

SUMTER COUNTY



Innovative USM Recycling Project Final Report

DEP Contract No. SW 165

SECTION 1.0 INTRODUCTION

1.1 Background

This project was developed by Sumter County (Sumter) to demonstrate the benefits of using advanced municipal solid waste (MSW) composting technology to recycle two nontraditional materials universally present in the MSW stream in substantial quantities—Undeliverable Standard Mail (USM) and small domestic animal remains. The project was conducted at Sumter’s new state-of-the-art Solid Waste Facility in partnership with the United States Postal Service (USPS) and the Sumter County Animal Control Department. The Sumter County Solid Waste Facility has the only operating MSW digester in Florida and is the only site with the capacity to evaluate the potential benefits of these and other innovative organics recycling programs.

The project not only produced benefits for Sumter but also served as an important model for the USPS. Currently, the USPS is energetically promoting USM recycling to capitalize on the economic, environmental, and customer satisfaction benefits associated with recovery of this material. The USPS is particularly interested in developing “closed loop” recycling programs that produce USM-content products the USPS can use in routine operations. While recovery and collection of USM is relatively easy to accomplish by using existing USPS fleet transportation systems to “back-haul” material to a central location, the USPS has had difficulty finding markets for recovered USM. The lack of markets has curtailed recycling efforts, and large quantities of USM presently enter the MSW stream for disposal.

If adequate recycling markets were available, the USPS could recover virtually all USM. However, USM presents problems for conventional recycling technologies. The material, if it is recognized as recyclable, is classified as “low-grade mixed paper” in commodity markets. Unlike other mixed paper, contamination from adhesives [also known as pressure sensitive adhesives (PSAs) or “stickies”], window envelopes, and glossy paper renders USM unacceptable for conventional paper recycling operations, which require more homogeneous feedstocks. Even though the USPS has been able to find limited recovery partners in Chicago and Atlanta, large metropolitan areas with established, specialized recycled-paper mills, USM quantities far exceed

the recycled paper industry's capacity. Low market values and high transportation costs have prohibited widespread USM recycling.

In an aggressive effort to develop recycling alternatives for USM, the USPS has developed innovative projects with Gridcore, Inc. of Long Beach, California to manufacture USM-content recycling containers for post offices, with J. R. Moon Pencil Co., in Lewisburg, Tennessee to manufacture pencils that contain 25% recycled USM, and with Pure Vision Technologies in Denver, Colorado to examine the feasibility of transforming USM into ethanol. While these projects demonstrate alternate uses for recovered USM, none of these technologies have proved economically viable for processing available large quantities of USM.

In January 1997, the USPS funded an innovative composting pilot project by Texas A & M University Extension to test compost produced from 150 tons of USM. The project, the first of its kind in the country, composted shredded USM in an outdoor windrow along with yard trimmings, liquid wastes, grocery and food processing residues, and approximately 250 cubic yards of wood chips. The compost, which took four months to produce, is now being tested in horticultural applications by Texas A & M University Extension.

Sumter's USM composting project represents a major breakthrough in USM recycling. By demonstrating the operational and economic feasibility of USM composting, Sumter's project can have an enormous impact on USM recovery rates. Sumter's project can potentially create a virtually unlimited market for USM in Florida and nationally. Compared with traditional paper recycling options, composting technology is readily available, relatively inexpensive, and capable of providing a stable demand for large quantities of USM.

The second element of Sumter's Innovative Grant project also addressed a material that is not currently being recycled—small domestic animal remains. While no statewide or national data is available, Sumter found no information to suggest that small domestic animal remains are being recycled for beneficial use in any county in Florida. Prevalent disposal technologies, burial and burning, potentially present adverse environmental impacts and produce no beneficial products.

A survey of the five counties in the Sumter County area revealed that all five use either incineration or landfill disposal for managing small domestic animal remains. Those counties that burn animal remains transport ashes to local landfills or to waste-to-energy facilities for disposal. Counties that do not operate crematories transport remains directly to landfills for disposal. None of the counties surveyed recover any beneficial use from the material.

Many small counties in Florida, like Sumter County, do not operate landfills and do not generate sufficient quantities of this material to justify the expense of incineration equipment. Counties that do not operate landfills or crematories must dispose of animal remains by burial, a disposal method that produces no beneficial products, presents material handling problems, and poses potential risks associated with disposal in unlined excavations. For large counties that generate substantial quantities of material, composting offers the opportunity to divert material from landfills, eliminate landfill or waste-to-energy tip fees, and produce a beneficial product.

Understandably, the nature of this material tends to discourage public discussion of current disposal practices and community involvement in planning for material management. Inside the solid waste industry, the material is rarely discussed. Consequently, animal control agencies and solid waste planners have had little incentive to develop alternative technologies. The Sumter project presented an opportunity to evaluate the operational and economic feasibility of composting small domestic animal remains as an alternative to conventional disposal methods.

