanced Marketability of Non-Traditional Materials

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This project helped direct attention to marketing opportunities for mixed cullet, which is of particular interest to small county generators. Often, smaller counties do not generate sufficient quantities of recyclables to maximize shipping efficiency, or their programs are not financially equipped to recycle materials that do not have a market value high enough to offset collection and handling costs. This project focused on a material that has traditionally been difficult to recycle (mixed color glass) and a low-value material (green glass) and attempted to identify local or regional markets in order to develop a self-sustaining program.

Sumter County sent samples of the processed glass product to a laboratory for extensive testing to determine its applications in concrete production as well as other applications. The laboratory tests showed that silica sand product made from green glass worked well in concrete production. Mixed color glass, however, did not set properly when used in a concrete mix due to alkali-silica reactivity (or ASR). The laboratory also performed a proctor test on the glass samples from Sumter County and found the results similar to regular soils. Therefore, the glass product would also be useful in many typical applications for sandy soil, such as drain field fill. Attachment C, *Sieve Analysis Results*, presents the laboratory report showing the results of the sieve analysis performed on glass samples from Sumter County.

Sumter County has identified various alternative uses for glass in the surrounding region. Ready markets will facilitate expansion of the program as additional volumes of material become available. This project has not only directed attention to the marketability of mixed color glass and green glass but will hopefully inspire other counties to evaluate and develop alternatives as well. As mentioned previously in this report, dozens of potential alternative uses exist for mixed color glass and green glass, including: sandblasting, golf course sand traps, ice control, road base, glassphalt, landscaping, stepping stones, lawn ornaments, pottery, drainage, filtration, glass beads, marbles, fiberglass, jewelry, tile, synthetic marble, terrazzo roof tile, and industrial flooring. These creative local markets for mixed color glass and green glass are abundant in Florida, and Florida counties have the opportunity to increase the value of their mixed cullet and green glass by creating a product that could be sold to these markets.

Any innovative idea is associated with a degree of risk. However, the importance of this innovative project has only increased with time. As previously mentioned in this report, market

conditions for traditional uses of glass have steadily declined. With the closing of a Florida glass plant and declining production at another, there has never been a more critical time for counties to be investigating alternative uses for a material that will continue to be a sizeable portion of the container stream.

**ATTACHMENT A**  
**SYSTEM COMPARISONS**

**ATTACHMENT A  
SYSTEM COMPARISONS**

System	System Size	Motor(s) Size	Electrical Requirements	Aggregate Size	# Passes to Create Sand	Throughput	Included w/ System	Labels and Lids
Andela GP-1 Long	59' 4"L x 9' 2"W x 10'H	10 HP	3 phase	3/8" minus	May require more than one pass for all material to be sand-like	2-10 tons/hr	Metered Surge Hopper, Loading Conveyor, Output Conveyor, Trommel Screen	Pass through pulverizer through separate chute
GAME GM2T	56"L x 52"W x 90" H	7.5 HP & 5.0 HP	3-phase	Any size	One pass	3-5 tons/hr	4 cy Hopper, Loading Conveyor, In-feed Conveyor for sanding unit w/ magnetic head, Pre-crusher, Trommel Screen, Output Conveyor	Are screened out before enter sanding unit

System (continued)	Maintenance Cost	Flow Mechanism	Safety Features	Pulverizer Price	Additional Items	Optional Items	Installation Cost Estimate	Total Estimated Cost
Andela GP-1	\$1.50 per ton	Hammer/link assemblies push material through	Protective Guards, Safety Interlocks	\$32,920 (1)	\$49,200 (1)	\$8,650 (1)	\$5,000 (1)	\$95,770 (1)
GAME GM2T	\$0.65 per ton	Gravity	Protective Guards	\$20,000	\$52,450	\$3,500	\$1,000	\$76,950

Notes:

(1) From October 1998 quote. Prices increased in March 1999.

