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FEBRUARY 1991

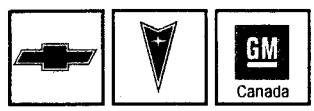
WASTE REDUCTION

C · P · C PROGRAM OVERVIEW

GM

WE CARE

WASTE ELIMINATION AND COST AWARENESS REWARDS EVERYONE



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GM
WE CARE
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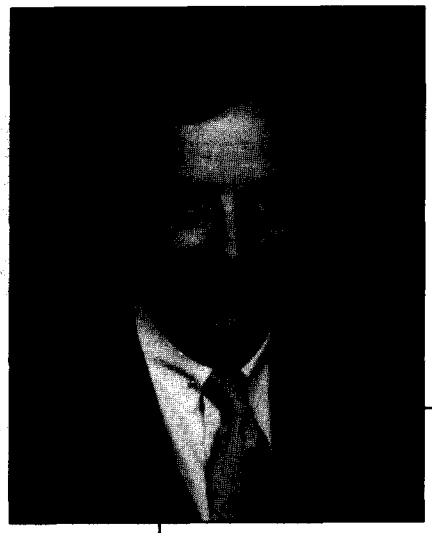

Chevrolet·Pontiac·Canada Group

To All C-P-C Employes:

Each of us is concerned about the many environmental issues facing us today, such as acid rain, depleting landfill space, water pollution, and hazardous wastes. However, while we learn about the increasing problems, few of us become actively involved in developing solutions. At C-P-C, it is time for EVERYONE to become involved in addressing environmental concerns -- both at home and at work.

While there has been progress at General Motors to address various environmental issues, many of the programs focus on dealing with the problems after they've been created. The focus must be to eliminate the problem at the source -- pollution prevention.

General Motors is presently formalizing a corporate-wide waste reduction program: Waste Elimination and Cost Awareness Rewards Everyone (WE CARE). The goal of WE CARE is to reduce the amount of waste to the environment while maintaining our quality and cost objectives. The WE CARE program not only makes environmental sense, but also makes good business sense.

C-P-C is implementing WE CARE as described in this Waste Reduction Guidebook. This publication was developed with the assistance of B-O-C and outlines the elements of the program. The book provides an excellent tool to help each of us get involved.

Thank you for your participation in this important effort.

Sincerely,

E. M. Mutchler
Vice President & Group Executive

Program Background

Earth Day 1970 ushered in the environmental movement as we know it today. The Environmental Protection Agency (EPA) also was created in 1970 and, since then, we have made substantial progress in improving environmental quality. Many pollution control programs have been put in place such as the numerous "end-of-the-pipe" requirements that have been placed on industries to control air and water pollution and waste disposal practices. This has resulted in large improvements in air and water quality in the U.S. and more environmentally responsible disposal of wastes, especially hazardous wastes.

Attention given by the media to our rapidly dwindling landfill space, depletion of the ozone layer, acid rain, and potential global warming has raised the environmental consciousness of many citizens. Citizens have become more aware and personally involved in preserving the environment for the future. There is a growing movement in which industries and individuals alike are looking at their every-day activities with an eye towards pollution prevention because there are limits to the environmental improvements that can be achieved by managing waste only after it is generated. The new focus is on reducing or eliminating emissions and discharges to the environment at their source (source reduction) and promoting environmentally-sound recycling.

Preventing or eliminating waste at its source not only makes sense for long-term environmental health, it can result in substantial economic benefits for industry. Immediate savings in raw material, production, and waste management costs could occur by eliminating the source or preventing the generation of wastes and emissions.

A reduction in the volume and toxicity of waste also decreases employe exposures to these materials in the workplace.

GM has made it a priority to organize and expand existing waste reduction efforts in our operations. These efforts have historically included waste minimization programs under the Resource Conservation and Recovery Act and other actions to reduce waste management costs. These efforts have been formalized in the Corporate WE CARE program (an acronym for Waste Elimination and Cost Awareness Rewards Everyone). The purpose of the Corporate program is to refocus waste management methods on preventing or reducing waste by encouraging the participation of every GM employe, establishing a channel of communication for sharing program information among the plant personnel and management staffs, and providing a unified corporate approach to waste reduction activities. This guidebook outlines the structure and elements of the C-P-C Program and provides a tool to the plants for implementation of their local programs.

Waste Reduction Objectives and Incentives

The objective of waste reduction is to reduce, to the greatest extent technically and economically feasible, the quantity and toxicity of waste produced or released. The benefits to be gained by doing so include enhancement of operational cost effectiveness, assurance of regulatory compliance, reduction of potential environmental liabilities, and further demonstration of GM's commitment to protect the environment. Within C-P-C, one of our primary objectives is to make waste prevention and reduction an important part of our corporate culture. To do this, it is essential to encourage active, highly visible waste reduction efforts and maximize the participation of all C-P-C employes in the program.

"Preventing or eliminating waste at its source not only makes sense for long-term environmental health, it can result in substantial economic benefits for industry."

1

"Currently acceptable methods for handling wastes, particularly hazardous materials, are very expensive and will become increasingly complex and costly as new, stricter regulations are imposed."

Many waste reduction programs now focus primarily on hazardous wastes. Although hazardous wastes have a high priority, efforts should encompass all wastes. **All** materials and emissions that are not products leaving C-P-C processes, plants, and offices are defined as "wastes" and should be addressed in the C-P-C program. With this broadened focus, the maximum regulatory, cost, material utilization, and environmental benefits are possible. As the term implies, waste reduction efforts concentrate on the operations, processes, procedures, and production units generating the waste, rather than on end-of-pipe treatment. Waste can no longer be the concern of only the environmental engineers who manage it after it is generated. Waste is the concern of each employe within C-P-C who plays a part in its generation.

The most important incentives for industry to change their waste management focus and step up waste reduction efforts include economics, regulatory compliance, environmental and personal safety concern, and public perception.