1.2 Project Objectives

The general objective of Sumter's project was simple. The project was designed to demonstrate the operational and economic feasibility of using advanced composting technology to recycle two organic materials not currently being recovered for beneficial use. Sumter's project addressed specific objectives of interest to the Florida Department of Environmental Protection (DEP), the USPS, and Sumter County.

From DEP's perspective, the objective of the Sumter project was to demonstrate the feasibility of using composting technology to expand recovery to nontraditional materials. The success of the Sumter project is expected to encourage other counties to implement similar recovery programs and, thus, increase statewide recovery rates.

Sumter's project incorporated USPS objectives mandated under the agency's "Policy for Environmental Protection." This policy, which articulates USPS's commitment to environmental protection as a sound business practice and as the "responsible thing to do," specifically obligates the agency to "foster the sustainable use of natural resources by promoting pollution prevention, reducing waste, recycling, and reusing materials." Since no agency or grant funds were allocated to the USPS for the Sumter project, USPS project activities were designed to impose no additional costs and only minimal additional expenditure of labor hours.

The project also addressed several Sumter objectives. By demonstrating the operational and economic feasibility of processing USM, the project was expected to help establish Sumter's composting technology as an effective and flexible system for maximizing diversion from disposal. Because the project enabled Sumter to implement system modifications and expand infrastructure to accommodate source-separated organic feedstocks, it has paved the way for processing other non-traditional materials. In addition, the project forged a new and mutually beneficial partnership between Sumter and the USPS and established Sumter as a potential recycling service provider for other USPS facilities.

Sumter's objectives with regard to the second, smaller component of the project, processing small domestic animal remains, were threefold. Sumter hoped to eliminate potential environmental risks associated with burying the material, demonstrate the operational and economic feasibility of composting the material, and develop material handling procedures and composting guidelines for use by other counties.

1.3 Formal Presentation of Project Results

While this project will undoubtedly be the topic of other future presentations, the Sumter USM recycling project was formally presented for the first time at the 1999 RecycleFlorida Today (RFT) Annual Conference and Exhibition held May 16-18, 1999 at Stuart, Florida. Anne Cazares, District Environmental Coordinator for the Suncoast District of the USPS, presented an overview of project activities and preliminary results. A copy of the RFT Annual Conference and Exhibition program documenting the presentation is attached as Attachment A, *Formal Presentation*.

The project has also been submitted for presentation at the National Recycling Coalition (NRC) Congress and Exhibition in September 1999. The proposed presentation, which is being considered by the Executive Steering Committee for the NRC-FEE Confluence Program ("Federal Track"), is being jointly proposed by the Suncoast District and Sumter County.

SECTION 2.0

PROJECT IMPLEMENTATION

2.1 Equipment and Services Acquisition

To meet the objectives of the USM recycling project, Sumter acquired additional equipment, completed modifications to the compost processing system, installed a lab center and testing equipment, and procured additional services. Attachment B, *Expenditures by Project Element*, presents a summary of all project expenditures by budget category.

To provide USM collection service to participating USPS facilities, Sumter procured a (previously-owned) roll-off truck, roll-off containers, and load locks. Sumter also procured a front-end loader for loading USM into the in-feed system and expanded the existing MRF building to accommodate a new, direct in-feed system. Once USM processing was underway, conveyor covers and a motorized conveyor sweeper were added to reduce litter. To ensure the success of the market demonstration element of the project, Sumter leased a ¼-inch trommel screen to process finished compost for distribution to USPS facilities.

A lab center and associated testing equipment was installed to support compost testing and data analysis activities. The new lab center will enable Sumter to more accurately test and monitor moisture content, oxygen levels, and temperatures and to compile and analyze test data to develop more effective quality control procedures.

Sumter procured professional engineering services to site and permit MRF modifications and solid waste consulting services to implement and monitor USPS participation, manage project administration, and develop educational deliverables.

2.2 Implementation of Cooperative Recycling Effort

Sumter's project represents a regional approach to developing innovative recycling solutions. The project was carried out by Sumter County in partnership with five USPS facilities located in five separate communities in Pasco and Hillsborough Counties. This regional approach is essential for forging the municipal-agency partnerships necessary to implement USM recycling programs throughout Florida.

Sumter's regional approach is an important prototype for future USM recycling programs. Because of the material's low market value, successful USM recycling depends upon taking advantage of the existing USPS infrastructure to maximize recovery rates and reduce collection costs. The USPS transportation infrastructure presents a challenge for municipal recycling programs. Since the mail delivery system is based on population distribution rather than political boundaries, USPS organizational structures are not congruent with municipal recycling programs. As a result, USM recycling cannot be easily implemented through municipal recycling programs. In order to develop the USM composting project, Sumter first had to identify the relevant USPS operational structures and enlist the cooperation of appropriate USPS management staff.

