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October 5, 2009

Johanna Poston
Waste Reduction Section
Florida Department of Environmental Protection
2600 Blair Stone Road, MS 4555
Tallahassee, FL 32399-2400

Re: **Innovative Waste Reduction and Recycling Grant IG8-06**
“MRFing Our Way to Diversion: Capturing the Commercial Stream”
Final Report

Dear Johanna:

In accordance with Pinellas County’s Grant Agreement IG8-06 with the Florida Department of Environmental Protection (DEP), I am pleased to submit the final report. This letter report follows the outline specified in the grant agreement. Attached are the two major deliverables resulting from this project, *Materials Recovery Facility Technology Review* and *Materials Recovery Facility Feasibility Study*.

INTRODUCTION

Background

One of the greatest potential obstacles to increased recycling in the Tampa Bay area (Pinellas, Hillsborough and Manatee counties) is lack of processing infrastructure. This is best demonstrated by recent efforts in all three counties to promote recycling to businesses and commercial property managers, which have been seriously hindered by limited action from private-sector recyclers to collect additional volumes of commercial recyclables in a manner that provides convenient and cost-effective alternatives to disposal. Therefore, a publicly driven initiative may be needed to expand the area’s commercial recycling infrastructure.

To help address this issue, Pinellas County applied for an Innovative Waste Reduction and Recycling Grant from DEP to conduct (1) a technology review of current processing technologies and facilities and (2) a feasibility study to evaluate the need for a local or regional materials recovery facility (MRF). In August 2007, Pinellas County entered into an agreement with DEP to

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receive the Innovative Grant. This is the final report for the grant project and summarizes the project's objectives, tasks and findings.

Project Goals and Objectives

The ultimate goal is to develop state-of-the-art material processing capacity in Pinellas County or the Tampa Bay area. To work toward achieving this goal, the objectives of this project were as follows:

- Evaluate the potential need for additional processing capacity.
- Review state-of-the-art processing technologies and MRF systems.
- Assess the feasibility of developing additional processing capacity.

Innovation

This project looked at materials processing strategies and technologies that are limited or nonexistent in Florida, as explained below.

- Advancements in processing technologies during the last five years have prompted the development of single stream and even mixed waste MRFs (the old "dirty MRF") in many parts of the country. Commercial waste and C&D debris sort lines are becoming fundamental components of truly integrated solid waste management systems and facilities. Only three single stream MRFs currently operate in Florida, and no true mixed waste MRFs exist in the state.
- Most recovered materials processing facilities (referred to as RMPFs in Florida, but more commonly known as MRFs elsewhere) in Florida were established to process residential recyclables. Elsewhere, increased attention has been paid to recovering the large quantities of recyclables that are generated in commercial and other non-residential sectors. This project focused on the role of the public sector to address the need for commercial processing capacity, either by directly developing a facility or indirectly by creating incentives for private sector investment in processing infrastructure.
- The use of green building design standards has been gaining momentum in numerous types of construction projects, and an increasing number of MRF developers around the country are incorporating these standards into facility designs.

Intended Audience

The primary audience of this project includes public and private sector recycling managers in the Tampa Bay area. However, the information and reports developed as a result of this project, especially the technology review, will be of use to communities throughout the state. It is also relevant to development of a plan to achieve a state-wide 75% recycling rate by 2020.

PROJECT IMPLEMENTATION

Services

Pinellas County Department of Solid Waste Operations (SWO) retained the services of Kessler Consulting, Inc. (KCI) to assist with this project. KCI conducted the research and analysis, coordinated the site visits, and assisted in report preparation. KCI also contributed their industry experience and knowledge, especially regarding MRF operations in other parts of the country.

Project Elements

The key project elements are summarized below.

