



An Organizational Guide to Pollution Prevention



Model Pollution Prevention Plan

February 1995

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WDCR828/050.WP5

Preface

Introduction

The Army's Model Pollution Prevention Plan (P2 Plan) is a tool for assisting an installation in a comprehensive program for defining responsibilities, developing guidelines, and establishing operating standards in preparing its individual pollution prevention plan.

The main objectives of the P2 plan are to establish standardized methods of doing the following:

- Identifying and tracking hazardous material usage and generation of waste at each of the installation's shops or operations.
- Identifying opportunities for reducing the volume of hazardous material usage and waste disposal through source reduction, recycle, or treatment.
- Identifying a procedure for preparing an implementation plan for the orderly adoption of pollution prevention projects.

Executive Order 12856 targets chemicals that are reportable on the Emergency Planning and Community Right-to Know Act (EPCRA) Section 313 Toxics Release Inventory (TRI), but the installation should focus its initial efforts on the largest material usage or waste streams generated at the installation. The largest streams typically offer the greatest opportunities for reduction.

Model P2 Plan Methodology

The P2 Plan was prepared in accordance with the methodology outlined in U.S. Environmental Protection Agency (EPA) guidance documents. The following specific activities are included as part of the model plan:

- commitment and program implementation
- setting of goals
- baseline inventory
- identification of pollution prevention opportunities
- preparation of an implementation plan
- annual pollution prevention reporting

The activities are described in the following paragraphs.

Commitment and Program Implementation

For a P2 Plan to be effective, it needs top management support in both policy statements and financial resource requests. Pollution prevention needs to be made a part of the organizational policy. An installation commitment statement and a sample pollution prevention policy statement are included as part of this model P2 plan.

We recommend that the installation designate the Environmental Quality Control Committee (EQCC) or equivalent body to be the policy-setting and decision-making body for pollution prevention for the installation.

Each installation should designate a Pollution Prevention Coordinator who is responsible for facilitating effective implementation, monitoring, and evaluation of the program.

A Pollution Prevention Assessment Team(s) (PPAT) should be formed as needed to assess pollution prevention opportunities. The teams should be temporary, having a specific charter to evaluate a particular waste generation activity, hazardous material usage, or pollution emission from the installation. The primary responsibilities of the Pollution Prevention Assessment Team(s) are to:

- perform pollution prevention opportunity assessments
- present the findings of the assessment to the EQCC or equivalent body for approval and funding
- implement projects approved by the EQCC or equivalent body
- monitor the performance of their pollution prevention projects

The PPAT should include personnel representing key installation functions that contribute to material usage or waste streams targeted for analysis. Other support elements necessary for implementing change in operations to facilitate the reductions also need to be represented. The team should include members who have direct knowledge of the processes that produce waste or other harmful emissions and technical advisors. Technical expertise can be supplemented by outside consultants and by calling on expertise from the following Army technical centers:

- Office of Director of Environmental Programs
- U.S. Army Environmental Center
- U.S. Army Environmental Hygiene Agency
- U.S. Army Environmental Policy Institute
- U.S. Army Acquisition Pollution Prevention Support Office

- U.S. Army Center for Public Works
- U.S. Army Construction Engineering Laboratory
- U.S. Army Armament Research, Development, and Engineering Center
- National Defense Center for Environmental Excellence

Setting of Goals

Each installation must set explicit goals for reducing the use of specific hazardous materials and reducing the volume and toxicity of waste generation within a reasonable time frame. The goals should support the overall goals of the installation's major command and Army-wide goals.

Baseline Inventory

A baseline inventory shall be conducted to identify the waste streams generated and hazardous material usage at the installation and to determine the locations from which each stream originates. The baseline inventory shall be performed on the basis of data obtained from a review of data from industrial hygiene/safety staff (OHMIS/HHIM); the facility's *Biennial Hazardous Waste Report*; the Water and Waste Department's *Hazardous Waste Operations Log* for the RCRA-permitted hazardous waste storage area; DA Form 3917, "Refuse Collection and Disposal"; and DA Form 2788-R, "Facilities Engineering Technical Data," for turn-in of recyclable materials.

Shops identified as major sources of waste or as key components in the installation's handling system for hazardous waste shall be investigated during a site visit. Investigations may consist of interviews with shop supervisors and other personnel, a tour of the shop, and a review of the waste-generating procedures. The information gathered during shop visits can be used for the following activities:

- identifying specific waste-generating processes
- highlighting process efficiencies and inefficiencies
- identifying specific waste problems
- evaluating existing pollution prevention practices
- increasing concern of shop personnel for waste reduction
- questioning the need for use of particular hazardous materials

Information obtained in the baseline inventory shall be used to rank waste streams or material usage for reduction efforts. Ranking normally is based on noncompliance issues first, then on the cost of waste disposal, and finally on the volume of waste generated. Data from the waste audit also will be evaluated to identify the major sources of each type of waste. The results will allow a more narrow focus on the larger waste streams and generators.

Identification and Evaluation of Pollution Prevention Opportunities

A range of pollution prevention alternatives shall be developed and screened for each of the major waste streams and for waste management practices at the installation as a whole. Technological, operational, and managerial pollution prevention alternatives will be identified.

Pollution prevention alternatives that pass preliminary screening will be evaluated further for technical and economic feasibility. Economic analyses will be performed by comparing potential reductions in treatment and disposal costs with the estimated costs of implementing the change. Improvements in working conditions and worker safety also should be considered.

Preparation of an Implementation Plan

An implementation plan shall be prepared to incorporate all pollution prevention alternatives that were found economically feasible and technically practical. The plan shall outline the installation's overall commitment and planned approach to pollution prevention and describe how each of the chosen pollution prevention alternatives will be implemented, demonstrated, or evaluated further.

Annual Pollution Prevention Reporting

Installations have the following reporting requirements that relate to pollution prevention:

- hazardous waste generator biennial or annual report, from RCRA
- annual EPCRA TRI reporting, from EO 12856
- Army Compliance Tracking System (ACTS) hazardous waste disposal and recycling roll-ups, from AR 200-1
- RCS 1383 reporting of programming, budgeting, and execution for all environmental projects, including P2, from AR 200-1
- Army Material Command in its ACTS data call requires its installations to report waste generation and disposal by process category

How To Use This Model Plan

This document has been prepared as a model P2 plan for installations to use in developing their individual plans. The P2 plan is written to be easily adaptable to meet individual site conditions. Instructions for personnel using the plans is marked with shading ("redlining") in the text. When the individual plan is prepared, the shaded text should be deleted. Information is included that may not apply to a given installation. If a section does not apply, delete it. Additional sections probably will need to be added to reflect the individual waste streams that are significant at a given installation. For your ease, at places in the text where the individual installation name should be used, a general installation name, "INSTALLATION-XXX," is used. When writing the plan using WordPerfect, do a search-and-replace to replace this term with your installation name.

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Section 1

Introduction and Regulatory Requirements

Introduction

Preventing pollution is INSTALLATION-XXX's top environmental priority. The current emphasis on pollution prevention is necessary to meet state and national pollution prevention policy goals, reduce long-term liabilities of waste disposal, save money by reducing the installation's raw material purchases and waste treatment and disposal costs, and protect public health and the environment.

Pollution prevention is a cost-effective means of meeting environmental objectives in an era when Army installations are simultaneously subject to stricter standards for pollution control, public criticism of their environmental records, and declining budgets. The costs of failing to prevent pollution are dramatically evident; at some installations, cleanup costs are estimated in the hundreds of millions of dollars.

Environmental liabilities increase directly with the volume of hazardous substances and materials in use and increase to a lesser extent as a result of other materials used and the solid waste generated.

Reducing these long-term liabilities requires a positive commitment, a sound plan, and an aggressive program for modifying past attitudes toward the conservation of all materials. Reducing liabilities also requires actively searching for opportunities to reduce the amount of waste generated and the use of toxic materials, fuels, and chemicals while still accomplishing INSTALLATION-XXX's mission.

Background

Identify the installation's primary mission clearly. Include in this section information about impacts due to the physical location of the installation: environmental, sociopolitical, cultural, and don't forget environmental justice issues.

Regulatory and Policy Requirements

The Federal Pollution Prevention Act of 1990 was enacted on November 5, 1990. Its purposes are as follows:

- Prevent or reduce pollution at the source whenever feasible.
- Promote recycling if pollution cannot be prevented.
- Permit treatment if pollution cannot be prevented or recycling cannot be implemented.
- Discourage disposal or other releases into the environment.

The Act is not limited to hazardous waste or chemicals subject to Toxics Release Inventory (TRI) reporting under Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). It also encompasses all hazardous substances, pollutants, or contaminants. Federal facilities, including Army installations, were included in the requirements of the Act when, in 1993, President Clinton signed Executive Order 12856, setting the Federal Government's policy on pollution prevention. The President noted:

... federal facilities will set the example for the rest of the country and become the leader in applying pollution prevention to daily operations, purchasing decisions and policies. In the process, federal facilities will reduce toxic emissions, which helps avoid cleanup costs and promotes clean technologies.

EO 12856 requires federal facilities to report TRI releases and to set agency goals of reducing TRI reportable releases by 50 percent from a 1994 baseline by 1999. It also requires that federal facilities subject to any of the requirements of EPCRA prepare P2 plans by the end of 1995 that indicate how the facility will support the Agency's P2 goals. Facility P2 plans should include a detailed inventory of waste generation, an analysis of pollution prevention opportunities and options, and a plan for implementing pollution prevention measures.

The Department of the Army (DA) also has issued regulations that stress minimizing the negative effects of the Army's activities on the environment. Army Regulation (AR) 200-1, *Environmental Quality: Environmental Protection and Enhancement*, prescribes DA responsibilities, policies, and procedures for preserving, protecting, and restoring the quality of the environment. AR 200-1 sets the Army's policy for hazardous waste minimization. It requires Army installations to reduce the quantity or volume and the toxicity of hazardous wastes whenever economically practical or environmentally necessary.

This P2 plan is based on current Army guidance and is being used by each installation to comply with the Federal Pollution Prevention Act of 1990; the Superfund Amendments and Reauthorization Act of 1986 (SARA); the Toxic Substances Control Act (TSCA); the Clean Air Act Amendments of 1990; the Clean Water Act of 1987; the Montreal Protocol on Substances that Deplete the Ozone Layer; Executive Order 12856; and DOD Directive 4210.15, *Hazardous Material Pollution Prevention*, dated July 27, 1989. The P2 Plan is framed according to the protocol outlined in EPA guidance manuals, *Waste Minimization Opportunity Assessment Manual* (EPA/625/7-88-003, July 1988), and *Facility Pollution Prevention Guide* (EPA/600/R-92/088). The plan was prepared in accordance with *Guidance to Hazardous Waste Generators on the Elements of a Pollution Prevention Program* (Federal Register, May 28, 1993).

[Include state and local requirements as necessary or applicable.](#)

Definitions of Pollution Prevention Terms

Under Executive Order 12856, pollution prevention means source reduction and other practices that reduce or eliminate the creation of pollutants through:

- increased efficiency in the use of raw materials, energy, water, or other resources
- protection of natural resources by conservation

The Federal Pollution Prevention Act of 1990 defines "source reduction" to mean any practice that:

- reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) before recycling, treatment, or disposal
- reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants

The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, and inventory control.

Under the Act, recycling, treatment, and disposal are not included in the definition of pollution prevention. However, some practices commonly described as "in-process recycling" may qualify as pollution prevention. Examples include solvent recycling using an integral still, continuous filtering of a plating bath, and recovery of volatile organic compounds (VOCs) from degreasing vents. Recycling that is conducted in an environmentally sound manner shares many of the advantages of prevention: It can reduce the need for treatment or disposal and conserve energy and natural resources.

Techniques for pollution prevention fall into six categories: source reduction, in-process recycling, process modification, improved plant operations, input substitutions, and changes in end-product. Before pollution prevention techniques can be used, a waste assessment must be conducted to show where reduction methods implemented by a facility can be most effective. Potential pollution prevention methods then are pinpointed. Pollution prevention requires a multimedia assessment. Transferring pollution from one medium to another does not constitute pollution prevention.

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Section 2

Commitment Goals and Program Implementation

Commitment

INSTALLATION-XXX is committed to reducing the environmental effects of its activities through an active pollution prevention program. In support of this commitment, the installation's pollution prevention policy statement (Figure 2-1) has been prepared and disseminated to all affected individuals in the installation.

Army Pollution Prevention Goals

This subsection will summarize the Army's Pollution Prevention goals and when they are finalized, targeting particular classes of wastes or materials used and how the particular installation is to support these goals, as required by EO 12856.

MACOM Pollution Prevention Goals

This subsection will summarize the MACOM Pollution Prevention goals and when they are finalized, targeting particular classes of wastes or materials used and how the particular installation is to support these goals.

Installation Pollution Prevention Goals

The long-term goal of INSTALLATION-XXX is to eliminate the use of hazardous materials, eliminate the generation of wastes, and eliminate emissions of pollutants to the environment (zero discharge). Achieving the goal of complete elimination is recognized as not being technically or economically feasible. Thus, goals have been adopted as interim measures with the ultimate goal of achieving zero discharge (Table 2-1).

Program Implementation

The Pollution Prevention (P2) program at INSTALLATION-XXX will be managed in accordance with AR420-47 and AR 200-1. This plan and the policies and procedures established to implement the plan are developed and approved by the EQCC or equivalent. The Pollution Prevention Program is implemented by the Installation's Pollution Prevention Coordinator, with the assistance of Pollution Prevention Assessment Teams as needed to develop, evaluate, and implement specific pollution prevention projects.

Table 2-1 INSTALLATION-XXX POLLUTION PREVENTION GOALS				
Waste Type	Subtype	Reduction Goal (%)	Baseline Year	Target Year
Hazardous Waste				
Hazardous Waste	EPA Toxic 17 Wastes			
Hazardous Waste	Solvent Wastes			
Hazardous Waste	Acids and Bases			
Solid Wastes				
Ozone-Depleting Chemical Use				
TRI Reportable Releases		50%	1994	1999

Environmental Quality Control Committee

The EQCC is the policy-setting and decision-making body for pollution prevention at INSTALLATION-XXX. The EQCC will closely coordinate their actions with the installation's Hazardous Waste Management Board (Ref. AR 420-47) to complement actions, not duplicate them. The following list summarizes the responsibilities of the EQCC:

- Brief the installation commander (IC) on all actions necessary or under way to make a pollution prevention program successful.
- Establish overall pollution prevention policies and procedures.
- Establish pollution prevention goals.
- Direct activities of the Pollution Prevention Coordinator.
- Rank the waste streams, processes, or facility areas for assessment.
- Establish priorities for implementation of projects.

- Obtain funding and establish schedule for implementation.
- Monitor or direct implementation progress.

The EQCC or equivalent is chaired by the following individual:

· Insert EQCC Chairperson here

A field grade officer from any major contributor to the installation's waste stream shall be the chairperson of the EQCC.

Figure 2-1
INSTALLATION-XXX
Pollution Prevention Policy Statement

INSTALLATION-XXX is committed to an active policy of protecting the environment in all of our activities. This pollution prevention policy statement is based on our commitment to the following:

- providing a clean and safe environment in our community
- ensuring a safe and healthy workplace for our staff
- complying with all applicable laws and regulations
- efficiently accomplishing our mission
- reducing future liability for waste disposal
- reducing waste management costs

To accomplish these objectives, we will implement programs for reducing or eliminating generation of waste through source reduction and other pollution prevention methodologies. This policy extends to air, wastewater, and solid and hazardous wastes. In addition to meeting the objectives, there are other important benefits related to pollution prevention.

INSTALLATION-XXX is committed to reducing the weight and toxicity of generated wastes. As part of this commitment, INSTALLATION-XXX gives priority to source reduction. Where source reduction is infeasible, other pollution prevention methods, such as recycling, will be implemented where feasible. The wastes that cannot be prevented will be converted to useful products or used beneficially, where feasible. Remaining wastes for which no pollution prevention option is warranted will be effectively treated (to decrease volume or toxicity) and responsibly managed. INSTALLATION-XXX will select waste management methods that minimize present and future effects on human health and the environment.

Pollution prevention is the responsibility of *all* of our staff. INSTALLATION-XXX is committed to identifying and implementing pollution prevention opportunities through solicitation, encouragement, and involvement of all employees.

The EQCC includes the organizations or departments that have significant operational or administrative interest in developing a pollution prevention plan. The EQCC has representatives of the following organizations:

- Directorate of Public Works
- Directorate of Resource Management
- Directorate of Logistics
- Directorate of Contracting
- Directorate of Personnel and Community Activity
- Directorate of Transportation
- Directorate of Industrial Operations
- U.S. Army Medical Activity (MEDDAC)

Additional members of the EQCC could include representatives of Safety and Health; Fire Protection; Preventive Medicine Services; Public Affairs Office; Staff Judge Advocate; Defense Reutilization Marketing Office (DRMO), Finance and Accounting; and Army, Air Force Exchange System (AAFES). An existing council, if qualified, may be used instead of establishing a new board.

Pollution Prevention Coordinator

The Pollution Prevention Coordinator has overall responsibility for the development and implementation of the P2 plan. The Pollution Prevention Coordinator has the responsibility for organizing, implementing, managing, or monitoring the following pollution prevention methods and programs:

- integrating pollution prevention in the installation's comprehensive planning
- preparing and updating baselines for hazardous material use and waste generation
- coordinating the performance of pollution prevention opportunity assessments (PPOAs) to identify and evaluate pollution prevention procedural changes, projects, and equipment
- recommending priorities for funding pollution prevention projects and equipment
- establishing policies for identifying, procuring, and tracking hazardous materials
- developing the installation's pollution prevention training programs

Pollution Prevention Assessment Team(s)

Pollution Prevention Assessment Team(s) (PPAT) will be formed as needed to perform PPOAs. The teams will be temporary, having a specific charter to evaluate a particular waste generation activity, hazardous material use, or pollution emission from the installation. The primary responsibilities of the PPAT are to:

- perform PPOAs
- present the findings of the assessment to the EQCC for approval and funding
- implement projects approved by the EQCC
- monitor the performance of their pollution prevention projects

The PPAT may be led by the installation's Pollution Prevention Coordinator or by a team leader who has a vested interest in the particular waste streams or operations to be investigated.

The PPAT will include personnel representing key installation functions that contribute to material use or waste streams targeted for analysis. Other support elements necessary for implementing changes in operations to facilitate the reductions also will be represented. The team will include members who have direct knowledge of the processes that produce waste or other harmful emissions and technical advisors.

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Section 3

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. Annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving INSTALLATION-XXX's pollution prevention goals. For facilitating this comparison, the same formats are used for the baseline inventory and annual reports.

Measurements of materials used and wastes generated take into account production levels (such as vehicles maintained or number of soldiers trained), so that P2 is not accomplished solely due to reductions in training or maintenance.

Baseline inventories have been prepared for the following categories and subcategories of waste and material use:

- Hazardous Waste Generation (Table 3-1)
 - Solvent Waste Generation
 - Waste Acids and Bases Generation
- EPA Toxic 17 Waste Generation (Table 3-2)
- Solid Waste Generation (Table 3-3)
- Ozone-Depleting Chemicals (ODCs) Usage (Table 3-4)
- TRI Reportable Releases (Table 3-5)

All data in these tables are reported in annual quantities.

Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventories will assist in developing projects for meeting the pollution prevention goals of INSTALLATION-XXX.

This section contains the summary of the Baseline Inventory. Detailed baseline information is in the appendices.

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Table 3-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Solvent Wastes							
2. Acids & Bases							
3. Wastewater							

Table 3-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
Treatment Sludges							
4. Fuels							
5.							

Table 3-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 19 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6.							
7.							

Table 3-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 19 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
8.							
9.							
10.							

Table 3-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 19 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
11.							
12.							
TOTAL			100 %				

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Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Benzene							
2. Cadmium & compounds							
3. Carbon Tetrachloride							

Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 25 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
4. Chloroform							
5. Chromium & compounds							

Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 25 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6. Cyanides							
7. Dichloromethane							

Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 25 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
8. Lead & compounds							
9. Mercury & compounds							
10. Methyl Ethyl Ketone							

Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 25 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
11. Methyl Isobutyl Ketone							
12. Nickel & compounds							

Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 25 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
13. Tetrachloroethylene							
14. Toluene							

Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
15. Trichloroethane							
16. Trichloroethylene							
17. Xylene							

Table 3-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 25 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
TOTAL			100 %				

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Table 3-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Aluminum Cans						
2. Corrugated Cardboard						
3. Office Paper						

Table 3-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

Page 33 of 3

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
4. Newspaper						
5. Glass						

Table 3-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6. Ferrous Cans						
7. Plastic (PET soft drink bottles, HDPE milk jugs, etc.)						
8. Yard Waste						

Table 3-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
9. Unclassified Waste						
10. Engine Oils						

Table 3-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

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Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
11. Engine Coolants						
12.						
TOTAL		100 %				

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Table 3-4
199_ USAGE OF OZONE DEPLETING CHEMICALS (ODCS) AT INSTALLATION-XXX

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ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
1. Freons							
2. Halons							
3. Cleaning Solvents							

Table 3-4
199_ USAGE OF OZONE DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

Page 38 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
4. Paint Strippers							
5.							

Table 3-4
199_ USAGE OF OZONE DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

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ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
6.							
7.							
8.							

Table 3-4
199_ USAGE OF OZONE DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

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ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
9.							
10.							

Table 3-4
199_ USAGE OF OZONE DEPLETING CHEMICALS (ODCS) AT INSTALLATION-XXX

Page 38 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
11.							
12.							
TOTAL		100 %					

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Table 3-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

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TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
1.							
2.							
3.							

Table 3-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

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TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
4.							
5.							

Table 3-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 43 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
6.							
7.							
8.							

Table 3-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 43 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
9.							
10.							

Table 3-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 43 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
11.							
12.							
TOTAL			100 %				

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Section 4

Pollution Prevention Opportunity Assessment

The PPOA enables INSTALLATION-XXX to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operation from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

INSTALLATION-XXX will use these forms to perform the assessment. Included in Appendix D are sample pollution prevention survey forms. The form should be used by the Pollution Prevention Coordinator or the EQCC as a tool during the survey. The forms contain questions and note areas to examine when interviewing or working with personnel who generate the waste.

The installation will be required to furnish information on the assessment forms. The needed information is the estimated reduction, a technical evaluation, and an economic evaluation. Base personnel will have to describe site-specific conditions so that the amount of reduction possible and the technical and economic feasibility of the alternative can be determined. The information generated by the installation will determine if these alternatives are good pollution prevention opportunities. Personnel performing the PPOA will have to work with the personnel generating the waste to find the best methods for reducing the waste stream.

Assessment modules are included for the following areas or waste streams:

Format Example

The following are P2 examples that typically have been found to work. They should be expanded to include materials listed in the format example. It is important to note that these are example assessment modules and should not be used verbatim. Site-specific information and cost data will need to be generated to assess the suitability and feasibility of each alternative process or chemical for your installation.

- Waste Solvent from Parts Cleaning
- Cleanup Solvents from Painting
- VOC Emissions from Painting
- Scrubber Sludge from Paint Booths
- Liquid Paint-Stripping Waste
- Dry Paint-Stripping Waste

- Battery Acids
- Radiator-Cleaning Waste
- Solid Waste
- Used Oil from Vehicle Maintenance
- Used Oil Filters from Vehicle Maintenance
- Used Antifreeze from Vehicle Maintenance
- Halon Used in Fire Extinguishers
- Freon Used in Refrigeration

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Pollution Prevention Opportunity Assessment Module

Waste Solvents From Parts Cleaning

Waste Stream: Waste Solvents

Operation: Parts Cleaning

Description

Waste solvents are routinely generated at military facilities during parts cleaning. Parts cleaning typically takes place during maintenance of vehicles and heavy equipment. The waste stream generated during these activities includes liquid waste solvent and degreasing compounds containing unwanted film material, air emissions of volatile solvents, solvent-contaminated wastewater, and solid waste consisting of oil, grease, soil particles, and other film material. There are three common solvent cleaning methods: cold cleaning, vapor degreasing, and precision cleaning. During cold cleaning, the solvent is applied either by brush or by dipping the items in a solvent dip tank. Vapor degreasing uses steam coils for heating the solvent to produce a vapor, and the item to be cleaned is inserted into the vapor region, where the solvent condenses, removes dirt and grease, and drips back into the tank. Precision cleaning flushes the article being cleaned with a solvent.

Alternative 1: Onsite Recycling Using Distillation

Description

Distillation is a recycling method for spent solvents that involves boiling and recovering the solvent. A small amount of sludge remains. The sludge is the dirt and grease from the cleaning process. Distillation reduces the need for offsite transportation and manifesting. Distillation units come in various sizes and types. Small batch-style units would be appropriate for facilities with low solvent usage. Larger units are available that could be centrally located to service several users.

The advantage of onsite distillation is that the facility controls its own hazardous waste. Sending solvents off the site is expensive and requires manifesting of the waste. The disadvantages are that distillation requires labor, energy, cooling water, and maintenance. Solvents that are to be recovered by distillation must be segregated.

Prevention Type: Recycling

Estimated Reduction: To be determined by the installation

Pollution Prevention Opportunity Assessment Module

Waste Solvents From Parts Cleaning

Technical Evaluation: To be determined by the installation

Economic Evaluation

Investment Cost: To be determined by the installation

Annual Savings: To be determined by the installation

Payback Period: To be determined by the installation

Alternative 2: Off-Facility Recycling

Description

Companies exist that provide the equipment and solvent for parts cleaning. The equipment is rented, and the company is contracted to pick up the spent solvent, supply fresh solvent, and recycle the spent material. The spent material will require a manifest. These units typically are dip tanks.

The advantage of this alternative is that the user does not have to dispose of waste solvents. The disadvantage is that the alternative is subject to the availability of local recyclers, is more expensive than having an in-house unit, is less convenient, and has the added liability of having an outside entity responsible for handling the installation's hazardous waste.

Prevention Type: Offsite Recycling

Estimated Reduction: To be determined by the installation

Technical Evaluation: To be determined by the installation

Economic Evaluation

Investment Cost: To be determined by the installation

Annual Savings: To be determined by the installation

Payback Period: To be determined by the installation

Alternative 3: Water-Based Cleaners

Description

Aqueous and semiaqueous cleaners are available that may be substituted for solvents. The cleaners can be alkaline or acidic or alcohol-based. The advantage of water-based cleaners is that solvent use can be eliminated. Eliminating solvents will reduce environmental liability and reporting and documentation requirements. The disadvantages are that the effectiveness of water-based cleaners for a specific task will have to be measured. Water-based cleaning may not be acceptable for all materials or processes. Another disadvantage is that aqueous cleaning still can produce a significant volume of waste that has to be managed and may be classified as hazardous waste because of its contents or pH.

Prevention Type: Product Substitution

Estimated Reduction: To be determined by the installation

Technical Evaluation: To be determined by the installation

Economic Evaluation

Investment Cost: To be determined by the installation

Annual Savings: To be determined by the installation

Payback Period: To be determined by the installation

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Pollution Prevention Opportunity Assessment Module

Cleanup Solvents From Painting

Waste Stream: Cleanup Solvents

Operation: Painting

Description

Most painting on Army installations is performed by conventional liquid spray technologies. The paint is mixed with a carrier, usually an organic solvent, and is applied to the surface with an air-pressurized sprayer. A major source of waste generated during painting is solvents used to clean painting equipment. Most paints are solvent-based, so they require solvents for cleanup. The solvents used depend on the type of paint used. Some of the more common solvents are methyl ethyl ketone (MEK); xylene; 1,1,1-trichloroethane; toluene; butyl acetate; ethylene glycol; and alcohol.

Alternative 1: Use painting methods that minimize solvent use.

Description

Solvent use can be reduced by changing painting methods. Powder coating or electrostatic dry-powder painting are two methods that minimize solvent use. Dry powder is air-blown onto the equipment, and the equipment is cured in an oven to bond the paint to the substrate. Electrostatic dry-powder painting sprays ionized dry powder onto a surface that has the opposite charge. The major limitation of dry-powder painting is that the items to be painted must be able to withstand the typical curing temperature of 350°F for 30 minutes.

Alternative 2: Use water-based paint when possible.

Description

Water-based paint is used to eliminate the need for solvent cleaners. The disadvantages of water-based paint are that the surface must be free of oil and grease so that the paint will adhere, longer drying times are required, and the transfer efficiency may not be as high as solvent-based paints.