The USPS is organized into districts that typically span several counties. For example, the Suncoast District on Florida's west coast stretches from Collier County north to Sumter County. Each district includes distribution centers that receive and process mail for area post offices. The Suncoast District includes distribution centers located in Ft. Myers, Bradenton (Manasota), Tampa, Lakeland, and Zephyrhills. The Zephyrhills facility processes and distributes mail to smaller post offices in Dade City, Land O'Lakes, and Odessa in Pasco County and Lutz in Hillsborough County. Distribution centers like the Zephyrhills facility are pivotal to the success of USM recycling since they can serve as centralized collection sites for material back-hauled from local post offices in the area.

USM recycling programs begin with the participation of USM distribution centers but also depend upon the support of local post offices served by those centers. While district environmental compliance coordinators have responsibility for identifying objectives and facilitating recycling activities throughout the district, local post masters retain considerable autonomy and have primary responsibility for implementing recycling programs for their facilities. Thus, development of a fully-committed USM program depends upon the voluntary cooperation of individual post masters and requires considerable coordination among participating facilities.

The potential implications of the Sumter project are enormous. The Sumter project, which crosses political boundaries to accommodate existing USPS infrastructure, demonstrates the regional approach that will be necessary if the USPS is to achieve its UBBM recycling goals. Sumter's project will serve as an important model for Florida communities seeking to expand existing programs. More importantly, the project can also serve as the spark that will ignite

development of USM composting programs throughout the United States that can recover up to 90 percent of that agency's waste stream.

2.3 Project Elements and Timeline

Sumter's project was made up of three major elements. The major element of the project entailed the recovery of USM through composting to produce Class A compost. The second element of the project was designed to demonstrate the benefits of recovering small domestic animal remains from the municipal solid waste stream, and the third element was intended to disseminate information about the project and its results. The three elements of the project are described in more detail in the following subsections.

2.3.1 Composting Undeliverable Standard Mail

The major element of the project expanded existing USM recycling options and demonstrated the benefits of USM composting. Sumter County collected USM generated by post offices located in Zephyrhills, Dade City, Land O'Lakes, Lutz, and Odessa, Florida. Participating USPS service facilities recovered USM and back-hauled the material to the Zephyrhills Post Office, a central mail processing plant for the area. Sumter collected the material at the Zephyrhills Post Office and transported it to the County's Solid Waste Facility where the material was loaded directly into Sumter's enclosed compost digester without additional sorting or processing. Following initial processing in the digester, partially composted material was transferred to a finishing area for final "curing" and finishing.

The USM recycling project was designed to take full advantage of existing USPS infrastructure and resources. Specifically, the Zephyrhills facility is a central processing plant that processes mail coming into the area and distributes it to local post offices in Dade City, Land O'Lakes, Lutz, and Odessa for final sorting and delivery to recipients. Each day, USPS mail trucks are loaded at the Zephyrhills facility, transport mail to the four post offices, and return empty to the Zephyrhills plant. This in-place transportation system offers a cost-effective and efficient means for back-hauling USM to the Zephyrhills plant for collection and processing.

To implement USM recycling, each participating USPS facility was provided with covered, wheeled containers suitable for storing recovered USM. As part of daily operations, USPS staff deposited recovered USM in these containers, and filled containers were loaded onto empty USPS trucks returning to the Zephyrhills plant. At the Zephyrhills plant, containers were

removed from trucks and emptied into covered roll-off containers for temporary storage. Empty wheeled containers were returned to participating USPS facilities via outgoing mail trucks from the Zephyrhills facility.

As frequently as necessary, Sumter County Solid Waste collected roll-off containers and transported USM to the Sumter County Solid Waste Facility. At the facility, the material was unloaded directly from roll-off containers by means of a front-loader into an in-feed hopper and onto a direct-feed conveyor for input into the compost digester without further processing or sorting. Processed MSW was also added to the digester, along with the appropriate quantities of nitrogen source material and water required to support the aerobic composting process. A lab center and compost testing equipment included in the project was installed to support testing activities throughout the compost production process. Oxygen levels, temperature readings, and moisture content were monitored and adjusted throughout processing to ensure optimal conditions for decomposition.

After processing in the digester for approximately three days, partially composted material was discharged, screened, and deposited in windrows in the compost finishing area, an enclosed area where compost is protected from exposure to weather and excessive moisture. In the finishing area, turning machines periodically agitate and aerate the compost to complete the composting process and produce the best quality compost.

As part of the project, Sumter made up to 500 cubic yards of USM-content compost available to the USPS for use in landscaping and soil amendment applications. This portion of the project is particularly important to the long-term transferability of this element of the project since the USPS is committed to developing “closed-loop” recycling programs for USM. To ensure consistent particle size and texture, Sumter arranged for rental of a ¼-inch finishing screen to process USM-content compost for USPS distribution.