- **Project Team Communication**
SWO and KCI stayed in regular contact throughout the project. In addition, a project kick-off meeting was held in 2007 with representatives of Hillsborough and Manatee counties. Sarasota County staff also joined in this initial meeting because of their interest in developing local processing capacity. KCI kept Hillsborough, Manatee and Sarasota county staff apprised of project developments that were relevant to each during the course of the project.
- **Needs Assessment**
An initial assessment of the need for additional processing capacity in the Tampa Bay area was conducted. This involved developing a list of the largest MRFs in the tri-county area, compiling relevant information about each, and surveying facility operators for additional information. Information about MRFs in the neighboring counties of Pasco, Polk and Sarasota was also compiled. KCI then compared the quantities of fiber and containers currently recovered in these counties with the throughput and, to extent available, capacity of the processing facilities. Finally, KCI estimated the quantities of residential and commercial recyclables that might reasonably be recovered through expanded and more progressive recycling programs in the Tampa Bay area.
- **Research and Data Collection**
KCI conducted extensive research regarding state-of-the-art processing facilities. In addition to literature reviews, KCI interviewed equipment manufacturers, facility design firms, MRF owners and operators, and staff of select state and local agencies. Extensive time was spent identifying state-of-the-art MRFs for site visits. In particular, limited printed information was found pertaining to mixed waste MRFs; however, visiting such facilities was an important element of this project. Equipment manufacturers and facility design firms provided the most useful information regarding the newest, most technologically advanced facilities.

- Facility Site Visits

SWO staff first visited a number of the Tampa Bay area MRFs that were identified in the Needs Assessment to gain a better understanding of their operations and plans for future expansions or upgrades. In March 2009, SWO and KCI staff visited Orange County's single stream MRF, which is operated by Waste Management (WM). Although we were interested in visiting WM's Reuters facility in Broward County, it was undergoing renovations and was therefore unavailable for a site visit. In May 2009, KCI staff visited eight MRFs in California. Because of out-of-state travel restrictions, SWO staff was unable to participate in these site visits. However, following the California site visits, KCI provided a slide show presentation to SWO staff. These site visits yielded the most useful information and provided first-hand knowledge about recent developments in processing equipment. Provided below is a list of the California facilities that were visited; more detailed information about each facility is provided in the Technology Review:

- Athens Disposal, City of Industry
- Davis Street Station, San Leandro
- CVT, Anaheim
- Green Waste MRF and Zanker Road C&D facility, San Jose
- Puente Hills MRF, Los Angeles County
- Recycle Central at Pier 96 and San Francisco Recycling & Disposal, San Francisco
- Sunnyvale SMaRT Station, Sunnyvale
- Western Placer Waste Management Authority, Lincoln

- Technology Review

Based on the research and facility visits mentioned above, KCI prepared a document entitled *Materials Recovery Facility Technology Review*, which is attached. The report provides an overview of MRF technologies and equipment, description of each facility visited, and a summary of key trends and developments in materials recovery and processing.

- Feasibility Study

KCI then prepared the *Materials Recovery Facility Feasibility Study*, which is also attached. The needs assessment that was conducted at the beginning of the project was updated and included in this report. It evaluates the need for additional processing capacity in the Tampa Bay area by looking at existing processing facilities and material recovery rates, and the potential to recover additional residential and commercial recyclables. Various other factors that affect MRF development are also discussed in the report. These include design options (dual stream, single stream or mixed waste MRFs), adequate and consistent material throughput, facility ownership and operation, demand and markets for recovered materials, and potential costs and benefits. Finally, these various factors are considered in light of existing circumstances in Pinellas County and the Tampa Bay area.

Problem Resolution

Pinellas County requested and received a nine-month extension to the original project period. This additional time was needed because of the lag time between the beginning of the grant period and the agreement execution date, other issues and projects that took priority during the course of the project, and the longer than anticipated time it took to identify and coordinate the MRF visits. No other problems were encountered during the course of the project.

PROJECT RESULTS

Meeting Goals and Objectives

We met all three objectives of this project.