Alternative 3: Use specialized cleaning equipment.

Pollution Prevention Opportunity Assessment Module

Cleanup Solvents From Painting

Description

Specialized equipment is available for cleaning paint guns and other paint-application equipment. Waste solvents requiring disposal as a hazardous waste can be eliminated.

Alternative 4: Collect and recycle cleaning solvent.

Description

Cleaning solvents can be collected and recycled using distillation. Several companies manufacture small distillation units or batch stills. Solvent can be recovered and reused. The residue from the distillation will have to be disposed of properly, most likely as a hazardous waste.

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Pollution Prevention Opportunity Assessment Module

VOC Emissions From Painting

Waste Stream: Volatile Organic Compounds Emission

Operation: Painting

Description

Volatile organic compounds (VOCs) are used during painting operations and are emitted to the air. Most painting on Army installations is performed by conventional liquid spray technologies. The paint is mixed with a carrier, usually an organic solvent, and is applied to the surface with an air-pressurized sprayer. One of the largest volumes of waste generated during painting is air emissions. During typical spray painting in a spray booth, 50 percent of the paint is deposited on the surface being painted, and the other 50 percent is sprayed into the air. As the paint dries, the solvent evaporates into the air.

USEPA regulates VOCs emitted from paint coating. Federal VOC limits for paint are 420 g/L for paints that cure below 90°C and 360 g/L for paints that cure above 90°C. Some state air-pollution control agencies are setting strict VOC content limits for paint. For example, the South Coast Air Quality Management District in California has set a 300 g/L VOC limit for general air-dried paints used for coating metal parts and products in fabricating and painting shops. Local regulatory agencies also control VOCs by setting total permissible discharge limits from facilities. The limits include point sources and fugitive sources. The U.S. Environmental Protection Agency is required to develop limits for toxic air emissions. The limits probably will have an effect on both the types of solvents used in paint and those used in cleanup.

Alternative 1: Use painting methods that minimize solvent use.

Description

VOC emissions can be reduced by changing painting methods. Powder coating or electrostatic dry-powder painting are two methods that minimize solvent use. Dry powder is air-blown onto the equipment, and the equipment is cured in an oven to bond the paint to the substrate. Electrostatic dry-powder painting sprays ionized dry powder onto a surface that has the opposite charge. The major limitation in dry-powder painting is that the items to be painted must be able to withstand the typical curing temperature of 350°F for 30 minutes.

Alternative 2: Use paint formulations that minimize or eliminate solvent use.

Description

VOC emissions can be reduced by using high-solid or low-VOC coatings. The coatings contain about 50 to 95% solids. The coatings require special spray equipment for application because of their high viscosity. Surface preparation for reducing the presence of grease or oil is more critical because of less solvent in the paint. In addition, spray application can be wasteful because there is a tendency to apply too much coating to achieve a ``wet" appearance similar to that obtained with normal solvent coatings.

Alternative 3: Use water-based paint when possible.

Description

Use water-based paint to eliminate the need for solvents and the resulting VOC emissions. Water-based paint uses a water-based solvent as the carrier. The disadvantages of water-based paint are that the surface must be free of oil and grease so that the paint will adhere, longer drying times are required, and the transfer efficiency may not be as high as for solvent-based paints.

WDCR828/024.WP5

Pollution Prevention Opportunity Assessment Module

Paint Booth Scrubber Sludge

Waste Stream: Scrubber Sludge from Paint Booths

Operation: Painting

Description

Most painting on Army installations is performed by conventional liquid spray technologies. The paint is mixed with a carrier, usually an organic solvent, and is applied to the surface with an air-pressurized sprayer. The largest volume of hazardous waste generated in painting involves air emissions that create paint sludge. For instance, during typical spray painting in a spray booth, 50 percent of the paint is deposited on the surface being painted, and the other 50 percent is sprayed into the air. As the paint dries, the solvent evaporates into the air. The air from the paint booth then is exhausted through a water scrubber that separates the paint from the air. The scrubber water normally is recycled, and paint solids are concentrated into a scrubber sump. When the sumps fill, the sludge is removed and put in drums for disposal.

Alternative 1: Use painting methods with higher transfer efficiencies.

Description

The amount of overspray from painting equipment should be minimized. Conventional air-atomized spray painting techniques are very inefficient. Some other coating methods that have higher transfer efficiencies include electrostatic spraying, airless spraying, dip coating, and powder coating.

Alternative 2: Use dry-filter paint booths.

Description

Changing the air-treatment system to dry filters will eliminate the scrubber system. This will reduce water use and potentially the amount of sludge to be disposed of. However, the filters from the system will have to be disposed of. Testing will be required to determine if the filters are hazardous waste.

Alternative 3: Use water-based paint when possible.

Description

Water-based paint is used to eliminate the need for solvents and the resulting VOC emissions. Water-based paints use a water-based solvent as the carrier. The disadvantages of water-based paint are that the surface must be free of oil and grease so that the paint will adhere, longer drying times are required, and the transfer efficiency may not be as high as for solvent-based paints.

Alternative 4: Implement better employee operating practices.

Description

Paint-spray systems often are manually operated, so employee training will reduce the amount of paint used and promote waste reduction. Keeping the air pressure low and the spray gun perpendicular to the surface adds several degrees of accuracy to the system by preventing overspray and minimizing sludge in the air-treatment system.

WDCR828/025.WP5

Pollution Prevention Opportunity Assessment Module

Liquid Paint-Stripping Wastes

Waste Stream: Liquid Paint-Stripping Waste

Operation: Paint Stripping

Description

Paint stripping is the process of removing paint and paint-type coatings from surfaces, usually as a preparation for inspection, dismantling, reconditioning, or repainting. Solvents or solvent-chemical mixtures are applied to the surface to destroy either the paint coating itself or the coating's ability to stick to the surface. When this process is complete, the residue of paint or solvent is removed from the surface, usually by a pressurized water wash or by scraping. In many instances, the solvent stripper must be reapplied to remove multiple coats or paint that is particularly resistant.

The wastes generated in the stripping process are a significant source of pollutants. The wastes include solvent or paint residue, which can be collected separately, and waste washwater, which contains solids and dissolved chemicals from paints and solvents. Collected solvent or paint residue typically is put in drums and transported to a licensed hazardous waste disposal site. Waste washwater requires treatment in an industrial wastewater treatment plant to remove the paint-stripping solvents (usually phenolic or methylene chloride components) and the metals either in the paint or in the material being stripped.

Alternative 1: Use mechanical methods for removing paint.

Description

A new plastic medium has been developed for blast-stripping painted surfaces without damaging the undersurface. This new material has many advantages over other materials, including engineered abrasive characteristics. It is recyclable, durable, and nonhazardous. The material is constructed of soft plastic formed into rough-edged granular media. Old paint is dislodged using the new media and conventional sand-blasting equipment. The resulting dry waste of pulverized paint and plastic media has significantly less volume and is more readily disposed of than the wastewater produced in solvent-based paint stripping. The plastic medium can be separated from the paint using a cyclone. The medium also can be recycled or reclaimed.

Pollution Prevention Opportunity Assessment Module

Liquid Paint-Stripping Wastes

One disadvantage is that mechanical stripping is not appropriate for the equipment. Another problem may be that the volume of material requiring paint stripping may not be great enough to justify the capital cost of the system. Advantages include elimination of solvent use, which results in less environmental liability, lower solvent emissions, and less waste shipped off the site as hazardous waste.

Alternative 2: Use different stripping solution.

Description

Nonphenolic stripping solutions can be substituted for traditional stripping solutions. Substances such as benzyl alcohol can be used to remove paint. Benzyl alcohol is not a regulated substance under SARA. The effectiveness of any substituted product will have to be evaluated. The disadvantage of this alternative is that the effectiveness of the new product must be determined. While eliminating solvent use, the new product may generate more waste than before. If product substitution works, then the liabilities, solvent emissions, and disposal costs associated with traditional paint stripping will be eliminated or greatly reduced.

WDCR828/026.WP5

Pollution Prevention Opportunity Assessment Module

Dry Paint-Stripping Waste

Waste Stream: Dry Paint-Stripping Waste

Operation: Paint Stripping

Description

Conventional sand blasting, abrasive blasting, and glass-bead blasting have been used to remove paint and rust from metal surfaces. These techniques cannot be used in many applications, because the abrasive media can damage aluminum or fiberglass surfaces and small or delicate steel parts. In the late 1980s, plastic media blasting was developed and manufactured for blast-stripping painted surfaces without damaging the undersurface. The new material has many advantages over other materials: It is recyclable, durable, and nonhazardous.

Today, spent plastic media are used routinely at Army corrosion-control and paint shops during normal paint- and corrosion-removal activities. Both media are used to remove paint from aluminum and steel vehicles, aircraft, and ground equipment parts. The operation takes place in a sealed booth. The spent media and the paint dust are removed through a vacuum and mechanically sorted. Reusable media are returned to the hopper for reuse; spent (pulverized) media and paint dust are discharged to a drum for disposal. This waste normally is characterized as hazardous because it contains concentrations of chromium, cadmium, and lead.

Alternative: Recycle and Reuse

Description

Plastic media that cannot be recovered through mechanical sorting could be recycled into other products. Vendors may be able to accept the spent material and reprocess the material back into basic plastic materials. Other options include mixing the spent material with paint to create a rough finish where needed, such as for a floor or other surface. Some companies rent the blasting media. When it becomes spent, the vendors take the material back. The vendor then reprocesses or separates the usable material for inclusion as raw materials into other products.

The advantage of recycling is the reduction or elimination of a waste stream. The disadvantages are that vendors may not be readily available or capable of accepting the facility's specific waste stream.

Pollution Prevention Opportunity Assessment Module

Dry Paint-Stripping Waste

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Pollution Prevention Opportunity Assessment Module

Battery Acid from Vehicle Maintenance

Waste Stream: Battery Acid

Operation: Vehicle Maintenance

Description

Battery acid is a main component of lead acid batteries from vehicles. Sulfuric acid typically is used in lead acid batteries. Military installations have a high demand for batteries. There are two typical methods for handling battery acid from dead batteries: (1) draining the battery and neutralizing the acid and (2) shipping the battery to a recycler without removing the acid. Potential environmental and safety problems of battery acid are its corrosive nature and the typically high concentrations of lead. Use of metal equipment during draining operations should be prohibited.

Alternative: Return wet batteries.

Description

If the current operating practice is to drain batteries, explore the opportunities for returning or recycling batteries with the acid still inside. Returning wet batteries eliminates potential environmental problems from draining or treatment. The advantages include elimination of the acid waste stream that contains corrosive waste and lead. The disadvantages may include the limited number of vendors that want to accept batteries containing acid. Wet batteries also will require heated storage areas to prevent freezing and cracking of the batteries. This alternative is more desirable if such a storage area is readily available.

WDCR828/046.WP5

Pollution Prevention Opportunity Assessment Module

Radiator-Cleaning Wastes

Waste Stream: Radiator-Cleaning Wastes

Operation: Radiator Cleaning

Description

Spent radiator-cleaning solution must be disposed of as hazardous waste because of its heavy-metal content. Radiators are drained and then cleaned by immersing them in a tank that is covered and heated. The tank is commonly called a "boil-out tank" or a "hot tank." Radiator-cleaning solution, typically sodium hydroxide-based, is prepared from a powdered concentrate and added to the boil-out tank. Depending on use, the radiator-cleaning solution is spent after 3 to 12 months of use. The buildup of dissolved oils and grease causes the solution to become buffered. There usually is no visual indication of a loss in strength, such as buildup of floating oil and grease in the tank. Increased foaming during heating can indicate a loss of strength. The spent solution typically contains up to 50,000 mg/L of lead at a pH of 11 to 12. The spent solution also contains solids, which normally settle to the bottom of the boil-out tank as sludge.

Alternative 1: Minimizing Change-Out of Boil-Out Tank

Description

The manufacturers of the cleaning solution typically state that the minimum change-out frequency is once per year. Depending on the number of radiators cleaned, precleaning procedures, and bath maintenance, however, bath life can be extended to as long as 10 years. Sludge should be shoveled from the boil-out tank weekly, and a maintenance charge of fresh chemical should be added to the bath every 2 weeks.

Bath life also can be extended by minimizing the buildup of oil and sludge by some combination of draining, rodding, flushing, or blowing out radiators before they are inserted into the boil-out tank. Also important is removing as much oil as possible from the oil cooler before insertion of the radiators into the boil-out tank.

Alternative 2: Reducing Waste Volume

Description

Pollution Prevention Opportunity Assessment Module

Radiator-Cleaning Wastes

The volume of waste requiring disposal as a hazardous waste can be minimized by removing the bath and trapping the solids by settling or filtration. The separated liquid can be returned to the tank for reuse. Alternatively, the boil-out tank can be outfitted with a side-stream filter/strainer and pump to remove solids and oil from the bath, thereby minimizing sludge generation and extending bath life.

Another technique is to increase the temperature of the bath, open the bath cover, and evaporate as much of the bath as possible, thereby minimizing the volume for disposal. The sludge may be removed by shovel, and the bath may be reused.

Alternative 3: Replacing Boil-Out Tank

Description

The volume of waste generated may be minimized by modifying or replacing the existing boil-out tank. Consideration should be given to obtaining a smaller-volume boil-out tank capable of processing the same number of radiators. For example, 120-gallon tanks are available for processing up to 64 radiators per day. The dimensions of the cleaning bath must be matched to each radiator's dimensions.

Ultrasonic cleaning tanks that use as low as 50 gallons of cleaning solution also are available.

Alternative 4: Sludge Dewatering

Description

The sludge generated by the boil-out tank probably is heavily contaminated with lead. Disposal cost can be minimized by removing as much water as possible from the sludge. Sludge shoveled from the boil-out tank can be placed into drums and allowed to air-dry over time or can be placed in 5-gallon buckets, allowing the solids to settle before decanting the liquid to the boil-out tank. A cloth or paper filter can be used to separate the liquid from the solids. Sludge also can be dried in drums by using electric band drum heaters.

WDCR828/028.WP5

Pollution Prevention Opportunity Assessment Module

Solid Waste

Waste Stream: Solid Waste

Operation: All Base Activities

Description

Solid waste is generated throughout INSTALLATION-XXX and is disposed of at to be inserted by installation. A waste audit was performed, and _____ tons of solid waste were estimated as being generated in 19--.

Alternative 1: Modification of Purchasing Practices.

Description

Purchase products that are reusable and durable and that have reduced volume or weight.

1. Require suppliers to ship orders in reusable or returnable packaging, such as wooden pallets and polystyrene peanuts, so that those items can then be reused in INSTALLATION-XXX packaging and shipping operations.
2. Install hot-air dryers or cloth-towel rolls instead of using paper towels in restrooms.

Alternative 2: Staff Education

Description

Educate staff to use fewer materials:

1. Use central bulletin boards or computer bulletin boards for memos, reports, and announcements instead of making one copy for each staff member.
2. Use electronic mail.

Pollution Prevention Opportunity Assessment Module

Solid Waste

3. Use double-sided copying.

Alternative 3: Donation or Sale of Usable Materials.

Description

Donate or sell usable materials:

1. Donate leftover and surplus food to a food bank.
2. Identify and donate old supplies to a charity or a school or offer them for sale to staff or to the general public.

Alternative 4: Reduction of Yard Waste

Description

Reduce the amount of yard waste generated:

1. Recycle grass clippings by leaving them on the lawn and allowing them to decompose naturally.
2. Convert clippings, brush, and pruned branches to yard mulch.

Alternative 5: Office Recycling

Description

Reduce the amount of solid waste disposed of:

1. Recycle waste paper by locating recycling bins at copy machines and other locations. Equip each office with a separate container for disposing of waste paper.
2. Recycle aluminum soft drink cans by locating recycling bins in kitchens, lunch rooms, break rooms, and other areas where soft drink machines and refrigerators are located. Provide manual can compactor to reduce volume of waste and quantity of cans that can be stored in the recycling bin.

Alternative 6: Residential Recycling

Description

Reduce the amount of solid waste disposed of by segregating the following from the trash for curbside pickup:

1. Newspapers
2. Aluminum Cans
3. Ferrous Cans
4. Glass

Alternative 7: Mixed-Waste Recycling

Description

Mixed-waste or back-end recycling relies on separating recyclables from a mixed-waste stream at a centralized processing facility on the installation or off the installation if recycling is mandatory in the local community. Glass, plastic, aluminum cans, and ferrous cans can be removed from the mixed-waste stream and recycled. Organic materials (food, yard waste, etc.) can be composted. Other remaining wastes can be disposed of in a landfill or incinerated.

1. Newspapers
2. Aluminum Cans
3. Ferrous Cans
4. Glass

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Pollution Prevention Opportunity Assessment Module

Used Oil From Vehicle Maintenance

Waste Stream: Used Oil

Operation: Vehicle Maintenance

Description

Waste included under this general clarification are lubricating and hydraulic fluids generated from servicing vehicles and other equipment. The major source of waste oil is the used motor oil generated by regular engine oil changes performed at motor pools. Oil changes routinely are performed on a set schedule as determined by Army policy. Standard vehicles receive oil changes every 6 months or 6,000 miles. Special vehicles are serviced every 400 to 600 operating hours. A single oil change can generate anywhere from 6 quarts for a gasoline engine in a typical automobile to 33 gallons for a 12-cylinder diesel engine.

Alternative 1: Motor Oil Testing (to extend life)

Description

Generation of used oil can be reduced by extending the time between oil changes. The current oil change standards are based on service-wide policy. However, the performance characteristics and life of motor oil varies, depending on the conditions under which the equipment is operated.

In an oil analysis program, oil samples are collected at a set interval and are submitted to a field laboratory for analysis. Analyses include a spectrometric test for metals and physical tests for water content, viscosity, and other contaminants.

Alternative 2: On-Board Bypass Filtration

Description

Most internal-combustion engines are equipped with a full-flow oil-filtration system. In this type of system, all of the oil that lubricates the engine first passes through an oil filter. The filter must be quite porous for the oil to pass at the required flow rate, so the filter is designed to remove only relatively large particles (larger than 40 microns) that could seriously damage an engine. Other contaminants that could degrade the

Pollution Prevention Opportunity Assessment Module

Used Oil From Vehicle Maintenance

oil's protective properties, create sludge, and cause engine wear, such as metals, microscopic dirt and carbon particles, and water, pass through readily.

A bypass filter system consisting of a much less porous element slowly filters a portion of the oil flow (usually less than 1/2 gpm compared with the 4 to 5 gpm that is typical for a full-flow oil filter). Oil is drawn from the bottom of a crankcase, passed through the bypass filter, and returned to the crankcase. Some bypass filters remove not only solids to the submicron level but also moisture.

Oil analyses have shown that a properly serviced bypass oil filter system can maintain motor oil in a condition where it need not be replaced. These systems have been shown to prolong engine life. Bypass filtration appears to be particularly effective on expensive large engines.

One filter system uses inexpensive paper-towel rolls as filter elements. These filters remove particulate contaminants down to 1 micron and reduce moisture to less than 40 ppm. Filter changes are recommended at 5,000 to 10,000 miles.

Alternative 3: Burning in Space Heaters

Description

Specially designed space heaters are available that can burn used oil and similar waste streams, such as automatic-transmission fluid, with little or no pretreatment. The heat generated from burning the waste oil is used for space heating, saving on disposal costs and lowering heating-fuel costs.

A typical space heater that burns used oil can generate between 150,000 and 500,000 BTU/hour by burning from 1 to 3.6 gallons of oil per hour. The heaters generally are located in a vehicle maintenance facility where the oil is produced.

Federal regulations for burning used oil in space heaters are addressed in 40 CFR 279 Subpart C. On-specification used oil generated on the site can be burned in space heaters without restriction. Off-specification used oil can be burned only if the oil is generated on the site, the heater has a maximum capacity of 500,000 BTU/hour, and combustion gases are vented to the ambient air. Hazardous oil cannot be burned in space heaters.

Alternative 4: Offsite Oil Rerefining

Description

Rerefining involves processing used lubricating oil to return it to virgin oil specifications so that it can be reused as a motor oil. Rerefining involves elaborate and expensive processing and is therefore only feasible as an offsite recycling program, handled either through a broker or directly with a rerefining facility. Current rerefining techniques include filtration, heating, settling, flash dehydration, vacuum stripping, and vacuum distillation.

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Pollution Prevention Opportunity Assessment Module

Used Oil Filters From Vehicle Maintenance

Waste Stream: Used Oil Filters

Operation: Vehicle Maintenance

Description

Used oil filters are generated during the regular maintenance of vehicles and equipment. DOD establishes the policy that dictates scheduled intervals. Normally, standard vehicles receive oil changes every 6 months or 6,000 miles. Special vehicles are serviced every 400 to 600 operating hours. Oil filters normally are changed as an integral part of the oil change.

Federal regulations covering the disposal of used oil filters are in 40 CFR 261. The regulations require that used oil filters be tested for toxicity characteristics and disposed of accordingly. However, an exemption from testing is provided for non-tin-lead alloy plated used filters that are drained in any of the following ways:

- puncturing the filter and hot-draining for 12 hours
- hot-draining for 12 hours and crushing
- dismantling and draining for 12 hours
- using an equivalent oil-draining method that removes used oil

Alternative 1: Crush filters to reduce volume.

Description

Used filters are drained of as much oil or fuel as possible and then are crushed and disposed of in 55-gallon drums. This can be accomplished in a specially designed filter crusher. Filter draining and crushing is done for several reasons. First, it separates the liquid oil waste from the solid filter to the greatest extent possible. Second, it compacts the filter and allows more filters to be disposed of in each drum, thereby reducing the number of drums and pounds for disposal.

Alternative 2: Recycle off the site.

Pollution Prevention Opportunity Assessment Module

Used Oil Filters From Vehicle Maintenance

Description

Recycling vendors for oil filters operate in many parts of the country. They process spent filters by shredding them and then separating the paper element from the metal casing. The metal casing is recycled as scrap metal, and the paper is disposed of or burned as a fuel. Most recyclers require that filters be drained for 12 hours and that they not be crushed.

Alternative 3: Separate filter elements and recycle metal.

Description

Oil filters can be cut open, and the paper element can be removed from the casing. The metal casing then can be drained and sold as scrap metal. There is an oil filter element cutter that, like a large can opener, cuts the bottom off the filter casing so that the element can be removed.

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Pollution Prevention Opportunity Assessment Module Used Antifreeze From Vehicle Repair and Maintenance

Waste Stream: Used Antifreeze

Operation: Vehicle Repair and Maintenance

Description

Used antifreeze is generated during repair and maintenance of gasoline and diesel engines. Antifreeze becomes a waste when it no longer meets the specifications required to perform its intended purpose (temperature and corrosion protection). Disposal and replacement are rarely based on performance; instead, they are based on engine running time or mileage.

Although antifreeze is not by itself regulated as a hazardous waste, contaminants, such as heavy metals, can make it hazardous.

Alternative 1: Antifreeze Testing (to extend life)

Description

Antifreeze properties that typically would be tested include specific gravity, freezing point, boiling point, pH, general corrosivity, aluminum corrosivity, and foaming. The American Society for Testing and Materials (ASTM) has established standard specifications for properties of antifreeze for automobile and light-duty engines and for heavy-duty engines. The standards and the ASTM test methods used to determine them are shown in Table 1.

Antifreeze testing can be applied through several types of programs. For large engines, such as power generators, when the appropriate laboratory facilities are available, it may be cost-effective to test antifreeze on an engine-by-engine basis. At regular intervals, samples would be collected and tested. Antifreeze not meeting specifications would be replaced, and the used antifreeze would be recycled or disposed of.

A less-extensive program would involve testing antifreeze samples from representative vehicles in a motor pool to establish an average antifreeze life for each vehicle class. On the basis of test results, a schedule for changing the antifreeze of all vehicles in that class would be implemented.

Pollution Prevention Opportunity Assessment Module Used Antifreeze From Vehicle Repair and Maintenance

A third type of program would involve changing antifreeze on a regular basis and consolidating and testing the used antifreeze from a number of vehicles. Test results would govern whether the antifreeze would be reused, recycled, or disposed of.

Table 1
ASTM ANTIFREEZE SPECIFICATIONS

Parameter	Range	ASTM Test Method
Freezing point °F (°C) (50% volume in distilled water)	-34 (-37)	D 1177
Boiling point °F (°C) (50% volume in distilled water)	226 (107)	D 1120
pH (50% volume in distilled water)	7.5 to 11.0	D 1287
Chloride (ppm)	25 maximum	D 3634
Corrosion in glassware (weight loss, mg/specimen) Copper Solder Brass Steel Cast Iron Aluminum	10 maximum 30 maximum 10 maximum 10 maximum 10 maximum 30 maximum	D 1384
Corrosion of cast aluminum (mg/cm ² /week)	1.0 maximum	D 4340

Foaming tendency (volume, ml)	150 maximum	D 1881
Source: Reference 8		

Alternative 2: Onboard Recycling

Description

Onboard recycling involves the use of filter systems that are installed on the engine. Antifreeze traveling through the engine cooling system is filtered to remove contaminants that adversely affect its properties. Onboard filtration systems can be either full-flow or bypass. Supplemental coolant additives can be added on a regular basis to replace corrosion and foam inhibitors.

Onboard filtration is particularly effective and often is necessary for long-running heavy-duty gasoline and diesel engines that need antifreeze to be maintained in prime condition to protect expensive components and reduce maintenance cost and vehicle downtime. This technology has been used in this application for more than 25 years. Most engines are not factory-equipped with onboard filters; typically, the filters are installed by the owner. Recommended coolant life can be as long as 240,000 engine miles when onboard recycling is used, compared with 36,000 to 40,000 miles when it is not. Onboard filtration has not been used much on automobiles and light trucks because it is not cost-effective. For small engines, off-board recycling technologies appear to be more useful.

Alternative 3: Antifreeze Recycling

Description

Off-specification antifreeze often can be restored through simple physical processes that remove contaminants and through replacement of chemical additives. Specific recycling methods that are seeing relatively widespread use include:

- standard particle filtration
- ultrafiltration
- distillation

In standard particle filtration, multistage filters in the 5- to 25-micron range are used to remove solids, such as dirt, rust, and suspended metals, that can act as abrasives and cause engine wear. This can be followed up with ion exchange, which removes dissolved metals that cause corrosion, or with aeration/filtration, which removes oils that can affect the freezing and boiling point or increase foaming. Additives usually must be added to precipitate out metals, reduce foam, and restore color. Virgin antifreeze can be added to lower the freezing point.

Several types of standard filtration systems are available in the automotive repair industry. Large stationary fleet-sized treatment units operate in 50- to 100-gal batches. The units can be set up to draw used antifreeze from a feed drum or a small tank, treat it, and discharge the recycled product to a second container. Portable units are available that can be hooked up directly to a vehicle's radiator. With all of these filtration units, filter elements must be replaced regularly and often have to be disposed of as a hazardous waste.

Another type of filtration system for antifreeze recently has been developed at the request of the U.S. Air Force. This relatively simple system uses rolls of household paper towels as elements and can remove particles smaller than 1 micron. The filters can be mounted on a portable skid or trailer and used throughout a maintenance facility to recycle antifreeze that has been collected in containers, or the filters can be attached directly to the engine to provide continuous filtration during engine use.

Ultrafiltration uses a multistage filtration process where the initial filter typically is in the 5-micron range and the final filter is in the 0.001-micron range. Ultrafiltration is designed to remove molecular-size contaminants, such as sulfates and chlorides, which are the primary causes of corrosion.

There is an ultrafiltration unit that uses 5- and 0.0025-micron filters. This device is reportedly capable of restoring antifreeze to meet all applicable ASTM standards, including corrosion. As with other antifreeze-recycling technologies that use filtration, additives and new antifreeze must be added to restore some properties.

Antifreeze distillation is a two-step process. In the first step, water is distilled under atmospheric pressure. In the second step, ethylene glycol is distilled under a vacuum. The two streams are condensed separately and collected in drums as processed ethylene glycol and distilled water. Dissolved and suspended solids and other contaminants remain in the process vessel and are disposed of. The recycled ethylene glycol then can be mixed with the proper amount of distilled water and additives and can be reused.

A batch-operated still, applicable for use in a maintenance garage, will operate in 15- to 20-gal batches. Each batch takes 10 to 15 hours to treat and generates 0.5 to 1 gal of still bottoms requiring disposal.