Economics

In the past several years, federal, state, and local regulations governing the handling, treatment, and disposal of wastes have caused a significant escalation in waste management costs. Currently acceptable methods for handling wastes, particularly hazardous materials, are very expensive and will become increasingly complex and costly as new, stricter regulations are imposed. Additionally, disposal surcharges are imposed on wastes. As new regulatory proposals increase the number of toxicity criteria, additional wastes will be classified as hazardous, further escalating handling and disposal costs.

Reduction efforts offer a way to reduce waste management costs by reducing the amount and toxicity of wastes generated. In addition, by focusing on the sources of the waste, raw material and operating costs can be reduced by increasing the efficiency of the processes. Waste reduction not only makes good environmental sense, but good business sense.

Regulatory Compliance

Under the Resource Conservation and Recovery Act (RCRA), waste generators must certify on the manifests for all hazardous wastes being shipped off site that a program is in place. The program must reduce the volume and toxicity of waste generated to the extent that is economically practicable; and practical methods must be selected for waste treatment, storage, and disposal that minimize the future threats to human health and the environment. In addition, waste generators are required by law to submit a biennial waste reduction report to the U.S. EPA.

Other regulatory factors driving the need to implement waste reduction include bans and restrictions on the land disposal of wastes; increasingly complex permitting requirements for air, water, and waste-related permits; and Community Right-to-Know (including SARA) legislation. The regulatory trend is towards more stringent environmental control and pollution prevention.

Furthermore, the waste generator retains ultimate responsibility for treating, storing, and disposing of wastes at either on-site or off-site waste management facilities. By preventing, eliminating, or reducing the generation of wastes, the costs associated with the potential mismanagement of those wastes can be reduced or avoided. Risk is also reduced that human or environmental health will be negatively impacted.

Environmental and Personal Safety Concern

C-P-C Group management, plant management, and other plant personnel share the concern to provide a safe and healthy workplace for our employes and to protect the air, water, and land that make up the environment. Reducing the amount and toxicity of wastes generated and maximizing the use of recycling and reuse opportunities by means of a formal waste reduction effort further demonstrates that the C-P-C Group is commited to personal safety and environmental protection.

Public Perception

Because of several large-scale incidents in the past involving accidental industrial releases and mismanagement of wastes, the general public is extremely sensitive to all environmental issues. The enactment of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) has given the public access to more detailed information about facility material usages and releases. In addition, the public is becoming increasingly more informed regarding these issues due to media coverage and mandated community programs. The twentieth anniversary of Earth Day further confirms the public's concern and has intensified public inquiry into what industry is doing to reduce its wastes and make its products friendlier to the environment. Consumers are increasingly looking at a company's policies, in addition to its products, before making purchasing decisions. A strong environmental policy could be a definite asset for affecting public perception about our company and our own employes can be good promoters of the plant's waste reduction efforts in their communities.

Objectives of this Guidebook

The primary objective of this guidebook is to assist plant personnel in the establishment and maintenance of an ongoing, continuous improvement program for reducing wastes at their facilities. The specific responsibilities of the individuals and groups involved in the program are presented in this Guidebook, as well as guidelines for conducting program activities and using the available resources within GM.

This Waste Reduction Guidebook should be used as its name implies; a guide book. Because each plant operates differently, the waste reduction techniques provided are only suggested methods and general recommendations for making the best use of existing resources within GM. These suggestions are based on the successes of other companies. Each plant should use local resources to their best advantage for development of their actual program implementation and maintenance strategies. We all share the goal of making the best quality product in the most cost efficient manner. Prevention or elimination of waste in our methods and processes is the key to achieving cost efficiency.

This Guidebook is not meant to be a static document. It will be updated to reflect improvements in the Waste Reduction Program procedures as the program develops over time.

Plant personnel using the Guidebook to conduct waste reduction activities should keep track of recommendations that they feel would improve its usefulness and pass these on to the C-P-C Headquarters, Environmental Group. Group Headquarters personnel will review all suggestions and incorporate those needed to update the Guidebook. ■

"Consumers are increasingly looking at a company's policies, in addition to its products, before making purchasing decisions."

2 Establishing a Waste Reduction Program

In April 1990, a Corporate effort was launched to centrally coordinate a waste reduction program within General Motors. Under direction of the Stationary Source Environmental Committee (SSEC), the GM Waste Reduction Committee was formed. The committee is chaired by Waste Management Services of Argonaut AEC with representatives from B-O-C, C-P-C, Truck & Bus, Saturn, and several components groups, as well as Legal Staff, Public Relations Staff, Industrial-Government Relations Staff, Advanced Engineering Staff, and the Environmental Activities Staff participating.

The Committee's purpose is to develop guidelines and strategies for overall coordination of the Corporate program. The Committee has named the Corporate program "WE CARE," which is an acronym for Waste Elimininations and Cost Awareness Rewards Everyone.

The elements of the WE CARE program closely relate to those of the North American Operations business strategy of "Synchronous Organization". Both deal with the identification and elimination of waste from our operations and utilize, among other elements, employe involvement, measurement of progress, and continuous improvement to reach their goals.

WE CARE is not a finite program. It is a process to change our corporate culture so that waste "prevention" is a daily operating philosophy rather than merely waste "management"; the overall objective being to reduce our emissions to the environment while increasing our efficiency.

C-P-C is in the process of developing and implementing the WE CARE program in the plants. This Guidebook is a step towards establishing local programs in the C-P-C manufacturing plants that are a part of a larger, organized Corporate effort. As the local programs develop, communications between the plants and the GM Waste Reduction Committee will be used to refine and further develop the total C-P-C Waste Reduction Program and result in improvements in this Guidebook.

To give focus and direction to the C-P-C Waste Reduction Program, the following Group policy and goals have been established. These provide the framework in which the plant programs should be developed.

C-P-C Waste Reduction Policy

The Chevrolet-Pontiac-Canada Group is committed to the pursuit of excellence in all aspects of its business. Of prime importance in this pursuit is excellence in managing resources effectively to help preserve the environment.

To minimize the impact of our operations, we will reduce emissions to the air, water, and land by putting priority on waste prevention at the source, elimination or reduction of wasteful practices, and utilization of recycling opportunities whenever available. The responsibility for achievement of this goal is primarily dependent on both management's support and actions of every employe to modify existing methods, procedures, and processes and to incorporate waste prevention into all new endeavors.