2.3.2 Composting Small Domestic Animal Remains

The second element of the project involved recovering small domestic animal remains, a non-traditional material universally present in the MSW stream that is not currently being recycled. Historically, disposal options for animal remains have been limited to incineration and burial. Florida regulations [Section 823.041(1), F.S.] require animal owners and custodians to dispose of the carcasses of diseased animals by burning or burial at least two (2) feet below the surface but impose no restrictions on public disposal technologies. Regulations do not require that these

remains be disposed of in Class I landfills or in lined excavations to eliminate the risk of ground water contamination. Further, regulations do not address the disposal of healthy, humanely euthanized animals.

Sumter's project was designed to demonstrate the advantages of in-vessel composting to recover a beneficial product from this material. The Sumter County Animal Control Department is located adjacent to the Sumter County Solid Waste Facility. Received or impounded small domestic animals that are not claimed or adopted are routinely euthanized at the Animal Control facility. During the project, animal remains were transported to the Solid Waste Facility by means of a front-loader, loaded into an in-feed hopper, and input into the compost digester by a direct-feed conveyor. Processed MSW was also added to the digester, along with appropriate quantities of nitrogen source material and water required to support the aerobic composting process.

In the compost digester, the aerobic process pasteurizes the material, eliminating the risk of potential soil or groundwater contamination, and produces a beneficial compost product. After processing in the digester for approximately three days, the partially composted material was discharged and handled following the procedures described in subsection 2.3.1, *Composting Undeliverable Standard Mail*, above.

2.3.3 Public Education and Information Dissemination

To help realize the potential long-term value of this project, Sumter has committed substantial efforts to public education and information dissemination. The Sumter County Solid Waste Facility attracts large numbers of visitors each year and hosts tours by state, regional, national, and international recycling groups. The facility is recognized for its state-of-the-art technology, and it serves as an appropriate site for promoting innovative technologies.

In addition to formally presenting the project at the Annual RFT Conference and Exhibition in May 1999, Sumter also conducted additional educational activities designed to promote composting and to facilitate recovery of material not presently being recovered from the MSW stream. The following subsections describe the public education and information dissemination activities the County conducted in connection with this innovative recycling project.

Educational Brochure: Sumter developed and produced an educational brochure describing MSW recycling and composting operations at the Sumter County Solid Waste Facility for

distribution to visitors to the facility and to other Florida solid waste departments. The brochure particularly focuses on expanding MSW composting to non-traditional materials and includes a description of the County's USM project. A copy of the brochure is included as Attachment C, *Educational Brochure*.

Educational Diskette: Sumter developed and will copy for distribution a PC-compatible diskette presenting information about MSW recycling and composting. The diskette includes a summary of Sumter's more than ten years experience with MSW composting, documentation of the benefits of MSW composting, and guidelines for MSW compost marketing. The diskette will be available on request at no charge. A print copy of sample text from the diskette is included as Attachment D, *Educational Diskette*.

Educational Digital Slide Presentation: Sumter developed and will produce an educational digital slide show presentation in electronic CD format suitable for general audiences and students. The digital slide presentation explains MSW composting at Sumter County, describes the benefits of this technology, and promotes the use of MSW as a high quality soil amendment. The digital presentation will be used to supplement visitors' tours of the facility and will be available to community groups and schools for educational and classroom use at no charge. Print copies of a representative sample of the digital presentation is included as Attachment E, *Educational Digital Slide Presentation*.

Educational Workshop: Sumter County conducted a compost workshop on July 8, 1999. Twenty-three participants representing municipal recycling and composting programs, private organics recyclers, University of Florida Extension Service, University of Florida IFAS, University of Florida Master Gardeners Program, and DEP attended. The workshop consisted of four presentations and a tour of the Sumter County Solid Waste Facility. A copy of the workshop agenda is included as Attachment F, *Educational Workshop*.

2.3.4 Project Timeline

The timeline for Sumter's innovative recycling project is summarized below.

INNOVATIVE RECYCLING PROJECT TIMELINE		
Activity	Initiation Date	Completion Date
Project Initiation	May 16, 1998	June 30, 1998
Procurement of Equipment	June 1998	August 1998
Extension of MRF Building	June 1998	October 1998
Installation of Direct-Feed System	September 1998	October 1998
Installation of Lab Center	January 1999	March 1999
Materials Processing	December 1999	June 1999
Compost Monitoring and Testing	January 1999	June 1999
Development of Educational Materials	April 1999	June 1999
Educational Workshop	April 1999	July 8, 1999

2.4 Problems Encountered and Solutions Developed

No major problems were encountered in connection with implementing this project. However, several unanticipated situations arose that necessitated minor adjustments to project implementation scenarios and budgets. The steps taken to overcome these challenges are valuable lessons learned for other jurisdictions planning similar USM recycling programs. The difficulties and the solutions developed are discussed in the following paragraphs.

