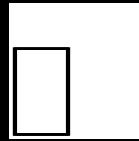




POLLUTION PREVENTION FACT SHEET

Pollution Prevention Program - Federal Programs Division

Fact Sheet #2: (Revised)



Establishing A Pollution Prevention Program

This Pollution Prevention Fact Sheet is one in a continuing series prepared under the Pollution Prevention Program of the Federal Programs Division of Environment Canada, Ontario Region. This Program is intended to help federal departments in Ontario become model environmental citizens by managing beyond compliance. This Fact Sheet presents the following:

- The basic components of a Pollution Prevention Program;
- Definition of a Pollution Prevention Program;
- A planning model for developing a Pollution Prevention Program;
- Success stories; and
- Further sources of information.



What is a Pollution Prevention Program?

A Pollution Prevention Program is an organized, comprehensive and continual effort to systematically reduce pollutants and wastes throughout an organization or at a specific facility.

Such a program includes management, planning, budgeting and monitoring elements to promote and support the development and implementation of pollution prevention.

A successful Pollution Prevention Program will save money. It can reduce waste management costs, raw material purchases, employee training requirements and worker protection costs. It can also reduce potential emissions and disposal liabilities, protect the environment, and protect public health and worker safety. A Pollution Prevention Program also indicates that a particular federal facility is aware of the federal strategy on pollution prevention and is initiating a commitment to the concept of sustainable development as outlined in [Pollution Prevention: A Federal Strategy for Action](#).



Development of a Pollution Prevention Program

The basic components of a Pollution Prevention Program include the following:

- Organizational and co-operative commitment to pollution prevention;
- Goals, objectives and an implementation schedule for the Program;
- Assessment of current practices and identification of opportunities for pollution prevention;
- Feasibility analysis of pollution prevention options (technical, economic, environmental);
- Priority listing of pollution prevention options; and
- Implementation and monitoring of the Pollution Prevention Program.

The Pollution Prevention Planning Model illustrated in Figure 1 is designed to provide guidance on the logical progression of procedures when establishing a Pollution Prevention Program.