- **Evaluate the potential need for additional processing capacity:** An initial needs assessment was conducted at the beginning of the project, and was updated and included in the Feasibility Study. This assessment estimates that by initiating an effective curbside recycling program in Pinellas County and establishing progressive commercial recycling programs in the Tampa Bay area, an additional 168,000 tons per year of fiber and containers might reasonably be recovered.¹ For Pinellas County alone, this estimate was 80,000 tons per year. Although several MRF operators in the Tampa Bay area indicated having the ability to significantly expand their facilities to provide more processing capacity than the current throughput, the fact that none processes even dual stream recyclables severely limits the ability of these facilities to help Tampa Bay area counties achieve the potential recovery envisioned in this assessment.
- **Review state-of-the-art processing technologies and MRF systems:** This review was completed and is provided in the attached *Materials Recovery Facility Technology Review*.
- **Assess the feasibility of developing additional processing capacity:** This assessment was completed and is provided in the attached *Materials Recovery Facility Feasibility Study*.

The ultimate goal is to develop state-of-the-art materials processing capacity in Pinellas County and the Tampa Bay area. During the three years since Pinellas County submitted this grant proposal, a number of things have occurred to impact this project. First, the county is preparing to issue a bid to establish countywide curbside recycling. We hope that this will spur private sector investment in either dual stream or single stream processing capacity, either by upgrading existing facilities or constructing a new facility to manage these materials. Second, the economic downturn that started

¹ For the purposes of this project, an effective curbside program was considered to be one that recovers at least 400 pounds of recyclable materials per household per year. A progressive commercial program is considered to be one that typically uses tools, such as mandates, education, technical assistance, incentives, design to maximize convenience, and/or enforcement, to proactively encourage recycling participation. Recovery of 25% of commercial recyclables currently disposed in the Tampa Bay area was used as a reasonable target if progressive commercial programs were established.

the latter half of 2008 has affected market prices for recovered commodities and reduced waste flow to the county's waste-to-energy facility. Third, the State legislature passed the 2008 Energy Bill (HB 7135) which calls for 75% recycling by 2020, but includes "any solid waste used for the production of renewable energy" in the definition of recycling.² The need for and feasibility of establishing additional processing capacity will depend upon how these and other factors evolve over the coming years.

Technology or Process Demonstration

Information gathered through the MRF technology review and facility site visits clearly demonstrates recent advancements in processing technologies and system designs. Some of the key findings are as follows:

- Fully integrated systems – Facilities located in areas with high state or local recycling/waste diversion goals tend to have truly integrated systems that are designed to capture all materials possible. In addition to traditional MRF lines, most of the facilities that were visited also had some combination of C&D recovery operations, organics (yard and food waste) recovery or composting, drop-offs for special wastes, and education centers.
- Single stream MRFs – Once thought to be cutting edge, single stream processing is now commonplace in many parts of the country. Fourth and fifth generation single stream equipment lines are producing clean, marketable commodities.
- Mixed waste MRFs – Mixed waste MRFs are again finding a place in solid waste management systems, although not in great numbers. Some communities are using them in lieu of separate collection of recyclable materials, and others are complementing their existing recycling systems by processing waste streams that are more difficult to target for recycling (e.g. multi-family and commercial) in mixed waste facilities. One of the most impressive facilities was in San Jose, California, where single stream and mixed waste lines are found in the same MRF, and actually merge commingled container lines for final separation. San Jose boasts a 75% waste diversion rate.
- Larger, more automated MRFs – With the reduction in material separation at the source comes the need for increased automation and more specialized equipment. In turn, larger MRFs are being built to achieve economies of scale in these more automated and capital-intensive systems. Therefore, although the average capital cost of more highly automated facilities, such as single stream MRFs, is greater than dual stream facilities, the average capital cost per daily ton of throughput is usually lower for single stream MRFs.
- Green building design – Awareness of climate change, the need for sustainability, and rising energy prices are fueling a trend to employ "green" building standards in new construction

² HB 7135, Section 403.7032(2).

and renovation projects, including MRFs. Green attributes include rainwater harvesting systems, solar panels, skylights, energy recovery ventilators and recycled-content building components. Some are seeking LEED[®] certification, which has been estimated to add 2-8% to facility costs, while others are implementing green design concepts without seeking certification.

Additional information about MRF technology developments can be found in the attached *Materials Recovery Facility Technology Review*.