C-P-C Waste Reduction Program Goals

1. *Prevent or reduce, to the greatest extent feasible, the generation of emissions and materials that are not part of the products leaving C-P-C processes, plants, and offices.*
2. *Provide program support that originates from C-P-C management and the UAW leadership.*
3. *Make the practice of waste reduction an integral part of our corporate culture.*
4. *Encourage the participation of every employe.*
5. *Recognize and reward improvements.*
6. *Continuously monitor our progress.*
7. *Share ideas and technology among all GM locations.*
8. *Continuously communicate information about our program and our successes to all C-P-C employes, C-P-C management, the Corporation, and the general public.*
9. *Allow each C-P-C location flexibility in how program implementation is accomplished.*

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"Waste prevention at the source, elimination or reduction of wasteful practices, and recycling are to be given top priority."

C-P-C Waste Reduction Policy and Program Goals

C-P-C's commitment to waste reduction is stated in our policy and goals.

A key point of the Policy and Goals is that C-P-C is committed, at the highest levels of management, to enact programs which will reduce and/or prevent the discharge of wastes to the environment.

Waste prevention at the source, elimination or reduction of wasteful practices, and recycling are to be given top priority. The options available and the priority in which they should be considered are clearly illustrated in Figure 2-1. As shown, treatment and/or disposal are the least attractive options and should be implemented only as a last resort.

To achieve the greatest potential environmental and cost impact, wastes are defined as any material or emission which is not part of the final product(s) leaving processes, plants, and offices. Figure 2-2 presents a list of specific types of materials which, by definition, are considered wastes by C-P-C.

For a successful program, commitment and active participation will be required of each employe. All employes throughout the company are familiar with how and where wastes are generated in their work areas; therefore, they can significantly contribute to the success of a waste reduction program. By encouraging and promoting ongoing communication, all employes can be made aware of the costs associated with waste handling and the benefits of waste reduction to the company and its employes. Awareness of waste reduction's importance will encourage employes to contribute suggestions that will enhance program success. The existing Suggestion Plan is one way of collecting those suggestions and rewarding participating employes. Plants are also encouraged to develop additional methods of recognizing employe contributions to stress the importance of the program.

Another important program element is continuously monitoring progress. The effectiveness of local programs can be determined by comparing waste-related costs and volumes versus production rate indicators over time. Sharing this information about waste reduction improvements with employes, management, and other C-P-C plants will help to maintain overall program momentum.

C-P-C Waste Management Priorities

Prevention
Elimination
Reduction
Recycling
Incineration
Treatment
Disposal

Figure 2–1

C-P-C Definition of Wastes

"Any material or emission that leaves a process, plant, or office and is not a product of that activity is considered waste. This includes both hazardous and non-hazardous solid waste, as well as emissions to the air and water."

Examples include:

Drums, cardboard, skids, other packaging materials, unused raw materials, metal scrap and chips, production by-products, scrap tooling, production scrap, non-conforming materials, scrapped equipment and parts, oils, solvents, cleaning fluids, maintenance supplies, office paper and stationery supplies, food service items and packaging.

Sludges, spilled materials and associated cleanup materials, trash and general refuse, hazardous waste, asbestos, PCB materials, construction debris, fly ash.

Discharges to the wastewater treatment system, sanitary system, stormwater system, the ground water, and surface waters.

Pollutants released into the plant air and outside air.

Figure 2–2

2

"The success of plant waste reduction programs is directly dependent on the level of management support for and the degree of employe participation in the plant program.."

Program Effectiveness = Support and Commitment

The success of plant waste reduction programs is directly dependent on the level of management support for and the degree of employe participation in the plant program. In the past, the environmental engineer has been given the responsibility for plant waste management after the waste was generated. A more efficient means of managing waste is to ensure that it is not produced in the first place. This requires that every GM employe be aware of the wasteful practices they encounter daily and participate in reducing or eliminating the waste from those activities. For this to happen, a change in operating philosophy must be supported by plant management that emphasizes less wasteful practices. Bringing about such a positive change requires a full commitment by management of the necessary resources for program support. Having management support for the program is like adding fertilizer to the "grassroots" cultural change that needs to take place.

Plant management plays a very important part in the success of the Waste Reduction Program. The vision and leadership provided by plant management to the program demonstrates the importance of the program to employes. In C-P-C plants, a powerful tool for management use is the Five-Year Business Plan. Reducing waste in manufacturing processes is the fastest way a plant can become a low cost, high quality manufacturer. Waste reduction goals and strategies could greatly augment the savings realized by other business plan strategies and, therefore, should be a part of every C-P-C Business Plan. This type of emphasis closes the loop of program success because plant management will ensure that program goals are achieved to meet the overall business plan goals.

The Role of Group Headquarters and C-P-C Plants

Each individual plant will be responsible for establishment of a local waste reduction program. The associated responsibilities include:

1) **Establishing the framework for a local program;**

2) **Encouraging employe suggestions and participation;**

3) **Recognizing and rewarding im provements;**

4) **Conducting waste reduction surveys;**

5) **Identifying feasible waste prevention, elimination, reduction, and recycling projects and opportunities;**

6) **Overseeing the implementation of projects;**

7) **Tracking waste reduction progress;**

8) **Preparing and distributing waste reduction reports; and**

9) **Communicating program information to local employes and management and to C-P-C Headquarters.**

It is the responsibility of each plant to periodically report on progress made towards meeting program goals and objectives to C-P-C Headquarters, in a format mutually acceptable to the Plant Champions/ Coordinators and Headquarters. Of special importance are the savings realized

and waste volumes reduced through implementation of plant programs. Successful ideas, projects, and activities also need to be communicated to Headquarters. In order to maintain ongoing awareness of the program and the benefits gained, waste reduction information reported to C-P-C Headquarters will be used to provide updates to other C-P-C plants, C-P-C Group management, and the Corporation. This information provides incentive to employes and management for supporting the program.