WDCR828/032.WP5

Pollution Prevention Opportunity Assessment Module

Halon Use in Fire Extinguishers

Waste Stream: Halons

Operation: Portable Fire Extinguishers

Description

Halon _____ is used as a liquid fire suppressant (streaming agent) in portable fire extinguishers. The fire extinguishers are used for [To be inserted by installation](#). Approximately _____ of these units are located throughout INSTALLATION-XXX, containing approximately _____ pounds of Halon. Approximately _____ pounds of halons are emitted during testing of the fire extinguishers.

Alternative 1: Discontinue testing of fire extinguishers containing Halon.

Description

Testing of fire extinguishers containing Halons will be discontinued. Alternative chemicals and methods are available for testing.

Alternative 2: Substitute fire suppressant.

Description

Carbon dioxide, water, dry-chemical, or foam portable fire extinguishers are currently available. Therefore, complete replacement of portable fire extinguishers using halon could be accomplished in the short term.

WDCR828/033.WP5

Pollution Prevention Opportunity Assessment Module

Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance

Waste Stream: Refrigerants (CFCs)

Operation: Refrigeration, Cooling-Equipment Maintenance

Description

Chlorofluorocarbons (CFCs) are used as heat-transfer fluids in the refrigeration cycle of air conditioners, freezers, and refrigerators. The refrigerant remains in a sealed system throughout the refrigeration cycle and is not emitted until the unit is disposed of, although small quantities may leak from the system or be emitted during servicing. The Clean Air Act Amendments require capture and recycling of refrigerants during servicing operation. The Clean Air Act Amendments and DOD Directive 6050.9 require phasing out various CFCs.

Alternative 1: CFC Substitution

Description

Much research has been and is being performed on finding replacements for CFCs. The advantage to CFC replacements is the reduced use of ozone-depleting chemicals. Reducing CFC use will comply with regulatory requirements and DOD directives.

Two problems are associated with CFC substitution. Replacement compounds not requiring retrofitting of equipment are not commercially available, and replacements that are available require equipment modification.

Fluoroiodocarbons recently were announced as true "drop-in" replacements for CFCs. However, these compounds are still undergoing testing and are not expected to be available for commercial use until 1996.

Pollution Prevention Opportunity Assessment Module

Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance

Most of the alternative refrigerants proposed and marketed today require physical retrofits of the equipment and the lubricants. They are less efficient than the CFCs they are replacing, which can lead to the need to replace existing equipment with higher-capacity equipment to accomplish the same level of service.

Substitute refrigerants include the following:

- HCFC-123 or HCFC-124 for CFC-11
- HFC-134a or HCFC-22 for CFC-12
- HFC-125 or HCFC-22 for CFC-502

Alternative 2: CFC Recycling

Description

CFCs, like other solvents, can be recycled through distillation. The CFCs must be removed from the equipment by certified technicians using registered equipment. The CFCs then are reprocessed either on the site or off the site, using distillation technology. The CFCs removed from the equipment will be replaced with recycled CFCs. The advantage of CFC recycling is that it allows continued use of equipment until a suitable CFC replacement is commercially available, and no new supplies of CFCs will have to be purchased. The disadvantage is that DOD is directing the phase-out of ozone-depleting chemicals, so reusing CFCs contradicts regulatory and DOD requirements. The availability of CFC recyclers also may be a hindrance to this alternative.

WDCR828/047.WP5

Section 5

Pollution Prevention Implementation

The following plan was developed to implement the pollution prevention options that have been determined to be feasible. Pollution prevention projects are separated into three categories:

- Past Pollution Prevention Projects
- Current Pollution Prevention Projects
- Future Pollution Prevention Projects

Current and future pollution prevention projects are summarized in Table 5-1.

The installation should demonstrate management commitment to P2 by giving the dollars spent on P2 and P2 activities in the past and projected expenditures for the future.

In this section, discuss how P2 success has been measured in past efforts and how it will be measured in the future. Note that units of measurement should take into account production levels so that P2 is not accomplished simply by reducing the workload.

In this section, identify barriers expected. Barriers include institutional (mission priorities, MILSPECS), financial, technical, and regulatory. Identify how the installation will find ways to reduce the effect of the barriers during implementation of P2. The following procedures can be tried to overcome the barriers.

Institutional Barriers

Institutional barriers can be overcome by raising the environmental awareness of the troops, civilian employees, contractors, and tenant organizations. Methods of accomplishing this include the following:

- Installation Commander's pollution prevention directives

- Pollution prevention news stories in post newspaper
- Outreach bulletins from environmental groups
- Pollution prevention training
- Clear definition of communication channels between groups

Financial Barriers

Financial barriers can be overcome by demonstrating that a pollution prevention project will result in a cost saving. Tools that may help in overcoming economic stumbling blocks include the following:

- Selecting projects with the greatest ``bang for the buck"
- Using well-defined economic analyses. DOD has guidelines on economic analysis in DOD Initiative 7041 3, ``Economic Analysis and Program Evaluation for Resource Management."
- Investigating alternative funding sources - IC's discretionary funds, recycling proceeds, O&M funds

Technical Barriers

Technical barriers can be overcome by attempting the following:

- Include installation's best technical expertise (personnel who operate the processes) during assessment, evaluation, planning, and implementation of P2 options.
- Include other expertise on the installation (civil engineering, logistics, design, maintenance).
- Consult with organizations external to the installation (your major Command, other Commands, Corps of Engineers).

Regulatory Barriers

Typical environmental regulations emphasize control, treatment, and end-of-pipe treatments. It may be difficult to break the thinking of doing only what is necessary to come into regulatory compliance. Try to be proactive and take a multimedia approach. Determine the regulatory effects on all media of implementing a P2 project.

Note awards and incentives offered, both Army-wide (DOD P2 awards) and within the installation. Available awards include the following:

- ASA(FM) has an Army-wide hazardous waste reduction award program.
- Each installation is required to have an incentive award for encouraging and promoting maximum awareness of the installation's P2 program.
- The Secretary of Defense presents an annual award to the DOD installation that has achieved noteworthy improvements in environmental quality in the preceding 2 years. An individual award is given to the military or civilian employee who has made the most significant contribution to the environmental quality program during the preceding 2 years.
- The Secretary of the Army presents an environmental quality award to the individual and the installation that have shown the most noteworthy contributions toward protecting and preserving the quality of the environment during the preceding 2 years (see AR 200-1 for nominating procedures).

Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project will be described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), actual waste reduction, actual implementation costs, actual savings, and funding sources. The following example is provided for guidance.

Project Title: Paint-Booth Conversion to Dry Filtration

Description: Paint-booth scrubber sludge was eliminated through installation of dry filters. Filters are replaced on a ____ month interval.

Location: Paint booths in Motor Pool _____, Building ____

Implementation Date: December 10, 1993

Targeted Waste Type(s): Hazardous Wastes, Waste Solvents

Waste Reduction: 19,000 lbs/year

Implementation Costs: Parts and Labor: \$9,500

Savings: Elimination of the waste stream has saved the installation \$6,000 per year in reduced waste disposal cost.

Funding Source: O&M account

Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources. The following example is provided for guidance.

Project Title: Antifreeze Recycling

Description: Used antifreeze from nontactical vehicles is disposed of as a waste, sometimes as a characteristic hazardous waste. Planned equipment is a used-antifreeze filtration system, which will allow used antifreeze to be filtered and returned to the vehicle.

Location: Motor Pool _____, Building ____

Implementation Date: CY 1994

Targeted Waste Type(s): Hazardous Wastes, Solid Wastes

Waste Reduction: 5,000 lbs/year

Implementation Costs: \$7,200

Savings: Elimination of the waste stream has saved the installation \$1,000 per year in reduced costs of waste-antifreeze disposal and drum and drum handling.

Funding Source: O&M account

Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources. The following example is provided for guidance.

Project Title: Cardboard Balers

Description: The installation will be able to recycle corrugated cardboard currently disposed of in an off-base landfill. The corrugated cardboard will be collected by Recycling Program employees, baled at the recycling center, and sold.

Location: Recycling Center

Implementation Date: CY 1995

Targeted Waste Type(s): Solid Wastes

Waste Reduction: 400,000 lbs/year

Implementation Costs: \$99,000

Savings: Waste Reduction - \$10,000/year

Cardboard Sales - \$20,000/year
Total Savings - \$30,000/year

Funding Source: Capital account

1383 Status: Submitted

WDCR828/049.WP5

Table 5-1
INSTALLATION-XXX POLLUTION PREVENTION IMPLEMENTATION PLAN

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost (\$)	Estimated Savings (\$/yr.)	Expected Implementation Date	1383 Status
<u>Cardboard Baler</u>	<u>Recycling Center</u>	<u>Solid Waste</u>	<u>400,000</u>	<u>\$99,000</u>	<u>\$30,000</u>	<u>CY95</u>	<u>Entered</u>

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WDCR828/048.WP5

Section 6

Annual Pollution Prevention Reporting

To assess progress in achieving the installation's pollution prevention goals, the following reports will be generated annually and are in this P2 plan:

- Annual Hazardous Waste Generation Report (Table 6-1)
- Annual EPA Toxic 17 Waste Generation Report (Table 6-2)
- Annual Solid Waste Generation Report (Table 6-3)
- Annual Ozone-Depleting Chemicals (ODCs) Usage Report (Table 6-4)
- Annual Toxics Release Inventory Emissions Report (Table 6-5)
- Annual Pollution Prevention Goals Achievement Report (Table 6-6)

In addition, the following report will be prepared and disseminated to identify the costs of hazardous waste disposal.

- Annual Hazardous Waste Cost Allocation Report (Table 6-7)

The goal of INSTALLATION-XXX is to charge individual operations for the costs of managing and disposing of their hazardous wastes.

WDCR828/008.WP5

Table 6-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 41 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Solvent Wastes							
2. Acids & Bases							

6-41

4-41

Table 6-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 41 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
3. Wastewater Treatment Sludges							
4. Fuels							
5.							

6-42

4-42

Table 6-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 41 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6.							
7.							

Table 6-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 41 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
8.							
9.							

6-44

4-44

Table 6-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 41 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
10.							
11.							
12.							

6-45

4-45

Table 6-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Page 41 of 3

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
TOTAL			100 %				

WDCR828/017.WP5

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Benzene							
2. Cadmium & compounds							

6-47

4-47

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
3. Carbon Tetrachloride							
4. Chloroform							
5. Chromium &							

6-48

4-48

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
compounds							
6. Cyanides							
7. Dichloromethane							

6-49

4-49

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
8. Lead & compounds							
9. Mercury & compounds							

6-50

4-50

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
10. Methyl Ethyl Ketone							
11. Methyl Isobutyl Ketone							

6-51

4-51

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
12. Nickel & compounds							
13. Tetrachloroethylene							

6-52

4-52

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
14. Toluene							
15. Trichloroethane							

6-53

4-53

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Page 47 of 5

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
16. Trichloroethylene							
17. Xylene							
TOTAL			100 %				

6-54

4-54

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6-55

4-55

Table 6-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

Page 56 of 3

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Aluminum Cans						
2. Corrugated Cardboard						
3. Office Paper						

Table 6-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

Page 56 of 3

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
4. Newspaper						
5. Glass						

6-57

4-57

Table 6-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

Page 56 of 3

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6. Ferrous Cans						
7. Plastic (PET soft drink bottles, HDPE milk jugs, etc.)						

Table 6-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

Page 56 of 3

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
8. Yard Waste						
9. Unclassified Waste						
10. Engine Oils						

Table 6-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

Page 56 of 3

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
11. Engine Coolants						
12.						

6-60

4-60

Table 6-3
199_ SOLID WASTE GENERATION AT INSTALLATION-XXX

Page 56 of 3

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
TOTAL		100 %				

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Table 6-4
199_ USAGE OF OZONE-DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

Page 62 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
1. Freons							
2. Halons							
3. Cleaning Solvents							

Table 6-4
199_ USAGE OF OZONE-DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

Page 62 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
4. Paint Strippers							
5.							

Table 6-4
199_ USAGE OF OZONE-DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

Page 62 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
6.							
7.							

Table 6-4
199_ USAGE OF OZONE-DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

Page 62 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
8.							
9.							
10.							

Table 6-4
199_ USAGE OF OZONE-DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

Page 62 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
11.							
12.							

Table 6-4
199_ USAGE OF OZONE-DEPLETING CHEMICALS (ODCS)AT INSTALLATION-XXX

Page 62 of 3

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
TOTAL		100 %					

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6-67

4-67

Table 6-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 68 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
1.							
2.							
3.							

Table 6-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 68 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
4.							
5.							

Table 6-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 68 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
6.							
7.							

6-70

4-70

Table 6-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 68 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
8.							
9.							
10.							

6-71

4-71

Table 6-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 68 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
11.							
12.							

6-72

4-72

Table 6-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

Page 68 of 3

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
TOTAL			100 %				

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6-73

4-73

Table 6-6
INSTALLATION-XXX 199_ POLLUTION PREVENTION ACHIEVEMENT REPORT

Waste Type	Subtype	Reduction Goal (%)	Baseline (lbs./year)	Current (lbs./year)	Achieved to Date (%)
Hazardous Waste					
Hazardous Waste	EPA Toxic 17 Wastes				
Hazardous Waste	Solvent Wastes				
Hazardous Waste	Acids and Bases				
Solid Wastes					
Ozone- Depleting Chemical Use					
TRI Chemicals					

WDCR828/009.WP5

Table 6-7
199_ ANNUAL WASTE DISPOSAL COST ALLOCATION AT INSTALLATION-XXX

Page 75 of 3

Generator Unit/Shop	Waste Type	Waste Code(s)	Disposed by Shop (lbs)	Unit Cost (\$/lb.)	Disposal Cost (\$)
1. TOTAL For Shop					
2. TOTAL For Shop					
3.					

Table 6-7
199_ ANNUAL WASTE DISPOSAL COST ALLOCATION AT INSTALLATION-XXX

Page 75 of 3

Generator Unit/Shop	Waste Type	Waste Code(s)	Disposed by Shop (lbs)	Unit Cost (\$/lb.)	Disposal Cost (\$)
TOTAL For Shop					
4.					
TOTAL For Shop					
5.					

6-76

4-76

Table 6-7
199_ ANNUAL WASTE DISPOSAL COST ALLOCATION AT INSTALLATION-XXX

Page 75 of 3

Generator Unit/Shop	Waste Type	Waste Code(s)	Disposed by Shop (lbs)	Unit Cost (\$/lb.)	Disposal Cost (\$)
TOTAL For Shop					
6.					
TOTAL For Shop					
7.					

6-77

4-77

Table 6-7
199_ ANNUAL WASTE DISPOSAL COST ALLOCATION AT INSTALLATION-XXX

Page 75 of 3

Generator Unit/Shop	Waste Type	Waste Code(s)	Disposed by Shop (lbs)	Unit Cost (\$/lb.)	Disposal Cost (\$)
TOTAL For Shop					
8.					
TOTAL For Shop					
9.					
TOTAL For Shop					

6-78

4-78

Table 6-7
199_ ANNUAL WASTE DISPOSAL COST ALLOCATION AT INSTALLATION-XXX

Page 75 of 3

Generator Unit/Shop	Waste Type	Waste Code(s)	Disposed by Shop (lbs)	Unit Cost (\$/lb.)	Disposal Cost (\$)
10.					
	TOTAL For Shop				
11.					
	TOTAL For Shop				
12.					

6-79

4-79

Table 6-7
199_ ANNUAL WASTE DISPOSAL COST ALLOCATION AT INSTALLATION-XXX

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Generator Unit/Shop	Waste Type	Waste Code(s)	Disposed by Shop (lbs)	Unit Cost (\$/lb.)	Disposal Cost (\$)
TOTAL For Shop					
TOTAL					

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Appendix A

Abbreviations

AAFES	Army, Air Force Exchange System
AR	Army Regulation
CAAA90	Clean Air Act Amendment of 1990.
COE	Corps Of Engineers
DA	Department of the Army
DEH	Director of Engineering and Housing
DFE	Director of Facility Engineering
DIO	Director of Industrial Operations
DLA	Defense Logistics Agency
DOD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EO	Executive Order
EQCC	Environmental Quality Control Committee
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
FAO	Finance and Accounting Office
FOA	Field Operating Agency
FE	Facility Engineer

GMP	Good Management Practice
GOCO	Government-Owned, Contractor-Operated
HMIS	Hazardous Material Information System
HWM	Hazardous Waste Management
IHWM	Installation Hazardous Waste Manager
IC	Installation Commander
ISCP	Installation Spill Control Plan
MACOM	Major Army Command
MCA	Military Construction, Army
MEDDAC	Medical Department Activity
MWR	Moral, Welfare, and Recreation
O&M	Operation and Maintenance
PPAT	Pollution Prevention Assessment Team
POL	Petroleum, Oil, and Lubricants
PPOA	Pollution Prevention Opportunity Assessment
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act of 1986
SOP	Standard Operating Procedure
SPCC Plan	Spill Prevention Control and Countermeasures Plan
TRI	Toxics Release Inventory
TSCA	Toxic Substance Control Act

TSDf	Treatment, Storage or Disposal Facility
TSG	The Surgeon General
VOC	Volatile Organic Compound

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Appendix B

Definitions

Appliance: Any device that contains and uses a Class I or Class II substance as a refrigerant and that is used for household or commercial purposes, including any air conditioner, refrigerator, chiller, or freezer.

Cartridge Filter: A discrete filter unit containing both filter paper and activated carbon that traps and removes contaminants from petroleum solvent, together with the piping and ductwork used in installing this device.

Characteristic Waste: The characteristics of ignitability, corrosivity, reactivity, and toxicity that identify hazardous waste.

Chemical Warfare Agent: A substance that because of its chemical properties is used in military operations to kill, seriously injure, or incapacitate humans or animals or deny use of indigenous resources.

Container: Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Designated Facility: A hazardous waste treatment, storage, or disposal facility (TSDF) that is identified on a manifest as the destination of a hazardous waste shipment. The facility must have an appropriate permit, have interim status, or be regulated under specific recycling requirements.

Nonattainment Area: Any area designated as being in nonattainment with the National Ambient Air Quality Standard (NAAQS) for ozone pursuant to rulemaking under section 107(d)(4)(A)(ii) of the CAA.

Disposal: The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or onto any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

EPA Hazardous Waste Number: The number assigned by USEPA to each hazardous waste listed in 40 CFR 261, Subpart D, and to each characteristic identified in 40 CFR 261, Subpart C.

Facility: All contiguous land and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units (i.e., one or more landfills, surface impoundments, or combination of them).

Federally Enforceable: All limitations and conditions enforceable by the Administration, including those requirements developed pursuant to 40 CFR, requirements within any applicable state implementation plan, and any permit requirements established pursuant to 40 CFR.

Generator: Any person or group whose act or process produces hazardous waste identified or listed in 40 CFR 261 or whose act first causes a hazardous waste to become subject to regulations.

Good Management Practice (GMP): A practice that, although not mandated by law, is encouraged to promote safe operating procedures.

Hazardous Waste: A solid waste, not specifically excluded from the restrictions of Federal regulation (42 USC 6901), that meets the criteria listed in 40 CFR 261 or is specifically named as a hazardous waste in Federal regulations.

Household Waste: Includes material discarded by single and multiple residential dwellings, hotels, motels, and other similar permanent or temporary housing.

Incinerator: Any furnace used in the process of burning solid waste for the purpose of reducing the volume of the waste by removing combustible matter.

Infectious Waste: 1. Equipment, instruments, utensils, and fomites of a disposable nature from the rooms of patients who are suspected to have or have been diagnosed as having a communicable disease and who must therefore be isolated as required by public health agencies. 2. Laboratory waste, such as pathological specimens and disposable fomites (any substance that may harbor or transmit pathological organisms). 3. Surgical operating room pathological specimens and disposable fomites attendant thereto and similar disposable materials from outpatient areas and emergency rooms.

Landfill: A disposal facility or a part of a facility where waste is placed in or on land and that is not a land treatment facility, a surface impoundment, an underground injection well, a salt bed formation, an underground mine, or a cave.

Hazardous Waste Management: The systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of hazardous waste.

Material-Tracking System: Each generator developing an in-house system to ensure that all hazardous materials and wastes are controlled from purchase to release or disposal in order to reduce loss and spillage.

Medical Waste: When defined as applicable to municipal waste combustors, any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in production or testing of biological agents. Medical waste does not include hazardous waste identified under RCRA-C or any household waste as defined in RCRA, subpart C.

Off-Specification Used Oil: Used oil burned for energy recovery and any fuel produced from used oil that exceeds the following allowable limits:

Arsenic	5 ppm max.
Cadmium	2 ppm max.
Chromium	10 ppm max.
Lead	100 ppm max.
Flash Point	100 °F min.
Total halogens	4000 ppm max.

Particulate Emissions: Any airborne finely divided solid or liquid material, except uncombined water, emitted to the ambient air.

Pollution Prevention: Source reduction and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other resources, or protection of natural resources by conservation. Recycling, energy, treatment, and disposal are not included in the definition of pollution prevention. However, some practices commonly described as "in-process recycling" may qualify as pollution prevention. Examples might include solvent recycling, metal recovery from a spent plating bath, and recovery of volatile organic compounds (VOCs).

Qualifying Recycling Program: Organized operations that require concerted efforts to (a) divert or recover scrap or waste from waste streams; (b) identify, segregate, and maintain the integrity of the recyclable materials to maintain or enhance the marketability of the material.

Recyclable Material: Material that normally has been or would be discarded (such as scraps and waste) and material that may be reused after undergoing some type of physical or chemical processing. Recyclable materials may include discarded materials that have undergone demilitarization or mutilation at an installation before being transferred to the property disposal office for sale. Recyclable materials do not include (1) precious-metal-bearing scrap; (2) those items that may be used again for their original purpose or functions without any special processing, such as used vehicles, vehicle or machine parts, bottles (not scrap glass), electrical components, and unopened containers of unused oil or solvent.

Recycling: The process by which recovered materials are transformed into new or usable products.

Resource Recovery Facility: Any physical plant that processes residential, commercial, or institutional solid waste biologically, chemically, or physically and recovers useful products (such as shredded fuel, combustible oil or gas, steam, metal, or glass) for resale or reuse.

Sludge: Any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant.

Source Reduction: Any practice that reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or emitted to the environment (including fugitive emissions) before recycling, treatment, or disposal. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, and inventory control.

Source Separation: The setting aside of recyclable materials at their points of generation by the generator.

Sump: Any pit or reservoir that meets the definition of tank and the troughs or trenches connected to it that serve to collect hazardous waste for transport to hazardous waste TSDFs, except that as used in the landfill, surface impoundment, and waste pile rules, ``sump" means any lined pit or reservoir that serves to collect liquids drained from a collection and removal system or a leak-detection system for subsequent removal from the system.

Treatability Study: A study in which a hazardous waste is subjected to a treatment process to determine one or more of the following:

- Whether the waste is amenable to the treatment process
- What pretreatment, if any, is required
- The optimal process conditions needed to achieve the desired treatment
- The efficiency of a treatment process for a specific waste or wastes
- The characteristics and volumes of residuals from a particular treatment process.

Treatment: Any method, technique, or process (including neutralization) designed to change the physical, chemical, or biological character or composition of any hazardous waste.

Used Oil: Any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such is contaminated by physical or chemical impurities.

Volatile Organic Compound (VOC): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, carbonates, and ammonium carbonate, that participates in atmospheric photochemical reactions.

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Appendix C

References

ENVIRONMENTAL PROTECTION AGENCY GUIDANCE

General Guidance

Waste Minimization Opportunity Assessment Manual, EPA/625/7-88/003, 1988.

Facility Pollution Prevention Guide, EPA/600/R-92/088, 1992.

Pollution Prevention in the Federal Government: Guide for Developing Pollution Prevention Strategies for Executive Order 12856 and Beyond, EPA/300/B-94/007, 1994.

Pollution Prevention and Right-to-Know in the Government: Executive Order 12856, EPA/100/K-93/001, 1993.

Setting Priorities for Hazardous Waste Minimization, EPA/530/R-94/015, 1994.

A Primer for Financial Analysis of Pollution Prevention Projects, EPA/600/R-93/059, 1993.

Pollution Prevention Act of 1990, Public Law 101-508, 1990.

Industry-Specific Guidance

These guides list source-reduction and recycling techniques for specific industries. The guides have been published by the Pollution Prevention Research Branch of EPA's Office of Research and Development as a series of industry-specific pollution prevention guidance manuals.

Industrial Category	EPA Document No.	Date
<i>Automotive Refinishing Industry</i>	EPA/625/7-91/016	10/91
<i>Auto Repair Industry</i>	EPA/625/7-91/013	10/91
<i>The Commercial Printing Industry</i>	EPA/625/7-90/008	1990
<i>The Fabricated Metal Industry</i>	EPA/625/7-90/006	7/90
<i>Fiberglass Reinforced and Composite Plastics</i>	EPA/625/7-91/014	1991
<i>Marine Maintenance and Repair</i>	EPA/625/7-91/015	1991
<i>The Paint Manufacturing Industry</i>	EPA/625/7-90/005	1990
<i>The Pesticide Formulating Industry</i>	EPA/625/7-90/004	1990
<i>Pharmaceutical Preparation</i>	EPA/625/7-91/017	1991
<i>Photoprocessing Industry</i>	EPA/625/7-91/012	1991
<i>Printed Circuit Board Manufacturing Industry</i>	EPA/625/7-90/002	1990
<i>Research and Educational Institutions</i>	EPA/625/7-90/010	6/90
<i>Selected Hospital Waste Streams</i>	EPA/625/7-90/009	6/90
<i>Mechanical Equipment Repair Industry</i>	EPA/625/R-92/008	1992
<i>Metal Casting and Heat Treating Industry</i>	EPA/625/R-92/009	1992
<i>Metal Finishing Industry</i> EPA/625/R-92/011		1992

Fact Sheets

The following fact sheets contain overviews, tips, or guidelines for pollution prevention. Some provide only general information or advice on how to set up programs; others identify pollution prevention opportunities for specific industries, processes, or materials. EPA, state agencies, and local governments produced the fact sheets. In many cases, multiple sources have published fact sheets on particular topics. Fact sheets on the topic areas below are available from the EPA library, 401 M Street, SW, Washington DC 20460 (202/260-1963). The source of this information is *Pollution Prevention Resources and Training Opportunities in 1992*, EPA, Office of Pollution Prevention and Toxics and Office of Environmental Engineering and Technology Demonstration, EPA/5650/8-92-002, January 1992.