Original project plans called for Sumter to provide approximately 25 recycling containers to participating USPS facilities for collecting and back-hauling USM to Zephyrhills. Following project initiation, project participants learned that because USPS policies prohibit the agency from accepting “gifts” or “donations” in any form, participating USPS facilities could not accept containers purchased with grant funds. Furthermore, since other USPS policies prohibit the USPS from transporting any equipment not owned by the USPS, Sumter could not “loan” recycling containers to participating facilities. To overcome these technical obstacles, the Environmental Compliance Coordinator of the Suncoast District arranged procurement of recycling containers for participating facilities, and Sumter agreed to grant the USPS a credit against recycling processing fees to offset the cost of the containers.

An unfortunate event delayed material processing by approximately one month. On October 23, 1998, a fire occurred in the Zephyrhills Post Office that destroyed administrative offices and caused severe smoke and heat damage throughout the facility. As a result of fire damage, mail processing operations were temporarily relocated to the rear parking lot, the loading dock, and outside services areas. These disruptions to normal operations created additional congestion in the USM recycling area and placed additional demands on staff. Consequently, the Zephyrhills Post Master requested a delay in start up of USM process from November 15th to December 14th.

Only minor operational problems occurred in connection with initiation of USM recovery and back-hauling from Dade City, Land O'Lakes, Lutz, and Odessa. Initially all participating facilities were supplied with three USM recycling hampers. Lutz, the second largest USM generator, occasionally used alternate containers for back-hauling, a practice that made handling more difficult for Zephyrhills staff. To eliminate this operational problem, operating requirements were communicated to participating facilities, and additional USM hampers were obtained to handle Lutz's USM quantities.

The Zephyrhills Post Master initially expressed some concern regarding the additional labor hours that USM handling for four other facilities might impose on his labor budget. To minimize loading time, Sumter recommended, procured, and installed a system of cargo load locks that facilitates manual loading of USM and reduces loading time. Zephyrhills staff developed uniform collection and back-hauling procedures for handling USM. As a result, the Zephyrhills Post Master reported that the project had little negative impact on his labor hour budget, and the Zephyrhills staff is now handling USM for all five locations in a little more time than was formerly required for handling only USM generated on-site.

Since USM generation rates increase dramatically when winter residents return North after Easter, quantities of recovered USM increased during the fourth quarter of the project period. This increase in quantities of recovered USM exacerbated litter control problems associated with processing paper at the Sumter County Solid Waste Facility, and Sumter undertook additional modifications to the in-feed system to resolve the problems. To control wind-blown litter, Sumter procured and installed metal covers for the in-feed conveyor system to reduce the effects of wind and to improve material management during loading. Sumter also procured and installed a conveyor cleaning brush and motor to remove sludge residue and paper fragments from the rotating in-feed conveyor.

Finally, during the fourth quarter of the project period Sumter also addressed and resolved a compost marketing issue. Sumter County typically uses County-produced Class A compost in road and other public works projects. Because participating USPS facilities expressed interest in using USM-content compost for landscaping projects, Sumter determined that a more finely-finished compost product would be more suitable for the USM market demonstration project. To produce fine quality Class A compost suitable for distribution to participating USPS facilities, Sumter procured rental of a ¼-inch trommel screen for processing finished compost to remove trace foreign matter and to ensure consistent texture.

SECTION 3.0 PROJECT RESULTS

3.1 How Project Objectives Were Met

The general objective of Sumter's project was simple. The project was designed to demonstrate the operation and economic feasibility of using advanced composting technology to recycle two organic materials not currently being recovered for beneficial use. The project achieved this general objective as well as more specific objectives of interest to DEP, the USPS, and Sumter County.

From DEP's perspective, the most important objective of the Sumter project was to demonstrate the feasibility of using composting technology to expand recovery to non-traditional materials. Sumter's project launched successful local programs for recycling USM and small domestic animal remains that will survive the project for years to come. These successful prototypes will encourage other counties to implement similar recovery programs and, thus, increase statewide recovery rates.

With respect to the USPS, participating USPS facilities are pleased with the program and plan to continue USM recovery and recycling with Sumter County. Both the Zephyrhills Post Master and the Environmental Compliance Coordinator consider the Sumter project to be a successful innovative model that other USPS facilities will want to duplicate. While participation is somewhat limited by existing transportation routes and the availability of back-hauling, the Zephyrhills Post Master hopes to be able to include additional facilities when transportation routes are restructured. The Environmental Compliance Coordinator hopes to initiate programs with Sumter County and other area service centers.

The project also achieved Sumter County's objectives. By demonstrating the operational and economic feasibility of processing USM (and small domestic animal remains), the project has helped establish Sumter's composting technology as an effective and flexible system for maximizing diversion from disposal. Because the project enabled Sumter to implement system modifications and expand infrastructure to accommodate source-separated organic feedstocks, it has paved the way for processing other non-traditional materials.