C-P-C Headquarters will be responsible for coordinating efforts for the Group to enhance the total program. These responsibilities include:

1) **Working with the plants to develop interim tracking, measurement, and reporting methods until the computer-based Environmental Management Information System (EMIS) is fully developed and available to all plants;**

2) **Working with EMIS project personnel to determine long-term tracking and reporting needs;**

3) **Working with the plants to design promotional materials that will provide program consistency within C-P-C;**

4) **Developing and coordinating communications methods for sharing information between plants and C-P-C Group management;**

5) **Compiling plant reports and other program information; and**

6) **Distributing program information to the plants, C-P-C Group management, the Corporation, etc.**

Any questions that are identified during use of this guidebook, or in conduct of the recommendations described in it, should be directed to the Environmental Group of the Facilities Engineering Department, C-P-C Headquarters.

Key Individuals and Teams

While wide-spread employe awareness and participation is important in the waste reduction program, the direction and leadership of several key individuals and teams in the program is vital. It is recommended that each separately managed facility within C-P-C establish and maintain these key personnel and teams. Qualifications and responsibilities for each are listed below.

Plant Champion

The plant Champion is someone at the Plant Manager's staff level who is committed to support the waste reduction program, and has the authority to cross organizational lines to implement and maintain a successful program. The Champion should be familiar with the facility and its personnel, and understand the facility operating procedures and quality control requirements. The Champion is a person who will support and promote the waste reduction program at the facility. It is recommended that the Environmental Manager be the Plant Champion.

Plant Coordinator

The plant Coordinator brings a more technical or "hands on" background to the program. The Coordinator should also be familiar with the facility, know the plant personnel, and understand local operating procedures and quality control requirements. In addition, the Coordinator should be familiar with new technology and local

waste management techniques and have a good rapport with facility management. Some facilities may find that a combination of two Co-Coordinators from different disciplines better suits their needs. The Coordinator(s) works closely with the Champion to establish and maintain a local program that is an ongoing part of the organization, regardless of future changes in plant personnel. Due to the size and complexity of typical GM operations, it is recommended that both a Champion and a Coordinator be maintained at each separately managed facility, even though a plant may have one person that fits the characteristics of both. Typically, it may be appropriate that a representative of the Materials Department be the Coordinator.

Plant Waste Reduction Committee

A Waste Reduction Committee should be established by the Champion and Coordinator to serve as the decision-making group for the plant's Waste Reduction Program. This Committee should be an established, dedicated group that is given responsibility and decision-making authority over the entire program. Committee members can be a subcommittee of the existing Hazardous Materials Control Committee, the local Quality Network Council, the Suggestion Plan Review Committee, or other existing related groups. Alternately, it could be a stand-alone group of volunteers from various plant areas or personnel designated by the Champion and Coordinator. In many cases, it is likely that the Coordinator would chair this Committee. The best candidates are employes who are enthusiastic about and believe in reducing waste in the plant. For this reason, it may be advisable to solicit volunteers from the salaried and hourly workforces to serve on the Committee. Committee members should also include representatives from various departments in the plant such as maintenance, quality control, production, engineering, purchasing, personnel, etc. Additionally, the plant representatives for the Suggestion-Plan and Employe Communications should be Committee members. Their participation is discussed in more detail in Section 3, Establishing and Maintaining a Waste Reduction Program.

The Waste Reduction Committee would have responsibilities for selecting waste reduction survey teams and survey team leaders (see following personnel descriptions) from among their own members or from others outside of the group. In addition, they would receive survey data compiled by the teams and coordinate brainstorming to develop waste reduction options. Following the surveys they would be responsible for screening potential options, selecting project leaders, and ensuring implementation and continued progress of waste reduction projects.

The Committee would also administer the ongoing plant program. Examples of Committee activities would include: formulating local program goals and strategies, overseeing program promotional activities, deciding on local recognition and reward systems, establishing the interactive link between the Committee, the local Suggestion Plan and Employe Communications groups, designating local responsibility for tracking, measurement, and reporting functions, reviewing plant progress data to determine if local objectives are being met, etc. In summary, the Committee would have responsibility for ensuring that the plant program is structured to reflect C-P-C's Waste Reduction Policy and meets the Group Program Goals while best serving the needs of the plant.

Project Leaders

Project leaders are also key personnel in the waste reduction program. When a waste reduction project at a plant is submitted for a detailed feasibility study, it is assigned a project leader. This person is typically the

individual who either suggested the project, one who may benefit from it, or someone who is either directly responsible or provides service/support for the process and/or area of the plant generating the waste. It is his or her responsiblity to follow the project from start to finish (from feasibility study on through submittal for approval, implementation, and startup of the method).

Although many of the steps for implementing a waste reduction project at C-P-C follow the same procedures used in implementing other plant projects, waste reduction project leaders are required to ensure that these steps are followed and are properly documented. Keeping the project on schedule, keeping the Champion, Coordinator and Waste Reduction Committee informed of project progress, and ensuring that sufficient waste reduction data are compiled and reported, are examples of a project leader's responsibilities.

Because selection as a project leader entails responsibilities in addition to, rather than instead of, normal job duties, leaders should be recognized for their efforts. The incentives used to encourage participation in waste reduction and to recognize efforts in these projects are most effective when developed at the plant level under the direction of the local Waste Reduction Committee.

Survey Teams and Team Leaders

These teams are responsible for the hands-on work associated with conducting waste reduction surveys. Teams and their leaders should be selected by the Champion, Coordinator, or the Waste Reduction Committee. Survey teams must collect data, audit plant areas, and interview employes in order to identify, characterize, and quantify wastes that are being generated within the survey boundary.

Brainstorming Teams

The goal of a brainstorming team is to generate waste reduction ideas based on the data available from a waste reduction survey. Again, participants should either be the Champion, Coordinator, Waste Reduction Committee members, or other participants selected by them. This team's responsibilities do not include ranking ideas. Rather, their purpose is to provide fresh perspectives and generate as many waste reduction ideas as possible. Brainstorming teams will typically be comprised of persons with waste reduction expertise, plant "decision makers," and representatives of the areas of the plant that would be affected by the waste reduction alternatives.

