



DENVER  
INTERNATIONAL  
AIRPORT  
*TOGETHER WE SOAR*

DIA Environmental Services  
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## RECYCLING RESOURCES ECONOMIC OPPORTUNITY GRANT FINAL REPORT (Draft Copy)

July 31, 2012

### ORGANIZATION INFORMATION

1. **Organization Name:**  
Denver International Airport
2. **Project Title:**  
Plastic Film Capture and Recycling Program
3. **Name of Project Coordinator:**  
Jerry Williams
4. **Project Coordinator e-mail address and phone number:**  
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## II. WORK PLAN

Please use the format provided in the table below for your goals and objectives as listed in your Scope of Work. Indicate the date each deliverable was completed or briefly describe why the deliverable was not completed.

<b>Deliverable</b>	<b>Completion Date</b>	<b>Comments (if deliverable was not completed, please explain why or what progress has been made)</b>
Install plastic film baler.	1/5/2012	
Train DIA employees and tenants on baler operation.	1/10/2012	
Track quantity of plastic film generated and baled.	1/19-Present	

## III. PROJECT SUMMARY

### 1. Executive Summary

Denver International Airport (DIA) generates and disposes of a significant quantity of plastic film as a result of cargo shipping operations. Waste composition studies suggested that up to 100 tons of the plastic film is landfilled annually. This RREO grant funded the development of a plastic film capture and recycling program at DIA, available for use both within the City operations as well as by tenant air freight/cargo operators. The main feature of the program was the purchase of a plastic film baler the enabled the consolidation and economical handling of an existing waste material.

The goals of this this project were to (1) capture the existing plastic film waste stream, (2) divert the plastic film from landfill disposal, and (3) provide a material resource to local recyclers to market the product to manufacturers in need of plastic film as a raw material in their production processes, thus providing a potential catalyst diversion of the film from the landfill for other industries and businesses.

#### **Challenges:**

- 1) Purchase and installation of the film baler,
- 2) Identifying all sources of plastic film generation,
- 3) Methodology and logistics of film collection, hauling, and distribution to the recycler,
- 4) Education of the City employees, tenants, and other businesses wishing to contribute, and
- 5) Continual motivation of the participants.
- 6)

#### **Successes:**

- 1) Purchase and installation of film baler
- 2) Identification of the sources of generation
- 3) Participation of the generators of the commodity
- 4) Diversion of approximately 2 tons of plastic film from the landfill

**Future opportunities:**

- 1) An opportunity exists for DIA to capture the plastic bags used to collect recyclables throughout the public areas of the airport. These bags are currently emptied into the recycling gables and, then, thrown away as trash. The success of this program is dependent on capturing a sufficient quantity to entice a recycler to market the product. Thousands of these bags are generated per week.
- 2) Conduct another Waste Audit of the entire DIA campus to help identify any additional sources of this commodity.

**2. Project Description & Overview of Work Completed**

## Project's goals:

- 1) Establish an in-house plastic film recycling program;
- 2) Divert over 100 tons from landfill disposal;
- 3) Reduce DIA and tenant hauling and disposal costs;
- 4) Generate revenue from a new recycled material stream; and
- 5) Defray the operating costs at DIA, thereby, contributing to the economic vitality of the City and County of Denver.

Bid posted for baler purchase	9/27/2011
PO issued for baler	10/5/2011
Arrangements for hauling and recycling bales accepted by Waste Management	11/5/2011
Electrical/baler installation	11/15/2011-1/5/2012
Forklift training	11/27/2011
Training for DIA employees and tenants	1/10-11/2012
Logistics for staging and management of bales finalized	1/19/2012