FACT SHEETS

General and Introductory Information

- *Conservation Tips for Business*
- *General Guidelines*
- *Getting More Use Out of What We Have*
- *Glossary of Waste Reduction Terms*
- *Guides to Pollution Prevention*
- *Hazardous Waste Fact Sheet for Minnesota Generators*
- *Hazardous Waste Minimization*
- *How Business Organizations Can Help*
- *Increase Your Corporate and Product Image*

- *Industrial Hazardous Wastes in Minnesota*
- *Local Governments and Pollution Prevention*
- *Pollution Prevention (General)*
- *Pollution Prevention Fees*
- *Pollution Prevention Training and Education*
- *Pollution Prevention Through Waste Reduction*
- *Recent Publications*
- *Reduce Hazardous Waste*
- *Reuse Strategies for Local Government*
- *Source Reduction Techniques for Local Government*
- *U.S. EPA's Pollution Prevention Program*
- *Video Tapes Available from the Virginia Waste Minimization Program*
- *Waste Exchanges: Everybody Wins!*
- *Waste Exchange Services*
- *Waste Minimization Fact Sheet*
- *Waste Minimization in the Workplace*
- *Waste Reduction Can Work For You*
- *Waste Reduction Overview*
- *Waste Reduction/Pollution Prevention: Getting Started*
- *Waste Reduction Tips for All Businesses*
- *Waste Source Reduction*
- *Waste Source Reduction Checklist*

- *What is Pollution Prevention*
- *Why Reduce Waste?*

Legislative Information/EPA and State Initiatives

- *About Minnesota's ``But Recycled Campaign''*
- *Alaska State Agency Waste Reduction and Recycling*
- *EPA's 2% Set Aside Pollution Prevention Projects*

- *EPA's ``List of Lists'' Projects*
- *EPA's Pollution Prevention Enforcement Settlement Policy*
- *EPA's Pollution Prevention Incentives for States*
- *EPA's Pollution Prevention Strategy*
- *Introducing the Colorado Pollution Prevention Program*
- *Michigan's Solid Waste Reduction Strategy*
- *Minnesota's Toxic Pollution Prevention Act*
- *New Form R Reporting Requirements*
- *Oregon's Toxic Use Reduction Act*
- *Pollution Prevention Act of 1990*
- *Promoting Pollution Prevention in Minnesota State Government*

Setting Up A Program

- *1991 Small Business Pollution Prevention Grants*
- *An Organization Strategy for Pollution Prevention*
- *Considerations in Selecting a Still for Onsite Recycling*
- *Colorado Technical Information Center*
- *Onsite Assistance (Colorado only)*
- *Pollution Prevention Grant Program Summaries and Reports*
- *Procuring Recycled Products*
- *Recycling Market Development Program*

- *Selecting a Supplier, Hauler, and Materials Broker*
- *Solid Waste Management Financial Assistance Program*
- *Source Reduction at Your Facility*
- *Starting Your Own Waste Reduction Program*
- *The Alexander Motor's Success Story*
- *The Eastside Plating Success Story*
- *The Wacker Payoff*

- *Waste Reduction Checklists*
 - *General*
 - *Cleaning*
 - *Coating/Painting*
 - *Formulating*
 - *Machining*
 - *Operating Procedures*
 - *Plating/Metal Finishing*
- *Waste Source Reduction: Implementing a Program*

Process/Material Specific

- *Aerosol Containers*
- *Aircraft Rinsewater Disposal*
- *Acids/Bases*
- *Chemigation Practices to Prevent Groundwater Contamination*
- *Corrugated Cardboard Waste Reduction*
- *Demolition*
- *Empty Containers*
- *Gunwasher Maintenance*
- *Lead Acid Batteries*
- *Machine Coolants:*

- *Prolonging Coolant Life*
- *Waste Reduction*
- *Metal Recovery:*
 - *Dragout Reduction*
 - *Ion Exchange/Electrolytic Recovery*
 - *Etchant Substitution*
- *Old Paints, Inks, Residuals, and Related Materials*
- *Pesticides:*
 - *Disposal of Unused Pesticides, Tank Mixes, and Rinsewater*
 - *In-Filled Sprayer Rinse System to Reduce Pesticide Wastes*
 - *Pesticide Container Disposal*
 - *Preventing Pesticide Pollution of Surface and Groundwater*
 - *Preventing Well Contamination by Pesticides*
 - *Protecting Mountain Springs from Pesticide contamination*
 - *Reducing and Saving Money Using Integrated Pest Management*
- *Metals Recycling*
- *Office Paper Waste Reduction*
- *Plastics:*
 - *The Facts About Production, Use, and Disposal*
 - *The Facts on Degradable Plastics*
 - *The Facts on Recycling Plastics*
 - *The Facts on Source Reduction*

- *Printing Equipment*
- *Refrigerant Reclamation Equipment/Services*
- *Reverse Osmosis*
- *Safety Kleen, Inc. Users*
- *Shop Rags from Printers*
- *Small Silver Recovery Units*
- *Solvents:*
 - *Alternatives to CFC-113 Used in the Cleaning of Electronic Circuit Boards*
 - *Onsite Solvent Reclamation*
 - *Reducing Shingle Waste at a Manufacturing Facility*
 - *Reducing Solvent Emissions from Vapor Degreasers*
 - *Small Solvent Recovery Systems*
 - *Solvent Loss Control*
 - *Solvent Management: Fiber Production Plant*
 - *Solvent Reuse: Technical Institute*
 - *Trichloroethylene and Stoddard Solvent Reduction Alternatives*
 - *Solvent Recovery: Fiber Production Plant*
 - *Solvent Reduction in Metal Parts Cleaning*
- *Ultrafiltration*
- *Used Containers: Management*
- *Used Oil Recycling*
- *Waste Management Guidance for Oil Cleanup*

- *Water and Chemical Reduction for Cooling Towers*
- *Waste Water Treatment Opportunities*

Industry-Specific

- *Aerospace Industry*
- *Auto Body Shops*
- *Automotive Painting*
- *Automotive/Vehicle Repair Shops*
- *Auto Salvage Yards*
- *Asbestos Handling, Transport, and Disposal*
- *Chemical Production*
- *Coal Mining*
- *Concrete Panel Manufacturers*
- *Dairy Industry:*
 - *Cut Waste and Reduce Surcharges for Your Dairy Plant*
 - *Dairy CEO's: Do You Have a \$500 Million Opportunity?*
 - *Liquid Assets for Your Dairy Plant*
 - *Water and Wastewater Management in a Dairy Processing Plant*
- *Dry Cleaners*
- *Electrical Power Generators*
- *Electroplating Industry:*

- *Dragout Management for Electroplaters*
- *Plating with Trivalent Chrome Instead of CR+6*
- *Water Conservation Using Counter Current Rinsing*
- *Water Conservation: Tank Design*
- *Water Conservation: Rinsewater Reuse*
- *What Should I Do With My Electroplating Sludge?*
- *Fabricated Metal Manufacturers*
- *Fiberglass Fabricators: Volatile Emissions Reduction*
- *Machine Toolers*

- *Metal Finishers:*
 - *General*
 - *Effluent Minimization*
 - *Rinsewater Reduction*
- *Oil Refiners*
- *Paint Formulators*
- *Paper Manufacturers*
- *Pesticide Formulating Industry*
- *Photofinishers/Photographic Processors*
- *Poultry Industry:*
 - *Poultry CEO's: Do You Have a \$60 Million Opportunity?*
 - *Poultry Processor: You Can Reduce Waste Load and Cut Sewer Surcharges*
 - *Survey Shows That Poultry Processors Can Save Money By Conserving Water*
 - *Systems for Recycling Water in Poultry Processing*
- *Printed Circuit Board Manufacturers*
- *Printing Industry*
- *Radiator Service Firms*
- *Shrimp Processors*
- *Steel Manufacturers*
- *Textile Industry:*
 - *Dye Bath and Bleach Bath Reconstitution*
 - *Water Conservation*
- *Wire Milling Operations: Process Water Reduction*

U.S. ARMY GUIDANCE

General Assistance

U.S. Army Construction Engineering Research Laboratory. P.O. Box 4005, Champaign, IL, 61820. 800-USA-CERL.

U.S. Army Cold Regions Research and Engineering Laboratory (CECRL), Hanover, NH 03755-1290. 603-646-4200, DSN 684-4200.

U.S. Army Environmental Hygiene Agency. Aberdeen Proving Ground, MD, 21010. (301) 671-3651 or DSN 584-3651.

U.S. Army Environmental Office. The Pentagon, Washington, DC, 20310-2600, (703) 693-5032 or DSN 223-5032.

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Materials Agency). Aberdeen Proving Ground, MD, 21010.
800-USA EVHL, (301) 671-2427 or DSN 584-2427.

U.S. Army Environmental Policy Institute. Champaign, IL, 61820. (217) 373-3320.

Pollution Prevention

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Material Agency). Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

Recycling

U.S. Army Engineering and Housing Support Center (USAEHSC). Directorate of Public Works. (703) 704-1606/1601.

Defense Logistics Agency. Check local Defense Reutilization and Marketing Organization (DRMO).

Air Pollution

U.S. Army Environmental Hygiene Agency. Air Pollution Engineering Division. Air Pollution Source Management (301) 671-3500 or DSN 584-3500; or Ambient Air Quality Management (301) 671-3954 or DSN 584-3954.

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Material Agency). Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

CFCs and Halon

U.S. Army Environmental Office. The Pentagon, Washington, DC 20310-2600, (703) 693-5032 or DSN 223-5032.

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Material Agency). Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

Endangered Threatened Species, Natural Resources

U.S. Army Environmental Center. Natural and Cultural Resource Division (703) 355-7968 or DSN 345-7968.

U.S. Army Engineering Waterways Experiment Station (CEWES), Vicksburg, MS 39180-6199, (601) 634-2512, FTS 542-2513.

Hazardous and Toxic Waste and Material Management

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Material Agency). Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

U.S. Army Environmental Hygiene Agency. Waste Disposal Engineering Division. (301) 671-3651 or DSN 584-3651.

Environmental Protection Agency-RCRA/Superfund Hotline. (800) 424-9346.

Environmental Protection Agency-TSCA Hotline. (202) 554-1404

Hazardous Waste Minimization

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Agency). Environmental Compliance Division. Army HAZMIN Program. (301) 671-2427 or DSN 584-2427.

U.S. Army Environmental Hygiene Agency. Waste Disposal Engineering Division, (301) 671-3651 or DSN 584-3651.

Solid Waste Management

U.S. Army Environmental Hygiene Agency. Ground Water and Solid Waste Management. (301) 671-2024.

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Material Agency). Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

General Environmental/Pollution Prevention

National Defense Center for Environmental Excellence. 1415 Scalp Avenue, Johnstown, PA 15904. 814-269-2432.

Air Force Center for Environmental Excellence, Pollution Prevention Division, Brooks Air Force Base, TX 78235-5318. 210-526-4214, DSN 240-4214.

Navy Energy and Environmental Support Agency (NEESA). Port Hueneme, CA. 805-982-4897.

Annapolis Detachment of the Carderock Division, Naval Surface Warfare Center, Environmental Protection Branch, Craig Alig, Director, 410-267-3526, DSN 281-3526.

Publications

U.S. Army Environmental Strategy into the 21st Century, 1992.

U.S. Army Engineering and Housing Support Center, *Installation Recycling Guide*, 1991.

U.S. Army Environmental Hygiene Agency, *A Commander's Guide to Infectious Waste Management at Army Health Care Facilities*, 1990.

U.S. Army Environmental Hygiene Agency, *A Commander's Guide to Hazardous Waste Minimization at Army Health Care Facilities*, 1990.

U.S. Army Corp of Engineers, *A Commander's Guide to Environmental Management*, 1990.

U.S. Army Corp of Engineers, *Hazardous Waste Management Systems Study*, 1991.

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Material Agency), *The Environmental Update*, published quarterly.

Army Environmental Policy Institute, Army Pollution Prevention Plan Manual: A Guide for Army Installations, 1993.

Environmental Health Engineering Directorate. U.S. Army Center for Health Promotion and Preventive Medicine Pollution Prevention Opportunity Assessment Protocol, 1994.

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Appendix D
Sample Pollution Prevention Survey Forms

This appendix includes forms that are examples of interviews used at other DOD installations in preparing P2 plans. The forms are examples and are not to be used verbatim but to spark ideas and assist in performing a PPOA. Similar assessments of your facility should be included in the appendix to your plan, along with feasibility studies of P2 opportunities that were evaluated.

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SAMPLE D-1

Pollution Prevention Survey

(insert base name and location)

Date:

Unit Designation, Shop Name, Building:

Type of Operation:

Process Description: Include process flow diagram showing hazardous material usage, wastes, products, and other releases (e.g., air emissions).

Wastes Generated:

.

.

Waste Disposal:

.

.

Releases to Air, Land, or Water From Operation:

.

.

Current Waste Minimization Practices:

Problems:

.

Waste Minimization Opportunities (In Shop):

.

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SAMPLE D-2

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Paint Shop*

Type of Operation: *General Painting of Installation*

Wastes Generated:

- Waste paints, paint thinner (mineral spirits, naphtha, toluene, xylenes), and empty 55-gallon paint drums generated from painting post structures and lines on the post's roads and runways and from cleaning painting trucks and equipment (20,106 lbs/year in 1990-91) (D001.,D007, D008, D018, D019, D035, F003, F005). The majority of the waste is nearly empty 55-gallon paint drums.

- Paint-coated gravel from testing and adjusting spray nozzles of the line-painting trucks on a gravel lot behind the paint shop. This practice was stopped in September 1993.

- Building paints are generally water based and generate little to no hazardous wastes.

Waste Disposal:

- Paint and paint-related waste, including paint-coated gravel, is put in drums and disposed of as a hazardous waste.
- Wastes generated from water-based paints are disposed of as nonhazardous wastes in the post landfill.

Current Waste Minimization Practices:

- The paint shop recently switched to ordering traffic paint in returnable 350-gallon Super Drums. The shop used to generate 300 empty drums of waste per year.
- A diked concrete pad has been proposed to be constructed at the shop. The contained area will be used to load and clean the line-painting truck.

Problems:

- Drums of hazardous wastes, paint, and solvent products are stored in areas without secondary containment.
- Paint used in miscellaneous jobs is ordered often in quantities greater than necessary, and excess paint must be disposed of as hazardous waste.

Waste Minimization Opportunities (In-Shop):

- Construct diked areas for storing drums of wastes, paint, and solvent products.
- Revise procedures for changing colors on line-painting truck if possible.
- Consolidate paint wastes in as few containers as possible.
- Order specialty paints in smaller-size containers to prevent waste.
- Rotate stock to prevent exceeding paint shelf life.

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SAMPLE D-3

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Cargo Helicopter Maintenance*

Type Of Operation: *Between-Flight Servicing, Refueling, and Unscheduled Maintenance of Helicopters*

Wastes Generated:

· Fuel-soaked absorbent pads from JP-4 and cleanups of hydraulic-fuel spills (13,900 lbs/year in 1992-93) (D001, D008, other regulated nonhazardous waste). Spills occur during aircraft maintenance and refueling and when temperature increases cause fuel to expand and overtop fuel tanks.

Waste Disposal:

· Used pads are disposed of in metal drums as hazardous waste.

Current Waste Minimization Practices:

- Aircraft fuel tanks are not filled to capacity before being stored in the hangars to prevent overspill from expansion of JP-4.

Problems:

- Pads often are not used efficiently.
- Shop personnel do not like to use foam soak-up pads, preferring fiber pads or rolls.
- Using metal drums to dispose of pads increases disposal weight.
- Maintenance personnel use rolls of pads as one-time disposable drop cloths during aircraft servicing.

Waste Minimization Opportunities (In Shop):

- Supply the shops with both fiber rolls and individual fiber pads for more-efficient use.
- Design fuel-catch pan to attach under unified fuel-control apparatus during maintenance.
- Paint hangar floors with nonskid paint.
- Use large (95-gallon) plastic overpacks rather than metal drums for disposal containers.

- Provide incentives for using pads more efficiently.

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SAMPLE D-4

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Power Plant*

Type of Operation: *Base-Wide Power and Heat Generation*

Wastes Generated:

- Waste oil (fuel, lubricating, and hydraulic) from leaks in diesel feed pumps, turbines, and turbine hydraulic system (2,800 lbs/year in 1992-93) (D001, D018, D019, D029, D039, other regulated nonhazardous waste).
- Spill-cleanup pads, rags, and absorbent material from oil leaks (1,600 lbs/year in 1992-93) (D001, other regulated nonhazardous waste).
- Fuel oil and Citri-clean from parts cleaning (other regulated nonhazardous waste).

- Hydrochloric and phosphoric acid (700 lbs/year in 1992-93) (D002)
- 1,1,1-trichloroethane from parts cleaning (198 lbs/year in 1992-93) (F001).

Waste Disposal:

- All wastes are collected in 55-gallon drums and disposed of as hazardous waste.

Current Waste Minimization Practices:

- In the process of replacing the turbine hydraulic system, which will reduce or eliminate leaks from that source.

Problems:

- There was an unsuccessful attempt to use a blend of waste oil and JP-4 as a fuel for three of the boilers. The mixture was uncontrolled and was fed into the units without pretreatment.
- The plant has no stack scrubbers. Pollution control is performed by monitoring emissions for carbon monoxide and oxygen and adjusting the boilers when necessary.
- Boilers are fueled primarily by gas and have a backup supply of arctic diesel. EPA is trying to restrict the burning of diesel to 10 percent.

- Additional stack testing (hydrocarbons, NO_x, SO₂) would likely be necessary if a greater percentage of diesel or waste oil was to be used for fuel.
- Feed pumps are 35 years old, leak, and need replacing. Leaking oil contains lead from pump bearings.
- Current oil-water separator does not work adequately and therefore is not used.
- Sulfuric acid is supplied in 55-gallon drums that require excessive handling and present opportunities for spills.

Waste Minimization Opportunities (In Shop):

- Replace leaking flanges in fuel-oil lines.
- Construct new oil-water separator and use high-pressure steam/hot water cleaning operation to replace the fuel-oil cleaning of parts.
- Replace the six feed pumps and oil purifiers to reduce leaks. Estimate cost at \$70K and \$22K per unit, respectively.
- Install 500-gallon tanks for sulfuric acid storage to replace the current use of drums.

- Use waste oil, diesel, and JP-4 as a fuel mixture in one or more of the boilers. Fuel and oil first would have to be blended and treated.

WDCR828/037.WP5

SAMPLE D-5

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: Hazardous Waste Storage Area

Type of Operation: *RCRA and TSCA Regulated Waste Storage Facility*

Wastes Generated:

· This shop is a RCRA and TSCA permitted facility that collects all hazardous wastes generated on the post as well as waste from other DOD facilities throughout Alaska.

· This shop also is used as a consolidation point for used oil from other nearby DOD facilities (970,000 lbs over a 2-year period) (D001, D018, D029, D039, F001, F003, other regulated nonhazardous waste).

- Solvent-contaminated soil from the cleanup of a past recurring spill at a waste-solvent drum-storage area near Building 6 (110,000 lbs as of 9/10/91; the cleanup is still under way) (D018, F005). The storage area had been operated by a tenant organization. They have improved their storage practices.

Waste Disposal:

- Used oil is being stockpiled on the site in railroad tank cars. The majority of the oil is off-specification, nonhazardous material. Some contains hazardous concentrations of solvents or metals.

- Hazardous wastes are shipped through a contractor to the lower 48 states, where they are incinerated or otherwise treated and/or landfilled.

Current Waste Minimization Practices:

- Used to send used oil off the site, where it was mixed with coal and burned in the power plant. Because of improper handling, the State no longer allows this practice. The oil is being stockpiled at the base in railroad tank cars.

- Converting several shops to use Black Gold furnaces that will burn up to 100 gpd of used oil to generate heat.

- Accumulation points for hazardous waste are in some instances housed in specialized storage sheds.

Problems:

- Waste oils sometimes contain hazardous concentrations of metals, organics, and solvents.
- Often, drums of waste paint are received from the paint shop 90 percent empty, and drums of cleanup pads are received light (dry and unused). A good portion of the disposal costs in these instances is for the weight of the drum.
- Large plastic overpacks are difficult to handle and store.

Waste Minimization Opportunities (In Shop):

- Better use of cleanup pads and lighter drums would lessen disposal costs.
- Burn waste oil and JP-4 as a fuel in the existing base power plant.
- Construct an incinerator or a separate power facility for burning waste oil and solid waste.
- Install additional Black Gold furnaces for heating buildings using waste oil.

WDCR828/039.WP5

SAMPLE D-6

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Transportation Company*

Type of Operation: *Stripping and Painting of Vehicles*

Wastes Generated:

- Methyl ethyl ketone (MEK) paint thinner and waste paint from cleaning painting equipment (~4,500 lbs/year in 1990-91) (D007, D008, F005).

- Plastic paint-stripping media are used to remove old paint from aluminum aircraft parts (soft, Type II media) and steel ground equipment parts (hard, Type III media). Spent beads and paint residue are collected and disposed of (27,200 lbs/year in 1990-91) (D006, D007, D008).

- Glass beads from stripping corrosion from steel parts. Spent beads and corrosion residue are disposed of (~9,000 lbs/year in 1990-91) (other regulated nonhazardous waste).
- Spent Turco (cold solvent) paint stripper and rinse water are generated from spot-stripping paint, particularly Boeing primer, from thin parts that cannot be stripped with plastic media. Turco is hand-applied with brushes. In addition, spent fine organic 606 (hot solvent) paint stripper and contaminated rinse water are generated from a dip tank stripping process used to remove paint from small parts (8,300 lbs/year in 1990-91) (D002, D007, D008, F001, F002, F003, F005).
- Used filters and paint-booth paper are generated from two dry paint booths (1,500 lbs/year in 1990-91) (D007, D008, other regulated nonhazardous waste).

Waste Disposal:

- MEK and waste paints, spent plastic stripping media, spent Turco, and organic 606 paint stripper and rinse water are collected in drums and disposed of as hazardous waste.
- Glass stripping beads and air filters have been disposed of in the past as hazardous waste but recently have tested as nonhazardous and have been disposed of in the base landfill.

Current Waste Minimization Practices:

- Plastic-media stripping process was installed in June 1990 and has greatly reduced the use of Turco stripping and the total waste generated from parts stripping.
- Paint booths recently were switched over from wet to dry filter. This has eliminated a 3,000 gallon/week waste stream of water.

Problems:

- Plastic media break down and create hazardous wastes because of metals from paint residue.
- There is no system set up for reusing MEK paint thinner.
- Paint shop foreman is concerned about using a still to recycle MEK. He feels that the recycled (off-spec) MEK may be used inadvertently to mix paints.

Waste Minimization Opportunities (In Shop):

- Switch to water-base paints, thereby eliminating the need for MEK. In the long term, use of hazardous paint strippers would be eliminated, and spent plastic media could be disposed of as nonhazardous waste.
- Recycle spent plastic beads.

- Install a still for recycling spent MEK.
- Use CO₂ paint stripping.
- Use organic-media paint stripping.

WDCR828/040.WP5

SAMPLE D-7

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Company Motor Pool*

Type of Operation: *General Motor Pool Maintenance and Repair*

Wastes Generated:

- Motor oil (3,000 lbs/yr in 1992-93) and oil filters (5,900 lbs/yr in 1992-93) from regular vehicle maintenance. Oil is changed every 6 months or 6,000 miles on standard vehicles and every 400 to 600 operating hours on special vehicles. Approximately 1,300 vehicles are serviced. These quantities include wastes generated at the Heavy Equipment Maintenance Shop (D001, other regulated nonhazardous waste).
- Antifreeze from regular vehicle maintenance (700 lbs/yr in 1992-93) (other regulated nonhazardous waste).
- Waste paint and related materials from painting fleet vehicles in two wet paint booths (1,800 lbs/year in 1992-93) (F005).

Waste Disposal:

- Used oil is being consolidated in a waste POL sump and tanks.
- Oil filters, used antifreeze, and waste paint and related materials are disposed of as hazardous waste.
- Solvents are disposed of by Safety Kleen.

Current Waste Minimization Practices:

- The floor of the garage is swept daily with a dry sweeping machine to eliminate dirt accumulation in the oil-water separators.
- Oil filters are crushed before disposal.
- Citrus (orange peel) solvent has been replacing PD-680.
- A test (litmus) for evaluating antifreeze has been implemented that has extended the life of antifreeze from 2 to 4 years.
- Diesel fuel is tested and reused if possible.
- A dry-filter, down-draft work area has been installed and is used for bodywork, such as sanding and touch-up painting.

Problems:

- Shop supervisor does not like the idea of recycling antifreeze.
- Synthetic motor oils are not acceptable to the Army because they may void vehicle warranties.
- This shop has been designated as an area to receive two Black Gold furnaces. Shop supervisor foresees a problem with open flames in his building. Furnaces would have to be located in a separate building if they operate with open flames.
- Shop supervisor feels that waste management requires a full-time supervisor and a dedicated staff, which he does not have.

Minimization Opportunities (In Shop):

- Institute a program for testing motor oil and antifreeze to increase the time between changes.
- Switch from wet to dry paint booth.

WDCR828/041.WP5

SAMPLE D-8

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Transportation Company, Heavy Equipment Maintenance*

Type of Operation: *Maintenance and Repair of Heavy Snow-Removal Equipment and Other Heavy Vehicles*

This shop is operated under the motor pool maintenance department

Wastes Generated:

· Motor oil, oil filters, and antifreeze from regular vehicle maintenance. Oil is changed every 4 to 6 months or 200 to 400 hours of vehicle running time; 300 vehicles are serviced, some needing as much as 132 quarts of oil per change. The quantities of used oil and filters generated at this shop are included in those listed.

· PD-680 degreaser from cleaning vehicle parts (2,000 lb/year in 1992-93) (D001).

- Contaminated diesel is generated when trucks are drained before overhaul (other regulated nonhazardous waste).

Waste Disposal:

- Used motor oil is being consolidated in 55 gallon drums.
- Used oil filters are disposed of in drums as hazardous waste.
- Spent PD-680 is disposed of in drums as hazardous waste.

Current Waste Minimization Practices:

- Used oil filters are crushed and drained before disposal.
- If diesel fuel is not contaminated, it is reused.

Problems:

- Synthetic motor oil is not acceptable by the Army because its use may void vehicle warranties.

Waste Minimization Opportunities (In Shop):

- Institute a testing program for motor oil to increase the time between changes.
- Use high-pressure hot water or detergent wash rather than a degreaser to clean parts. Treat washwater in an oil/water separator.
- Filter PD-680 for reuse (may already be doing this).

WDCR828/042.WP5

SAMPLE D-9

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Transportation Company, Diesel Maintenance*

Type of Operation: *Diesel Generator Teardown and Rebuild*

Wastes Generated:

- Used motor oil and diesel fuel in unknown condition are generated when diesel generators are drained before teardown (1,000 lbs/yr in 1992-93) (D001, other regulated nonhazardous waste).

Waste Disposal:

- Used motor oil is put in drums and disposed of as waste.
- Diesel fuel is reused if possible or disposed of as waste.

Current Waste Minimization Practices:

- Diesel fuel is tested for water content and reused if possible.

Problems:

- In the past, generator parts were cleaned with tetrachloroethylene (PCE) and then rinsed off down the building floor drains. The shop received a notice of violation from EPA for this practice. Parts are currently cleaned at Fort Richardson, but this is an unacceptable practice because of the delays involved. New procedures are being investigated.
- There is no Army-approved method for testing motor oil for reuse.

Waste Minimization Opportunities (In Shop):

- Institute a testing program for motor oil to determine if it can be reused.

- Potential alternatives for parts-cleaning technologies are:
 - High pressure steam or hot water
 - Alkaline cleaning system

WDCR828/043.WP5

SAMPLE D-10

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Public Works, Operating Engineers*

Type of Operation: *Hazardous Waste and Materials Response*

Wastes Generated:

- Various wastes are generated from emergency response cleanup actions at off-post locations. Examples of wastes generated and sent to the RCRA storage facility in 1992-93 include asphalt cutback (4,600 lbs), waste oil (9,700 lbs), and PCB-contaminated material (1,200 lbs).

- Waste diesel fuel, antifreeze, transmission fluid, etc., from maintenance of shop vehicles.

Waste Disposal:

- Nonhazardous waste oil is being stockpiled at the base in railroad tank cars.
- Other wastes are placed in drums and disposed of as hazardous waste.

Current Waste Minimization Practices: None

Problems:

- Little can be done to minimize waste at the source because most wastes originate off the site and are a result of cleanup activities.

Waste Minimization Opportunities (In Shop):

- Institute a testing program for motor oil and antifreeze to increase the time between changes.

WDCR828/044.WP5

SAMPLE D-11

Pollution Prevention Survey

Date:

Unit Designation, Shop Name, Building: *Defense Reutilization and Marketing Office (DRMO)*

Type of Operation: *Hazardous and Nonhazardous Material Collection, Storage, Redistribution, and Sale.*

Wastes Generated:

· DRMO is a consolidation point for unused products from military installations throughout the state. The wastes are those that have exceeded their shelf life or are no longer needed by the original purchaser. DRMO tries to find other uses for them. Materials include:

- Paints
- Sulfuric acid
- Cleaners
- Adhesives
- Petroleum products

- Chemical DECON kits
- DRMO spent approximately \$3.6 million on disposal of materials received from Army installations in 1992.

Waste Disposal:

- Where possible, materials are sold or given away for reuse. Remaining materials are disposed of as hazardous waste through a RCRA-permitted hazardous waste storage area.

Current Waste Minimization Practices:

- Try to resell or reuse products.

Problems:

- Many items are received without MSDS sheets. They cannot be reused and must be analyzed before disposal.

Waste Minimization Opportunities (In-Shop):

- Shops should obtain MSDS sheets with purchases of all chemical products and should keep MSDS sheets with products even during disposal.

- Shops need to rotate stock so that shelf lives are not exceeded, and shops should limit purchases to the amount needed.
- Shops should use proper storage to keep materials longer.

WDCR828/045.WP5



July 1998
RG-133

Pollution Prevention Assessment Manual

A Guide for Large Quantity Generators and
TRI Reporters in Preparing a Source
Reduction and Waste Minimization Plan

Office of Pollution Prevention and Recycling

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



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1. Pollution Prevention Makes Good Business Sense

Pollution prevention **does** make good business sense—and it's the law in Texas. The Waste Reduction Policy Act (WRPA) of 1991 requires certain industries and businesses that generate hazardous waste or release toxics to prepare a source reduction and waste minimization (SR/WM) plan and a SR/WM annual progress report.

