Rockwell

"World Class" Resource Recovery & Recycling Program Guide

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This guide describes the basic elements found in a successful resource recovery and recycling program and provides guidance for the development and implementation of a "world class" program. This guide assumes that such a program does not currently exist at a facility. Depending on the maturity of your existing program, some of these basic elements may already be in place.

The following is a suggested list of key steps that should be considered to achieve a "world class" resources recovery and recycling program.

"Key Steps"

- *Identify Program "Champion" & Establish Team*
- *Complete Solid Waste Survey*
- *Complete Market Evaluation*
- *Determine Required Resources*
- *Establish Program Goals*
- *Obtain Management Support*
- *Determine Collection Containers & Segregation Strategies*
- *Establish Labeling System*
- *Educate Plant Population*
- *Implement Program*
- *Monitor Program Results & Identification Of Opportunities For Expansion*

The target audience for this guide is the "champion" or the individual who will coordinate and manage the overall program at your facility. The "Key Steps" section has been included to assist you in your efforts to establish and maintain your program. The "Reality Check" at the end of each step has suggestions for shortcuts and other pertinent advice. The information in this section was developed based on three years experience in defining, implementing, and refining a program within the Rockwell Collins Commercial and Defense businesses in Iowa.

Remember that for your program to be "world class", a tremendous amount of work and dedication will be required. At any time during the development or start-up of your program, if you don't feel a genuine need or desire to improve the methods of handling your facility's solid waste generation and disposal practices, or you feel it is just a whole lot more than you want to take on, PLEASE transfer the program to someone else. Once you begin the process to get your site employees set for the change and then stop the momentum, it will be twice as hard for the next person to restart the process. If you demonstrate a personal commitment to improving your site process and instill this commitment to others at your site, there is no limit in what your program will accomplish!

"Key Steps"

Step #1: Identify Program "Champion" & Establish Team

The selection of a dedicated, enthusiastic, and creative program manager (champion) is critical to the success of a "world class" program. In the initial stages of this program, it is recommended that this individual have no other full-time responsibilities. The program manager must be able to dedicate 100 percent of his/her time to the program.

The manager should have the overall responsibility for implementing a resource recovery and recycling program. The manager is responsible for gathering information from all recycling activities; reporting on solid waste reduction and affirmative procurement activities; environmental compliance of the program; and employee education. Remember that the program must also comply with federal, state, and local laws and regulations.

Once the champion has been identified, a team should be established to assist in developing the program. Part of the team's charter should be to examine all imaginative ideas, logistically feasible or not, with the premise that "nothing is impossible". Team members should pursue opportunities using their own expertise as well as leveraging the knowledge from other field experts who deal directly with these issues on a daily basis.

The team should meet regularly to present new ideas and provide updates to previous suggestions. In addition to the team champion, the team will need subteam leaders to work on and chair specific program components such as information gathering, training, resources, and floor space subteams. These subteam leaders are the support group for the champion and will provide back-up leadership in the event that other team members are absent or performing other duties. Together they will make up the core team whose purpose is to create the program agenda, identify and or accomplish action items, serve as a "gatekeeper" during meetings, and be knowledgeable backup for the champion.

To assist in educating team members, it is suggested that a visit be scheduled to at least one recycling company to get educated on what commodities (ie, paper, plastics, metals, etc) will be the easiest to recycle. Another important criteria is to identify those commodities that are "dead-end" materials (ie, commingled plastics, contaminated paper products, etc) that may not be considered during the initial start-up phase. The overall goal of the team should be the pursuit of new, innovative opportunities for waste reduction and pollution prevention.

- "Reality Check" -

In today's business environment, the probability that a full-time person will be available to manage this program is remote at best, at least in the early stages. As the program gets "up and running", more time must be allowed for the manager to supervise and expand the program. Full-time dedication from the champion, from the start, will obviously help ensure a "world class" program. Having a trained back-up person for the champion's normal duties will help the overall continuity of the recycling program.

While on the discussion of team building ideas, it is helpful to ensue that all the teams established are cross-functional (ie, salaried, hourly, union, etc) and include several different disciplines (Maintenance, Human Resources, Purchasing, Union Leadership, etc) For example: It would be helpful to gain a supportive team member from the purchasing department to assist your efforts in reducing the incoming packaging. Cross-functional teams provide for a better overall knowledge of the personalities and processes of your facility and will help ensure that the program will be more readily accepted.

One of your team's goals is to grow and foster a positive and personal ownership of the program throughout the workforce. You need to get the momentum rolling to ensure the buy in and support of the yet undecided. Experience shows that when employees' ideas are incorporated into the day-to-day interworkings of the business, any changes that result from these ideas is more readily supported by the majority of the workers.

Step #2: Complete Solid Waste Survey

To establish an effective recycling program, a facility must first determine the types and volumes of solid waste materials generated. Each facility needs to perform an initial waste audit. This audit can either be performed internally or by an outside service. Most states have Solid Waste Minimization Programs that may be able to provide this service for free or for a minimal cost.

If your approach is to internalize the audit, you need to be vigilant with regard to what type of items are being placed in the dumpsters and trash compactors.