3.2 How the Project Used Advanced Technologies or Processes

The Sumter project demonstrated the use of technologies that are not in common use on a statewide basis in jurisdictions of similar size or demographics. The project was conducted at the newly-constructed Sumter County Solid Waste Facility, a state-of-the-art integrated recycling and composting facility that combines a front-end materials recovery facility with an in-vessel compost digester system.

The Sumter County Solid Waste Facility has the only operating MSW digester in Florida. Thus, the project's technology is "advanced" according to DEP project criteria. Furthermore, this project is the first in the United States to process USM in an aerobic digester to produce Class A USM-compost.

3.3 How the Project Led to Greater Quantities of Recovered Materials

The Sumter project demonstrated the capacity to recycle virtually 100 percent of USM being generated in the Zephyrhills service area. Prior to project initiation, only two of the five participating USPS facilities were recovering USM for recycling. Based on previous recycling service records, the Zephyrhills Post Office was recovering from 10 to 14 tons per month, and Lutz was recovering from 3 to 7 tons per month. Under previous service agreements, the USPS had no assurance that this material was being recycled since local commercial recyclers who collect USM may dispose of the material if a market is not available.

During the project period, recovery rates increased to about 30 tons per month, and 100 percent of recovered material was recycled into USM-content Class A compost. In addition to the guarantee that 100 percent of the material was being recycled, the USPS also has the beneficial use of USM-content compost for use locally in landscaping projects.

Prior to project initiation, Sumter County disposed of small domestic animal remains by burial and derived no beneficial use from the material. During the project period, 100 percent of this material was recycled into Class-A compost. Aside from eliminating the risk associated with burial in unlined excavations, the project created a beneficial use for this material.

3.4 Transferability of Technology and Processes

Six days a week, 52 weeks a year the USPS delivers mail to virtually every person in the country through a well-developed infrastructure. The USPS handles over 180 billion pieces of mail each year, and nearly **40%** of that volume is business-generated correspondence, magazines, and advertising that the USPS calls Standard Mail. Since Standard Mail is typically mailed at third class rates, it is not forwarded or returned to the sender when it cannot be delivered to addressees, and postal facilities must properly dispose of thousands of tons of USM each year. Since the USPS estimates that USM makes up **70%** to **90%** of the agency's waste stream, USM recycling offers the opportunity to approach a zero disposal rate.

Every USPS mail facility in Florida, from the smallest neighborhood post office to regional mail distribution centers at major international airports in large metropolitan areas, generates USM. Central Forwarding Facilities, specialized processing centers that handle mail forwarding services for other postal locations, are particularly large USM generators.

USM generation rates are especially high in Florida because of the State's seasonal population. While first class mail is forwarded to temporary residents when they return to their permanent residences, USM is not, and USM generation rates soar during Florida's off-seasons. Even small Florida communities experience several times their usual generation rates when winter residents return north. Fluctuating generation rates place additional strain on already limited paper recycling markets and make it more difficult for recyclers to market the material.

Similarly, every community in Florida faces the challenge of managing small domestic animal remains. In addition to animals that either die or are euthanized under the care of privately practicing veterinarians, animal control agencies euthanize thousands of animals in Florida each day. Even small counties like Sumter County must dispose of one to two hundred carcasses a month and one to two thousand carcasses every year, and this rate is increasing. Although data is not available on a statewide basis, preliminary project surveys indicate that larger communities dispose of hundreds of dead animals per week and tens of thousands each year. Thus, every community in Florida can take advantage of the innovative recycling technology demonstrated by the Sumter project.

The technology demonstrated by Sumter's project is highly transferable and easily adapted to existing MSW and yard waste composting operations. Sumter's project demonstrated that both

USM and small domestic animal remains are suitable feedstocks for existing in-vessel composting systems. With relatively limited modifications to accommodate direct in-feed of these materials without additional processing, existing in-vessel composting systems can create markets for USM. In addition, the Texas A & M project has demonstrated that with minimal preprocessing, USM can be composted in windrows. Thus, USM could be introduced as a desirable carbon source to improve the quality of the compost being produced by Florida's numerous existing yard waste composting facilities.

USM composting is also an attractive alternative for communities where composting technology is not presently in use. Composting technology is relatively inexpensive to acquire and operate and is especially flexible in design and capacity. Windrow composting systems can be adapted for backyard, institutional, or municipal settings and can be designed to process from a few cubic yards a week to hundreds of tons per day. Thus, municipal and private-sector USM composting operations can be developed in proximity to USM sources and can be designed to accommodate available USM supplies.

While small domestic animal remains are biologically suitable for windrow composting, aesthetic considerations make in-vessel composting more appropriate for this material. In-vessel composting technology is also extremely flexible, widely available, and relatively inexpensive to own and operate. Commercially available in-vessel systems range in capacity from two or three cubic yards to sixty tons per day. Small three- to five-cubic-yard capacity in-vessel digester systems can be purchased for as little as \$5,000 to \$6,000.