**Methodology**

- The baler was placed airside at the joint-use air cargo building, a central location accessible by the major users of plastic film. This group consists of the cargo bays for six airlines including: Alaska, American, UAL/Continental, Delta, Frontier, and Southwest Airlines, along with five air couriers including: DHA Airlines, Federal Express, United Parcel Service, Swissport, and Air General.
- The employees at each location were consulted on the purpose of the program and trained in the operation of the equipment.
- It is the responsibility of each tenant to collect and transport their plastic film, load it into the baler, and compress it. A very simple operation.
- An issue with some of the air couriers is the distance from their facilities to the baler (about ¼ mile). They have to dedicate employee labor and time to capturing the plastic and transporting it to the baler.
- Two outlying locations were identified as generators of the plastic: the receiving department at the central stockroom, and the loading dock in the Airport Administration building where all the concessionaires receive their incoming stock. A collection container was placed at these two locations. A City employee hauls the product down to the baler, as needed.
- Another waste audit is being requested to help locate other possible sources for this material.
- Waste Management Inc. (WMI) was chosen as the hauler and recycler of the bales. The only option available through WMI was to place a 53 foot semi-trailer, detached from the cab, sitting on City property. Once enough product was accumulated to justify the hauling costs, WMI will haul the

trailer to the recycling yard and replace it with an empty one. DIA encountered some unexpected logistical problems with this procedure. Without a loading dock, the only method of loading consisted of pushing the palletted bales into the trailer one at a time. DIA had several concerns about this method, not the least of which was safety. A different staging area was necessary. A temporarily vacant warehouse space at the joint use cargo area was selected. The bales will be staged out of the weather until a sufficient quantity is accumulated. A loading dock on the landside of the building will facilitate loading without any safety issues. In addition, the hauler will not have to enter the airside of the DIA campus, thereby avoiding any air traffic concerns.

#### **Economic/Environmental Benefits**

- It costs DIA \$59.30 per ton to haul and dispose of waste in the landfill. Depending on the purity of the bales, WMI has agreed to haul the product to their recycling center at no cost to DIA in addition to giving DIA rebates based on the current market. This will help defray the operating cost for the Airport.
- The tenants operating at DIA who manage and pay the cost of their own waste stream are encouraged to use this baler which will reduce their operating costs.
- The obvious environmental impact will be to reduce the amount of waste going to the landfill.
- DIA and the transportation corridor along Pena Boulevard will undergo massive expansion over the next decade. With this program firmly embedded in DIA, the benefits of it will be spread throughout this growth (example: the new hotel and train station currently under construction).

#### **3. Summary of Findings & Results**

- Approximately 3600 lbs. of plastic film have been captured. DIA has yet to make the first shipment to WMI. The shipment will be made once 4500 lbs. (5 bales) have been collected.
  - These bales are not 100% plastic film. Some of the cargo airlines have switched to a non-shrink wrap higher density visquine, between 4 and 6 mils. DIA has been mixing this into the bales. This will possibly negatively impact the rebates that DIA will receive from WMI.
  - DIA would like to further co-mingle the plastic film with other plastics generated on the DIA campus. One of which is the recycling bags used to collect recyclables in the public areas of the terminal and concourses. Once the bags are emptied of their recyclables, they are thrown in the trash containers. This will be discussed with DIA's current hauler and other potential haulers for their recycling potential.
  - An additional waste audit is being planned to identify any sources overlooked on the DIA campus.
- The response from the Tenants and the DIA Administration was generally positive and supportive. DIA administration was extremely enthusiastic about the project and was very proactive in the coordination and involvement of the employees and tenants. At first, the tenants were slow to become involved. It took several weeks to work the routine into their system but over time with our constant encouragement and education, it has become a habit in their daily schedule.

#### **4. Summary of Unanticipated Outcomes or Roadblocks**

- Since the RREO funds were not available until after the purchase and installation of the equipment, DIA had to create a system to handle the RREO grant. A special purchase order from which DIA could draw funds was set up for this account.
- Instead of sole sourcing the purchase of the baler, DIA had to send out an RFP to at least three potential bidders.
- The lead time on the baler was five to seven weeks from the date of the order.
- The initial cost estimates for the electrical connection were underestimated due to logistics and location. DIA spent several unanticipated weeks finding a cost effective way to complete this phase of the project.