Tear open the trash bags and question the janitors about where the materials came from. Perform an audit of the landfill that your site uses. Plan a trip to the landfill to see what items represent the largest percentage of your waste. As part of your audit, take a lot of pictures both at the landfill and at your dumpsters and compactors when they are being loaded. (Note: These pictures are very effective visual aids that can be used during your management presentations and plant training sessions.)

Since the overall success of the program will require the cooperation from all members of the facility, specifics of the program will need to be communicated to the plant members. During your investigation/waste audit stage of the program, talk with the workers on the floor and in the offices to get a feel for the overall attitude towards the Company's responsibility to the environment. Knowing the existing culture and attitudes of your fellow workers will help you later in the implementation phase of the program. This is also a great time to write down the names of employees that have positive attitudes towards your efforts. You will need their help when you expand the program and they also can be considered for team membership. As you interview employees, don't forget to include the Bargaining Unit. Discuss the overall concept of the program with union leadership. Explain the overall benefit of your program and include concepts such as ownership of how we treat the environment and reduced impact on the municipal landfill which, in the long run, will help reduce taxes.

If you choose to outsource the solid waste audit, there are different groups/agencies that can assist you in conducting a solid waste audit for your facility. Remember that many recycling companies will conduct audits, but may concentrate solely on the commodities that they accept and may attempt to convince you that recycling additional materials is not necessary. Regardless of whether the audit is performed internally or by outside sources, the results of the audit need to be documented.

Some of the more prominent materials found in your waste may include:

- Plastic bags
- Cardboard/paper (computer, office newspaper, colored) books, magazines, three ring binders
- Miscellaneous plastic (tubes, trays, bottles, cases)
- Packaging materials
- Interplant packaging
- Wood scrap/pallets
- Maintenance scrap, construction/demolition materials
- Cafeteria waste - Styrofoam cups, plates, beverage cans, food cans & boxes, etc
- Production Metals
    - Ferrous (steel and iron)
    - Nonferrous (brass, aluminum, copper)
    - Other
- Office Printer Waste - toner cartridges, printer ribbons, etc.

This list is neither all inclusive nor meant to limit materials that you should consider for recycling. Each business has solid wastes unique to its specific facility and operation. A creative and enthusiastic team may identify additional material candidates available for recycling based upon your regional markets.

After a baseline survey has been completed, information from this survey can be used to estimate the volumes of materials potentially available for recycling.

- "Reality Check" -

DUMPSTER DIVING - *The waste audit is one of the most important steps in the program due to the fact that the results of the survey will be your baseline to work from and to compare to later. You must have a documented starting point so that a plan can be developed. Even if you decide to have the audit done by an outside source, you need to go along for the education. This is also the dirtiest portion of the task so dress appropriately for the job. Wear gloves, boots, coveralls or old clothes that can be torn or stained. Remember to take along clean clothes for the ride back from the landfill because you may smell a little funny.*

The waste audit at the landfill should be done at least three times for each dumpster/compactor at your site to get accurate information to base the program on. Variations in the production schedule may cause different waste streams to be generated throughout the month. By auditing each dumpster/compactor several times during the month, you will achieve a good cross section of the total facility waste stream picture.

Plan the visit to the landfill with landfill management and your waste hauler. Introduce yourself, your waste reduction plans and invite them to participate. Most landfills have policies against persons strolling around with cameras so ask if you can take pictures during your audit. When doing your audit, tear open the trash bags from your site and see what is really in there. Take photos, document material distinctions, and estimate volumes.

Some of the items identified during our audit may not be a common recycling commodity but you may discover other outlets for these items through a Waste Exchange or Reuse Program, through a local rehabilitation facility outlet store (Goodwill, United Way, Salvation Army, etc) or other outlets fueled by your own imagination. Document how much material you find that could be reused within your own facility (ie, by capturing these items and reissuing these supplies back to the assembly lines). The results of your waste audit will make apparent the amount of bags, boxes, and trays and other materials that are tossed in the dumpster each day.

During your waste audit, also concentrate on special solid waste unique to your operation. An example could be special vendor packaging. Check to see how many of the cardboard boxes are not recyclable due to the foam padding that is glued to the boxes. Write down the part number, the vendor name and address, and any other information you can use. This is a great opportunity to reduce your waste simply by contacting your purchasing function and investigating if the foam really needs to be glued to the box or not. In several cases there may be no reason for the glue and the change will save your vendor a labor step, the cost of the glue, and the need for that chemical in the facility. Implementing this small change will remove more items from your waste stream, allow you to sell the cardboard box, and add another success story to your list of environmental accomplishments. In some facilities, vendors are very willing to pay the freight to have their original shipping containers returned. They realize the cost savings (ie, the expense of purchasing new containers and freight versus getting used containers free and paying the return freight).

The waste audit will also allow you to test the effectiveness of your hazardous waste/medical waste disposal program. Keep an eye out for any waste chemicals, chemical containers, chemical applicators, sharps, etc that may have inadvertently found their way to the landfill. Document your findings and notify the individual responsible for the hazardous waste program at your site. Remember that used batteries also need to be addressed. Used batteries should be turned in to the tool crib for new ones. Batteries are considered a hazardous waste, in some states, and steps need to be taken to prevent these from ever getting into your nonhazardous waste stream. A simple "old for new" exchange program at the tool crib can fix this.

If you were not convinced about the need for this program, a tour of your landfill should make you a believer!!!