Local Goals and Strategies

Once the Champion, Coordinator, and Waste Reduction Committee have been established at a plant, the next step is to develop local goals and strategies for program implementation that take into account the existing management and operating structure. The C-P-C Group goals may be adopted as the local goals or they may be supplemented with specific reduction criteria or other objectives, depending on how the local program is to be structured.

Local strategies should also be developed. They spell out the steps in "how" the goals are to be met. The list of plant responsibilities in the previous section "The Role of Group Headquarters and C-P-C Plants" is a helpful starting point. A plant that knows how they will accomplish the tasks in that list has the basis for a successful waste reduction program.

The following section presents suggestions for structuring a plant program. ■

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"Individual effort is the key to making real changes at C-P-C, therefore, every single hourly and salaried employe is an important player."

Implementing a Plant Waste Reduction Program

The elements of C-P-C's Waste Reduction Program are shown in Figure 3-1. At the heart of C-P-C's efforts is the Corporate WE CARE program which provides overall program support. In the next circle are C-P-C's Waste Reduction Policy and Goals. The Policy and Goals give direction to the plants so that management, key program personnel, and/or the local Waste Reduction Committee can shape the plant's local goals and strategies (next outward circle). Plant goals and strategies should be developed to set a course for the program that includes all the program drivers (as shown in the outer circle of Figure 3-1).

The drivers of a waste reduction program are:

- **Employe participation**
- **Employe suggestions**
- **Waste surveys**
- **Waste reduction projects**
- **Tracking and measurement**
- **Local communication**
- **Rewards and recognition**
- **Local program promotion**
- **Information sharing between plants**
- **Reporting**

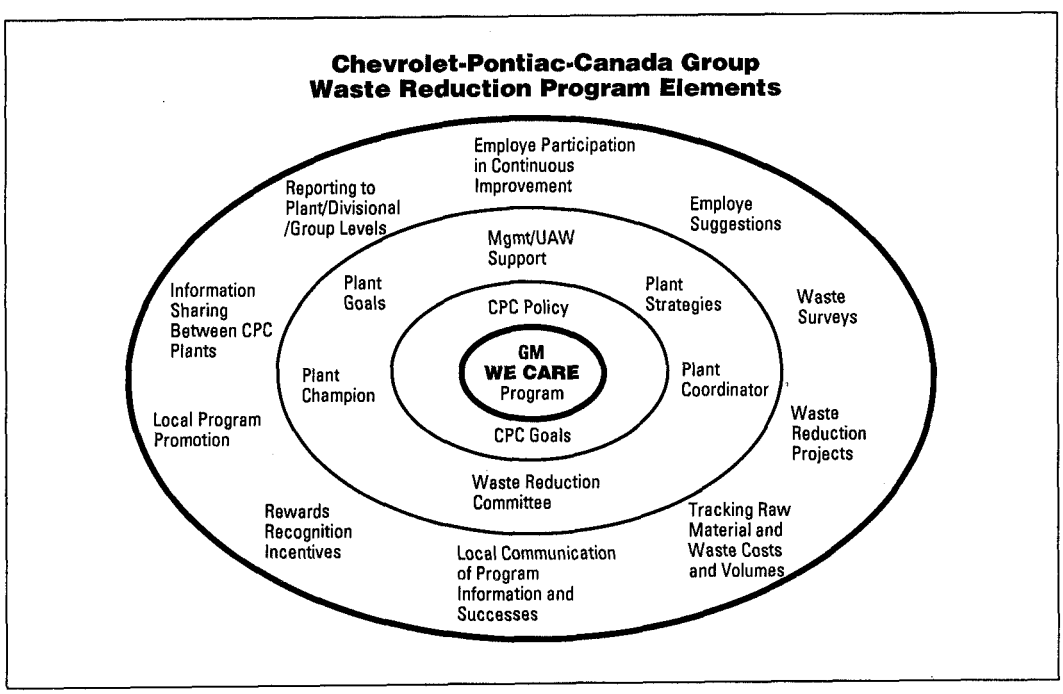

Figure 3–1

The key to program success is to have a firm foundation of management and UAW support, effective plant goals and strategies, and devoted key personnel that will create and sustain a balance between the activities that drive the program.

The program drivers are discussed in more detail in this section of the Guidebook.

Employe Participation in Continuous Improvement

The essence of a waste reduction program is employe participation. Individual effort is the key to making real changes at C-P-C, therefore, every single hourly and salaried employe is an important player. Because every employe comes in contact with many forms of waste daily, no one is exempt from participation in the program.

The plant's Waste Reduction Committee should develop the framework for employe participation including how to encourage participation and what mechanism(s) will be used to collect, evaluate, and implement ideas. Consideration must be given to how to keep positive interaction flowing between the employes and the Committee. Discouragement will defeat an effort faster than any other factor.

The Committee may want to consider encouraging the formation of employe action groups that look at certain types of waste reduction methods (for instance, a recycling program or working with suppliers to reduce waste from the materials they supply the plant) or concentrate on certain areas of the plant (their own department, for example). An excellent means of recruiting enthusiastic participants in these kinds of efforts is to solicit volunteers. With the media attention being given to the environment, there should be no lack of interest from employes in doing something to preserve it.

Employes should be encouraged to think about reducing waste and wasteful practices in their own work, lunch, and break areas. Any employe who has or uses a trash can at work is included. Anyone who knows of wasteful methods has a responsibility to correct the problem, have it corrected by the appropriate personnel, or suggest solutions for correcting it. Any amount of waste of new or unused raw materials should be reduced as much and as quickly as possible. When raw materials are wasted, the plant incurs the cost of the material plus handling and disposal charges without getting any benefit at all from the material.

Design engineers, especially, have enormous opportunities to lower the cost and increase the quality of our products by eliminating or reducing waste in our operations. Employes, and even suppliers, who play a part in designing C-P-C's products and processes must make a serious effort to design waste prevention into both the production processes and the final product(s) so that maximum efficiency can be achieved.