These small, commercially-available in-vessel composting systems offer an attractive alternative to conventional MSW disposal methods. These systems are available in a modular design that can be easily expanded. With a modest initial investment, municipalities and counties with limited resources can implement a composting system to manage animal remains in a safe, economical, and environmentally sound way.

Both of these nontraditional materials are universally present in significant quantities throughout Florida, and both are relatively easy to segregate and cost-effective to collect. Particularly in the case of USM, the USPS is highly motivated to recover the material and offers an in-place transportation system to haul the material to central locations for collection. Because of the nature of the material, small domestic animal remains are generated and managed at centralized locations and are source separated for processing. On the material supply side, all the circumstances necessary to implement a successful recycling program for these materials are

present. Sumter's innovative project provides the necessary technology to create a stable, accessible, and expandable process for recovering these materials for beneficial use.

Obviously, public education and information dissemination is crucial to implementing recycling programs for these two non-traditional materials. Other Florida communities and private sector recyclers must be informed of the availability of the materials for recovery, the accessibility of the technology for processing the materials, and the economic viability of the proposed recycling programs. To accomplish this important objective, Sumter's project included a substantial public education and information dissemination component in addition to the presentation required by the project.

By providing information about project in a variety of formats and widely distributing this information, the Sumter project will facilitate the development of similar programs in other communities. The potential for expanding USM recycling is particularly promising. In addition to municipal USM composting programs like Sumter's project, USM composting offers private sector recyclers unique opportunities for developing projects in partnership with the USPS. Sumter County is proud of its state-of-the-art recycling and composting facility and is convinced that its innovative technology will serve as a model for other Florida communities.

3.5 Detailed Analysis of Cost Effectiveness

The County's project demonstrated that composting is an economically viable and cost-effective alternative to existing recycling and disposal options for both USM and small domestic animal remains. Over 80% of the project budget was earmarked for recycling infrastructure with a useful life of 10 to 15 years. This infrastructure will allow Sumter to not only continue to recycle the two nontraditional materials included in this project but also to expand MSW composting in the future to other non-traditional materials that can be direct-fed into Sumter's digester. Thus, while the costs of the project will be substantially recovered in the next few years, the project will continue to produce benefits for many years to come.

Because neither USM nor small domestic animal remains is currently being recycled, statewide average recycling costs are not available. Currently, USM recycling is extremely limited, and USM that is not separately recovered is collected and disposed of as Class I solid waste. A preliminary project survey indicated that small domestic animal remains are not presently being recovered for beneficial use. Thus, a portion of project costs will be recovered through

avoidance of \$50 to \$70 per ton disposal costs and production of a beneficial product with a market value of approximately \$20 per ton.

When USM is recycled, recovered USM is collected at individual USPS service locations by local recyclers. Typically, these local recyclers can market limited amounts of USM by tying the material to more desirable commodities such as OCC or ONP. This marketing strategy devalues higher quality commodities and creates market problems by forcing acceptance of USM. End-users forced to accept USM in order to get better products eventually dispose of large quantities of unusable USM at landfills. Even if recyclers can market limited quantities of USM by combining it with more valuable commodities, they are unable to market the quantity of material that would be generated by a fully-committed USM recycling program.

In addition to limiting the quantity of USM that can be recovered, current recycling arrangements impose other limitations. Because USM is difficult to market to traditional recycled paper markets, local recyclers must charge the USPS premium rates for collecting, transporting, and marketing or disposing of the material if unmarketable. Under these arrangements, the USPS has no opportunity to offset transportation costs by taking advantage of USPS truck fleets to back-haul material to a central collection site. Moreover, once USM is collected by local recyclers, the USPS has no guarantee that it will not be disposed of if unmarketable and no opportunity to procure USM-content products.

Project participants that previously recycled USM paid a minimum of \$30 per ton plus \$100 per pickup for recycling service. Sumter's project reduced those costs by more than half. Sumter's USM recycling project improved cost-effectiveness in four ways:

- Reduced transportation and handling costs
- Eliminated preprocessing expenses
- Produced a valuable USM-content end-product
- Reduced undesirable environmental impacts

Sumter's project improved cost effectiveness by reducing transportation and handling costs in several ways. First, by using empty USPS trucks to back-haul material to a central collection site, the project eliminated a substantial portion of transportation costs for collection. Second, by collecting the material in roll-off containers at a central location, the project maximized economies of scale and reduced material handling costs. Finally, the project eliminated

marketing costs by processing the material locally rather than transporting it long distances to major recycled paper markets with the hope that some portion would be recyclable.

Sumter's project also eliminated the need for expensive pre-processing. Recovered USM was loaded directly from roll-off storage into Sumter's compost digester without additional sorting or pre-processing. Unlike the recycled paper manufacturing process, this innovative composting technology eliminates the need to sort, compact, bale, wash, bleach, chemically treat, or otherwise pre-process USM to prepare it for recycling.