Step #3: Complete Market Evaluation

Once the waste survey is completed, a market survey or economic analysis needs to be accomplished. This economic analysis of each waste stream should include best handling methods and the availability of regional markets. This analysis allows the team to make intelligent choices in program start-up and deployment of resources. The material markets section of the analysis should include not only how the local recycling industry prefers the materials packaged, but also an examination of the total costs (manpower, equipment, transportation) necessary to meet this preference. The higher price obtained for material packaged in the preferred method may not be sufficient to justify the increased costs. The results of this evaluation will tell you what the market value is for each quantity of waste generated.

This market evaluation will help you to determine what quantities of each waste stream can be recycled:

- At a profit
- At a "wash" (save here but cost there)
- At a loss

Additional information on recycling, potential markets, and raw material/supplies costs can be obtained from:

- The Environmental Protection Agency (federal or regional offices);
- State solid waste or recycling agencies;
- Community colleges and universities;
- Local recycling organizations, state recycling organizations, National Recycling Coalition;
- Industry associations;
- Yellow pages under recycling or waste paper;
- Local newspapers;
- Municipal solid waste programs;
- Waste haulers;
- Local paper, aluminum, or cardboard manufacturers;
- Periodicals;
- Other recyclers/generators in the area;
- Potential buyers of recycled material;
- Rockwell purchasing and internal stock room.

Potential buyers should be queried regarding shipping quantity requirements, acceptable levels of contamination, average and seasonal prices, pick-up and delivery requirements, and equipment availability (eg, Will they provide a storage bin or trailer for hauling the material?).

Examples of how these factors can affect the recycling program are:

- When a larger quantity of material is needed before sale (ie, paper, cardboard, plastic), you may opt for a crusher/bailer to minimize storage requirements.
- Will the contractor pick up the materials or will you need to transport as part of the sale?
- Do you or the contractor pay the freight costs?

Remember that your final decisions on support equipment, collection containers, and storage requirements for recycling will drive your facility square footage requirements.

- "Reality Check" -

"Now we're getting to the FUN part !!!" - You will need to quickly become an expert on all recycling options in order to derive a working solution that not only removes a great deal of materials from your facilities waste stream, but also doesn't create a burden on the facility's core business. Here is a great place to use outside resources to identify established programs. Ask for information identifying the methods used and outlets available for your specific waste streams. Investigate whether there are established Waste Exchange Programs in your state. A Waste Exchange Program matches waste products with potential end-users in a confidential manner. (Example: Your facility has a large volume of packaging peanuts and other packaging materials. The Waste Exchange lists companies who need packaging materials. This program is designed to match the two companies together.) This is also a great place to list some of the odd stuff you discovered in your waste audit. The Waste Exchange may know just the right company that is looking for Rockwell's "slightly used left-handed gonkulater by-pass valves."

Having your broker spot a trailer on-site in which to stack paper and cardboard bales saves labor, floor space, and scheduling time. Rather than having several separate bins for paper (white, colored, computer, junk mail, etc), a single bin for mixed-color paper will generate less revenue but will remove more paper from your waste stream. Employee participation is higher, training is easier, and the time involved in recycling is less.

Other things to consider:

- *The labor needed to move material from collection point to storage area;*
- *The method used for storing and transferring;*
- *The effort required to prepare material for shipment to off-site broker (banding, bailing, transferring to larger shipping vessel, etc);*
- *How quick can material be removed from your facility if the revenues for the material were increased/reduced? (Free up that floor space!);*
- *The employee training needed versus the additional revenues for specific commodities sorted;*
- *The material that can be collected for "waste-to-energy" disposal;*
- *The material that could have been captured and returned to the Supply Room for reissue to the plant.*

Step #4: Determine Required Resources

Once the waste survey has been completed, the team needs to determine what additional resources will be needed to support the program. These resources may include manpower, equipment, and facilities.

Manpower - In addition to the members of the recycling team, don't forget that eventually every employee in the plant can be used. Strong support and participation from the entire workforce will help reduce the amount of additional manning needed to maintain the program.

Equipment. The team needs to determine the best balance between labor costs and support equipment efficiency. For example, if a large and inexpensive labor pool is available, cheaper, more labor intensive equipment can be used. Conversely, in a tight manpower situation, the purchase of more expensive but labor saving equipment may be a better option.

The types, models, capabilities, and purposes of available recycling equipment are numerous. Equipment is available to assist in collecting, compacting, baling, shredding, sorting, and accomplishing other tasks associated with processing material for recycling. Ease of use, simplicity, cost, safety and effectiveness of the support equipment are important traits to consider. When searching the market for equipment items that best fit your requirements, contact different manufacturers to obtain names of companies, municipalities, or other agencies that are using the equipment. Ask questions to obtain their candid evaluation of the equipment, including operating costs. Also contact recycling program managers of other industries in your area and ask for their input. Don't forget that efficient transportation of the materials, both inside the plant and eventually off-site, will be essential for the overall success of the program.

Facilities. Facilities requirements for a recycling center need not be complex. The overall size will be determined by the characterization and quantities of solid waste materials to be recycled by the site. Typically, the area consists of a material recovery facility (MRF), otherwise known as a recycling center and a small office, if possible. Another useful tool at the MRF is a network computer to be used to help manage the program. The MRF should be large enough to house the material processing equipment (balers for cardboard, paper, plastics, magnetic separator, metal can "condenser", etc) and allow for material handling equipment maneuverability. The MRF should also provide some storage capability for materials that are subject to weather damage.