**ATTACHMENT B**  
**GRANT FUNDS EXPENDITURES**

**ATTACHMENT B  
GRANT FUNDS EXPENDITURES**

<b>Expenditures</b>	<b>Glass Processing Equipment</b>	<b>System Mods and Installation</b>	<b>Site Improvements</b>	<b>Roll-Off Containers (5)</b>	<b>Additional Labor Expenses</b>	<b>Training &amp; Materials</b>	<b>Product Development/ Testing</b>	<b>Project Management</b>	<b>Project Reports</b>	<b>TOTAL</b>
GAME	\$44,772.50									\$44,772.50
United Truck & Body				\$10,600.00						\$10,600.00
FL Rock			\$1,260.00							\$1,260.00
FL Rock			\$2,055.00							\$2,055.00
TIA 10/30/99								\$584.80		\$584.80
GAME	\$44,772.50									\$44,772.50
TIA 11/30/99								\$1,882.30		\$1,882.30
TIA 12/31/99								\$950.00		\$950.00
TIA 1/31/00								\$1,219.80		\$1,219.80
Evans Hardware		\$27.49								\$27.49
Garry's Rental		\$41.25								\$41.25
Hughes Supply, Inc.		\$353.78								\$353.78
Besco Electric Supply Co.		\$55.92								\$55.92
TIA 2/29/00								\$1,052.50		\$1,052.50
TIA 3/31/00								\$1,104.90		\$1,104.90
TIA 4/30/00								\$735.00		\$735.00
TIA 6/22/00								\$470.00		\$470.00
Bushnell Auto Parts		\$19.12								\$19.12
Bushnell Auto Parts		\$27.78								\$27.78
Bushnell Auto Parts		\$5.83								\$5.83

**ATTACHMENT B  
GRANT FUNDS EXPENDITURES**

<b>Expenditures</b>	<b>Glass Processing Equipment</b>	<b>System Mods and Installation</b>	<b>Site Improvements</b>	<b>Roll-Off Containers (5)</b>	<b>Additional Labor Expenses</b>	<b>Training &amp; Materials</b>	<b>Product Development/ Testing</b>	<b>Project Management</b>	<b>Project Reports</b>	<b>TOTAL</b>
Epperson and Co.		\$495.00								\$495.00
TIA 7/25/00									\$2,085.00	\$2,085.00
TIA 8/15/00							\$2,767.10			\$2,767.10
Salescorp of FL, Inc.						\$1,975.00				\$1,975.00
Salescorp of FL, Inc.						\$1,085.00				\$1,085.00
TIA 9/15/00							\$1,100.00			\$1,100.00
Morris Welding, Inc.		\$25.00								\$25.00
Coastline Equip	\$19,863.00									\$19,863.00
TIA 9/30/00							\$1,200.00			\$1,200.00
TIA 10/31/00							\$642.50			\$642.50
MC of Florida		\$21,800.00								\$21,800.00
TIA 10/31/00								\$4,065.00		\$4,065.00
TIA 11/30/00									\$9,890	\$9,890.00
<b>TOTAL</b>	\$109,408.00	\$22,851.17	\$3,315.00	\$10,600.00	\$0.00	\$3,060.00	\$5,709.60	\$12,064.30	\$11,975.00	\$178,983.07
<b>Available</b>	\$113,000.00	\$18,000.00	\$4,000.00	\$10,000.00	\$6,000.00	\$3,000.00	\$10,000.00	\$9,750.00	\$5,250.00	\$179,000.00
<b>Balance</b>	\$3,592.00	(\$4,851.17)	\$685.00	(\$600.00)	\$6,000.00	(\$60.00)	\$4,290.40	(\$2,314.30)	(\$6,725.00)	<b>\$16.93</b>

**ATTACHMENT C**  
**SIEVE ANALYSIS RESULTS**

**ATTACHMENT D**  
**GRANT FUNDS EXPENDITURES**