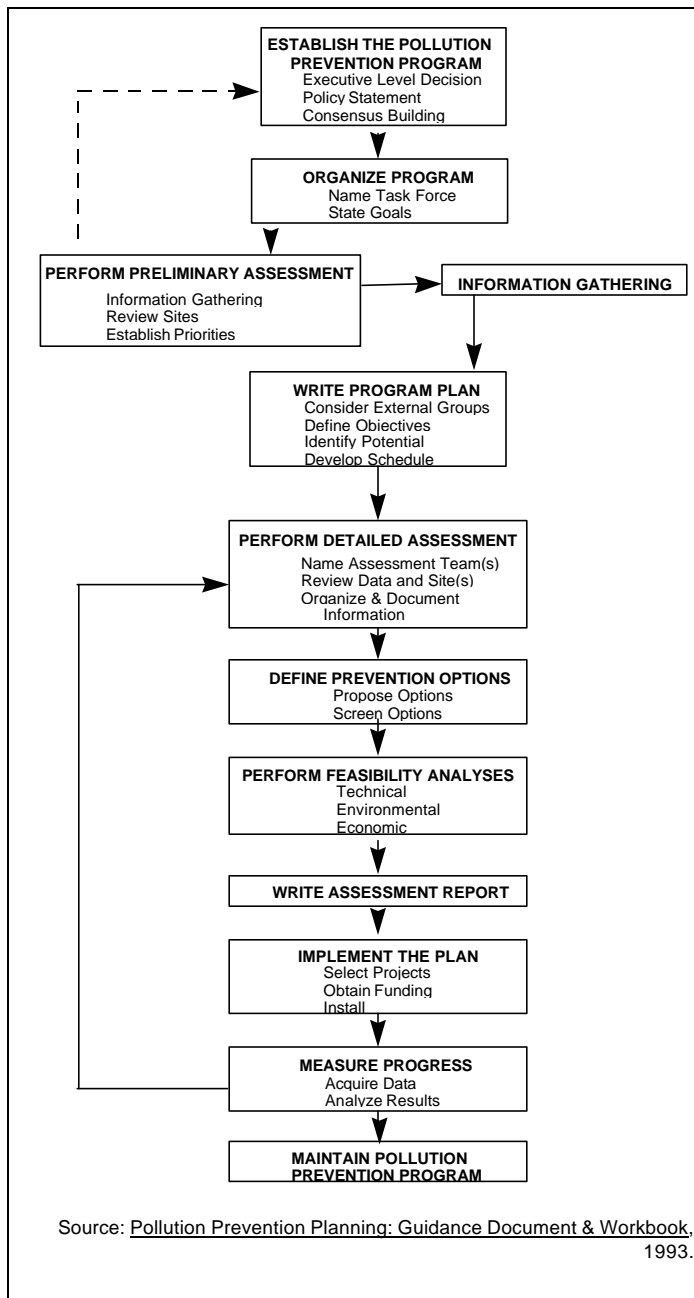


Figure 1: Pollution Prevention Planning Model

Definition of Pollution Prevention

Pollution prevention is defined by the federal government as "...the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce overall risk to human health and the environment."

For example, pollution prevention is achieved by raw materials substitution; process redesign or modification; in-process recycling; improved maintenance; and operations or administrative changes.

Pollution prevention does not include substitution of one toxic substance for another, treatment of wastes already produced, out-of-process recycling or incineration.



Step 1 - Establish the Pollution Prevention Program

The first step involves the following:

- Developing an organizational commitment to Pollution Prevention;
- Establishing goals; and
- Assigning responsibilities.

Developing an Organizational Commitment to Pollution Prevention

Top management support is needed to ensure that pollution prevention becomes an organizational goal. It may be necessary to gather preliminary information to demonstrate to senior management that pollution prevention opportunities exist. These opportunities should be explored to establish priorities for the Pollution Prevention Program. Once senior managers have decided to establish a Pollution Prevention Program, it should be conveyed to all employees through a formal policy statement. The employees' support of the Pollution Prevention Program must be ensured. You are trying to implement a shift in the way people look at their environment.

Establishing Goals

In developing a Pollution Prevention Program, it is important to establish goals, objectives and schedules that are consistent with the pollution prevention policy statement and your organization's culture.

As a minimum, the Pollution Prevention Program should incorporate the objective to reduce the generation of wastes and the release of pollutants. Other specific objectives can cover a variety of areas such as costs, safety and productivity. Since organizations differ dramatically, setting goals can be accomplished in a variety of ways. Pollution prevention goals may be qualitative and/or quantitative. Qualitative goals strive to meet "a significant reduction" in waste generation.

Quantifiable goals are preferable because they are specific, measurable and provide a clear guide to the Program's expectations. As with the objectives, the goals can cover a number of areas such as waste

quantities generated, waste disposal, waste toxicity or costs.

Assigning Responsibilities

A suggested management structure would be one which consists of establishing two groups: the Pollution Prevention Task Force and the Pollution Prevention Assessment Team.

The **Pollution Prevention Task Force** oversees the Program through its planning, implementation and evaluation stages. The Task Force should consist of representatives from all parts of the organization, including operations, maintenance, purchasing and finance.

The **Pollution Prevention Assessment Team** performs the actual work of assessing the organization's operations and suggests possible pollution prevention projects. Projects could include measures to reduce hazardous wastes, the installation of more efficient machinery, or the adoption of better housekeeping procedures.



Step 2 - Conduct a detailed assessment of your operations

The generation of baseline facility or process information will serve as the means to identify pollution prevention opportunities. This information will also serve as the basis for demonstrating success, progress and accomplishments of the Pollution Prevention Program.

Initially, waste streams or uncontrolled releases must be identified and characterized as solid/liquid/gas and hazardous/non-hazardous. A waste audit will identify where wastes are being generated and why.

Note: A waste audit is similar to an environmental audit but there is one major difference. An environmental audit is conducted to identify where the wastes generated end up and to verify if a facility's waste treatment and disposal practices are in compliance with environmental regulations. Conversely, a waste audit addresses why wastes are generated and allows an organization to identify how it can prevent or significantly reduce the generation of those wastes.

Refer to the section entitled "Further Sources of Information" for a list of contacts that can assist you with developing and implementing a waste audit. Some of the information that can be gathered through a waste audit is summarized in Table 1.

- What is the composition of the waste streams and emissions generated at the facility?
- What is their quantity?
- From which production processes or treatments do these waste streams and emissions originate?
- Which waste materials and emissions fall under environmental regulations?
- What raw materials and input materials in the facility generate these waste streams and emissions?
- How much of a specific raw/input material is found in each waste stream?
- What quantity of materials are lost in the form of volatile emissions?
- How efficient is the production process and its various steps?
- Are there any steps in the process that could be eliminated or combined while maintaining specifications?
- Are any unnecessary waste materials or emissions produced by mixing materials which could otherwise be reused with other waste materials?
- Which good housekeeping practices are already in force at the facility to limit the generation of waste materials?