- "Reality Check" -

Obtaining available floor space for the MRF and subsequent placement of collection containers and recycling equipment in a facility will be an on going challenge. The use of needed floor space in today's facilities sometimes doesn't settle well with the supervisors on the floor. It is, however, very important to recognize the need to place the collection containers where they are most accessible for the users. Locating collection containers and supporting equipment in an area away from the generating processes will cause additional burden on employees, loss of productivity, and less overall participation. It is also important to realize that spotting too many recycling bins on the floor will also cause a loss of productivity during the collection phase. Ideally, you would want your MRF in a centralized location in the facility to reduce the overall collection labor effort. Remember that in the real world, the establishment of an MRF and operation of a solid waste recycling program is not your company's core competency.

Although you have employee and management support, when it comes to decisions of floor space for recycling or production, you will probably end up with the less desirable location. As long as you obtain some area to establish your "world class" recycling program, you have achieved your goal.

Step #5: Establish Program Goals

Like any other program, specific goals need to be established. The program manager and the team need to determine what the overall goal of the program will be:

- Is it a recycling program?
- Is it a waste minimization program?
- Is it profit driven versus waste elimination?

Remember that the goal needs to be in sync with state and local solid waste strategies and goals (ie, state waste reduction goals, landfill bans, etc).

To determine and track the success of your program, specific numerical goals need to be established (ie, 25% or 50% reduction per year in cubic yards or tons, etc). You can begin to establish your waste reduction priorities based on criteria such as the largest volumes of waste generated or wastes with the largest associated disposal costs.

The following three metrics, alone or in combination, can be used to provide a complete picture of your recycling program operations.

Solid Waste Disposal : This metric is a method to measure solid wastes disposed of in landfills and through incineration, if applicable, in tons. The annual numbers are compared to previous years, including the baseline year to measure performance. The desired trend is a reduction in annual tonnage and/or cubic yards that is disposed. Increases in disposal quantities should be examined to determine whether they were due to ineffective programs, inaccurate baseline data, or other factors such as changes in production processes or product mixes.

Solid Waste Generation: This metric measures the total waste generated at the facility in tons or cubic yards. The total waste is the sum of the disposed amount and the recycled/reused amount. The desired trend is reduction in annual tonnage and/or cubic yards generated. This metric allows a facility to determine the effect of their source reduction efforts.

Recycling Percentage: This performance indicator measures the recycled/reused amounts divided by the total waste generation. The desired trend is an increase in the annual recycling percentage. This indicator judges the effectiveness of the recycling efforts.

- "Reality Check" -

Programs that cannot document proven success will be difficult to justify as future operating budgets are developed. Tracking and documentation of every step of your program is important, but don't get "spooked" by this task. Start with documenting the steps outlined in this guide and expand from there. Learn to become very familiar with computerized spread sheets or identify someone on your team who is.

Gaining access to past landfill disposal quantities is not difficult but separating out wastes and weights from specific manufacturing processes, lawn care, construction/demolition debris, etc may be more difficult. Including someone on your team from the maintenance staff can be helpful in determining past landfill disposal totals.

You may find that removing several truck loads of packaging materials from your waste stream only saved a ton or two in weight, but the total cubic yards sent to the landfill was reduced greatly. Reduction of these types of bulky waste streams may not impact total tonnage much; however, these efforts are still great to include in your metrics. Remember that every time the compactor goes to the landfill, it costs you money for tipping fees. Anything that you can do to get that "lightweight, fluffy stuff" out of your waste stream will allow the compactor to sit still a few more days.

The decision of recycling program versus waste minimization program ultimately needs to be supported by senior management. Although waste minimization practices are the direction your team is striding towards, accomplishing that goal is next to impossible without strong support from senior management.

Step #6: Obtain Management Support

Management support is crucial for the overall acceptance of the program. After you get a handle on the big picture (ie, waste survey, teams, employee attitudes, etc), discuss all your findings with your site environmental professional to get his/her input. The next step is to create a management presentation to sell your program. Schedule a meeting with the senior line executive (ie, Vice-President, Plant Manager, etc) to inform him/her of the opportunities. Depending on the business unit, other levels of management may need to be involved in the approval process. Be prepared !!! Do not go to this meeting with the idea that management will tell you how to create and/or organize the program. Make sure that you are prepared and then give your pitch. Remember that the information that you are presenting is probably new to management. If this is the case, it may take a little more explanation on your part to educate management and demonstrate the need for this program. Your suggestion "may not fly" the first time but do not get discouraged. If your proposal is turned down, ask what additional information is needed to achieve program approval. Remember that if you do not have management's commitment your program will not survive. If you are not 100% successful the first time, do not get discouraged. Take what you have learned, regroup, reorganize and be prepared to present the idea at another scheduled meeting.

Remember that your request for management's commitment will be to:

- Support a "world class" program;
- Provide a signed letter to all employees, <u>from the top level person</u>, demonstrating his/her support;
- Ask for the opportunity to present the program to as many employees as possible;
- Ask for the resources to "do it right" (floorspace, equipment, labor, time);
- Ask for a given day to address the new recycling guidelines by having a "Clean out the office day". (This project can be a real team building exercise.)