This manual is organized to accomplish two objectives:

- to assist you in preparing a pollution prevention plan as required under the WRPA;
- to aid you in planning, developing, and implementing a successful pollution prevention program.

For more information on how to determine whether your facility is subject to the pollution prevention plan reporting requirements, refer to TNRCC document RG-209, “Does the Waste Reduction Policy Act apply to you?”

Non-TRI Small Quantity Generators can gain benefit from following the assessment instructions in this manual. However, specific requirements for Non-TRI SQGs are outlined Appendix B, or can be found in TNRCC publication RG-196, *Source Reduction and Waste Minimization Executive Summary and Certificate of Completeness and Correctness for Non-TRI Small Quantity Generators*.

For help preparing a WRPA annual progress report, order TNRCC publication RG-112, *Source Reduction and Waste Minimization Annual Progress Report: Instruction Manual and Forms for Large-Quantity Generators and TRI Reporters*.

Each chapter in this manual contains worksheets, detailed descriptions explaining the worksheets, and advice on how to complete a pollution prevention assessment and plan. You may need to modify the procedures and worksheets to fit your specific needs. Appendix C, “Example Pollution Prevention Plan,” includes one facility’s simplified plan.

Chapter 2 presents instructions and approaches for preparing a pollution prevention plan as required by the WRPA. Chapters 3 through 6 present worksheets that will help you prepare your plan.

The rules governing Texas source reduction and waste minimization planning are included in

Pollution Prevention in Texas

Pollution prevention begins with a good approach to waste management. The Texas Solid Waste Disposal Act encourages using this order of preference for methods of managing hazardous waste:

1. Source Reduction (most preferred)
2. Reuse or Recycling
3. Treatment to destroy hazardous characteristics
4. Treatment to reduce hazardous characteristics
5. Underground injection
6. Land disposal

Throughout this manual we will refer to this order of preference as the “waste management hierarchy.” This hierarchy applies to nonhazardous waste as well. In this manual, we focus on the most preferred categories

There are two types of pollution prevention: source reduction and waste minimization. As illustrated in the waste management hierarchy, source reduction is preferred. Pollution prevention activities may address **any** hazardous substance, pollutant, or contaminant. Your facility may already be incorporating pollution prevention activities into plant operations. A pollution prevention plan helps you document existing activities as well as develop new projects.

This manual focuses on the most preferred categories: source reduction, reuse or recycling, and some forms of treatment. In addition to evaluating your hazardous wastes, you should examine cardboard, paper, typewriter ribbons, aluminum cans, and other nonhazardous wastes. Evaluating your nonhazardous wastes can mean substantial savings through recycling and reduced disposal costs.

For more information on specific source reduction and pollution prevention options, see Chapter 4, “Doing Your Pollution Prevention Assessment.”

How Does Pollution Prevention Make Sense?

There are many reasons to have a pollution prevention plan that reduces both the amount of waste

generated and the amount of toxic releases to the environment. Six important reasons are:

- economic incentives — it pays to reduce waste.
- paperwork reduction — you can reduce your regulatory burden.
- reduced liability — it's your responsibility.
- state policy — it's the law.
- increased public awareness — it's the right thing to do.
- improved human health and the environment — it's our future.

It Pays to Reduce Waste

Pollution control and waste management costs. Pollution prevention pays. Texas facilities have reported big savings from developing pollution prevention plans under the WRPA. An independent survey of Texas facilities with WRPA pollution prevention plans indicates these results:

- 80 percent considered the plan to be useful to their facility.
- 77 percent broke even or had a cost savings from pollution prevention projects.
- 48 percent had a net cost savings of more than \$40,000 from these projects.
- More than one-third of the respondents are now large-quantity generators (LQGs) but expect to become conditionally exempt small-quantity generators (CESQGs) over the next three years.

Companies must look beyond the up-front costs of pollution prevention and examine all costs associated with managing wastes—including disposal, potential liability, and regulatory costs. Additional benefits include improved public perception and community relations and reduced overhead.

Lone Star Success

As a result of going through the WRPA pollution prevention planning process and attending a Texas Auto Dealers' Association assistance workshop, a West Texas auto dealer has:

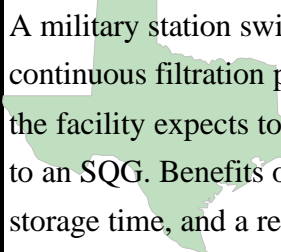
- cut paint and related waste by 90 percent—from 4,000 to 400 pounds a year;
- eliminated the use of carburetor cleaner by 400 pounds per year;
- switched to a new parts washer solvent that tests nonhazardous even after use;
- had the new solvent re-refined, for a reduction of 5,500 pounds per year;
- changed from small-quantity generator (SQG) to a CESQG in approximately one year.

Reduce Your Regulatory Burden

The paperwork required for environmental reporting and record keeping is extensive. Time spent doing paperwork is a business expense, so reducing your paperwork can translate into savings and increased efficiency. A reduction in the amount of waste managed can translate into a reduction in paperwork.

How can reducing the amount of hazardous waste reduce paperwork? It's simple: the less waste you have, the fewer manifests and other paperwork you have to fill out. If your facility reduces enough to change generator status, your facility can reap even greater benefits. For example, if your facility is a large-quantity generator (LQG) of hazardous waste (see Appendix A, "Basic facts about hazardous waste and TRI," for hazardous waste information) and becomes an SQG, your facility may benefit from increased storage time and fewer pollution prevention requirements (see Chapter 2 for details on WHPA requirements). If your facility is already an SQG, your regulatory burden could be further reduced by becoming a CESQG. It pays to be aware of your generator status and to try to reduce it to a lower level.

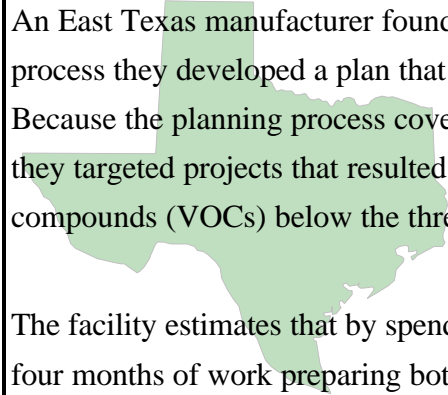
Lone Star Success



A military station switched from a parts washing system based on off-site waste management to a continuous filtration parts washing system. By completing this single pollution prevention project, the facility expects to save over \$20,000 per year and reduce their generator status from an LQG to an SQG. Benefits of changing from an LQG to an SQG include fewer inspections, increased storage time, and a reduction in paperwork, which the facility estimates will save another \$13,000 annually.

Pollution prevention planning may also help you reduce paperwork if your facility is required to report on the Toxics Release Inventory (TRI) Form R. For more information on TRI, see Appendix A, "Basic Facts About Hazardous Waste and TRI." Each reportable chemical requires a separate Form R. If your facility reduces the levels of reportable chemicals managed or released to below the threshold, you may be able to use the Form A. The Form A is significantly shorter and easier to complete than the Form R.

Lone Star Success



An East Texas manufacturer found that by going through the required pollution prevention process they developed a plan that reduced emissions and the facility's regulatory burden. Because the planning process covers air emissions reported to TRI as well as hazardous waste, they targeted projects that resulted in reductions in air emissions. They reduced volatile organic compounds (VOCs) below the thresholds required by two regulatory programs.

The facility estimates that by spending about one month preparing the plan, they will save about four months of work preparing both Title III and Title V permits. These are significant savings both in time and money.

You may find that by going through the planning process you find ways to reduce or even eliminate the need for hazardous waste and TRI. You could also apply these techniques to drop below the threshold for other reporting requirements. As the Lone Star Success case studies show, many facilities in Texas have found that reducing form, is the best way to reduce paperwork.

It's Your Responsibility

Once you generate a hazardous waste, you are legally responsible for the proper management of that waste forever. In addition, federal and state laws target generators of hazardous waste as being at least partially responsible for the cleanup of wastes that leak from disposal sites.

Generators using off-site treatment, storage, or disposal, face financial liability when the facility operators mismanage waste and when facility owners improperly design the disposal facility itself. Increases in insurance costs or an inability to obtain insurance will result in higher treatment and disposal costs or the loss of available treatment or disposal capacity. You can reduce this expense by reducing the cause of the liability, which is your hazardous waste. Preventing pollution can also reduce health and safety risks and requirements. By reducing the amount of hazardous waste your business generates, you can reduce your long-term liability.

It's the Law

Texas state policy regarding pollutants and contaminants is to reduce pollution at its source and to minimize the impact of pollution, reducing the risk to public health and the environment.

The best solution is to generate as little as possible, reduce the volume or the hazardous properties of what is generated, and dispose of the remaining waste safely.

Lone Star Success

A Nuevo Laredo facility worked through its vendors to receive raw materials in returnable containers wherever possible. The facility now receives 90 percent of all chemical deliverables in returnable totes. By doing this, the facility has reduced the number of drums disposed of annually by approximately 250 drums. In addition, before disposal, drums had to be rinsed; by eliminating disposal, it has reduced its wastewater generation by 45,000 gallons a year.

Purchasing chemicals in returnable totes saves money in several ways. Chemicals can now be purchased at bulk rates, reducing materials handling. There are also no disposal or cleanup costs associated with the empty drums. The facility estimates that using returnable totes saves the company \$5,000 a year.

It's the Right Thing to Do

The public today is more informed about environmental issues. People are aware of the potential effects that hazardous waste and the release of pollution can have on human health and the environment. Therefore, companies that are environmentally aware and work towards waste reduction can improve their working relationship with the public, their neighbors, and their customers.

It's Our Future

The most important reason to promote pollution prevention is to protect our health and our environment. When we improve and protect the environment, we are ultimately protecting ourselves, our economy, and our future.

2. Complying with the Waste Reduction Policy Act

WRPA requires facilities that generate hazardous waste or report on the TRI Form R to prepare a five-year pollution prevention plan, to submit an executive summary of that plan to the TNRCC, and to report annually on their progress. All companies that recognize the importance of protecting human health and the environment should incorporate a pollution prevention plan into their overall business plan.

This chapter is designed to guide businesses in establishing a pollution prevention plan. Included are an overview of the requirements for complying with pollution prevention rules (see Appendix D) as well as methods for preparing a plan. Appendix C, “Example Pollution Prevention Plan,” demonstrates one Texas facility’s method for meeting WRPA requirements.

Does the WRPA Affect Me?

WRPA’s reporting requirements apply to thousands of facilities throughout Texas. The following information will assist you in determining if WRPA applies to you. For more information regarding WRPA applicability, please refer to RG-209, “Does the Waste Reduction Policy Act Apply to You?”

One way to get out of reporting to WRPA is to reduce your waste generation. See “Getting Below Reporting Thresholds” on page 8 for more information.

Groups Affected by the WRPA

The pollution prevention rules apply to the following groups:

- all large-quantity generators (LQGs) of hazardous waste
- all small-quantity generators (SQGs) of hazardous waste
- all persons subject to TRI Form R reporting (SARA Title III)

LQGs, SQGs, and TRI Form R reporters must prepare a five-year plan to keep on site for inspection. The due date for the plan is based on the previous years’ amounts of hazardous waste generated or TRI chemicals released and transferred (as per the total of Sections 5 and 6 on the TRI Form R).

If your facility has more than one EPA, solid waste (5-digit), or TRI identification number, you should report under each number. If a new facility is built or an old facility expands and the rules suddenly apply to it, the facility has 90 days to have a plan in place and submit an executive summary to the TNRCC.

Groups Not Affected by the WRPA

The pollution prevention rules do **not** apply to the following groups:

- conditionally exempt small-quantity generators (CESQGs) that are **also not** TRI Form R reporters
- facilities regulated **only** by the Railroad Commission of Texas

Getting Below Reporting Thresholds

Several facilities have “reduced out” of WRPA planning and reporting requirements by reducing their wastes to levels below reporting thresholds. If you are no longer a TRI Form R reporter and a CESQG, you are no longer subject to WRPA. In other words, if you generate less than 1.102 tons of hazardous waste a year and are not subject to TRI Form R requirements, WRPA does not apply to you.

What Does the WRPA Require?

To comply with WRPA, you must complete these two steps:

- prepare a pollution prevention plan; and
- send the TNRCC an executive summary of your plan.

Large Quantity Generators and/or TRI Form R reporters must also send the TNRCC an annual progress report.

Under the law, if you fail to prepare the plan, send in the executive summary, or submit an annual progress report, you can be considered in violation of the Texas Administrative Code. The penalties for such a violation can be as high as \$10,000 per violation per day. Failing to meet the reduction goals stated in your facility’s plan is **not** a violation and does not expose you to any penalties.

Prepare a Pollution Prevention Plan

If WRPA applies to you, you need to prepare a WRPA pollution prevention plan. According to the rules, this plan should be available to the TNRCC for on-site inspection. **All** WRPA pollution prevention plans need to include at least the following elements:

- ▶ list of all hazardous wastes generated and quantity in tons (using your facility's most recently submitted annual waste summary);
- ▶ a description of source reduction/waste minimization projects including:
 - a discussion of environmental and human health risks associated with these projects;
 - a description of any media transfer and/or change of waste or release associated with projects;
 - a schedule for project implementation and completion;
- ▶ facility reduction goals; and
- ▶ an executive summary and certificate of completion and correctness (see below).

LQG/TRI facility plans **must also** include a prioritized list of projects. In this list, include the following information for each project:

- project explanation;
- economic and technical feasibility;
- consideration of environmental/health risks and benefits;
- discussion of media/contaminant transfer possible due to project implementation;
- type of project (source reduction or waste minimization);
- implementation schedule; and
- individual project goal.

Send in an Executive Summary

You must submit your pollution prevention plan's executive summary and certificate of completion and correctness to the TNRCC by the time the plan is due to be completed. **All** executive summaries must include:

- facility information (name, address, contacts, IDs, etc.);
- estimated amount of hazardous waste to be generated in the fifth year (based on the reduction goals in plan);
- prioritized list of contaminants to be reduced;

- list of source reduction activities; and
- certificate of completion and correctness, signed by the owner or corporate officer.

LQG/TRI facilities must **also** include:

- list of all hazardous wastes and reportable TRI releases and volumes;
- discussion of media/contaminant transfer possible due to project implementation;
- project implementation milestones; and
- implementation schedule for future reduction goals.

Report Annually

Large-quantity generators and/or facilities that report on the TRI Form R must **also** submit a WRPA annual progress report July 1 of each year. For a copy of RG-112, *Source Reduction and Waste Minimization Annual Progress Report Manual and Forms*, call TNRCC publications at 512/239-0028. You may also download RG-112 from the TNRCC Web site at <http://www.tnrcc.state.tx.us>.

How Can I Comply?

One possible method for preparing your plan is through the use of the assessment worksheets provided in this document. Using the worksheets in this document is advisable if the following are true at your facility:

- facility contains many reportable hazardous waste and TRI “waste” streams;
- past reporting and record keeping has been sketchy or questionable;
- assessment team/environmental component not familiar with processes and wastes;
- facility is probably a large-quantity generator and/or a TRI reporter; and
- limited reduction projects.

Using the worksheets may require more time, but the advantages could be considerable, including identifying more reduction opportunities. Completing the worksheets can also help you set up a program that focuses on cost-effective reductions.



Lone Star Success

By utilizing the Pollution Prevention Assessment Manual worksheets and the TNRCC pollution prevention workshops in setting up their pollution prevention plan, a Dallas-area facility reduced hazardous waste generation by 63 percent from 1994 to 1995, even while increasing production, and implemented projects resulting in 88.1 tons of waste that were **not** shipped off-site for disposal or incineration. This facility also found employee training and education to be a key element in reducing waste generation

Not all facilities use the worksheets. Appendix C, “Example Pollution Prevention Plan,” includes an example of a well-written, concise plan whose authors chose **not** to use the worksheets.

The following table describes the information needed for completing a pollution prevention plan as required by the Waste Reduction Policy Act and the corresponding assessment worksheets covering the required information.

While all worksheets are invaluable in conducting a thorough pollution prevention assessment and in finding additional ways to reduce your wastes and costs, no WRPA reporting requirements exist for using Worksheets 1, 2, 5, 9, 11, and 16.

Table 1. Which Worksheet Do I Use for Each Requirement?

WRPA pollution prevention plan requirements	Worksheet(s)	SQG/ non-TRI	LQG/ TRI	Page No.
Initial survey An initial survey of the facility's activities which will identify those activities that cause hazardous waste, and/or will identify activities that result in the release of pollutants or contaminants.	Worksheet 6: “Process and Waste Stream Data”		✓	39
	Worksheet 7: “Waste Stream or Release Summary”		✓	41
Prioritized list of projects A. A list of prioritized source reduction projects, based upon information obtained during the initial survey, which are economically and technologically feasible. B. A list of prioritized waste minimization projects, based upon information obtained during the initial survey, which are economically and technologically feasible.	Worksheet 14: “Waste Reduction/Release Project Prioritization”		✓	67

<p>Source reduction projects</p> <p>A. A discussion of technical and economic considerations in selecting each project to be undertaken.</p> <p>B. A discussion of environmental and human health risks considered in selecting each project to be undertaken.</p> <p>C. An identification and discussion of cases in which the implementation of a source reduction activity designed to reduce risk to human health or the environment may result in the release of a different pollutant or contaminant or may shift the release to another medium.</p> <p>D. An estimate of the type and amount of reduction anticipated.</p> <p>E. A discussion of source reduction goals for the project, including incremental goals to aid in evaluating progress.</p> <p>F. A schedule for the implementation of each source reduction project.</p>	<p>Worksheet 12: “Technical Feasibility”</p> <p>Worksheet 13: “EMS Environmental Accounting”</p> <p>Worksheet 8: “Assessment of Risk to Human Health and the Environment”</p> <p>Worksheet 12: “Technical Feasibility”</p> <p>Worksheet 10: “Option Description”</p> <p>Worksheet 3: “Goals”</p> <p>Worksheet 15: “Implementation/Installation”</p>		<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>51</p> <p>63</p> <p>43</p> <p>51</p> <p>47</p> <p>23</p> <p>71</p>
<p>Waste minimization projects</p> <p>A. A discussion of technical and economic considerations in selecting each project to be undertaken.</p> <p>B. A discussion of environmental and human health risks considered in selecting each project to be undertaken.</p> <p>C. An identification and discussion of cases in which the implementation of a waste minimization activity designed to reduce risk to human health or the environment may result in the release of a different pollutant or contaminant or may shift the release to another medium.</p> <p>D. An estimate of the type and amount of reduction anticipated.</p> <p>E. A discussion of waste minimization goals for the project, including incremental goals to aid in evaluating progress.</p> <p>F. A schedule for the implementation of each waste minimization project.</p>	<p>Worksheet 12: “Technical Feasibility”</p> <p>Worksheet 13: “EMS Environmental Accounting”</p> <p>Worksheet 8: “Assessment of Risk to Human Health and the Environment”</p> <p>Worksheet 12: “Technical Feasibility”</p> <p>Worksheet 10: “Option Description”</p> <p>Worksheet 3: “Goals”</p> <p>Worksheet 15: “Implementation/Installation”</p>		<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>51</p> <p>63</p> <p>43</p> <p>51</p> <p>47</p> <p>23</p> <p>71</p>
<p>Facility goals</p> <p>A. An explanation of source reduction and waste minimization goals for the entire facility.</p> <p>B. An explanation of incremental goals for the entire facility.</p>	<p>Worksheet 3: “Goals”</p>		<p>✓</p>	<p>23</p>
<p>Employee awareness and training programs</p> <p>An explanation of employee awareness and training programs to aid in accomplishing source reduction and waste minimization goals.</p>	<p>Worksheet 4: “Employee Training Program”</p>		<p>✓</p>	<p>25</p>

LQG executive summary (also fulfills requirements for SQG/non-TRI reporter plan) An executive summary of the plan (included at the end of this outline) which shall include at a minimum: A. A description of the facility which shall include: Name of the facility, address, contact, general description of the facility, including TNRCC ID numbers. B. A list of all hazardous wastes generated and a list of all reportable TRI releases and the volumes of each C. A prioritized list of pollutants and contaminants to be reduced and a statement of reduction goals D. An explanation of environmental and human health risks considered in determining reduction goals E. Implementation milestones for individual project development and an implementation schedule for future reduction goals F. Identification and description of cases in which the implementation of source reduction or waste minimization activity designed to reduce risk to human health or the environment may result in the release of a different pollutant or contaminant or may shift the release to another medium	Worksheet 17: “LQG Executive Summary”	✓	✓	77
Certification Certification by the owner of the facility, or, if the facility is owned by a corporation, by an officer of the corporation that owns the facility that has the authority to commit the corporation's resources to implement the plan, that the plan is complete and correct	Worksheet 18: “Certification of Completion”		✓	81
SQG/non-TRI executive summary form and certificate of completion Meets executive summary requirements for SQG/non-TRI facilities	Worksheet “Appendix B”	✓		3

Where Do I Send My Summary and Reports?

Mail your executive summary and the certificate of completion and correctness to:

Industrial Pollution Prevention Team, MC-112
Office of Pollution Prevention and Recycling
TNRCC
PO Box 13087
Austin TX 78711-3087

Please mark “SR/WM executive summary” on the envelope.

If you have questions about your submission or about specific WSPA requirements, call 512/239-3100. Please do not fax your plans, executive summaries or annual progress reports, unless requested by the TNRCC.

The plan is kept on-site and is confidential. The executive summary and the certificate of completeness and correctness are required to be submitted to the TNRCC and are available to the public. To better inform your community of the positive pollution prevention efforts your facility has undertaken, we suggest the executive summary be placed in your local library for easy public access.

Could I be Exempt?

Companies may request an exemption from reporting under the WRPA from the TNRCC executive director, if they meet all the specific requirements. This exemption request must be resubmitted yearly. The criteria for exemption will be based on the executive director's assessment of the following:

- the facility has reduced the amount of pollutants and contaminants generated or released by 90 percent since the base year (1987, or first completed year of operation);
- the potential impact on human health and the environment of any remaining hazardous waste generated, or pollutant or contaminant released; and
- a demonstration that additional reductions are not economically and technically feasible.

In order to be granted an exemption, the facility must be able to demonstrate these criteria to the satisfaction of the executive director. The facility should then consider which would take more time; obtaining an exemption annually, or preparing a plan once. Please note that **very** few exemptions have been granted, and nearly all have been cases in which the facility is closing down or no longer generates hazardous wastes. If you believe you qualify for an exemption, please contact the TNRCC Office of Pollution Prevention and Recycling's Industrial Pollution Prevention Team at 512/239-3100.

3. Planning, Organizing, and Goal-Setting

Your pollution prevention program will affect your entire company—production, financial, marketing, and others. This chapter presents ideas for bringing representatives from your entire facility together to develop a company environmental policy and organize a pollution prevention program.

A key ingredient to your success will be to train your employees in order to increase their awareness of pollution prevention issues.

Develop a Company Environmental Policy

Your pollution prevention program depends on management support. In order for senior management to understand what they are supporting, it may be necessary for you to draft a corporate environmental policy outlining the program's objectives.

Beyond informing your management of the program's objectives, the policy is also senior management's formal commitment to follow the program. With your senior management's formal commitment you will likely find it easier to set up pollution prevention procedures. See Worksheet 1 on page 19 for one example of a corporate environmental policy.

Organize a Pollution Prevention Program

If your company has established its environmental policy, you can use the policy guidelines to help establish your pollution prevention program. Your program may include educational, incentive, and waste assessment components.

Create a Pollution Prevention Program Task Force

Program task force members should include people from departments that have significant interest in the program. In a large company, this task force may include many people, whereas in a small company only two or three people may be involved.

Your pollution prevention program task force's primary functions will be to:

- establish a WRPA source reduction/waste minimization plan, including

development of measurable goals which are consistent with the policy adopted by management;

- implement the source reduction/waste minimization plan; and
- monitor plan results versus goals.

In selecting members, remember that the responsibilities will probably also include:

- establishing a waste tracking system;
- prioritizing waste streams for assessments;
- choosing assessment teams;
- supervising waste assessments;
- selecting and justify feasible options;
- obtaining funding and implement options; and
- promoting pollution prevention within the company.

Although group size will vary, the task force should include members of any department interested in the program. One of the keys to a successful team is a strong leader who is committed to pollution prevention. Use Worksheet 2 on page 21 to list your task force members and Worksheet 3 on page 23 to list your goals.

Train Employees: Increase Their Awareness

Your facility employees are your most valuable resource. Training employees and encouraging pollution prevention awareness stimulates them to find innovative solutions to waste generation problems. Use Worksheet 4 on page 25 to describe your employee training strategies.

Select a Great Assessment Team

Your assessment team's job is to review and identify ways that your facility can reduce its waste. The team will vary depending on company size, complexity, and resources. Generally, it is best to select people in the company that will be affected by the assessment as well as those who can contribute to the assessment. Personnel from the following areas should be considered when developing the assessment team:

- | | |
|---------------------|-------------------------|
| • site coordination | • facilities |
| • operations | • materials control |
| • engineering | • shipping/receiving |
| • maintenance | • environmental control |

- scheduling
- procurement
- accounting
- safety/legal
- research and development
- management
- quality control
- personnel

List your assessment team members and their duties on Worksheet 5, page 27.

Worksheet 1 — Corporate Environmental Policy

Because a successful hazardous waste reduction program requires corporate commitment, it is recommended that the policy you draft have these three features:

First, the policy should be signed by a senior officer of your corporation, preferably the chief executive officer (CEO). The CEO's signature indicates that the policy is fully supported by all of your company's management.

Second, the policy should contain a clear statement that it is company policy to reduce wastes and releases of pollutant and contaminants to the environment.

Third, the policy should give you and senior management guidelines for your pollution prevention program.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
--	--	--

Worksheet
1

**CORPORATE
ENVIRONMENTAL POLICY**



<p>EXAMPLE — CORPORATE ENVIRONMENTAL POLICY</p> <p>(Your company).....is committed to continued excellence, leadership, and stewardship in protecting the environment. Environmental protection is a primary management responsibility, as well as the responsibility of every employee.</p> <p>In keeping with this policy, our objective as a company is to reduce waste and achieve minimal adverse impact on air, water, and land through excellence in environmental control.</p> <p>Our environmental guidelines include the following:</p> <p>Environmental protection is a line responsibility and an important measure of employee performance. In addition, every employee is responsible for environmental protection in the same manner he or she is for safety.</p> <p>Reducing or eliminating the generation of waste has been and continues to be a prime consideration in research, process design, and operations; and is viewed by management like safety, yield, and loss prevention.</p> <p>Source reduction/waste minimization (reuse and recycling) of materials has been and will continue to be given first consideration prior to classification and disposal of waste.</p> <p>_____ Chief Executive Officer</p>
--

Worksheet 2 — Program Task Force

Use Worksheet 2 to list your program task force members. Three unique functions you might need to fill are:

Program manager — The program manager is responsible for the entire program including plan development and pollution prevention assessments. A pollution prevention assessment is a review opportunities to reduce, recycle, and minimize waste. Area coordinators and assessment team coordinators are helpful in making these assessments.

Area coordinators — Does your company have more than one site? If so, break your responsibilities up into site-specific tasks, and get the help of a coordinator at each site.

Assessment team leaders — Assessment team leaders coordinate activities concerning a specific pollution prevention project and brings together all aspects of the assessment including waste audits, option generation, engineering, costs, and financial evaluations.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
--	--	--

Worksheet
2

PROGRAM TASK FORCE



Function	Name	Location	Phone number
Program manager			

Organization Chart

(sketch)

Worksheet 3 — Pollution Prevention Goals

Separate goals should be set for both source reduction and waste minimization efforts at the facility. Goals should include tools to aid in evaluating progress. The company's plan should also explain both overall goals and incremental goals for the entire facility.

When setting goals, make sure they are flexible, measurable, motivational, understandable, and achievable with a reasonable level of effort.

Worksheet 4 — Employee Training Program

Training is critical to the success of a company's pollution prevention program. Companies should set goals to help all employees achieve pollution prevention, regardless of the level of knowledge or experience in the environmental area.

If your company does not have a program in place, now is a good time to start. Worksheet 4, "Employee Training Program," includes a checklist of important employee training areas.