Table 1: Questions to consider during a waste audit

The extent and complexity of the information gathering system should be consistent with the needs of your organization. Keep in mind that the goal of the Pollution Prevention Program is to prevent pollution, not to collect data.

Much of the data needed for a Pollution Prevention Program may be collected as a normal part of operations or in response to existing regulatory requirements as shown in Table 2.



Step 3 - Identify pollution prevention options

After data from the waste audit has been collected and summarized, the Pollution Prevention Assessment Team can begin a comprehensive evaluation of a facility's pollution prevention options. This can entail the selection of specific waste streams as individual targets for waste reduction. Once a waste has been targeted, the task is to determine the methods that will be used to accomplish the reduction of the waste.

Data sources for facility information include

Regulatory information:

- Waste shipment manifests (Regulation 347)
- Emission inventories
- Hazardous waste storage reports
- Waste, wastewater, and air emissions analyses, including intermediate streams
- Environmental audit reports

The Compliance Promotion Office, at the Federal Program Division can provide additional information. Contact Lawrence King at (613) 952-8679.

Process information:

- Process flow diagrams
- Design and actual layouts
- Operating manuals and process descriptions
- Equipment lists
- Equipment specifications and data sheets
- Piping and instrument diagrams
- Plot and elevation plans
- Equipment layout and logistics

Raw material / production information:

- Product composition and batch sheets
- Material application diagrams
- Material Safety Data Sheets
- Product and raw material inventory records
- Operator data logs
- Operating procedures
- Production schedules

Accounting information:

- Waste handling, treatment, and disposal costs
- Water and sewage costs, including surcharges
- Costs for nonhazardous waste disposal (eg. trash & scrap metal)
- Product, energy and raw material costs
- Operating and maintenance costs

Other information:

- Environmental policy statements
- Standard procedures
- Organization charts
- Expert advice from industry or engineering associations

Table 2: Data Sources for facility information

A Pollution Prevention Program should be started with measures that are relatively easy and inexpensive to produce and yield results quickly. Examples of such measures include improved housekeeping, preventive maintenance and best management practices.

Some potential options for pollution prevention may require more detailed analysis. These cases may

involve process efficiency improvements, equipment modifications or materials substitution.



Step 4 - Perform a Feasibility Analysis

Identified pollution prevention options should be examined to determine which are technically, economically and environmentally feasible. This feasibility analysis allows for the prioritization of pollution prevention options for implementation.

A technical evaluation will determine whether a proposed pollution prevention option is likely to work in a specific application.

An economic evaluation will estimate the total costs and benefits expected from each option and should illustrate the anticipated payback period.

An environmental evaluation will address the advantages and disadvantages of each option with regard to their effect on the environment. It should also indicate the level of regulatory compliance and distinguish between current, pending and future environmental regulations.



Step 5 - Write an Assessment Report

An assessment report should be written to summarize the results of the pollution prevention options assessment. This report will be the basis for implementing and maintaining the Pollution Prevention Program. It may also be used to secure funding for projects that require capital investment.

The report should provide the following information:

- Prioritized pollution prevention projects;
- Implementation schedule;
- Overall project economics;
- Required resources; and
- Possible performance measures for the project evaluation after implementation.



Step 6 - Implement the Pollution Prevention Plan

Select Projects for Implementation

Final decisions about which pollution prevention projects will be implemented are made at this point.

Obtain Funding

Funding for selected projects will be sought and secured from the previously established Pollution Prevention Task Force.

Install Selected Projects

Once funding is secured the selected projects are initiated. As the implementation process continues, many pollution prevention projects may require changes in operating procedures, purchasing methods, or materials inventory control. Policies, procedures and employee training will likely be affected by the changes. Training and incentive programs can familiarize employees with new pollution prevention procedures and equipment.

Review and Adjust

The pollution prevention process does not end with implementation. It should be reviewed and adjusted as different circumstances arise. The technical, economic and environmental effectiveness of pollution prevention projects must be tracked with respect to the goals and objectives of the Pollution Prevention Program.