- "Reality Check" -

Several internal publications, available throughout the Corporation, stress the need for each employee's cooperation in protecting our natural resource and the environment in which we operate. These publications also recognize the responsibilities of our facilities to be a good citizen of the community. This program has the ability to allow the plant employees to accomplish these tasks and, at the same time, extend the useful life of the local landfill. Publishing a newsletter and highlighting team success will feed the imagination and promote innovation.

Experience has shown that new programs, including recycling programs, do not always get approved the first time you ask. Remember that there are always larger issues working through the system that are competing for the same resources. Several attempts may have to be made to rework program ideas before management approval is granted. This effort will not be easy; however, by seeking approval to initiate this program, you will gain more experience about the interworkings of the business. This educational process will help you in your efforts in learning to deal with many different attitudes and personalities throughout the facility. If your request is disapproved the first time, "keep your cool" and be patient. The success of this program will require people's behavior to be modified and that process never occurs without resistance.

Step #7: Determine Collection Containers & Segregation Strategies

Containers

Once you determine the number of commodities to be recycled, it will be necessary to determine the number and location of recycling bins needed. The best way to accomplish this is by walking through the facilities. Marking the locations on a schematic of the building will help you to estimate your container costs. Mark all the places you plan to spot a group of recycling bins on a facility drawing or map. Remember that you can always adjust the final number of recycling containers required later, however, you need to document your best guess on the initial walk-through. There are many different container size options available so keep the overall size, in line with your collection requirements.

Recycling Bins - Containers are chosen based on the material to be collected, expected volume, collection strategy, and cost. Collection containers can be a simple plastic bin or box. Desktop paper collection containers are typically small cardboard or plastic bins located on or by the desk. A container should also be located near all copiers, fax machines, and printers. Collection containers also need to be positioned in designated areas throughout the facility. Collection containers should be a noticeable color for ease of identification and collection.

Smaller bins will fit into more locations but will create the need for more frequent collection and hence more labor costs. A larger collection container will make collection easier and reduce manning requirements, but it will be more difficult to obtain available floor space. (Note: Obtaining adequate floor space ["Floor wars"] will be a much larger task than you first recognize. Having upper management support in the beginning should help eliminate or reduce this obstacle.)

Collection Containers - Most of the recycling bins will need to be emptied into large collection containers by custodial or other collection staff on a scheduled basis. Cardboard boxes ("Gaylords") or plastic shipping tubs can be used for this function. Gaylord containers are sometimes cheaper but take up much more room, are unattractive, and require a pallet and pallet mover to transport. Plastic shipping tubs are more expensive, initially, but can be sized for the location. They usually have built-in wheels, will stack when empty, and can be more attractive. These tubs can be ordered to accommodate a fork truck, electric prime mover, or attach a hitch for pulling. These shipping tubs are also a great place to advertise the program's title or slogan. The plastic tubs may force you to set up an exchange or loop program with your recycling broker. Remember that a loop program usually requires a staging area for the empty tubs. A staging area will also be needed for Gaylords and pallets as well. Investigate the possibility of having a trailer spotted on or near the dock to lessen the need for moving full tubs more than once. Full tubs take up a lot of floor space.

Support Equipment

Balers - Balers are normally required to package cardboard and some paper and plastics into more manageable bundles. Compacted items are less bulky, save transportation cost, reduce floor space needs, and often command higher prices. When purchasing a baler, consider versatility of the make and model of the unit. Balers can be either horizontal (self-load) or vertical stoke. The horizontal baler will cost more but is less labor intensive. The vertical downstroke unit will cost less but is labor intensive. This unit can be considered for bailing of plastics and as a backup, in the event the horizontal baler is down for maintenance.

Shredders/Sorters - Shredders reduce the bulk of many materials (paper and plastic). A paper shredder may be warranted if your site processes large quantities of "Company Confidential", "Privacy Act", or "For Official Use Only" papers.

Sorters are used to separate metals. A simple magnetic sorter can be used to separate ferrous from non-ferrous metals and other contaminates. When obtaining these pieces of equipment, self-loading, or conveyer type units should be considered since they are less labor intensive.

Collection and Segregation Strategies

Separation Methods - Material separation can occur at the generating source, at the drop-off containers, or at the MRF. The choice of collection and segregation strategies will have a considerable impact on the level of employee participation, operating costs, and the overall success of the program. The easier it is for the employees to participate in the program, the greater the level of participation that will be achieved.

Drop-Off - The drop-off collection method typically consists of placing multiple collection bins in a centralized location, often the recycling center, where participants bring their recyclables. Participation can be increased by placing additional bins in strategic locations throughout the facility. Participants are required to sort their material and place it in appropriate bins.

Advantages: This collection method is usually the least expensive collection option and equipment costs are minimized. Persons that voluntarily drop off recyclables tend to properly sort items. Drop-off collection can be used alone or in conjunction with other collection methods.

Disadvantages: Participation levels are usually lower since participants bear the burden of collecting and delivering recyclables to the collection center. Recyclables may be comingled or mixed with trash if bins are unattended. Trying to identify specific employees that may need additional training on segregation procedures will be difficult under this method. If employee participation is mandatory, recyclables are unlikely to be properly sorted. The area may also become untidy if bin overflow is allowed. Productivity may also suffer due to each employee being required to deliver their own recyclable to the drop-off area.