Worksheet 5 — Assessment Team Make-Up

In a small business, the assessment team may be limited to one or two individuals responsible for facility operations. Each team should include people with direct responsibility and knowledge of the particular waste streams or plant areas. A team leader should be chosen who is familiar with the facility, the people, and the processes. It is also very important for the team leader to **want** to reduce and eliminate wastes and releases.

On Worksheet 5, fill in the information on the assessment leader and the team members.

4. Doing Your Pollution Prevention Assessment

A pollution prevention assessment is a review of a company's opportunities to reduce, recycle, and minimize waste. The assessment results can be used for planning and allocating resources for pollution prevention projects, as well as setting the 'baseline' for measuring future pollution prevention progress. All facilities generating hazardous waste or releasing or transferring toxic chemicals can benefit from an assessment. The level of detail and exact approach each facility takes in performing the assessment depends the size of the company, the number of waste streams, and many other factors.

This chapter contains information on how to perform an assessment. The worksheets can provide you assistance. You can use many of these worksheets to document the assessment phase of a source reduction and waste minimization plan as required under WRPA.

There are four major components to conducting a pollution prevention assessment:

- identifying waste streams to eliminate;
- assessing the risk each waste stream represents;
- prioritizing waste streams to reduce; and
- identifying pollution prevention options.

Remember that visiting your site and talking with the employees is essential for completing the above components. They have an understanding of the plant's functions and inefficiencies that will prove valuable. Ask questions.

Before visiting the site, all assessment team members should review the processes so they can evaluate the various processes and ask pertinent questions.

The inspection should cover a full array of process flows and areas of operation at the plant including:

- shipping and receiving areas
- raw material storage areas
- waste generation points
- waste storage area
- product/by-product areas
- unit processes

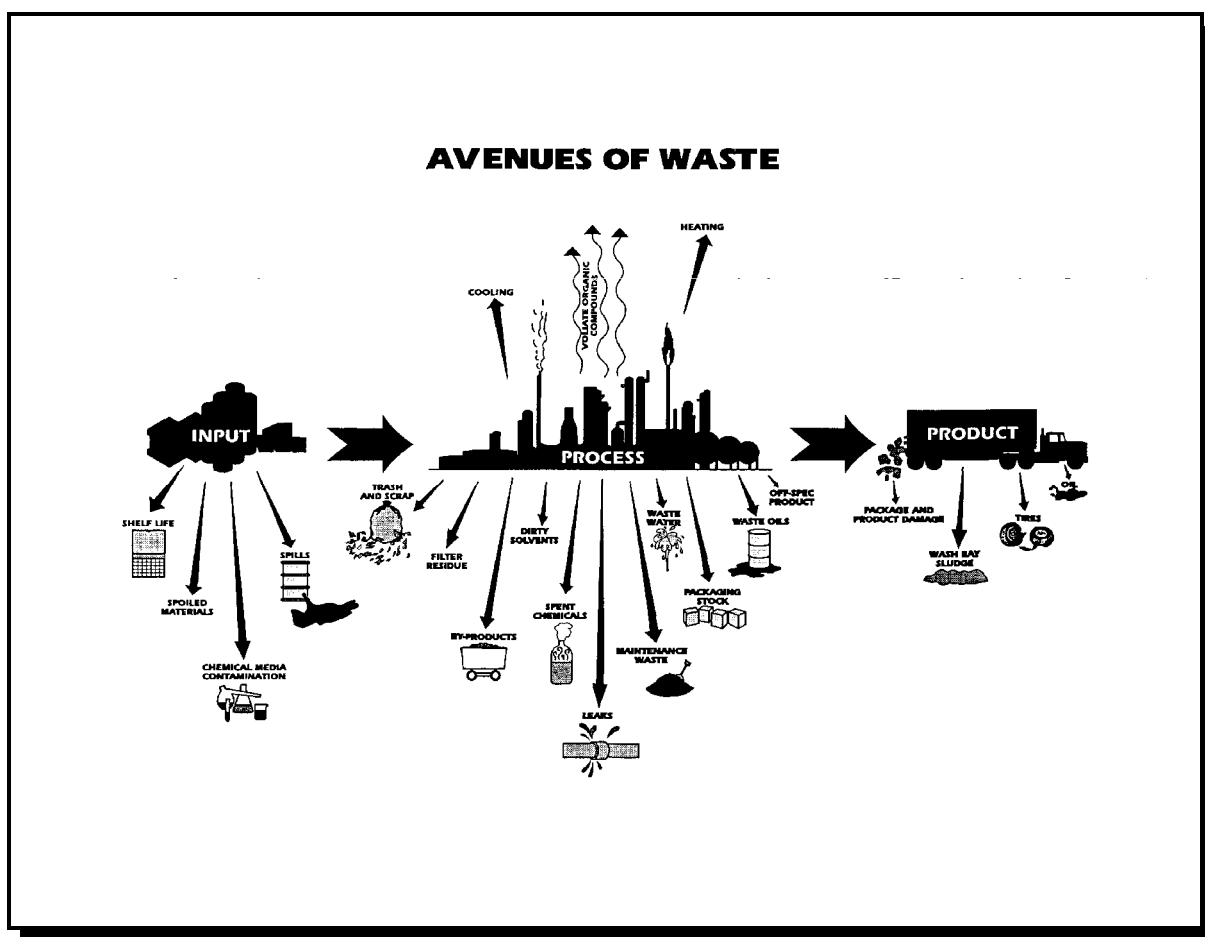
Other suggested activities for the team to undertake during the walk-through are:

- document what you see and take notes;
- carefully observe operations and procedures;
- discuss processes and wastes with shop-level employees;
- check for odors, leaks spills, and drips; and
- review waste materials in department trash bins and cans.

Identify Waste Streams to Eliminate

Table 2, “Avenues of Waste,” represents areas where waste streams are generated throughout a process. Every arrow coming out or below the diagram represents a waste. Your initial goal will be to identify where wastes occur, how much waste is generated, and what risks the wastes pose, based on the way it is managed. Worksheets 6, 7, and 8 will assist you in documenting this information.

Table 2. Avenues of Waste



Where does Waste Happen?

When conducting your site visit, look at the big picture for your facility. What wastes do you see? You may find opportunities to reduce your wastes in every step of your process. Common avenues of waste include:

- container leaks and spills;
- materials with an expired shelf life;
- infrequent equipment maintenance; and
- improper product handling.

How Much Waste Happens?

Once your team completes the inspection, take some type of approach to analyze the waste streams and their processes. One method is the material balance approach. Utilize data from the process and waste stream worksheets (6 and 7) and information from the site inspection.

According to the material balance approach, the weight of all materials entering the process must equal the weight of all the materials leaving the process. When the final product comes out weighing less than the amount of materials that went in, the difference is the amount of waste generated. Locating the reduction possibilities for this waste is your assessment's goal.

To complete your material balance calculations:

- examine each unit and prepare a process flow diagram for each process
- identify all inputs for each unit process (including raw materials, containers, reused waste and process water)
- identify all unit process outputs (including products, by-products, wastes to be recycled and disposed)
- identify waste losses by tracking the process using a flow chart

Obtaining an overall picture of the plant's operation and its weaknesses (if any) will help the assessor(s) determine the areas with the most potential for pollution prevention.

How is That Waste Managed?

You need to know what you do with that waste now—and what effects that waste management strategy is having—in order to have an idea what effect a different strategy will have.

Determine whether one waste stream management method would be better than the one currently used. You may find, for example, that a waste you are currently sending off-site for disposal may be recycled on-site. Look for ways to move your wastes up the waste management hierarchy as illustrated in Chapter 1 of this manual.

Use Worksheet 7, “Waste Stream Summary,” to describe your waste stream management methods.

Assess the Risk Each Waste Represents

Answering key questions concerning your facility’s wastes will assist you in determining the risk each waste represents. Remember that risk depends on operational procedures and precautions taken (or not taken) at a facility.

In assessing risk you should consider the waste’s:

- compound (chemical) characteristics;
- health hazards; and
- environmental hazards.

Addressing these considerations will help you better determine the potential for risk. Although this determination is subject to the individual judgement of your assessment team, it will help others make their own decision about the level of risk associated with each waste stream.

Worksheet 8 “Assessment of Risk,” on page 43 will help you determine your waste streams’ risk.

Prioritize Your Waste Streams

Prioritizing your waste streams is important in determining which pollution prevention projects your facility will implement.

The general approach to prioritizing waste streams involves these steps:

- ▶ consider the risk presented by the waste; and
- ▶ consider each of the questions below:
 - What is the disposal current cost, and if possible, how high or low will future costs go?
 - Examine the current environmental regulations (federal, state, and local), and potential future laws. Do these laws inhibit current processes for a waste stream or

- are they likely to in the future?
- Are the raw material costs high? Might they increase to an unacceptable level sometime in the future? Are alternative materials available?
- Does the waste pose a direct, immediate, or perceived threat to the workers, the public, and the environment?
- Does a waste create problems for processing, handling, storing, and discharging?
- How much volume is generated? Will future capacity issues be a problem?
- How long will a chemical (compound) will be hazardous?

Worksheet 9 on page 45 offers a simple system for prioritizing your waste streams efficiently.

Identify Your Options

Your next step in the assessment process is to identify your pollution prevention options. Use Worksheet 10, page 47 to outline options your facility has identified.

As noted in Chapter 1, the Texas Solid Waste Disposal Act outlines an order of preference when considering waste management options. Those options are discussed below:

Source Reduction

The rules governing Texas source reduction and waste minimization planning are covered in 30 TAC §335, Subchapter Q. In general, source reduction includes any activity that reduces or eliminates the generation of hazardous waste at the source or the release of a pollutant or contaminant, usually within a process.

Source reduction options include technological and material changes as well as changes in procedure and organization.

The following are specific source reduction activities your facility may want to consider:

Good Operating Practices

- Separate types of hazardous waste to make them more amenable to recycling
- Separate hazardous waste from nonhazardous waste
- Improve maintenance scheduling, record-keeping, or procedures
- Change production schedule
- Other changes in operating practices

Process Modifications

- Institute recirculation within a process
- Modify equipment, layout, or piping
- Use of a different process catalyst
- Institute better controls on operating bulk containers to minimize empty container disposal
- Change from small containers to bulk containers to minimize empty container disposal
- Other process modifications

Inventory Control

- Institute procedures to reduce outdated material
- Test outdated material
- Eliminate shelf-life for stable materials
- Use better labeling procedures
- Institute clearinghouse to exchange materials
- Other changes in inventory control

Surface Preparation and Finishing

- Modify spray systems or equipment
- Substitute coating materials used and/or improve application techniques
- Change from spray to other system
- Other surface preparation and finishing modifications

Spill and Leak Prevention

- Improve storage and stacking procedures
- Improve procedures for loading, unloading, and transfer operations
- Install overflow alarms or automatic shut-off valves
- Install vapor recovery systems
- Implement inspection or monitoring program of potential spill and leak sources
- Other spill and leak prevention activities

Cleaning and Degreasing

- Modify stripping/cleaning equipment
- Change to mechanical stripping/cleaning devices (from hazardous solvents to other materials)
- Change to aqueous cleaners
- Modify containment procedures for cleaning units
- Improve draining procedures
- Redesign parts racks to reduce drag out

- Modify or install rinse systems
- Improve rinse equipment design and/or operation

Raw Material Modifications

- Increase purity of materials
- Substitute nonhazardous for hazardous raw materials
- Other raw material modifications

Product Modifications

- Change product specifications
- Modify design or composition of product
- Modify packaging
- Other product modifications

Waste Minimization

Waste minimization is defined in Texas as any practice that reduces the environmental or health hazards associated with hazardous wastes, pollutants, or contaminants. The most common waste minimization methods are reuse, recycling, and some forms of treatment.

For WRPA plan and annual progress report purposes, examples of waste minimization may include reuse, recycling, neutralization, and detoxification. The federal Environmental Protection Agency (EPA) definition of waste minimization differs from the Texas definition. In federal programs, waste minimization is defined as source reduction plus recycling.

The goal of recycling is to recover or reclaim unused material. Generated material can be recovered either on-site or off-site, depending on the quantity of waste generated, the capital and operating costs, and availability of in-house expertise.

An alternative to on-site recycling is the use of waste exchanges, which aid in the transfer of wastes from the generator to another company. Companies interested in waste exchanges can list and request wastes through the TNRCC RENEW (Resource Exchange Network for Eliminating Waste) program. The RENEW program helps bring together waste generators and potential users. For more information on RENEW, contact the TNRCC's Office of Pollution Prevention and Recycling at 512/239-3100 or visit the RENEW Web page at <http://www.tnrcc.state.tx.us/admin/topdoc/pd/002>.

Like source reduction, examining waste minimization options may require outside research. Each

facility's processes and waste streams are unique; a large amount of knowledge may be required to make an informed decision regarding recycling options.

Treatment Options

Treatment of waste ranks third, below source reduction and recycling, in the state hierarchy of waste management. If no source reduction, reuse, or recycling option is viable, treatment must be considered as an option before land injection or disposal.

If the business does not meet each of these requirements and treats hazardous wastes on-site, it must obtain a RCRA hazardous waste treatment permit. A business may **not** dispose of its hazardous waste on-site unless it has obtained a RCRA treatment, storage, or disposal facility (TSDF) permit. Obtaining a permit is a complex, costly, and time-consuming process. The process is described in Title 40 of the Code of Federal Regulations (40 CFR 270) and in 30 TAC Chapters 305 and 335.

If a business has determined that its wastes are not hazardous as defined by the EPA or the state, it should still take steps to ensure that it is complying with all applicable federal and state requirements for disposal of nonhazardous waste. It should make all reasonable efforts to ensure that nonhazardous waste are handled in a way that prevents uncontrolled release to the environment and the potential future liabilities associated with such releases. A waste can be classified as nonhazardous and still contain some hazardous chemicals and have the potential to cause harm to human health or the environment if improperly treated, stored, or disposed.

By answering the questions on Worksheet 11, page 49, you can determine which treatment options are feasible.

Finding More Ideas

When you are looking for ways to cut waste, don't forget one resource that is always available—the people who work in your facility every day. Your engineers and operators might come up with the most practical solutions.

If you look to the outside, consider these sources of information:

- **State and local environmental agencies** — The TNRCC's Office of Pollution Prevention and Recycling offers many programs to help businesses and industries including technical guidance documents, site visits, and workshops. See Appendix F for

more information about available TNRCC resources.

- **Equipment vendors** — Equipment vendors and other service companies are excellent sources for identifying equipment-oriented options. Vendors are eager to assist companies in implementing projects and, in some cases, set up bench-scale test programs.
- **Trade associations** — Trade associations generally provide assistance and information about environmental regulations and techniques for complying with these regulations.
- **Pollution prevention case studies** — The University of Texas at El Paso hosts and maintains a Web site containing TNRCC pollution prevention case studies at <http://p2.utep.edu/p2/casestudies/p2main.cfm>.
- **Gulf Coast Hazardous Substance Research Center** — The Center at Lamar University coordinates the activities of a consortium of eight universities to concentrate in the areas of source reduction, waste minimization, and alternate technology development. For more information, call 409/880-8768 or refer to the GCHSRC Web site at <http://www.gchsrc.lamar.edu>.
- **Published literature** — Technical magazines, trade journals, government reports, and research briefs often contain useful pollution prevention information. See Appendix F for information regarding TNRCC and EPA guidance documents.
- **The Environmental Protection Agency (EPA)** — The EPA provides many pollution prevention services, including clearinghouses, databases, bulletin boards, periodicals and directories, and hot lines. An overview of EPA offerings can be obtained by ordering the Pollution Prevention Directory (EPA742/B-94-005) from EPA's Pollution Prevention Information Clearinghouse (PPIC) at 202/260-1023.

The Web sites of the TNRCC (<http://www.tnrcc.state.tx.us>) and the EPA (<http://www.epa.gov>) also have useful information. For a list of helpful publications and the EPA, see Appendix F. Many of these publications are tailored to a specific industry—perhaps yours!

Once your initial assessment is complete, you should have a list of pollution prevention options. You can then evaluate potential projects and select the most promising of them based economic and technical considerations.

Analyze Technical Aspects

The next step in your pollution prevention assessment is to conduct a technical evaluation of your options. The technical evaluation examines each option considered, regardless of whether it could be part of current operational procedures. Process changes may need to be tested or researched.

First, define the problem. Many of the solutions to waste generation are very simple. For example, the problem is not how to consolidate partially empty drums into a single drum for waste disposal, but rather answer the question: “Why weren't the drums completely emptied?”

Employees who are familiar with the process and equipment can often contribute valuable ideas to help in the technical feasibility. By listening to employee suggestions and adding engineering skills, simple, common sense solutions to the problem may become evident.

Because performing a technical feasibility evaluation requires comprehensive knowledge of source reduction techniques, vendors, relevant manufacturing processes, company resources, and facility limitations, a consultant may be necessary. For equipment-related options or process changes, the assessment team may wish to arrange visits to see other businesses.

By selecting up-to-date equipment that prevents pollution and is efficient, waste can be prevented before it becomes a problem. Since there may be several types of equipment from which to choose, making the best choice is not always an easy task. Equipment vendors can also be of use and may install equipment on a trial basis. If using a vendor, it is advisable to seek a second opinion and to work with more than one vendor.

There are many important considerations involved performing technical evaluations; some key ones are listed on Worksheet 12, “Technical Feasibility.”

Chapter 5, “Analyzing the Feasibility of Each Project,” will assist you in determining the economic feasibility of your options.

Worksheet 6 — Process and Waste Stream or Release Data

One of the keys to a successful pollution prevention program is a good-cradle-to-grave tracking system. The pollution prevention battle is almost won when a company knows the type and location of their chemicals, waste streams, or releases.

Identify each process or waste stream separately. Use a separate worksheet for each waste stream or release. This worksheet lists several important documents that provide valuable facility information.

Beside each of the listed documents, check whether the document is available or not and if it is current. There is also a space to include the location of the document.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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**Worksheet
6**

**PROCESS AND WASTE
STREAM DATA**



Document	Available ?	Current ?	Location
Process flow diagram			
Material balance			
Flow/amount measurements			
Stream number			
Stream analyses			
Stream number			
Input materials to process			
Shipping/receiving inventory			
Process description			
Operating manuals			
Equipment list			
Equipment specification			
Piping and instrument diagrams			
Hazardous waste manifest			
Work flow diagrams			
Material safety data sheets			
Production schedules			
Emission inventories			
Environmental audit reports			
Batch sheets			
Permit/permit applications			
Notice of registration			

Worksheet 7 — Waste Stream/Release Summary

The “Waste Stream/Release Summary” worksheet summarizes the most important information gathered from the documents identified in Worksheet 6. This worksheet will help the assessment team prioritize the waste streams or releases and processes at the facility.

This worksheet can also provide the company with documented proof of pollution prevention assessment efforts for each waste stream or release. It is important to report quantities consistently using the same unit of measure. For WRPA reporting purposes, please report your wastes and releases in tons.

- Process/operation — Briefly describe the type of process or operation (e.g. batch, continuous, semi-batch, etc.)
- Waste/release name — Include the identification number and name of the waste.
- Source/origin — Determine and write down the point of waste generation or release.
- Component/attribute of concern — Include a list of all chemicals and amounts found in each waste stream or release. Also include a list of all hazardous characteristics found in the waste streams.
- Amount of waste generated or toxics released — Record the amount of waste or toxics released or generated for a period of time (e.g., tons per year).
- Consumption rate (input) — Determine the annual consumption rate by identifying amount of input materials required, in a given year, for production in a process (optional; for throughput calculation).
- Production rate (output) — Determine the annual production rate by identifying the amount of product produced in a given year (optional; for throughput calculation).
- Cost of disposal — Calculate the cost of disposal by including unit and overall cost.
- Method of management — Identify the method of management for each waste stream. These are a few examples of management or disposal methods:

- | | |
|---------------------------------|-----------------------|
| • disposed in a landfill | • incineration |
| • on-site recycling | • air releases |
| • combustion with heat recovery | • distillation |
| • dewatering | • deep-well injection |
| • discharges to surface water | • transfers to POTW |

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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Worksheet
7

WASTE STREAM SUMMARY



Descriptions
1. Process/operation
2. Waste name
3. Source/origin
4. Component/attribute of concern
5. Amount of waste generated
*6. Consumption rate (input)
*7. Production rate (output)
8. Disposal (waste)
9. Method of management
10. Possible alternate management methods

Worksheet 8 — Assessment of Risk to Human Health and the Environment

Depending on the recorded information for each of the questions, estimate the “Level of Risk” for each issue.

You can find information that will help you describe compound characteristics and health hazards in the *NIOSH Pocket Guide to Chemical Hazards*. This guide is available through the U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health. Another useful source is *Dangerous Properties of Industrial Materials* by N. Irving Sax and Richard J. Lewis, Sr.. You should also review the MSDSs required by law to accompany all chemicals. If you do not have your MSDSs readily available, the EPA maintains a Web site containing both chemical substance fact sheets and MSDSs at <http://tis.eh.doe.gov>.

The third category, environmental hazards, addresses ways in which the environment is or could be exposed to compounds in the waste stream, and the potential risks associated with this exposure. In assessing environmental hazards, consider the exposure pathway. For example, what is the proximity of your waste stream to waterways, schools, parks, and residents? Record this information as it will help you evaluate your facility’s overall risk.

Another important issue to consider is the health of wildlife and plants near your facility. It is important that you designate someone to observe and be aware of the health of wildlife and plants near the facility at all times. This will be especially important if a decline or increase in population is noted.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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Worksheet
8

ASSESSMENT OF RISK



Questions:	Level of risk: high, medium or low
1. Compound (or chemical) characteristics: a. Chemical name: _____ b. Exposure limits: _____ c. IDLH (immediately dangerous to life or health) level: _____ d. Chemical and physical properties: _____ -	1a. 1b. 1c. 1d.
2. Health hazards: a. Route of health hazard (inhalation, skin absorption, ingestion, eye contact): b. Symptoms: _____ c. Target organs: _____ d. Level of toxicity: _____ e. Known carcinogen?: _____	2a. 2b. 2c. 2d. 2e.

<p>3. Environmental hazards:</p> <p>a. Type of exposure (air, land, or water): _____</p> <p>—</p> <p>b. Exposure routes (incinerator, surface containers, underground tanks, underground injection wells, etc.): _____</p> <p>c. Observation of wildlife and plant health near the facility: _____</p> <p>_d. Proximity (miles, feet) to the following:</p> <table border="0"> <tr> <td>School _____</td> <td>Day care center _____</td> </tr> <tr> <td>Residents _____</td> <td>Church _____</td> </tr> <tr> <td>Park _____</td> <td>Restaurants _____</td> </tr> <tr> <td>Other _____</td> <td></td> </tr> </table> <p>e. Proximity (miles, feet) to waterways (ponds, wells, springs, rivers, etc.): _____</p> <p>f. Provide brief schematic of facility and the surrounding area.</p>	School _____	Day care center _____	Residents _____	Church _____	Park _____	Restaurants _____	Other _____		<p>3a.</p> <p>3b.</p> <p>3c.</p> <p>3d.</p> <p>3e.</p>
School _____	Day care center _____								
Residents _____	Church _____								
Park _____	Restaurants _____								
Other _____									

Worksheet 9 — Waste Stream Prioritization

All waste streams and processes should be reviewed for pollution prevention opportunities. However, this is not always possible. It is often necessary to prioritize the waste streams and releases.

The questions listed on the worksheet should be assessed in the following ways:

- **Relative weight (W)** should be assessed on a plant wide basis, according to each of the eight criteria listed on Worksheet 8. The relative weight should be between 1 and 10 (1 = not important, 10 = most important). The weight will depend on company goals, pollution prevention goals, and other factors. Since the weight reflects company policy, the relative weights will remain constant on all the waste stream/release sheets.
- **Rating (R)** represents a waste stream's rank and will vary from one waste stream/release to the next. The rank for each criteria will reflect the need for waste reduction. The rating, similar to the relative weight (W), should also be done on a scale of 1 to 10.

The relative weights (W) should be multiplied by each rating (R) to fill in column ($R \times W$). Then add the ($R \times W$) columns to calculate the sum of priority ratings. Comparing the waste stream sheets with one another will enable the team to give each stream a priority rank.

Worksheet 10 — Source Reduction/Waste Minimization Options Description

The first section of Worksheet 10 provides space to record the possible source reduction or recycling option, and a short description of this option. Estimating the amount of waste reduction is a WRPA requirement. The estimated waste reduction should specify the amount reduced and the time involved.

The second section includes an area to indicate the type of option described; whether it involves source reduction or recycling. This section is also necessary to meet the WRPA planning requirements.

In the last section, record the names of the person responsible for the option proposal and the reviewer. Finally, record the decision to approve study of the option and the reason for accepting or rejecting the option proposal. This explanation is extremely important and should be as explicit as possible.

Note: This worksheet could be utilized as an employee suggestion form.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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Worksheet
10

OPTION DESCRIPTION



Option name:

Briefly describe the option: _____

Waste stream(s) affected: _____

Input material(s) affected: _____

Product(s) affected: _____

Estimated waste reduction: _____

Indicate type:

_____ Source reduction

_____ Recycling/reuse

_____ On-site

_____ Off-site

_____ Equipment-related change

_____ Personnel/procedure-related change

_____ Material reused for its original purpose

_____ Materials-related change

_____ Material recycled

_____ Material sold

_____ Other

_____ Other

Originally proposed by: _____ **Date:** _____

Reviewed by: _____ **Date:** _____

Approved for study: _____ **yes** _____ **no, By:** _____

Reason(s) for acceptance or rejection: _____

Worksheet 11 — Treatment Feasibility

The questions on Worksheet 11 will help you evaluate treatment feasibility. The last part of this worksheet includes space for final comments about the technical feasibility of the treatment options under consideration and should help in justifying or explaining the treatment option selection. Comments may include especially detrimental or beneficial results of the option.

Note: Some forms of treatment may not count toward waste minimization. However, they are still preferred by the TNRCC over injection and land disposal.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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Worksheet
11

TREATMENT FEASIBILITY



Option: _____

Questions:
1. What is the best available method to treat the waste?
a. Treatment to destroy the hazard
b. Treatment to reduce the hazard
c. Neutralization
d. Bioremediation
e. Vitrification
2. What type of containment system will be used for treatment?
3. Will the containment system meet RCRA regulations?
4. How long will waste be stored before treatment?
Comments:

Worksheet 12 — Technical Feasibility

Worksheet 12 provides a list of questions to help evaluate each source reduction option's technical feasibility. For question 15, it is important to note that concentration is not source reduction. Reduction in water usage may have the ultimate effect of increasing pollutant concentrations in the waste water. Therefore, any reduction in water usage without a corresponding reduction in pollutants should be handled cautiously.

The last part of this worksheet includes space for final comments about the technical feasibility of the source reduction option under consideration. This should help in justifying or explaining the source reduction option selection. Comments may include detrimental or beneficial option results.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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Worksheet
12

TECHNICAL FEASIBILITY



Option: _____

Questions:
1. Is space available or will new construction be required?
2. Are utilities available or must these be installed ?
3. Is the new equipment or technique compatible with current operating procedures, work flow, and production rates ?
4. Will product quality be maintained ?
5. How soon can the system be implemented ?
6. Will installation stop production ? How long?
7. Will training be required for the new system?
8. Does the system alleviate or create human health and environmental problems?
9. Is the system safe?
10. Are there any regulatory barriers? Are permits necessary?
11. Does the vendor provide acceptable service?
12. Did production, maintenance, and purchasing groups contribute to the technical evaluation?
13. Is additional labor required?
14. Is new design required for the system? Can the design be done in-house?
15. Does a similar system currently exist?
16. Could water use reductions result in a more concentrated wastewater?
17. Could the system result in the release of a different pollutant or contaminant, or shift the release to another medium ? If so, describe.
18. What is the approximate time estimate of the project completion?
19. What impact does failure of the system have on production, and is a backup system required?

5. Analyzing the Economic Feasibility of Each Project

In the previous chapter, pollution prevention options were selected for closer review and examined for their technical feasibility. Each source reduction, recycling, or treatment option should now be examined in more detail using the economic feasibility analysis.

Analyze Economic Aspects

Economic feasibility studies have two benefits:

- Efficiency — identify areas to reduce waste and save money; and
- Evaluation — compare options identified in the technical feasibility study.

By examining economic feasibility, companies save money while reducing waste. This is possible because waste is, by definition, inefficient use of raw materials. Isolating the costs associated with wastes allows a company to make an informed decision when implementing their plan.