Each employe should look at every daily task and activity in which he or she is involved and think about the steps, materials, or actions that add unnecessary costs to those tasks and activities. In other words, is there waste occurring in the process? How can the job be done more efficiently (with less waste)? Is there a better way to design the process or end product to prevent or eliminate waste? Is material substitution an option to reduce waste volume or toxicity? Would having a different type of contract with a supplier or suppliers help to reduce waste? Does waste occur because things are not done right the first time? How can this be corrected? Can a suggestion be submitted that could benefit this and other jobs or activities like it?

Another way employes can participate in the program is to analyze the contents of the trash cans and bins they use daily. What

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"...every effort should start with consideration of how the waste could be prevented or eliminated."

kinds of materials are there and where did they come from? What can each person do to keep from contributing to the volume of solid waste? (Peer pressure is a good incentive for employe participation in this case.) If reduction of the wastes are not possible, would they be candidates for a recycling program?

The Waste Reduction Committee should emphasize to employes that every effort should start with consideration of how the waste could be prevented or eliminated. Only after this consideration should other methods be contemplated (see the method prioritization list, Figure 2-1 in the section on Establishing a Waste Reduction Program).

Use of the GM Suggestion Plan

Each employe has valuable ideas for reducing waste generation. The GM Suggestion Plan is a well established system through which ideas can be presented and the individual or a group of employes recognized and rewarded for contributing those ideas. A successful system which encourages, recognizes, and rewards new waste reduction ideas will help everyone realize the importance of waste reduction as an integral part of their job.

It is recommended that the person in charge of the plant's Suggestion Plan be a member of the Waste Reduction Committee. The local Suggestion Plan and the Waste Reduction Program should be integrated because they are so closely related. For instance, some means of identifying waste reduction suggestions should be developed so that their savings can be separated from other suggestions for waste reduction reporting purposes. It is important that all waste cost and volume reductions be tracked so that program progress can be measured and the information shared with all employes.

It is possible that waste reduction suggestions may present only intangible benefits (no measureable cost savings). An example would include projects for which the Return On Investment (ROI) period exceeds the standard pay-back period, but implementation of the project would lower regulatory compliance costs that are difficult to quantify or calculate. Another example is substituting the use of recycled paper for all office stock papers. These suggestions are important too, because they may provide environmental benefits rather than a large cost savings. Minimizing the impact on the environment is part of the C-P-C policy. A method of recognizing and/or rewarding these types of suggestions should be developed. The plant may decide to handle them as they do safety related suggestions or could develop alternative methods of recognition.

Waste Reduction Surveys

Employe suggestions make up a large portion of the program input for waste reduction ideas. Another important input is waste reduction surveys which are an integral part of the Waste Reduction Program. To prevent waste generation, you must know all sources of the plant waste streams and emissions. This knowledge can be gained by identifying all waste generation locations and activities and gathering data about the wastes generated. These steps are accomplished by collecting plant data, defining waste streams, quantifying waste volumes, documenting waste management methods and costs, and identifying potential waste reduction alternatives. These activities can be broken down into the following phases:

Waste Surveys;

Screening Waste Reduction Options;

Technical, Economic, Operational Feasibility Assessments; and

Waste Reduction Project Implementation.

The flow chart presented in Figure 3-2 illustrates how these phases fit together and shows the steps included in each phase. Sources of information that may be used in the survey include documents such as existing permits, department layouts, flowsheets, production records, operating manuals, lab test data, Material Safety Data Sheets, waste manifests, shipping papers, purchasing records. Actual process knowledge and experience gained from preparation of regulatory compliance reports (such as SARA 312/313) are also extremely valuable in defining waste streams. These data will then be used to help identify and assess methods of waste reduction.

Waste reduction surveys are conducted in particular areas or production units of the plant by a selected survey team or an outside contractor. In-house survey teams and team leaders should be selected by the Plant Champion, Plant Coordinator, or the Waste Reduction Committee. The survey team or outside contractor carries out specific activities according to a schedule laid out at the beginning of a survey. Surveys are triggered by situations such as a need for baseline information, regulatory requirement changes, or production volume, raw material, or process changes.

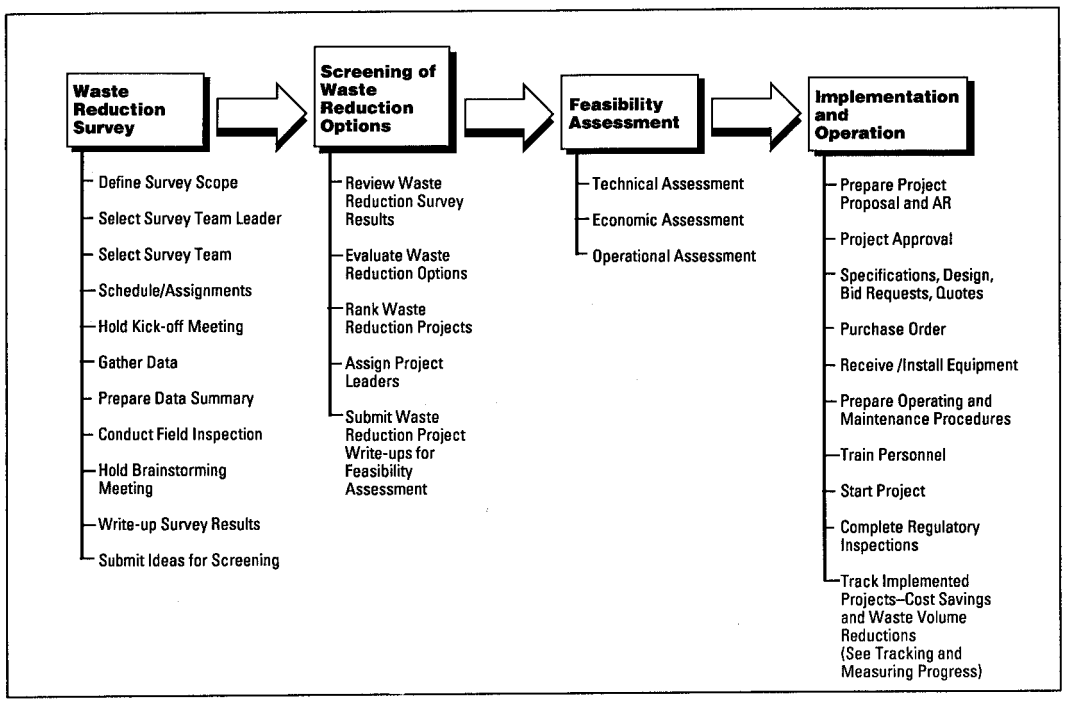

Figure 3–2

The supplemental section of this guidebook contains a detailed description of each step of the waste reduction survey and includes easy-to-use worksheets for assembling survey data and documenting the results of survey activities. Also included, is a discussion of the steps involved in screening waste reduction options, conducting feasibility assessments, and implementing projects.