Source Separation - This method is the most common and fosters a great deal of participation. The containers used are available at a close distance from the work station for easy access. All the materials placed in these bins are sorted by the user. At scheduled periods, the bins are emptied by the collection team/custodians and taken to the MRF.

Advantages: Materials are never mixed. Also, there is less overall contamination and all employees monitor their own areas. The participation is much greater with less negative impact on productivity.

Disadvantages: The amount of floor space needed throughout the facility to accommodate all the containers is greater. There is also the initial cost to purchase the containers. Other facilities have proven that commercially available household duty recyclable bins have held up fine and are about one third the cost of industrial grade bins. There are recycling bins available in every size and color. Several models are stackable which allows placement of several different bins on the same floor space.

- "Reality Check" -

Marking the facility maps where the equipment and containers go will proceed much faster if performed on an off-shift or during a weekend. If not, the questions and defensive behavior from everyone who sees you with a floor plan would make your trip through the facility next to impossible to complete. Your survey could create a lot of needless explaining from managers who may not have yet been informed about your program. The assistance of your facility's Floor Space Planner would be a good source of information for this tour. The planner will be aware of planned or on-going changes to the facility that should be considered as part of your container placement plans.

After you decide what commodities you want to capture from a given area, let the workers in that area provide input as to where the containers need to be placed. Their ownership of these bins will support your efforts and ensure better program participation.

Of the two collection methods listed, the source separation method is the more successful of the two.

Persons with mental and physical disabilities are often an underutilized labor resource. Rockwell facilities are usually located a short distance from a local rehabilitation center that supports these individuals. If so, this labor option should be considered. These facilities are usually looking for clean sorting/packaging jobs to use as training opportunities for their clients. In most Rockwell manufacturing facilities, there are enough expensive items that could be reused to warrant having a sorting/ repackaging line set up. This waste avoidance program has the ability to provide clean, multitask jobs for these people and an opportunity to be trained into more productive, self-sufficient jobs. This is such a win/win opportunity for the program by involving these agencies.

The revenues to cover the expense of this sorting service are usually created from the money saved by not purchasing new items. The savings and the expense are usually a wash. Using this option provides an opportunity to save the landfill expense, the landfill volume, and provide an opportunity for the underutilized citizens of your community to become useful.

Step #8: Establish Labeling System

Labeling of the recycling bins and collection containers is a very important part of the overall program. Labels should identify the commodity being collected and explain what is acceptable and what is not acceptable. The development and finalization of each label is a difficult process. Too much information tends to be ignored and too little information will confuse the user.

- "Reality Check" -

The idea of labels seems simple at first, but ease of understanding and use throughout your facility can be a significant problem. Examples of container labels are outlined in the SWELL book. In addition to posting labels on each recycling bin and collection container, constant employee training and awareness will be needed in the beginning phase of the program. You will encounter employees who want every possible bit of information to be written on each recycling container. On the other hand, there will be just as many employees who will make it equally clear that there is way too much information on the bins. Again, refer to the SWELL book for suggestions on labels.

Step #9: Educate Plant Population

Without plant-wide education, the best designed and equipped recycling program will not succeed. A comprehensive training program will help to foster an in-depth awareness about environmentally sound recycling practices and landfill opportunities. It will also help promote an overall positive environmental behavior in all employees.

By making the plant populace aware of the programs and educating them on their part, program effectiveness will be greatly increased. The recycling team must stress the benefits of source reduction, recycling, and purchasing environmentally preferable products throughout the educational process. This includes increasing awareness by speaking at all employee meetings, leadership training, and staff meetings. Be sure to solicit comments and suggestions on how the program can be improved. Don't forget to incorporate the program into the orientation program for new hires. If possible, you want this same message mentioned at senior management staff meetings as well.

The education program should focus on raising the awareness of how the program benefits the environment. This awareness must demonstrate to site personnel how their participation will make a difference. Internal newspapers, cafeteria table tents, and bulletin boards are prime media avenues to the facility population. Many basic media messages have already been produced by recycling associations. These messages can be supplemented by plant specific messages listing the materials recycled, program manager phone number, and similar information.

Another important communication strategy is to include progress reports listing the amounts recycled, the savings generated, and the amount of products purchased containing recycled material. By including this information, facility personnel see the progress being made and feel that their efforts are going toward a tangible goal.

An additional element of education is community outreach. This may include visiting local schools to educate the children, speaking at community colleges and hosting Earth Day activities. As part of the community outreach program, materials and brochures furnished by recycling associations can be used to reinforce your overall message. The education process should always have a positive focus, regardless of whether it is internal or external to your organization.

- "Reality Check" -

Publish a rule book of the guidelines specific to your program (see SWELL book). This will be a handy reference tool that will need to be available for the teams you train, new employees, or ones who missed the educational meetings. The "clean out day" is a great time for employees to get comfortable with the new recycling guidelines. The best time to train the workers is when they are together such as team meetings or safety meetings. The group meeting environment saves you time and gets the same message to everyone in the area about the rules of recycling. Get into as many group meetings as possible before the program kickoff day and pick out a focus person in that group to be the resident expert. This expert can field the questions from the team as they come up and either answer them or get in touch with the program champion. This practice helps to spread the leadership responsibility throughout the facility.