The core elements of evaluating the economic feasibility of a pollution prevention option are:

- Waste cost evaluation: What is it costing you to generate waste?
- Project cost evaluation: What are the pollution prevention option's costs and potential savings?
- Comparison: Does the option cost or save money?

Pages 52 through 60 provide detailed information for conducting your economic analysis. Use Worksheet 13 to show the results of your analysis.

Prioritization

Once you have calculated the total cost of doing business under the current system, you can compare that cost to the cost of implementing the options you have identified in your technical evaluation. By going through a detailed economic feasibility study you can identify which option will save you the most money.

The final step in the feasibility analysis is ranking waste reduction projects. After completing Worksheet 14, "Waste Reduction Project Prioritization," all projects should have a priority rank.

This will enable the task force to choose the order of pollution prevention projects to be undertaken.

Crayons to Computers: How Complex Should Your Analysis Be?

WRPA requires an analysis of project's economic feasibility but does not specify how detailed your analysis must be. Your analysis depends on a variety of factors such as the number of projects you have, how much capital is needed, internal company policies, etc.

The level of analysis depends on one's needs. For example, some people never reconcile their personal checking accounts. They have a rough idea of how much they spend, and keep a small buffer in the account. They may never bounce a check, but aren't always sure where the money goes. Other people may use software to identify exactly how much money they spend and where they spend it. These people are able to spot waste in their spending habits and manage their money more efficiently.

Likewise, with WRPA, your economic analysis may be minimal, ensuring only that the project doesn't cost too much. This is particularly effective on simple projects. However, a simple cost comparison could overlook some of the hidden costs, such as labor, liability and regulatory compliance. To get the most benefit from your plan you may wish to sharpen your pencil and do a full cost accounting of your projects.

Crayon Accounting: Preliminary Screening

If you have several options, you might want to start your economic feasibility analysis by comparing the costs of the different projects to identify some of the better projects and to eliminate some of the impractical options. A simple analysis is particularly good at identifying the "low-hanging fruit," or options that are easy and inexpensive to implement.

For example, Joe's Paint Shop generates hazardous waste as a result of paint booth operations. Ed, the shop manager, worked with the employees to develop four options:

	Option	Saves Money by:	Savings	Costs
1	Rotating filters	Filters last twice as long because ones in low-use area are switched out with ones in high-use areas.	\$5.00/filter or \$100/year	minimal
2	Substitute filters for baffled Styrofoam elements	Lasts four times longer between replacements and can be washed off for reuse.	\$5.00/filter or \$200/year	\$10/filter or \$100/year
3	Switching to water based paints	Water-based paints to meet our needs are more expensive.	?	2.00/gal
4	Automated paint gun washing system	Saves on labor, solvent usage. Reduces gun clogging.	\$900/year	\$800 (once)

Even a simple look at the options showed Ed three things:

- Option 1 saves money; the only costs are for a worker to take a few minutes to rotate the filter. The shop adopted this option immediately.
- Option 2 costs more initially, but the savings are realized quickly, so they adopted this option as well.
- Options 3 and 4 looked promising, but Ed decided to do a more detailed analysis before adopting them.

For options 1 and 2 no further work is needed. Ed wrote “By substituting filters for baffled Styrofoam elements, we will save \$100 a year. Rotating the filters to extend their life span will save another \$100 a year.” This met the requirements for an economic feasibility analysis in his plan and executive summary.

Of course, an analysis like the one above only tells part of the story. More detailed accounting of option 3 would reveal savings. For instance, under the current system, the shop has to dispose of the protective clothing as hazardous waste. By switching to option 3 they could reduce disposal costs, and the clothing would last longer.

The next few sections cover how to use economic analysis to identify ways to save even more money by reducing waste.

Using a Pencil: Identifying Hidden Costs

Many facilities are not aware of how much they spend on hazardous waste. These costs are usually counted as overhead. By identifying the hidden costs, the company can identify opportunities for savings.

In the following example, an auto shop office manager attributed the environmental costs to the process area. By doing this, she was able to identify inefficiencies and convince some mechanics to switch to nonhazardous solvents.

Two bays at an automobile repair shop use parts washers. Bay 1 has switched to nonhazardous parts washer, while auto bay 2 uses a hazardous solvent to clean parts. The solvent is picked up by a company and recycled off site. Sally, the office manager, would like to switch bay 2 to a nonhazardous solvent, but the repair technicians claim the soap washers slow down work. The owner agreed with the bay 1 mechanics because he saw that they were repairing vehicles quicker than bay 2.

Sally looked at some of the **true** costs of using a hazardous solvent:

Bay 1 costs	
Hazardous solvent costs	$\$3.00/\text{gal} \times (1,500 \text{ gal/yr}) = \$4,500/\text{yr}$
costs to pick up waste solvent	$(4 \text{ drums/year}) \times \$450/\text{drum} = \$1,800/\text{yr}$
Total costs	\$6,300/yr

Even though the soap costs more per gallon, the mechanics use less. Over a year, they purchase over a thousand gallons less soap than hazardous solvents.

Bay 2 costs	
Soap solvents	$(\$5.00/\text{gal}) \times (300 \text{ gal/yr}) = \$1,500/\text{yr}$
pick up costs	$\$0.00/\text{yr}$
Total costs	\$1,500/yr

Bay 2 cost the service station at least \$4,800 **more** than bay 1! Once the owner realized how much it cost to use the hazardous solvents, it didn't take long for Bay 2 to switch.

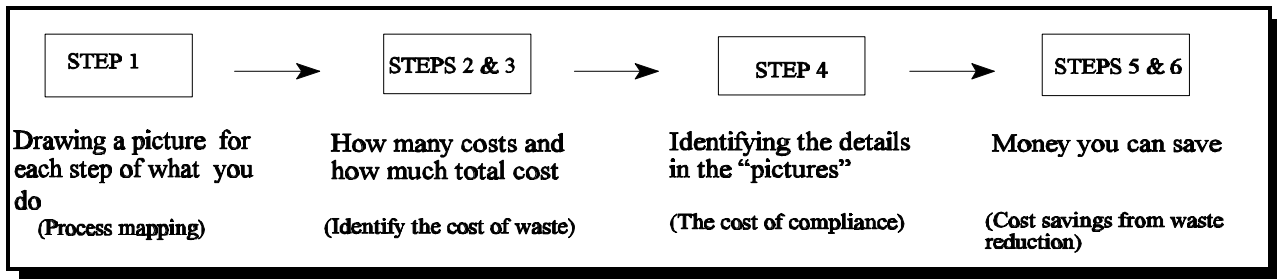
In the previous example, Bay 1 was viewed as more profitable, when in fact they were simply shifting the cost of handling the waste out of the area. Both bays were paying Bay 1's waste expenses.

Sharpening the Pencil: Full-Cost Accounting

Of course, the only way to be reasonably sure of a project's economic feasibility is to look at **all** of the costs of doing business under the current system. Once you have determined that cost, you can look at all the costs and savings from implementing your project. You can then compare the old way to the new way and make an informed decision.

Worksheet 13 is a tool for doing full cost accounting. The worksheet will guide you through six basic steps to save money by reducing waste:

- draw an input/output 'picture' of each step or process in your business;
- figure how much the raw materials cost for each process;
- calculate your costs to dispose of the waste for each process;
- determine how much you spend to comply with laws for waste you generate;
- add up all of the costs of managing waste; and
- look for ways to reuse or recycle materials, lower costs, and save money.



After you have completed these steps, you will:

- notice hidden overhead costs;
- see things you do in your business that cause waste;
- locate areas where you can reduce your waste;
- determine operational efficiency;
- measure what it may be costing you to dispose of reusable or recyclable things;
- find places where you can reduce your costs, save money, and be a cleaner business.

Economic Analysis, Step by Step

Conducting an economic analysis of your facility's processes may appear to be an involved and complicated process. By following the steps below and working through Worksheet 13 on pages 63 through 64, you may not only find the process much simpler than you imagined, you may find the benefits you gain are well worth the effort.

Step 1: Draw a Picture of What You Do

Track the inputs (supplies) used and outputs (wastes) created during each step or process. For example, imagine that **one process** in your business involves cleaning the presses with petroleum-based solvent. You may have many processes in your operation, but for the example, we will look only at one process. On the next page, there is an example of how the worksheet is used to track the inputs and outputs for the press cleaning step. Once the inputs and outputs are identified in Step 1, how the outputs are disposed of is recorded in the far right corner of Step 1.

Step 2: Determine Traditional Input (Supply) Costs per Process per Year

Determine your **annual** costs for each of the inputs in this process. This includes the cost of labor and materials. In Step 2 of the example, notice that there is a total cost for doing this one process throughout the year (A). Your calculations will vary depending on the process.

Note: You will have to calculate the costs for each process in your operation separately and will need a separate worksheet for each process. Make copies of the blank worksheet to enter costs for other processes.

Step 3: Determine Traditional Output (Disposal) Costs per Process per Year

Determine your annual costs for each output (disposal) connected with this process. The example in Step 3 demonstrates the amount spent on each type of disposal method for this process and then adds them all up for a total cost to dispose of all wastes from this process (B).

Step 4: Identify Hidden Costs per Year

In this step you may identify some of the costs for this process that may be hidden in your overhead or other accounts such as permit fees and training costs. These additional costs must be paid by you, but usually do not add value to your final product. Finding the exact dollar amount is not as important as identifying the various compliance costs linked to the process. In the example, the costs were estimated and totaled for the year (C).

Step 5: Sum Total Costs per Year

Add up the cost of materials going into the process (A), the cost of disposal of excess materials (B), and any hidden costs (C). In the example worksheet, we calculated the total cost for cleaning the presses. By knowing what **each** process (press cleaning, for example) costs your business, you can start to manage your costs more effectively and save money.

Now that you have done the example for Steps 1 through 5, you can use this information to find ways to save money. Step 6 is to compare the cost of doing business as it is now with alternatives designed to reduce your waste at the source and save you money. After reading the example, use the back of the worksheet to identify areas in your business where you can save money.

Step 6: Compare Costs Using a Waste Reduction Option

After determining the cost of materials that are being used, and the cost to dispose of the left over materials, as well as any hidden costs, you now want to see if you can reduce, reuse or recycle any of those left over materials. Based on their technical feasibility study, the company decided to a solvent recycling unit. It reduces raw materials and labor needed to do clean up (see the example below). Other processes may need different waste reduction options.

The table below makes several assumptions about solvent distillation units based on information gathered from vendors. Your unit may perform differently than the estimates here. It is important to figure out how much solvent your unit recovers, because other numbers are based on it (see below). Even with a solvent recovery unit, some new solvent must be purchased. Usually machines recover between 50 and 70 percent of the original solvent, so additional solvent that will need to be purchased will range from 30 to 50 percent of the initial amount.

Waste reduction option table (Option — installing a two-gallon solvent distillation unit)	
A. Amount of solvent you use in a year for this process (number of times you do process x amount used each time):	117 gallons
B. Annual costs to use this much solvent for this process (\$.53/half pint = \$8.48/gallon):	\$922.16
C. Annual disposal costs to dispose of this much solvent as hazardous waste (Step 3, from the front of Form 1):	\$231.25
D. Minimum average amount (percent) of solvent recovered with a two-gallon solvent distillation unit:	0.65
E. Amount of solvent recovered per year for this process (A x .65) with 65 percent recovery rate:	76.05 gallons
F. Additional solvent purchases required for this process, above the amount of solvent recovered with a solvent distillation unit (A-E):	40.95 gallons
G. Average amount (gallons) of still bottom sludge disposed of per year with a two-gallon solvent distillation unit:	110 gallons
New cost to purchase solvent for this process (B x .35). Sixty-five percent recovery rate means you only need to buy 35 percent as much new solvent:	\$347.26
Cost to dispose of 110 gallons of still bottom sludge per year for this process (contact your local hazardous waste hauler):	\$185.00

The information from the front of the worksheet (Steps 1 through 5) was used. It appears in the “Before” column of the second worksheet. Next, the new information from the waste reduction option table (previous page) was written in the “After” column. Finally, the current operating costs are compared to the costs of using the new waste reduction option (see Worksheet 13).

At the bottom of back side of the worksheet, there is a comparison calculation which will tell you how long it will take until you break even on any equipment you had to purchase in the waste reduction option. This is called the “payback period” and it shows you two things:

- how long it takes to break even on the equipment purchased; and
- how quickly you can start to save money.

At the Click of a Mouse: Software for Cost Accounting

Many companies determine their environmental costs with one of many software packages available on the market. The TNRCC has developed a software package, the Cost Analysis Module (CAM). As with the worksheets, you are not required to use the software, but some facilities may find it a useful tool.

The CAM software package allows you to document and compare the costs associated with two or more industrial processes. The cost comparison shows itemized costs as well as total cost of one process compared to another. CAM will also analyze the net present value of the cost to adopt one process or another. Finally, it can provide you with the amount of time it takes to recover any capital expenditures. Finally, you can generate a graphic of the actual savings generated over a ten year period. To order CAM, please contact the TNRCC Office of Pollution Prevention and Recycling at (512)239-3100.

Other sources of cost accounting information include Web sites such as the EPA's Enviro\$en\$e Web page at <http://es.epa.gov>.

The level of analysis is up to you. The purpose is to ensure that the options you choose will not cause undue financial strain on your company. Whether this can most efficiently be determined with a simple analysis or a complex cost accounting system is up to you and your facility.

Set Priorities

Now that the technical and economic feasibility of each project has been evaluated, you can use Worksheet 14, "Waste Reduction Project Prioritization," to help prioritize and select the best possible project options. The prioritized list may represent the order of implementation or the order of importance. The most important projects may not be implemented in the order of importance. You may want to pick projects that are easy to implement, or "low hanging fruit". Many small easy successes can help lay a solid foundation for large scale projects. Showing the rationale for the rank order of projects in the plan helps all plan users understand the nature of the plan.

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Worksheet 13 — EMS Environmental Accounting

Step 1: Draw a Picture of What You Do

- Track the inputs (supplies) and outputs (waste costs) created during the process.
- Each input should correspond to one or more outputs.
- This step does not include the final product or service.
- Outputs may require you to control pollution, or to dispose of waste.
- Indicate how you dispose of them.

Step 2: Determine Traditional Input (Supply) Costs per Process per Year

- Determine your annual input costs for each individual input of this process.

Step 3: Determine Traditional Output (Disposal) Costs per Process per Year

- Determine your annual output costs for each output from this process. When disposal is involved, determine how many times you pay for disposal in a year.

Step 4: Identify Hidden Costs per Year

- Identify some of the hidden costs for this process.*

*Some hidden costs result from compliance requirements your business has triggered. You must pay these associated costs, but usually do not add value to your final product. These regulatory and compliance costs are frequently found in overhead. When they are hidden in overhead, they are not seen as part of your business processes.

Step 5: Sum Total Costs per Year

- Add the cost of materials going into the process, the cost of disposal of excess materials and controlling pollution, and any hidden costs.

Step 6: Compare Costs Using a Waste Reduction Option

- Determine the cost of materials that are being lost through disposal.
- Choose a waste reduction option from the options you have identified in your technical feasibility study.
- Compare your current costs to the cost of using an alternative method that reduces waste.
- Determine the payback period of any new equipment purchased.

Worksheet 13

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Worksheet 14 — Waste Reduction Project Prioritization

Worksheet 14 includes space for three projects. Make more copies for additional projects. Questions 1 through 4 require an actual number to be placed in the "Total" column, then after comparing the totals for each project, the projects should receive a ranking in order of their desirability for that criteria. For example, on question number 1, if project 1 reported savings of \$2 million a year (from Worksheet 13), and project 2 reported \$1 million a year, then their ranking would be 2 and 1, respectively. Project 2 would receive the highest ranking (1) because savings are greatest, thus more would be gained by this project.

Example

Priority rating criteria:	Project: 1		Project: 2	
	Total	Rank	Total	Rank
1. Savings (difference in old vs. new)	\$2 mill/yr	2	\$1 mill/yr	1
7. Processing problems	2		1	
	Rank total		Rank total	
	4		2	
Priority rank	2		1	

Since they are not quantifiable, you are not required to total questions 5 through 7. However, they can still be ranked by comparing the projects to one another. For example, since there are fewer problems associated with this project than project 2, Project 1 above received a 2 for processing problems.

At the bottom of the worksheet, record the sum of the rank column for each project next to "Rank Total." Based on this total, prioritize the projects. The project with the lowest rank total will have the first priority; that with the highest total will have the last priority.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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Worksheet
14

**WASTE REDUCTION
PROJECT PRIORITIZATION**



Priority rating criteria:	Project:		Project:		Project:	
	Total	Rank	Total	Rank	Total	Rank
1. Savings (difference in old vs. new)						
2. Payback period						
3. Projection of potential waste reduction						
4. Risk to workers, public, and the environment						
5. Environmental regulations						
6. Processing problems						
	Rank total		Rank total		Rank total	
Priority rank						

6. Implementation

Oral and written reports are the products of the pollution prevention assessment and feasibility analysis. These reports will be used to justify the project to management and to obtain funding. Pollution prevention options that involve operational, procedural, or material changes will likely be implemented without detailed documentation or presentations. You will likely be asked to include extensive documentation for projects involving equipment modifications, the installation of new equipment, or major capital expenditures.

This chapter covers what you may include in your written documentation and oral presentations. In addition, the chapter covers scheduling project implementation and evaluating its effectiveness after it is implemented.

Documentation

A good final report can be an important tool for convincing your management to fund your pollution prevention project.

Of primary concern to your management will be:

- **What will this project do?** (increase production, decrease costs, keep the plant in compliance with the law, reduce liability exposure, reduce exposure of the public and environment to risk, etc.).
- **What is the project?** (location, equipment, personnel, infrastructure, timing of implementation).
- **What will the project cost?** (initial capital and net operating cost).
- **Is the project profitable?**

Carefully describe what the project will do for your plant and the company. If the project's main impact is to keep the plant in compliance with the law, you should consider including references to significant statutes and penalties. Any reduction of environmental risk should specifically be included. Any financial benefits that the project may bring should also be highlighted.

Implementation

Once your management has approved your pollution prevention project, implementation can begin. Implementation will generally follow the procedures established by your firm for any new procedure, process modification, or equipment change. Implementing a major pollution prevention project typically involves several steps described below:

- Prepare the final project design.
- Arrange for construction or procure materials.
- Install new equipment.
- Train operators and maintenance staff.
- Run bench-scale testing.
- Start operation.
- Begin monitoring performance and evaluating results.

Use Worksheet 15, “Implementation Schedule,” to outline your implementation procedures.

Evaluate Performance

Evaluating your project’s performance is essential to ensuring support for future activities. The easiest way to evaluate the performance of your waste reduction project is to measure the economic benefits obtained and reductions in waste generated.

Measurements before the implementation should be recorded on the worksheet as baseline measurements; and as actual for measurements made after implementation (projected would be used for the measurements you anticipate when you design the project). You will likely generate a minimum of three measurement sets; baseline, actual, and projected. Worksheet 16, “Performance Evaluation,” provides a format to document your project’s results.

Worksheet 15 — Implementation Schedule

Record your start and completion dates. Plan ahead and target start dates and completion dates for all phases; they can be changed later if necessary. Also, make sure to receive guarantees from the vendor or equipment dealer regarding the equipment you purchase. Your vendor should allow you time to bench-scale test the equipment. If not, find another vendor.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet_of_Page_of_ Project No. _____
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**Worksheet
15**

IMPLEMENTATION SCHEDULE



Implementation schedule	Start date	Completion date
Prepare a detailed design.		
Prepare a construction bid package and equipment specification.		
Select construction staff and purchase materials.		
Install new equipment.		
Train personnel.		
Start operation.		
Start performance monitoring and evaluation.		

Worksheet 16 — Evaluate Performance

Worksheet 16 provides you with a method of calculating your project's effectiveness. Keep in mind that waste generation, while directly **dependent** on production, may not be directly **related** to production.

This method divides the weight of the material used (or waste generated) by the amount of finished goods manufactured by your process (e.g., gallons of product, number of cans, etc.). The calculation is labeled weight/unit product.

Although this method of measuring waste reduction does take into consideration your production rate there are still other factors that could cause you problems. For example, periodic plant maintenance can cause one time increases in your hazardous waste generation which could cause problems in evaluating data. In general, you should distinguish between production-related wastes and maintenance-related or clean-up wastes.

7. Filing your Supporting Documentation

Although your plan remains at your facility and is confidential, you must submit your Executive Summary and Certification of Completion to the TNRCC's Office of Pollution Prevention and Recycling.

Submit the Executive Summary

Table 1, "Which Worksheet Do I Use for Each Requirement?" lists the planning elements your Executive Summary must cover. Completing Worksheet 17 on page 77 is one way to provide all of the required information.

Regardless of format, your facility's Executive Summary should be written by the person most involved and most familiar with the pollution prevention plan—probably the task force leader. This worksheet contains all the Texas Administrative Code requirements found in 30 TAC §335.474.

Submit a Certificate of Completion

As soon as your facility's plan is complete, present it to the chief financial officer, the plant manager, and the task force leader for their review. The owner of the facility should sign a certification of completion—a note that certifies that a plan that meets the requirements of the law has been prepared. Send this certificate to the TNRCC at the address shown on page 13.

If a corporation owns the facility, then an officer of that corporation who has the authority to commit the corporation's resources to implement the plan should sign. By signing the certification of completion, the owner or officer is certifying that the plan meets the specified requirements and is complete and correct.

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Worksheet 17 — Executive Summary

It is **very** important that the bold portions of the form be correct — if these items are reported incorrectly, your submission may not be properly credited to your facility. Please take extra time to ensure that these are correct. For all identification numbers, if not applicable, please use N/A. Also, if there is more than one identification number for your facility, please include all identification numbers.

- **Facility name:** Include the facility name you use to report TRI and hazardous waste
- **Name, address of contact:** Please provide the name, title, address and phone number of the individual who should receive information from the TNRCC about pollution prevention. **Note:** If this is at a different address than the facility itself, please state this and include the actual facility mailing address.
- **Plan date:** date of actual submittal
- **EPA ID:** begins with TX; on manifests
- **SW ID:** on Notice of Registration or Annual Waste Summary
- **TRI ID:** on form R if facility is TRI reporter
- **TNRCC air acct:** old Texas Air Control Board account number; on air permits
- **NPDES permit:** EPA wastewater permit number
- **UI well codes:** underground injection well identification codes
- **Primary SIC code:** Standard Industrial Classification code
- **Facility description:** describe general facility operations

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet _ of _ Page _ of _ Project No. _____
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**Worksheet
17**

EXECUTIVE SUMMARY



Executive summary - part 1
Provide facility information.
1. Name of the facility:
2. Contact person:
Mailing address:
city, state, zip:
Contact phone:
Contact fax:
3. Plan year:
Plan date due (circle one):
4. EPA ID number (12 digit):
5. TNRCC Solid Waste number: (5-digit; formerly TWC NOR #):
6. Toxic Release Inventory (TRI) ID number (if applicable):
7. TNRCC air account number (formerly TACB#; if applicable):
8. NPDES permit number (if applicable):
9. Underground Injection Well code(s) number (if applicable):
10. SIC code(s) (circle primary code):
11. General description of facility and activities:

Executive Summary — part 2

List all hazardous wastes generated amount for 19_____

The data should be taken from your Annual Waste Summary form.

Description of waste/TX waste code number:	Amount generated in tons

Executive summary — part 3

List all reportable TRI chemicals, CAS numbers and the amount released or transferred for 19__

The data should be taken from your TRI Form R — Sections 5 and 6 only.

TRI chemicals and CAS number:	Amount released or transferred in tons

Executive summary — part 4

4. Provide a prioritized list of pollutants and contaminants to be reduced during 5-year period:

1.

2.

3.

4.

5.

6.

7.

8.

Executive summary — part 5

5. State the source reduction and waste minimization goals for the facility:

Executive summary — part 6

6. Explain the environmental and human health risks considered in determining reduction goals:

Executive summary — part 7

7. What are the implementation milestones for individual project development?

Executive summary — part 8

8. What is the implementation schedule for future reduction goals?

Executive summary — part 9

9. Identify cases in which the implementation of source reduction or waste minimization activity designed to reduce risk to human health or the environment, may result in the release of a different pollutant or contaminant or may shift the release to another medium.

Worksheet 18 — Certification of Completion

The person who signs the Certification of Completion should have the authority to commit the corporation's resources to implement the plan.

Firm _____ Site _____ Date _____	POLLUTION PREVENTION ASSESSMENT <input type="checkbox"/> Source reduction <input type="checkbox"/> Waste minimization	Sheet _of_ Page _of_ Project No. _____
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Worksheet
18

EXECUTIVE SUMMARY



Certificate of Completion

This document certifies that the pollution prevention plan has been completed and meets the specified requirements of the Waste Reduction Policy Act of 1991, the Solid Waste Disposal Act and 30 TAC §§335.471-335.480 and that the information provided herein is true, correct, and complete.

This document also certifies that the person whose signature appears below has the authority to commit the corporate resources necessary to implement this plan.

_____	Position (check one):	<input type="checkbox"/> Facility Owner
Signature		<input type="checkbox"/> Corporate Officer
		<input type="checkbox"/> Other

Date		

Appendix A

Basic Facts About Hazardous Waste and TRI

Basic facts about hazardous waste and TRI

What is hazardous waste?

Hazardous wastes are a subset of solid wastes. Basically, a solid waste is a liquid, solid, semisolid, or gaseous material that is either no longer wanted or no longer fit for its intended purpose (see Federal 40 CFR Part 261 for exemptions).

Federal (40 CFR Part 261) and Texas (TAC, Chapter 335) regulations define a solid waste as hazardous if it has one or more of the following characteristics:

Ignitability — ignitable hazardous wastes burn under certain conditions.

Corrosivity — corrosive hazardous wastes include those that are acidic and those which can rapidly eat away (corrode) steel.

Reactivity — reactive hazardous wastes react violently under normal conditions, such as coming into contact with water.

Toxicity — toxic hazardous wastes are harmful or deadly when swallowed, inhaled or absorbed through the skin.

Solid waste is also considered hazardous if it is listed on one of three lists developed by the United States Environmental Protection Agency (EPA):

- **Nonspecific source wastes** (40 CFR 261.31)— general wastes, commonly produced by manufacturing and industrial processes (for example, spent halogenated solvents, dioxin wastes).
- **Specific source wastes** (40 CFR 261.32)— wastes from specifically identified industries such as wood processing, petroleum refining, and organic chemical manufacturing (for example, sludge, still bottoms, wastewater).
- **Commercial chemical products** (40 CFR 261.33 (e) and (f))— specific commercial chemical products, or manufacturing intermediates (for example, chloroform, creosote, sulfuric acid, DDT).

While many wastes have dangerous properties, not all are defined as hazardous. For instance, radioactive and infectious wastes are considered dangerous, but they are not defined as hazardous waste and therefore, are regulated differently than hazardous wastes.

For WRPA reporting purposes, facilities that generate 13.2 tons or more of hazardous waste per year are considered **large-quantity generators (LQGs)** of hazardous waste. Facilities generating less than 13.2 tons per year are **small-quantity generators (SQGs)**. For more information on WRPA applicability, please refer to TNRCC document RG-209, “Does the Waste Reduction Policy Act Apply to You?”

Waste minimization is a policy mandated by the U.S. Congress in the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA). This and other RCRA provisions have led to significant increases in the cost of waste management.

Generating hazardous waste in Texas

Lone Star Success

Facilities are making efforts to reduce their wastes. From 1993 to 1994, Texas facilities reduced hazardous waste generation by 19 percent and in 1994 facilities reporting to WRPA reported a source reduction of more than 40 million tons of hazardous waste.

Data from WRPA reporters also demonstrates the benefits of pollution prevention planning. Facilities that have gone through the pollution prevention planning process reported a 20 percent reduction in hazardous waste generation from 1993 to 1994. Facilities that have not completed a pollution prevention plan showed a 3 percent increase during the same period.

What is the Toxics Release Inventory?

The federal Pollution Prevention Act of 1990 requires facilities reporting under the Toxics Release Inventory (TRI) provisions of section 313 of SARA Title III to provide information on pollution prevention and recycling activities with each annual filing. Texas has a similar law, the Waste Reduction Policy Act (WRPA or Senate Bill 1099), found in the Texas Health and Safety Code Chapter 361, Subchapter Q, which requires hazardous waste and TRI reporting facilities to have in place a source reduction and waste minimization plan.