- Managing the plastic, once baled, was more complex than originally anticipated. Waste Management Inc. (WMI) was chosen as the hauler and recycler of the bales. The only option available through WMI was to place a 53 foot semi-trailer, detached from the cab, sitting on City property. Once enough product to justify the hauling costs was accumulated, WMI would haul the trailer to the recycling yard and replace it with an empty one. DIA encountered some unexpected logistical problems with this procedure. Without a loading dock, the only method of loading consisted of pushing the palletized bales into the trailer one at a time. DIA had several concerns about this method, not the least of which was safety. A different staging area was necessary. A temporarily vacant warehouse space at the joint use cargo area was selected. The bales will be staged out of the weather until a sufficient quantity is accumulated. A loading dock on the landside of the building will facilitate loading without any safety issues. In addition, the hauler will not have to enter the airside of the DIA campus, thereby avoiding any air traffic concerns.
- An issue with some of the air couriers is the distance from their facilities to the baler (about ¼ mile). They have to dedicate employee labor and time to capturing the plastic and transporting it to the baler. Fed Ex is one of the biggest generators of plastic film at DIA and is instrumental to the success of this program. Their participation to date has been sporadic. DIA will continue to work with these couriers to find the most efficient way for them to participate.
- The amount of plastic film available for diversion has not met the original expectations. A waste audit to identify other sources along with the possibility of co-mingling other types of plastic are now being studied.

#### 5. **Communication of Project Findings**

- Formal presentations of the program have been given to all DIA employees and departments along with the airport businesses.
- A discussion of program and results has been conducted at the annual CAFR summit.
- DIA all-user bulletins have been sent out.

#### 6. **Future Impact of the Project**

- There are two hurdles to overcome in recycling any given product: 1) finding a market for it, and 2) segregating and accumulating enough of the product to make it economically feasible. There is a lot of plastic generated at DIA apart from the usual suspects of plastic bottle containers. There is a lot of plastic wrap that is different grade than the preferred plastic film. There are thousands of recycling bags put into the trash compactors on a daily basis. The plastic film is just the tip of the iceberg. Now that DIA has the infrastructure to start managing this product, DIA is investigating the possibilities of extrapolating this effort to other forms of plastic. If DIA can collect enough of the plastic and bale it in a convenient form for the recycler, then there will be a greater chance of opening a market for more products. Once that market has been established, it should be easier for other industries with a similar waste stream to recycle these commodities. The recycling hauler will have to be on board. DIA has received notice from other haulers who are interested in a more varied line of plastics and it is something that DIA will pursue, if necessary. The rebates may not necessarily be there, but if DIA can show a savings from keeping the material out of the land fill, that also will be an impetus for other businesses.

#### 7. **Financial Summary**

See Attachment 1

**8. Conclusion**

To realize the initial goals set, DIA is aware that a long term commitment is necessary to obtain everyone's participation. DIA must frequently review the waste stream to identify all sources of this commodity. The program will always be dynamic. Different types of plastic will have to be introduced to this process. A recycler willing to investigate downstream markets is essential to its success. This will be a long term project.

**9. Appendix**

a. Grant Metrics Table (see Attachment 2)

b. The project was basically in-house on the DIA campus, however, I thought I would include the name and contact numbers of a few of the tenants that are currently contributing to the effort.