"To prevent waste generation, you must know all sources of the plant waste streams and emissions.."

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Waste Reduction Projects

Many waste reduction ideas can be implemented easily within a work area by modifying a procedure, changing the types of materials in use, or making simple adjustments or repairs to the existing equipment. Ideas that require large expenditures of time, money, or manpower will have to be handled as a project.

Once an idea is identified as a waste reduction option, it must undergo a feasibility analysis. The criteria for evaluating an idea fall into three categories: technical, economic, and operational feasibilities. These categories contain such criteria as:

The feasibility analysis will determine if the idea is worth implementing. The lists below are recommended criteria. Plants should evaluate ideas based on the criteria they normally use to justify business decisions. It should be noted, however, that the focus for waste reduction in federal regulations is on the reduction of volume and toxicity of waste streams and not necessarily on a reduction of costs. In all cases, projects should move the plant towards their program and business plan goals.

An extended discussion of project feasibility assessments and project implementation is presented in the supplemental section of this guidebook.

Technical	**Economic**	**Operational**
Available technology	Capital investment	Product quality effects
Vendor support	Operating costs	Downtime to install
Permits required	Maintenance costs	Space availability
Reliability	Return on investment	Process compatibility
Resource availability	Avoided costs*	Retraining requirements
		Employe health & safety

* Avoided costs include expenses for raw materials, production, utilities and other support, permitting or other regulatory compliance, waste transportation and disposal, and waste-related taxes.

Tracking and Measuring Progress

The previous section entitled "Employe Suggestions" explained the importance of tracking the savings from waste reduction suggestions separately from other suggestions. Suggestions are one source of information regarding program progress. Another source is the tracking of raw materials purchased (and the associated costs) versus volumes and costs of waste disposal, and the relationship of both to production volumes.

The importance of tracking can not be stressed enough. Tracking allows the plant to:

1) **Measure their progress towards program and business plan goals;**

2) **Determine the effectiveness of waste reduction projects and suggestions that have been implemented;**

3) **Share progress information with local employes to maintain program momentum;**

4) **Generate reports for plant departments or business units, local management, divisional support offices, and Group Headquarters;**

5) **Compile data for present regulatory reporting; and**

6) **Communicate progress to the community and government agencies.**

Plants may decide to use tracking methods already in place, but present methods can be misleading for waste reduction tracking purposes. Most data tracking is done on a basis unrelated to production levels because present regulatory reports require it in this form. It is easier to track waste reduction efforts this way, but the method does not give a true picture of the impact of waste reduction efforts in the plant.The best method for waste reduction tracking is to correlate raw material purchases and waste volumes generated to a plant production volume indicator. The indicator used by the plant will depend on what production information is most readily available and accurate. The indicators that may be used include: number of parts, units, or tonnage produced, labor man-hours worked, or plant sales/ revenues. Indicators should be tied to a time period (per month, per quarter), depending on the local availability of the information. With this correlation, continuous improvements in waste reduction are measured as a ratio to production levels.

By tracking waste volumes versus production volumes, many companies with waste reduction programs have found that even during times of increasing production volumes, their waste volumes have decreased. This is a powerful incentive to continue waste reduction efforts and has a great impact on public or regulatory relations. During the program startup phase, it is best to treat the plant as a whole when tracking waste volumes versus production volumes. Otherwise, large amounts of production data would have to be gathered and frustration could arise when production data does not correlate with specific waste streams. As the local program progresses and the computer-based Environmental Management Information System (EMIS) develops, tracking may be refined to include the waste versus production volume method for departments and/or business units.

Data tracking will be simplified when EMIS is fully on-line in the plants. The present schedule for full implementation, however, extends into 1993. In the meantime, the Manguard environmental software presently available provides some tracking capabilities (Appendix C in the supplemental

"By tracking waste volumes versus production volumes, many companies with waste reduction programs have found that even during times of increasing production volumes, their waste volumes have decreased."

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"Continuous communication about the program goals, activities at the plant, the personnel involved, and the results of everyone's efforts is imperative to maintain awareness and interest in the Waste Reduction Program.."

section of this Guidebook provides more detail on tracking).

Tracking of plant data with the necessary elements should begin as soon as possible to establish a baseline for future comparisons of data. Without a starting point, it is difficult to determine how far you have progressed.

Tracking and measurement of waste reduction progress is a critical element in the Waste Reduction Program. Plants will be required to document this data because it is the key to continuous improvement and absolutely necessary for communicating progress information. Until EMIS is able to provide this tracking ability, some portions of the tracking may have to be done with Manguard, manually, or on a spreadsheet software program. Group Headquarters will provide coordination between the plants to determine how this tracking will be accomplished in the interim. Reporting of data is discussed in a later section.

Local Communications

The cement that holds together all the program elements discussed to this point is local communications. Continuous communication about the program goals, activities at the plant, the personnel involved, and the results of everyone's efforts is imperative to maintain awareness and interest in the Waste Reduction Program.

Each plant has a representative for all Employe Communications functions. It is recommended that this person be a member of the plant's Waste Reduction Committee along with the Suggestion Plan representative. The Employe Communications representative has contact with GM Employe Communications, which gives them a link to other plants and the corporate communications network. A strategy for local communications should be developed by the Committee by using Employe Communications as a resource.