Material Recovery

Although not directly attributable to this project, the county is in the process of establishing a countywide curbside recycling program, which could recover an estimated 30,000 to 40,000 additional tons of recyclables. The county is in the processing of bidding for collection and processing services, which we hope will encourage the private sector to expand or develop dual or single stream processing capacity.

Before further considering the role the county might want to play in developing or creating incentives for additional processing capacity, we plan to review the outcome of the curbside bid and await passage of any state legislation during the upcoming session related to the 75% recycling goal.

Transferability

Electronic copies of the Technology Review and Feasibility Study are included on the attached CD for placement on DEP's website. The results of this project will be presented to the Pinellas Partners in Recycling (Recycling Subcommittee of the Solid Waste Technical Management Committee) and shared with our grant partners in the Tampa Bay area (Hillsborough and Manatee counties) and other interested parties in the surrounding area (e.g. Pasco, Polk and Sarasota counties).

Also attached to this report is an article about the project that we have submitted to RFT and the SWANA Florida Sunshine Chapter for publication in their newsletters. KCI also plans to submit an abstract pertaining to MRF technologies to RFT and SWANA for consideration as a conference presentation.

Last, but certainly not least, we hope that the conclusions of our research will be used by DEP as it develops a plan for achieving 75% recycling by 2020. While Pinellas County's application and award of this grant preceded the Florida Legislature's passing of HB 7135, we feel that the information provided in these reports is directly relevant to the 75% recycling goal. In particular, it is clear to us that Florida is poised to apply the technological developments and policy lessons learned from California, the nation's current leader in waste diversion.

Financial Summary

Provided below is a financial summary by quarter. In-kind contributions include time expended on this grant project by participating county staff. The final Payment Request Form will be submitted under separate cover after all payments have been disbursed.

	Funds Expended	In-Kind Contribution
<i>Project Budget</i>	\$116,500.00	\$38,000.00
<i>Costs for the First Quarter</i>	\$0.00	\$320.00
<i>Costs for the Second Quarter</i>	\$850.00	\$506.00
<i>Costs for the Third Quarter</i>	\$5,597.50	\$605.00
<i>Costs for the Fourth Quarter</i>	\$18,065.03	\$2,865.00
<i>Costs for the Fifth Quarter</i>	\$12,563.98	\$2,232.00
<i>Costs for the Sixth Quarter</i>	\$15,596.79	\$10,113.50
<i>Costs for the Seventh Quarter</i>	\$28,091.94	\$15,440.00
<i>Costs for the Eighth Quarter</i>	\$35,733.14	\$6,446.00
Total	\$116,498.38	\$38,527.50
Ending Balance	\$1.62	-\$527.50

The impact of this project on recycling program cost-effectiveness and efficiency cannot be determined at this time. The findings of this project are being considered by Pinellas County staff to determine what role the county might want or need to play in establishing state-of-the-art processing capacity in the Tampa Bay area.

Conclusions

In conclusion, this project has been very beneficial to Pinellas County. We have not only gained a clearer understanding of local processing facilities, but have also become more knowledgeable about advancements and trends in materials recovery facilities and systems that have occurred in recent years. This information will enable us and our colleagues in the Tampa Bay area to make better informed decisions as we proceed with improvements to our recycling programs and promote the development of state-of-the-art processing capacity to support these programs.

*Johanna Poston
Florida Department of Environmental Protection
October 5, 2009
Page 9*

On behalf of Pinellas County, I express our sincere appreciation to DEP for providing funding for us to undertake this project. Please feel free to contact me if you have any questions or would like additional information concerning the project or final deliverables.

Sincerely,

Andy Fairbanks
Waste Reduction Program Supervisor

Attachments

Materials Recovery Facility Technology Review
Materials Recovery Facility Feasibility Study
CD containing electronic copies of all documents
Article submitted to RFT and SWANA Florida Chapter

xc: Bob Hauser, Pinellas County Solid Waste
Lisa Ledoux, Pinellas County Finance Department
Robin Mitchell, Kessler Consulting, Inc.