Sumter's project produced a viable USM-content end product suitable for procurement by the USPS. Sumter has been producing MSW compost for more than ten years and during that time has used MSW compost in a variety of landscaping and public works applications. Based on this extensive experience, Sumter has concluded that the use of MSW compost results in substantial savings and produces superior results compared with top soil and other soil amendments.

In the case of small domestic animal remains, Sumter's project improved cost effectiveness by reducing labor costs for material handling and by producing a valuable end product from material that was not previously being recovered. (Communities where the material or ash residue are landfilled could expect to achieve additional substantial savings from disposal cost avoidance.)

Finally, for every ton of USM that is back-hauled and every ton of animal remains that are composted, environmental impacts are reduced. Composting these materials conserves valuable resources by reducing fuel, tire, and vehicle consumption and decreasing wear on roads highways. Composting reduces energy consumption in processing and diverts material from landfills. Moreover, "closed-loop" recycling continues to be one of the most environmentally desirable recycling options.

While composting these materials offers immediate benefits for Sumter County, the long-term benefit of the project is its greater value as a demonstration for other Florida communities. Sumter's project helped demonstrate that composting is an economically viable, environmentally sound alternative to traditional recycling technology that can help Florida increase recycling rates by expanding MSW and yard waste composting to include these and other non-traditional materials.

3.5.1 Project Costs by Element

Attachment G, *Costs by Project Element*, presents a summary of all project costs by project element.

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. Attachment H, *Project Expenditures by Funding Source*, summarizes contributions to the project by funding source.

3.5.3 Savings through Tip Fee Avoidance

The Sumter project recycled over 100 tons of USM and recycled nearly 30 tons in June alone. As the program continues and recovery procedures become routine, the USM program is expected to recycle between 25 and 30 tons per month. Prior to project initiation only two of the five participating USPS facilities were recycling USM, and only 13 to 21 tons per month were being recovered. Thus, the project is diverting at least 10 tons per month of additional material from disposal. Since area disposal fees typically range from \$50 to \$80 per ton, the project saved from \$500 to \$800 per month in disposal cost avoidance.

The true impact of the project is probably even greater than the project's increased recovery rates suggest. While two USPS facilities were recycling USM through local paper recyclers prior to project initiation, a portion of that material was probably being disposed of because of weak demand, low prices, and high contamination. In other words, while 100 percent of USM recovered by the project was recycled into Class A compost, only a small percentage of the material previously collected by local paper recyclers was actually used to produce recycled paper.

In addition to savings through tip fee avoidance, the Sumter project produced recycling cost savings for participating USPS facilities. Because USM has little market value for conventional paper recyclers, the USPS must pay premium rates for recycling services. Prior to project initiation, participating USPS facilities were paying approximately \$30 per ton plus \$100 per pull for USM recycling services (or \$1,300 per month for 30 tons of material and 4 pulls). The

Sumter project reduced these recycling costs dramatically to \$800 per month for the same service.

Since the Sumter County Animal Control Department buried small domestic animal remains on site, that element of the project did not produce savings through tip fee avoidance. In communities where this material is incinerated or landfilled, substantial savings would be realized through tip fee avoidance.

3.5.4 Cost/Benefit Ratio for the Project

Using conservative assumptions, the Sumter USM project generated \$30,600 in combined benefits on an annualized basis from disposal cost avoidance and value added. Disposal cost avoidance benefits are estimated to be between \$50 and \$80 per ton, and value added benefits are estimated to be approximately \$20 per ton. Assuming a recovery rate of 30 tons per month, calculations for combined cost benefits are summarized below:

\$23,400/year	Average benefit from disposal cost avoidance for 360 tons of USM
\$7,200/year	Average benefit from value added to 360 tons of USM
\$30,600/year	Combined average benefits from cost avoidance and value added

At this recovery rate, capital costs will be recovered in less than 8 years, and grant funds will be fully recovered in less than 10 years. Cost recovery calculations are summarized below.

\$243,100 (Capital Costs) divided by \$30,600/year (Cost Recovery Rate) equals 7.9 years.

\$299,600 (Grant Funds) divided by \$30,600/year (Cost Recovery Rate) equals 9.7 years.

3.6 How the Project Enhanced Marketability of Non-Traditional Materials

Clearly, the Sumter project enhanced the marketability of both USM and small domestic animal remains. Most of the USM generated by USPS facilities throughout Florida is entering the MSW stream because the material has little value to traditional paper markets. Small domestic animal remains are not currently recovered for beneficial use in any Florida jurisdiction. Both materials are generated by government agencies and are normally disposed of as solid waste.

The Sumter project successfully demonstrated the operational and economic feasibility of processing these two non-traditional materials into Class A compost with an estimated market value of \$20 per ton. The project demonstrates the economic and environmental advantages of adopting a regional approach to recycling challenges to take full advantage of existing agency infrastructures. In addition to disposal cost avoidance and value added benefits, the project also produced intangible benefits by reducing negative environmental impacts and eliminating health and safety risks.