The plant's own Employe Communications Network (ECN) can be an excellent medium to promote the program locally. The local ECN is always looking for stories and items of interest to plant employes. The Waste Reduction Committee has a need to share program information to maintain program momentum. A mutually beneficial situation exists naturally between these two groups with the overall advantage being program promotion.

Other local communication mediums that could be used include plant bulletin boards, newsletters, and department update meetings. Individual employes or employe groups may want to participate in coordinating some of the communications activities for the plant.

The type of information that is shared should be determined by the Waste Reduction Committee. It will depend on local program structure such as the goals established, types of local employe participation and recognition used, and how often program progress information is available. Information should be shared routinely, possibly in a standard format that becomes recognizable to all employes. The important part of communicating is to do it often and with some variety so that employe interest remains fresh.

Rewards and Recognition

Each employe has a responsibility to perform their job efficiently and to continuously look for changes that increase its efficiency. However, special efforts are often made by employes and should be rewarded or recognized. We presently have the GM Suggestion Plan to accomplish this

recognition and reward. For purposes of the Waste Reduction Program, the plant's Waste Reduction Committee may want to make other forms of recognition or reward available to employes for unique or extraordinary efforts, for project leaders' contributions, or as a result of locally organized competitions. It is up to the plant to decide what the focus of the local program will be and, therefore, what types of incentives and program promotions will be used. A few ideas are presented in the supplemental portion of this guidebook.

In all cases, plant programs should provide a consistent message to employes about the importance of the program. The means used to reward and recognize employes is a very visible mechanism that could be used to demonstrate this importance.

Promoting the Program

As discussed in the previous two sections, communicating information about program progress and rewarding employe participation are very effective methods of program promotion. General promotional techniques are also recommended to heighten program awareness or re-emphasize the importance of the program to employes.

Program promotion can be as simple as putting up posters or as detailed as having an ongoing "advertising" campaign. It can be used for local efforts such as soliciting volunteers for special waste reduction activities (for instance, a recycling program) or notifying employes of upcoming planned events (waste reduction challenges). Other information that can be shared to promote the program are general costs for waste handling versus waste reduction or waste reduction tips for use at home or at work. Getting employes to think about waste reduction as a lifestyle rather than a task will help to bring about a cultural change in the plant more quickly.

The "Waste Watch" newsletter is a corporate publication that can also be used to feature plant success stories for employe information. It is published by Argonaut AEC, Waste Management Services.

The ideas presented are not requirements for plant programs. They are possibilities for building or maintaining employe interest in the program. Group Headquarters will work with the plant personnel to design some promotional items, that will provide consistency among the C-P-C plants.

Sharing Information Between the Plants

As the plant programs develop, waste reduction ideas will be generated that will be worth sharing among other plants with the same or similar processes. It may eventually be beneficial to establish a "waste exchange" directory among the C-P-C plants. Group Headquarters will be responsible for coordinating the flow of this type of information between the plants.

Several methods may be used for communicating information. It could simply be through encouraging direct contact between the Plant Champions or Coordinators, through holding periodic meetings between the Plant Coordinators, or by providing C-P-C program updates from Group Headquarters. The Waste Management Services Group publishes a technology exchange newsletter called "EnvirNet" that is available for sharing information with other GM plants. C-P-C plants are encouraged to use this means of sharing ideas and technology also.

As the C-P-C Waste Reduction Program develops, Group Headquarters will work with the plants to determine other possible forums that can be used to communicate technology and waste exchange information.

"Getting employes to think about waste reduction as a lifestyle rather than a task will help to bring about a cultural change in the plant more quickly."

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Reporting to Plant, Divisional, and Group Levels

Plant/ Divisional

The Plant Champion, Plant Coordinator, and/or the Waste Reduction Committee should decide what type of progress reporting will be required in the plant. Communicating information to employes through established mediums has been discussed previously. It is also important to keep management informed of the work being accomplished, the savings generated, and the amounts of waste being reduced. The reporting is necessary for measuring progress against established program and business plan goals and provides current information to management. Positive progress will ensure continued program support from management.

Other reporting may be needed for divisional support offices or management. The format of information to be provided can be decided between the Waste Reduction Committee, Plant Champion, or Plant Coordinator and the receiver of the information.

Group Reporting

During the program startup phase, each plant is expected to establish a baseline of data for raw material and waste volumes and costs versus present production levels (see "Tracking and Measuring Progress"). Until a uniform method of tracking and reporting can be developed, reporting to Group Headquarters will be done in annual cycles. This time frame will allow for the establishment of baselines and the development of an interim method for the plants to use in reporting to Headquarters. Once the Manguard/EMIS tracking is available, the reporting time period will be reviewed with the plants and possibly modified. Information reported from the plants will be compiled by Headquarters into a single report showing all C-P-C plants and shared with the plants and C-P-C management.

Plant reports are to be sent to the Environmental Group, Facilities Engineering Department, C-P-C Headquarters, 258–25, 30001 VanDyke Ave., Warren, MI 48090-9020.

A Look into the Future

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We all have a desire to leave a clean environment for our children and grandchildren. It will take an individual effort by each one of us to accomplish this task. By working together, our combined efforts can really make a difference.

The key is for every person to make a habit of watching for and avoiding wasteful practices in their daily activities, both at home and at work. Making waste reduction a part of our lives will bring a three-fold advantage... increased efficiency and quality in all of our endeavors... reduced generation of wastes... increased tangible and intangible cost savings.

At work this means better utilization of the expensive raw materials used in our operations and an overall reduction in the emissions of pollutants to the environment. With every employe practicing waste reduction daily, continuous improvement will happen naturally. By taking the same practices home and into our communities, we can have an immeasurable positive impact on the environment. ■

"Making waste reduction a part of our lives will bring a three-fold advantage... increased efficiency and quality in all of our endeavors... reduced generation of wastes... increased tangible and intangible cost savings."

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Acknowledgements

Special thanks are given to the B-O-C Facilities Engineering Department, Environmental Group, for their development and assistance on the contents of this guidebook.

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