Step #10: Implement Program

Because there are so many elements to the program, the champion needs to identify team members who can help take responsibility for some of them. The champion is responsible for the overall program, but he/she can not do it all alone. Even if one person could do it all, the program wouldn't have the mix of ideas required to "grow" the best program possible. After all your groundwork has been completed, the program needs to be implemented. The team can make a checklist and assign completion dates to the major parts of the program. The decisions about individual responsibilities need to be addressed.

Some suggested action items may include:

- Who distributes the recycling bins?
- Who decides if there needs to be more or less bins per given area?
- Who decides what commodities are collected and labels the bins?
- Who empties the bins?
- Who transports the material to the MRF?
- Who operates the balers?
- Who services the balers when they get full?
- Who do you contact if the duties are not completed correctly?
- Who do they contact if something is wrong?
- Who is in charge of the documentation and results?
- Who gets the information to the media/bulletin boards?

- Who gets the material moving out after processing?
- What penalties exist for non participation? (This is for senior management to address.)

Office "Clean-Out"

The idea of an office "clean out your files day" has been very well received. This clean out day can be successful for many reasons.

- The day kicks off the recycling program in a big way to let people know something has changed.
- The letter from the president, or other senior management person, stating the importance of this program is amplified by hosting this event.
- This is a great time to allow the people to come to work in blue jeans and T shirts and get their office tidied up. The opportunity to dress casual has worked well as an advertisement about the event's kickoff.
- The amount of floor space and furniture that becomes available will surprise everyone. (It's hard to justify a five shelf bookcase in the office if it's empty.)
- You have quick results to show the workforce as you report the amount of paper, equipment, and space recycled during this single event.
- If the facility has a clean-out day, the people who violate the program's rules can not say they were not informed.

- "Reality Check" -

The actual steps involved in developing and implementing a site specific program will vary depending on the maturity of your existing program, if any, and the corporate culture.

Some additional ideas that you may want to consider include:

- *Put up a bulletin board of things found in the wrong bin (ie, metals, plastics, Styrofoam, food, etc).*
- *Before you start, complete baseline audits of specific departments and perform follow-up audits in 6 months to gauge their performance.*
- *Set up prizes to be given out on the "clean out" day. Have a number hidden inside the recycling handbook that is used for the drawings. This will encourage the employees to open the book and look inside. If you have a "cherished" prize, then maybe having a drawing once a month would cause each person to keep a tighter hold on his/her book.*
- *The program team members should wear their environmental shirts to foster awareness.*
- *One idea that keeps being suggested is to promote competition between engineering departments to see who collects the most magazines on clean up day. This makes cleaning fun and gets a few more magazines off the shelf. This competition idea sounds good, but in reality, it is very hard to judge fairly; causes a lot of needless tracking; and ultimately rewards the areas that have been pack rats in the past.*
- *Keep in mind that you will make some mistakes as your program develops. Don't dwell on them. Learn from them and go forward. As long as you keep focused on the overall program goal, treat everyone honestly and fairly, and work new environmental successes into your program, you will succeed.*

Step #11: Monitor Program Results & Identification Of Opportunities For Expansion

As the program progresses, the results need to be monitored and corrections made. Don't forget that, in addition to recycling waste products, a focused effort needs to be made when purchasing new materials for the plant.

Purchasing Environmentally Preferable Products - The purchase of products containing recycled material is a necessary part of closing the reuse/recycling loop. While the program manager is the chief advocate, the environmental program team members are important supporters. The effectiveness and success of this program requires senior level interest to motivate users and procurers.

Why You Should Buy Recycled Products - Americans generate a huge amount of garbage. In 1991, the amount of waste generated in the United States exceeded 280 million tons. The bulk of our waste continues to be landfilled while the number of landfills decreases; tipping fees and transportation costs increase; new landfill sitings are hampered by environmental concerns and permitting constraints; and states try to close their borders to out-of-state waste. For these reasons, interest in recycling is at an all-time high.

You are probably familiar with the recycling logo, with its three chasing arrows. The arrows represent the three elements of the recycling process.

- Collecting materials that otherwise would be throw away.
- Manufacturing new products from those materials.
- Purchasing the new products.

Recycling isn't completed until the materials we collect are turned into new products and those products are purchased. This complete cycle is known as closing the loop.

For recycling to succeed, businesses need to take action by purchasing recycled materials when possible. Purchasing agents can have a positive impact on buying recycled.

- You have a tremendous opportunity to help resolve the national solid waste management problem.
- By being proactive in learning about the broad range of available recycled products and how they can be used by your company, you can lead your company in an activity that ultimately will save money, contribute to the success of your corporate recycling program, be good for the environment, and foster goodwill among employees and customers.
- What your company buys has a direct relationship to what it throws away. If disposal can be avoided by reducing, reusing, or recycling materials, then your company can avoid related labor, storage, and disposal costs. Similarly, if your company can reuse materials or reduce what it uses, then it will save on material costs.

Many companies are purchasing recycled products. Given the public pressure to increase recycling collection programs and to minimize waste generation, it is essential to expand recycling programs.