1. Air General, Scott Authier, 303 311-0760

2. Swissport (Lufthansa), Paul Robertson, 303 638-7526

c. Pictures (See Attachment 3)

## Attachment 1

### Denver International Airport Grant Budget Table

Description	Grant Funds Spent	Matching/In Kind Amount (if any)	Total Amount
Personnel Salaries	\$0.00	\$6,260*	\$6,250
Fringe Benefits	\$0.00	\$0.00	\$0.00
Tuition/Fees	\$0.00	\$0.00	\$0.00
Travel Costs	\$0.00	\$0.00	\$0.00
Materials/Supplies/Equipment(under \$5000)	\$16,041.42	\$0.00	\$16,041.42
Equipment Purchases (over \$5000)	\$0.00	\$0.00	\$0.00
Contractors/Subcontractors	\$4,028.00	\$0.00	\$4,028.00
Consultants	\$0.00	\$0.00	\$0.00
Training/Education	\$0.00	\$0.00	\$0.00
Marketing/Advertising	\$0.00	\$0.00	\$0.00
Other Direct Costs	\$0.00	\$0.00	\$0.00
Indirect Costs	\$0.00	\$0.00	\$0.00
<b>Total Project Cost:</b>	<b>\$20,069.42</b>	<b>\$6,250</b>	<b>\$26,319.42</b>

\*This figure represents the total hours on in-kind labor at an FTE of \$65.00

**Total award amount: \$21,600.00**

The table above reflects the current allocated funds based on invoices submitted. **You currently have \$1,530.58 remaining in your grant award budget.**

Special note if your project currently has outstanding reimbursements:

Once final reimbursements are submitted and approved, adjust the "Grant Funds Spent" column to reflect all funds spent during the grant cycle. Please add all matching/in kind funds spent during the project. Refer to your scope of work for the amount of matching/in-kind funds you committed for this project. This table must be included in your final report in the "Financial Summary" section.

# Grant Metrics

Date project fully operational:

January-12

(Based on deliverables- month that impact of grant would have changed volumes/job creation/participants)

Diversion Rates:

(Choose one material per box. Only list those collected over the grant cycle. Must be listed as "tons". See tab labeled "Conversion Tables" if needed.)

Material Diverted #1		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12	0.4	
April-12	0.45	
May-12	0.45	
June-12	0.45	
<b>Total</b>	<b>1.75</b>	

Other div. material:

Material Diverted #2		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12		
April-12		
May-12		
June-12		
<b>Total</b>	<b>0</b>	

Other div. material:

Material Diverted #3		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12		
April-12		
May-12		
June-12		
<b>Total</b>	<b>0</b>	

Other div. material:

Material Diverted #4		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12		
April-12		
May-12		
June-12		
<b>Total</b>	<b>0</b>	

Other div. material:

Material Diverted #5		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12		
April-12		
May-12		
June-12		
<b>Total</b>	<b>0</b>	

Other div. material:

Material Diverted #6		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12		
April-12		
May-12		
June-12		
<b>Total</b>	<b>0</b>	

Other div. material:

Material Diverted #7		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12		
April-12		
May-12		
June-12		
<b>Total</b>	<b>0</b>	

Other div. material:

Material Diverted #8		Other (pls describe below)
Tons Diverted		
July-11		
August-11		
September-11		
October-11		
November-11		
December-11		
January-12		
February-12		
March-12		
April-12		
May-12		
June-12		
<b>Total</b>	<b>0</b>	

Other div. material:

End use of diverted materials:

(Describe where materials are going [e.g., MRF, new products, reuse])

The bales are being sent to Recycle America which is a MRF owned by Waste Management, Inc.

Number of Permanent Jobs Created:

Include full-time & part time paid positions.  
1 FTE = 40 Hours Per Week

Type of Permanent Job(s) Created:

(Provide titles of jobs created)

n/a

Average Salaries of Jobs Created:

(Average of all jobs created)

Average Monthly Customers for FY 2011:

(July 1, 2010 - June 30, 2011)

Average Monthly Customers for FY 2012:

(Estimate or customer lists)

Avg. Monthly Amount	
July-11	
August-11	
September-11	
October-11	
November-11	
December-11	
January-12	
February-12	
March-12	
April-12	
May-12	
June-12	
<b>Ave. / FY 12</b>	<b>#DIV/0!</b>