Step 7 - Measure and Monitor Progress

There are several methods for acquiring and analyzing data to measure the efficacy of projects that are designed to prevent pollution. Some of these methods are outlined in the Ontario Ministry of Environment and Energy's Pollution Prevention Planning Guidance Document and Workbook referenced in the section "Further Sources of Information." Some parameters that can be evaluated include the quantity of waste generated; changes in waste toxicity; and the quantity of waste shipped off-site or treated on-site.

Aside from assessing its effectiveness in preventing pollution, a pollution prevention project should also be evaluated for its cost-effectiveness, just as would be expected from any other process or capital investment. The economics of the project can be evaluated by any of several techniques such as payback period, net present value, or return on investment.



Step 8 - Maintain the Pollution Prevention Program

The task of maintaining a viable Pollution Prevention Program will be made easier with the establishment of an awareness program. Such an activity will promote employee involvement in the Pollution Prevention Program.

Pollution prevention should be integrated into an organization's management structure as it is a multi-media activity that cuts across all environmental programs. Both the Pollution Prevention (P2) Program and the Total Quality Management (TQM) approach are based on the same premise: to improve quality performance and change the process that produces the defects.

Table 3 presents some of the key actions that can be undertaken to effectively maintain and improve a Pollution Prevention Program.

Integrate pollution prevention into corporate planning:

- Assign pollution prevention accountability to the operating units where waste is generated
- Track and report program status
- Conduct an annual program evaluation at a corporate level

Provide ongoing staff education programs:

- Make pollution prevention awareness part of new employee orientation
- Provide advanced training
- Retrain supervisors and employees

Maintain internal communication:

- Encourage two-way communication between employees and management
- Solicit employee's pollution prevention suggestions
- Follow-up on suggestions

Reward personnel for their success in pollution prevention:

- Cite accomplishments in performance reviews
- Recognize individual and group contributions
- Consider pollution prevention a job responsibility subject to review

Provide public outreach and education in pollution prevention efforts:

- Publicize your innovations and pollution prevention successes
- Arrange for employees to speak publicly about pollution prevention measures in other federal facilities or in schools and civic organizations

Table 3: Ways to maintain and improve a Pollution Prevention Program

Success Stories

Does your department have a pollution prevention success story to share? Other government departments in Ontario would like to hear about your experience in dealing with a particular problem. Please provide relevant information to the Pollution Prevention Coordinator, Federal Programs Division, Environment Canada. We will ensure that all interested parties receive this information.

Further Sources of Information

Centre for Environmental Research Information (CERI). U.S. E.P.A. (513) 569-7562. Internet: <http://www.epa.ohio.gov/opp.state.html>

EPA Waste Minimization Opportunity Assessment Manual. EPA/625/7-088/003. July 1988. Hazardous Waste Engineering Research Laboratory, U.S. EPA, 26 W. Martin Luther King Drive, Cincinnati, OH 45268.

Great Lakes Pollution Prevention Centre:
(519) 337-3423 or (800) 952 8995.
Email: info@c2p2online.com
Internet: <http://www.c2p2online.com>

Manufacturing Environmental Performance Program by Doreen Henley. October 1995. Alliance of Manufacturers and Exporters Canada (613) 233-8423 or (613) 238-8888 ext. 238.

Pollution Prevention Handbook by Thomas Higgins. 1995. Lewis Publishers: Boca Raton.

Pollution Prevention Planning Guidance Document and Workbook. March 1993. Ontario Ministry of Environment and Energy, Pollution Prevention Office. (416) 314-7910.

Pollution Prevention: A Federal Strategy for Action. Minister of the Environment. June 1995.
(613) 997-2800 or (800) 668-6767.
Email: enviroinfo@cpgsv1.am.doe.ca.
Internet: http://www.doe.ca/pollution/strategy/pl_t_pl_e.htm

Profit from Pollution Prevention: A Guide to Waste Reduction and to Waste Recycling in Canada. Pollution Probe Foundation. 1990. (416) 926-1907.

Waste Minimization: Winning with the Environment. Canadian Manufacturers' Association. February 1992. Alliance of

Manufacturers and Exporters Canada (613) 233-8423 or (613) 238-8888 ext. 238.

For further information about the Pollution Prevention Program for federal facilities in Ontario, please contact:

Environment Canada
Ontario Region - Environmental Protection Branch
Federal Programs Division
49 Camelot Drive
Nepean, Ontario, K1A 0H3
phone: (613) 952-8675
fax: (613) 952-8995
e-mail: fpd@ec.gc.ca

All Fact Sheets can be found on the Internet at:
www.on.ec.gc.ca/epb/fpd
(aussi disponible en français)