Quality customer service and sound business management should guide the implementation of a buy recycled program. The "Buy Recycled" Business Alliance members believe that purchasers and suppliers should voluntarily and aggressively implement buy recycled programs. To assist in understanding how recycled products can be labeled, the following list of terms and abbreviations is provided.

TERMS AND ABBREVIATIONS

Pre-consumer: Materials that have been recovered or diverted from the solid waste stream, excluding those materials generated from and commonly reused, such as mill broke and home scrap.

Post-consumer: Only those products generated by a business or consumer that have served their intended end uses, and which have been separated or diverted from the solid waste stream for the purposes of collecting and recycling and disposition. Post-consumer material does not include manufacturing wastes.

Recyclable: A product or material that can be collected, separated, or otherwise recovered from the solid waste stream for use as a raw material in the manufacture or assembly of a new product.

Recycled Content: The percentage of recycled material used in the manufacture of a product. Federal Trade Commission guidelines only allow recycled content claims that include material recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer) or after consumer use (post-consumer).

Recycling: Any process by which waste or materials that would otherwise become waste, are collected, separated, or processed and revised or returned to use in the form of raw materials or products.

Virgin Materials: Any materials used in industrial processing or manufacturing that have not been previously used.

TIPS FOR BUYING RECYCLED

Get a Commitment:

- Obtain buy-in from management.
- Establish a recycling committee or assign a coordinator.
- Include a buy recycled statement in your mission statement or purchasing policy.

Become Educated About Recycled Products:

- Use available directories to learn about what products that are available locally.
- Establish a baseline of what products your facility already purchases.

Evaluate and Revise Purchasing Specification, Policies, Procedures:

- Identify what recycled products you are already purchasing.
- Move beyond office paper. Recycled products are available in many new areas, including vehicle fleet, building and construction, and landscaping.
- Review purchasing specifications for discrimination against recycled products (such as brightness requirements).
- Conduct blind product tests.
- Define the amount of recycled content required for each product, focusing on higher post-consumer content.

Set Goals and Monitor Progress:

- Goals should be time-based and specific. For example, "By July 1, 1996, increase recycled paper purchased 50 percent over 1990 levels."
- Goals should motivate. State goals so that employees are accountable for results. Be ready to adjust them periodically.

Look at Creative Cost Strategies:

- Shop around and conduct competitive bids. The number of recycled product manufacturers and distributors continues to increase and become more competitive. When vendors know you're serious about buying recycled, they'll listen.
- Buy in bulk by ordering less often or by combining purchases with other organizations (cooperative purchasing).
- Consider a product's life-cycle costs. For example, plastic lumber may cost more than wood initially, but is more durable and requires less maintenance and repair costs over its lifetime.

Work with Vendors:

- Let your vendors know, in writing, that you prefer high quality post-consumer recycled products. Your commitment and purchasing power can encourage a vendor to stock recycled products.
- Require your vendors to include certification of recycled content for products.
- Request that contractors, such as maintenance, janitorial, and construction/builders use post-consumer recycled products in their services.

Promote your Program:

- As stated before, let vendors know your preference for recycled products.
- Print organization publications, literature forms, and business cards on recycled paper, including the words "Printed on Recycled Paper."
- Include information on your "buy recycled" program in your organization's newsletter, advertising, and annual report.

Monitor your Program:

- A successful "buy recycled" program should include monitoring of both program implementation and recycled product markets.
- Compare your baseline data with present purchasing habits and document results.

- Recycled product problems are more often perceived than real. Therefore, document both problems and solutions, and document the success stories as well.
- Keep current “buy recycled” information available for new market availability.

- Acknowledgments and Notes from the Author -

The ideas and practices outlined in this manual have been developed by the Solid Waste Environmental Leadership and Learning (SWELL) teams at Rockwell Collins Divisions located in Cedar Rapids, Iowa. (Collins Commercial Avionics and Collins Avionics and Communications Divisions). The Solid Waste recycling effort has been spearheaded by Darrel Brothersen, Resource Recycling & Waste Reduction specialist. Darrel's efforts have been recognized by the Iowa City Chamber of Commerce, the State of Iowa, the National Recycling Coalition, and United States Navy Best Manufacturing Practices.

The Resource Recovery & Recycling Program in place at the Collins Divisions in Iowa has grown into what it is today only because I was given very strong support from upper management within CACD. President Jack Cosgrove and Vice Presidents Bill Richter and Herm Reininga have allowed me to expand this program throughout the Rockwell Iowa operations. I was empowered to do whatever I thought was necessary to create a waste minimization program. This empowerment allowed me flexibility with few operational boundaries.

Some of the necessary steps I have taken to make this program successful are

- *Set up contracts with agencies to perform sorting and processing jobs;*
- *Utilize the state and national environmental agencies to gain much needed information and assistance so as not to reinvent the wheel;*
- *Educate our work force about the need for environmentally-friendly work habits;*
- *Implement changes to our work habits causing employees to reduce, reuse, and recycle;*
- *Work with our suppliers to modify packaging and/or returning packaging;*
- *Assist state and national agencies and organizations by educating businesses about the opportunities that exist through solid waste awareness programs and by implementing "buy recycled" programs.*

If every recycling program "champion" could have this type of support from his/her management, the environmental impact Rockwell would achieve would definitely be WORLD CLASS!

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