The following are types of TRI releases and transfers:

- any release into the air, whether it is fugitive or stack emission;
- any on-site discharge to a water body or receiving stream (including storm water runoff);
- injection of liquid wastes into on-site underground injection wells;
- any on-site land disposal, including landfills and surface impoundments;
- transfers off-site of wastewater to publicly-owned treatment work;
- transfers off-site to facilities for treatment, storage, or disposal;
- transfers off-site for recycling; and
- transfers off-site to be burned for energy recovery.

It is important to study both hazardous waste generation and TRI releases/disposal when planning for pollution prevention.

Who must report under TRI?

At this time, a facility must report if it meets **all three** of the following criteria:

- has 10 or more full time employees;
- conducts manufacturing operations, and is included in the Standard Industrial Classification (SIC) codes 20 through 39 (primarily manufacturing firms); and
- produces, imports, processes, or uses amounts above a set threshold of any of the 650 chemicals on the TRI list.

The thresholds for determining which of the TRI listed chemicals must be reported are:

- Manufacture, process or import more than 25,000 pounds/year per chemical; or
- Otherwise use more than 10,000 pounds/year per chemical.

In Texas, about 1200 facilities report under TRI.

Note: In May 1997, the U.S. Environmental Protection Agency (EPA) expanded the types of companies that report to TRI to include seven new industry groups.

The new industry groups are:

- | | |
|--|--|
| • metal mining | • chemical and allied products-wholesale |
| • coal mining | • petroleum bulk stations-wholesale |
| • electric utilities | • solvent recovery services. |
| • commercial hazardous waste treatment | |

TRI information from the seven new industry groups will be included in the data for reporting year 1998.

How does Texas rank for TRI releases?

Texas ranks first in the nation for toxic releases and disposals reported by manufacturers for 1995, the most recent year for which there is data available. However, Texas ranks second in the nation for **reductions** of releases/disposals from 1988 to 1995 and ranks first in the nation for **reductions** of toxic air emissions from 1988 to 1995.

These reductions are especially noteworthy because they coincide with a 24 percent **increase** in gross state product over the same time period by the manufacturing sector in Texas, according to data compiled by the State Comptroller.

For more information about TRI program, please contact the TRI coordinator at the TNRCC, 512/239-3100, or EPA's EPCRA hot line at 1-800-535-0202. You may also visit the TNRCC TRI Web page at <http://www.tnrcc.state.tx.us/exec/oppr/tri/tri.html>.

Appendix B

Small-Quantity Generator/Non-TRI Reporter Executive Summary Form and Instructions

Small-quantity generator/non-TRI reporter Executive Summary form and instructions

Instructions for completing the SQG/non-TRI reporter Executive Summary form

This form is only for SQGs that are **not** TRI reporters. If a facility is also a TRI reporter, see 30 TAC 335.474 for "LQG-type" plan and Executive Summary requirements.

Following are detailed instructions on filling out the Executive Summary form presented on the following pages. Please type or neatly print the required information on the form or a clear copy of the form. You are **not** required to use the Executive Summary form; however, the same information should be provided to the TNRCC Office of Pollution Prevention and Recycling, MC-112.

- **Date plan due** — Enter the date that your plan is due. If you are unsure of your due date, please refer to Appendix B, “Does the Waste Reduction Policy Act Apply to You?”
- **Executive Summary date** — Enter the date that the Executive Summary form is sent to the TNRCC.
- **EPA ID (RCRA)**— Enter the 12 character identification code.
- **TNRCC SW reg.**— Enter the 5 digit solid waste registration number (on your Notice of Registration) issued by TNRCC.
- **Facility name** — Enter the name of the facility as it is identified in other reports submitted to the TNRCC, such as a plant site name or other appropriate facility designation.
- **Mailing address** — Enter the mailing address of the facility contact person for this report. The address can be either street or PO box. **Please include state and zip code.** Use the nine-digit zip code (xxxxx-xxxx) when it is known.
- **Facility description** — Provide a brief description of what is made, processed, and/or manufactured at the facility.
- **Facility contact person** — Enter the name of the person who can answer questions about the facility's plan and Executive Summary from the public and the TNRCC.
- **Contact phone** — Enter area code and telephone number for the facility contact person.
- **SIC code** — Enter the 4-digit Standard Industrial Classification (SIC) code that best describes the principal product or service at the facility.
- **Number of employees** — Enter the estimated number of full-time employees working for your entire company in a year. This information is optional, but allows us to better track the quality of our service.

- **Estimated amount of hazardous waste generated the fifth year, in tons** — Enter the **estimated** amount of hazardous waste you expect to generate in the fifth year, in tons. This amount is based on your facility's reduction goals.

For example: If your plan due date was 1/1/96, then you need to enter the estimated amount of hazardous waste you would generate by the year 2001. Your facility reduction goal and the projects described in your pollution prevention plan should help you estimate the amount of hazardous waste you would generate by the year 2001.

- **List of hazardous waste to be reduced and the corresponding source reduction activities** — Enter a prioritized list of hazardous waste generated (from your Annual Waste Summary waste codes beginning with "9" or ending with "H") that you expect to reduce in the projects you outlined in your plan. For each hazardous waste, place a check mark in the appropriate box to identify the source reduction activity you plan to use to reduce the waste. Table 2 provides a list of examples of source reduction activities.

For example: Suppose one of the projects in your plan is to reduce paint waste generated in the painting operation through raw material modification. On the form, you need to enter paint waste as the waste to be reduced and place a check mark under the column raw material modification to identify the corresponding source reduction activity.

- **Certificate of completeness and correctness** — On the lower part of the form, the facility owner or corporate officer certifies that the plan has been completed and meets the specified requirements of the rules and the information provided is true, correct, and complete.
- **Check box located in the Certificate of completeness and correctness section of the Form:** Enter "X" if this form is submitted to amend information already submitted.
- **Optional information for SQG Executive Summary report** — On the back of the form, you will also find the SQG optional information section. If you wish, you can provide additional information on a separate page. However, there is **no** requirement that you complete the optional section of this form.
- **Revisions to the Executive Summary form** — If the information you provide on your Executive Summary form does not change, you are **not** required to submit a new Executive Summary form each year. However, if you update your plan, then you need to send in a revision to your Executive Summary form within 30 days with any changes from the prior year.

SOURCE REDUCTION / WASTE MINIMIZATION EXECUTIVE SUMMARY AND CERTIFICATE OF COMPLETENESS AND CORRECTNESS FOR SMALL-QUANTITY GENERATORS*								
Date plan due		EPA ID	_____			Executive Summary date		
Facility name						TNRCC SW ID	_____	
Facility contact person		Mailing address				SIC code	_____	
Contact phone						Number of employees		
Facility description								
Estimated amount of hazardous waste generated the fifth year, in tons								
From your plan, list hazardous waste to be reduced		Source reduction activities you plan to use to reduce generation of each hazardous waste listed. Place a check mark in the appropriate box.						
Hazardous waste (in order of priority)	Good operating practices	Inventory control	Spill and leak prevention	Raw material modification	Process modification	Cleaning and degreasing	Surface preparations and finishing	Product modification
	Q	Q	Q	Q	Q	Q	Q	Q
	Q	Q	Q	Q	Q	Q	Q	Q
	Q	Q	Q	Q	Q	Q	Q	Q
	Q	Q	Q	Q	Q	Q	Q	Q
	Q	Q	Q	Q	Q	Q	Q	Q
	Q	Q	Q	Q	Q	Q	Q	Q
<p align="center">Certificate of completeness and correctness</p> <p>Certificate of completeness: I certify that the source reduction and waste minimization plan has been completed and meets the specified requirements of 30 TAC §§335.471-335.480, and that the information provided herein is true, correct and complete. I also certify that I am the person who has the authority to commit the corporate or company resources necessary to implement the plan.</p> <p>Facility owner or corporate officer _____ Date _____ If this is a revision of a previously submitted report, check this box <input type="checkbox"/> G</p>								

Please complete this form and return to:

Office of Pollution Prevention and Recycling, MC-112
Texas Natural Resource Conservation Commission
PO Box 13087
Austin, TX 78711-3087

If you have questions, please call (512) 239-3100

Optional information for SQG Executive Summary report

If you wish to provide a discussion on any of the sections listed below, please attach separate sheets as needed.

4a. A discussion of the person's previous effort at the facility to reduce hazardous waste or the release of pollutants or contaminants through source reduction or waste minimization;

4b. A discussion of the effect changes in environmental regulations have had on the achievement of the source reduction and waste minimization goals;

4c. The effect that events the person could not control have had on the achievement of the source reduction and waste minimization goals; and

4d. A discussion of the operational decisions the person has made that have affected the achievement of the source reduction and waste minimization goals.

Appendix C

Example Pollution Prevention Plan

Example pollution prevention plan
source reduction and waste minimization plan for BJ Services Company
U.S.A., Tomball Research and Technology Center

A) Activities that generate hazardous waste

- spent solvents from laboratory (fuel blended)
- paint solvents (recycled)
- parts washing solvent (recycled)
- waste drilling mud (landfilled)
- contaminated floor dry (landfilled)
- immersion cleaner liquid (recycled)

B) Prioritized list of source reduction and waste minimization projects

I. Parts washing solvent

- a. Reduce amount of waste solvent currently generated by changing procedure used to determine solvent change out (SR).
- b. Begin trials with other nonhazardous solvents to select, if possible, a suitable replacement solvent (SR).

II. Laboratory solvent

- a. Improve procedures in waste segregation to minimize hazardous waste generation (SR).
- b. Begin trials with other nonhazardous solvents to select, if possible, a suitable replacement solvent (SR).

C) Discussion of projects

Ia. The hazardous waste generated by parts washers in the manufacturing/rebuild shop can be decreased in two ways. One is by decreasing the number of times the solvent is changed out. Technically this would present little difference in the quality of washed parts since the parts are washed until clean. The increase in time spent washing parts would be negligible. Economically, the cost of the service would be about the same. Environmental risk would decrease from present practice because the amount of solvent recycled and handled would decrease. Human health risks would be the same since workers would still be exposed to the hazardous solvent.

Ib. The second project would involve finding an effective nonhazardous solvent to replace the hazardous solvent presently being used. The new solvent would have to be as effective as the hazardous solvent and comparable in cost. The trials could be performed at minimal cost with one parts washer and fluids to be tested supplied by vendors. The environment would be greatly benefited by the use of a nonhazardous solvent and the risks to human health would decrease.

2a. The hazardous waste stream from the laboratory can be minimized in two ways. One would be to ensure that waste is segregated properly and only hazardous waste goes into the hazardous waste stream.

2b. Since a constituent of this hazardous waste stream is solvent used in laboratory operations, the second project would involve finding effective nonhazardous solvents to replace the hazardous solvents presently being used. The new solvent would have to be as effective as the hazardous solvent and comparable in cost. The trials could be performed at minimal cost with the procedures in place now and be substituting fluids to be tested which will be supplied by vendors. The environment would be greatly benefited by the use of a nonhazardous solvent and the risks to human health would decrease.

D) Reduction anticipated

1a. Changing the parts washing solvent change out schedule in the manufacturing/rebuild shop will result in an estimated source reduction of 6 tons of hazardous waste per year.

1b. Replacing the current parts washing solvent with a nonhazardous solvent will result in an estimated source reduction of 11 tons of hazardous waste per year.

2a. Improving procedures for the research and development laboratory hazardous waste segregation will result in an estimated source reduction of hazardous waste of 0.5 ton per year.

2b. Replacing the current solvents in the laboratory with nonhazardous solvents will result in an estimated source reduction of 0.5 ton of hazardous waste per year.

E) Implementation schedule

1a. January 1995 — Select a change out schedule for the parts washer solvent in the Manufacturing/rebuild shop that will enable employees to effectively clean parts yet reduce the number of change outs per month to reduce the amount of hazardous waste generated. March 1995 — Start trials of other solvents for parts washing with the goal of selecting an alternative by December 1997.

2a. January, 1998 — Examine research and development hazardous waste segregation procedures with goal of placing improved procedures in place by December 1998.

2b. January, 1999 — Start trials of alternate solvents for use in laboratory with goal of making a determination by December 1999.

F) Facility goals

The goal for the entire facility is to reduce hazardous waste reported on the Annual Waste Summary to 10 tons by 1999.

December 1997 — Reduce manufacturing/rebuild hazardous waste by 40 percent.

December 1999 — Reduce research and development hazardous waste by 10 percent.

G) Employee awareness and training

1. The BJ environmental management guide has under the introduction tab Section IB some of the Valdez Principles including ones directed at waste minimization.
2. The Tomball Facility has a waste minimization program in place to minimize waste, including hazardous waste.
3. The manager of each department that generates hazardous waste, as well as the employees directly associated with hazardous waste generation are give additional instruction on minimization and reduction.

I) Pollutant shift to another medium

1. The solvent used in the manufacturing/rebuild shop will be reduced in volume initially and possibly replaced with a nonhazardous solution.
2. Improving laboratory procedures will reduce the volume of waste generated. Replacing the solvents used with nonhazardous solvents will further reduce the volume of hazardous waste.

Plan Executive Summary

Facility: Tomball Research and Development Center
11211 FM 2920
Tomball, Texas 77375

Contact: David H. Burkett

Date: December 1994

Description: The facility is the site of various support groups for BJ Services Co., U.S.A. including engineering, instrumentation, and manufacturing/rebuild for oil field service equipment. Also located at the facility is a research laboratory for oil field service chemicals, and several administrative departments.

TACB account: HG-1053-L

Solid waste registration: 36611

Hazardous waste generated: (1993 volumes)

<u>Waste</u>	<u>Quantity</u>
0194203H–Spent solvents from laboratory	2.1 tons
0294211H–Paint solvents	0.0 tons
0501203H–Parts washing solvent	17.8 tons
0001301H–Waste drilling mud	0.3 tons
0002409H–Contaminated floor dry	0.1 tons
900250–Immersion cleaner fluid	0.4 tons

Pollutant reduction list

1. Parts washing solvent
2. Spent solvents from laboratory

Reduction goal

The goal is to reduce the hazardous waste reported on the annual waste summary for the Tomball facility to 10 tons by 1999.

Environmental and human health risks considered

The hazardous solvents used at the Tomball facility may be detrimental to the environment and human health. Therefore, the reduction in use is a reduction in risk to human health and the environment.

Project milestones

January 1995	Select a change out schedule for the parts washer solvent to reduce volume generated and monitor for two months to determine effectiveness.
March 1995	Begin trials for possible alternate parts washer solvent with goal of selecting an alternative by December 1997.
January 1998	Examine Research and Development hazardous waste segregation procedures with goal of placing improved procedures by December 1998.
January 1999	Begin trials of alternative solvents for use in laboratory with goal of making a determination by December 1999.

Future reduction goals

Future reduction goals will be established in 1999 after evaluation of the effectiveness of the aforementioned goals and examination of other reduction opportunities.

Pollutants changed or shifted

1. The solvent used in the manufacturing/rebuild shop will be reduced in volume initially and possibly replaced with a nonhazardous solution.
2. Improving laboratory procedures will reduce the volume of waste generated. Replacing the solvents used with nonhazardous solvents will further reduce the volume of hazardous waste.

Appendix D

TNRCC Pollution Prevention Rules (30 TAC §335, Subchapter Q) Pollution Prevention: Source Reduction and Waste Minimization

TNRCC Pollution Prevention Rules (30 TAC Chapter 335, Subchapter Q)

Pollution Prevention: Source Reduction and Waste Minimization

§335.471. Definitions.

The words and terms used in this subchapter have the meanings given in the Waste Reduction Policy Act of 1991, Senate Bill 1099, or the regulations promulgated thereunder. The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise. Further, the following words and terms, as defined herein, shall only have application to this subchapter.

Acute hazardous waste — Hazardous waste listed by the Administrator of the United States Environmental Protection Agency (EPA) under the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (42 U.S.C. §6901 et seq.), because the waste meets the criteria for listing hazardous waste identified in 40 Code of Federal Regulations, §261.11(a)(2).

Board — The Texas Air Control Board.

Commission — The Texas Water Commission.

Committee — The waste reduction advisory committee established by the Texas Solid Waste Disposal Act, Health and Safety Code Annotated, §361.0215.

Conditionally exempt small-quantity generator — A generator that does not accumulate more than 1,000 kilograms of hazardous waste at any one time on his facility and that generates less than 100 kilograms of hazardous waste in any given month.

Environment — Water, air, and land and the interrelationship that exists among and between water, air, land, and all living things.

Facility — All buildings, equipment, structures, and other stationary items located on a single site or on contiguous or adjacent sites that are owned or operated by a person who is subject to this subchapter or by a person who controls, is controlled by, or is under common control with a person subject to this subchapter.

Generator and generator of hazardous waste — Have the meaning assigned by the Texas Solid Waste Disposal Act, Health and Safety Code Annotated, §361.131.

Large-quantity generator — A generator that generates, through ongoing processes and operations at a facility:

- (A) more than 1,000 kilograms of hazardous waste in a month; or
- (B) more than one kilogram of acute hazardous waste in a month.

Media and medium — Air, water, and land into which waste is emitted, released, discharged, or disposed.

Pollutant or contaminant — Includes any element, substance, compound, disease-causing agent, or mixture that after release into the environment and on exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions, including malfunctions in reproduction, or physical deformations in the organism or its offspring. The term does not include petroleum, crude oil, or any fraction of crude oil that is not otherwise specifically listed or designated as a hazardous substance under §101(14)(A)-(F) of the environmental response law, nor does it include natural gas, natural gas liquids, liquefied natural gas, synthetic gas of pipeline quality, or mixtures of natural gas and synthetic gas.

Release — Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment. The term does not include:

- (A) a release that results in an exposure to a person solely within a workplace, concerning a claim that the person may assert against the person's employer;
- (B) an emission from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;
- (C) a release of source, by-product, or special nuclear material from a nuclear incident, as those terms are defined by the Atomic Energy Act of 1954, as amended (42 U.S.C. §2011 et seq.), if the release is subject to requirements concerning financial protection established by the Nuclear

Regulatory Commission under §170 of that Act;

(D) for the purposes of §104 of the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §9601 et seq.), or other response action, a release of source, by-product, or special nuclear material from a processing site designated under the Uranium Mill Tailings Radiation Control Act of 1978 (42 United States Code, §§7912 and 7942) §102(a)(1) or §302(a); and

(E) the normal application of fertilizer.

Small quantity generator — A generator that generates through ongoing processes and operation at a facility:

(A) equal to or less than to 1,000 kilograms but more than or equal to 100 kilograms of hazardous waste in a month; or

(B) equal to or less than one kilogram of acute hazardous waste in a month.

Source reduction — Has the meaning assigned by the federal Pollution Prevention Act of 1990, Pub.L. 101-508, §6603, 104 Stat. 1388.

Tons — 2,000 pounds, also referred to as short tons.

Toxics Release Inventory (TRI)— A program which includes those chemicals on the list in Committee Print Number 99-169 of the United States Senate Committee on Environment and Public Works, titled "Toxic Chemicals Subject to the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA, 42 United States Code Annotated, §11023), 313" including any revised version of the list as may be made by the Administrator of the EPA

Waste minimization — A practice that reduces the environmental or health hazards associated with hazardous wastes, pollutants, or contaminants. Examples may include reuse, recycling, neutralization, and detoxification.

§335.472. Pollutants and Contaminants.

The following pollutants and contaminants are subject to source reduction and waste minimization planning.

- (1) all hazardous wastes generated;
- (2) all chemicals which exceed threshold reporting requirements pursuant to Emergency Planning and Community Right-to-Know Act of 1986, §313.

§335.473. Applicability.

This subchapter applies to facilities which are required to develop a source reduction and waste minimization plan pursuant to the Waste Reduction Policy Act of 1991, Senate Bill 1099, or the regulations promulgated thereunder, including:

- (1) all large quantity generators of hazardous waste;
- (2) all generators other than large quantity generators and conditionally exempt small quantity generators as defined by Health and Safety Code, §361.431(3);
- (3) persons subject to §313, Title III, Superfund Amendments and Reauthorization Act of 1986 (Emergency Planning and Community Right-to-Know Act (EPCRA), 42 United States Code, §11023). These TRI covered facilities would be required to develop source reduction and waste minimization plans for only the TRI listed chemicals that exceed threshold quantities established under EPCRA.

§335.474. Source Reduction and Waste Minimization Plans.

All persons identified under §335.473 of this title (relating to Applicability) shall prepare a five year (or more) source reduction and waste minimization plan which may be updated annually as appropriate according to the schedule listed in §335.475 (relating to Implementation Dates). Plans shall be updated as necessary to assure that there never exists a time period for which a plan is not in effect. Prior to completion of the plan and each succeeding plan, a new five-year (or more) plan shall be prepared. Plans prepared under paragraphs (1)-(3) of this section shall contain a separate component addressing source reduction activities and a separate component addressing waste minimization activities.

(1) With the exception of small quantity generators which are subject to paragraph (3) of this section, the plan shall include, at a minimum:

(A) an initial survey that identifies:

(I) for facilities described in §335.473(1), activities that generate hazardous waste; and

(II) for facilities described in §335.473(3), activities that result in the release of pollutants or contaminants designated under §335.472 of this title (relating to Pollutants and Contaminants);

(B) based on the initial survey, a prioritized list of economically and technologically feasible source reduction and waste minimization projects;

(C) an explanation of source reduction or waste minimization projects to be undertaken, with a discussion of technical and economic considerations, and environmental and human health risks considered in selecting each project to be undertaken;

(D) an estimate of the type and amount of reduction anticipated;

(E) a schedule for the implementation of each source reduction and waste minimization project;

(F) source reduction and waste minimization goals for the entire facility, including incremental goals to aid in evaluating progress;

(G) an explanation of employee awareness and training programs to aid in accomplishing source reduction and waste minimization goals;

(H) certification by the owner of the facility, or, if the facility is owned by a corporation, by an officer of the corporation that owns the facility who has the authority to commit the corporation's resources to implement the plan, that the plan is complete and correct;

(I) identification of cases in which the implementation of a source reduction or waste minimization activity designed to reduce risk to human health or the environment may result in the release of a different pollutant or contaminant or may shift the release to another medium; and

(J) an executive summary of the plan which shall include at a minimum:

(I) a description of the facility which shall include:

(I) name of the facility;

(II) address;

(III) contact;

(IV) a general description of the facility; and

(V) Texas Air Control Board account number (TACB), Texas Water Commission (TWC) solid waste notice of registration number, TWC Wastewater permit number, United States Environmental Protection Agency (EPA) identification number (Resource Conservation and Recovery Act (RCRA) number), National Pollutant Discharge Elimination System (NPDES) permit number, and underground injection well code identification number.

(ii) a list of all hazardous wastes generated and the volume of each;

(iii) a list of all reportable TRI releases and the volume of each;

(iv) a prioritized list of pollutants and contaminants to be reduced;

(v) a statement of reduction goals;

(vi) an explanation of environmental and human health risks considered in determining reduction goals;

(vii) implementation milestones for individual project development;

(viii) an implementation schedule for future reduction goals; and

(ix) identification and description of cases in which the implementation of

source reduction or waste minimization activity designed to reduce risk to human health or the environment may result in the release of a different pollutant or contaminant or may shift the release to another medium. Included in this description shall be a discussion of the change in characteristic of the normal waste stream or release and how it will be managed in that affected medium.

(2) The source reduction and waste minimization plan may also include:

- (A) a discussion of the person's previous efforts at the facility to reduce risk to human health and the environment or to reduce the generation of hazardous waste or the release of pollutants or contaminants;
- (B) a discussion of the effect changes in environmental regulations have had on the achievement of the source reduction and waste minimization goals;
- (C) the effect that events the person could not control have had on the achievement of the source reduction and waste minimization goals;
- (D) a description of projects that have reduced the generation of hazardous waste or the release of pollutants or contaminants; and
- (E) a discussion of the operational decisions made at the facility that have affected the achievement of the source reduction or waste minimization goals or other risk reduction efforts.

(3) The plans of small quantity generators shall include, at a minimum:

- (A) a description of the facility which shall include:
 - (i) name of the facility;
 - (ii) address;
 - (iii) contact;
 - (iv) general description of the facility; and
 - (v) TACB account number, TWC Solid Waste Notice of Registration number, TWC Wastewater Permit Number, EPA Identification number (RCRA number), NPDES permit number, and underground injection well code identification number.
- (B) a list of all hazardous wastes generated and the volume of each;
- (C) a list of all reportable TRI releases and the volume of each;
- (D) a prioritized list of pollutants and contaminants to be reduced;
- (E) a statement of reduction goals;
- (F) information on environmental and human health risks, such as Material Safety Data Sheets or other available documentation, considered in determining reduction goals;
- (G) implementation milestones for individual project development;
- (H) an implementation schedule for future reduction goals; and
- (I) identification and description of cases in which the implementation of a source reduction or waste minimization activity designed to reduce risk to human health or the environment may result in the release of a different pollutant or contaminant or may shift the release to another medium. Included in this description shall be a discussion of the change in characteristic of the normal waste stream or release and how it will be managed in that affected medium.
- (J) certification by the owner of the facility, or, if the facility is owned by a corporation, by an officer of the corporation that owns the facility who has the authority to commit the corporation's resources to implement the plan, that the plan is complete and correct.
- (K) an executive summary of the plan which shall include at a minimum:
 - (I) a description of the facility which shall include:

- (I) name of facility;
- (II) address;
- (III) contact;
- (IV) EPA ID, TNRCC solid waste notice of registration number;
- (V) primary SIC code.
- (ii) a projection of the amount of hazardous waste that the facility will generate (based on what is reported as hazardous waste under 30 TAC 335.9) at the end of the five year period that the plan is in place.
- (iii) prioritized list of pollutants and contaminants to be reduced.
- (iv) a list of source reduction activities associated with reductions of pollutants identified under 335.474(3)(D).

(4) The executive summary may include:

- (A) a discussion of the person's previous effort at the facility to reduce hazardous waste or the release of pollutants or contaminants through source reduction or waste minimization;
- (B) a discussion of the effect changes in environmental regulations have had on the achievement of the source reduction and waste minimization goals;
- (C) the effect that events the person could not control have had on the achievement of the source reduction and waste minimization goals; and
- (D) a discussion of the operational decisions the person has made that have affected the achievement of the source reduction and waste minimization goals.

§335.475. Implementation Dates.

All facilities subject to this subchapter shall develop a source reduction and waste minimization plan. The implementation year shall be determined by the prior year's reported volumes of hazardous waste generated and/or total TRI releases. A facility once subject to this subchapter shall remain subject until it no longer meets the requirements of §335.473 of this title (relating to Applicability) or are exempted under §335.477 of this title (relating to Exemptions). Volumes for calculations will be based on total hazardous waste generated and/or total TRI releases. The executive summary shall be submitted to the commission and the board on the date the plan is required to be in place. Plan implementation will be according to the following schedule:

(1) The source reduction and waste minimization plan shall be in place, available for review, and shall be implemented no later than July 1, 1993 for:

- (A) hazardous waste generators reporting 5,000 tons or more; or
- (B) TRI facilities reporting 100 tons or more.

(2) The source reduction and waste minimization plan shall be in place, available for review, and shall be implemented no later than January 1, 1994 for:

- (A) hazardous waste generators reporting less than 5,000 tons but more than or equal to 500 tons; or
- (B) TRI facilities reporting less than 100 tons but more than or equal to 10 tons.

(3) The source reduction and waste minimization plan shall be in place, available for review, and shall be implemented no later than January 1, 1995 for:

- (A) hazardous waste generators reporting less than 500 tons but more than or equal to 15 tons; or

(B) TRI facilities reporting less than 10 tons but more than or equal to 5 tons.

(4) The source reduction and waste minimization plan shall be in place, available for review, and shall be implemented no later than January 1, 1996 for:

(A) hazardous waste generators reporting less than 15 tons but more than or equal to 5 tons; or

(B) TRI facilities reporting less than 5 tons but more than or equal to 1 ton.

(5) The source reduction and waste minimization plan shall be in place, available for review, and shall be implemented no later than January 1, 1997 for:

(A) hazardous waste generators reporting less than 5 tons but greater than 1.102 tons (1,000 kilograms); or

(B) TRI facilities reporting less than 1 ton.

(6) After the effective date of this subchapter, any facility which becomes subject to the requirement to have a source reduction and waste minimization plan, either within 90 days prior to or at any time following the dates referenced in paragraph (1)-(5) of this section, shall have 90 days to have the plan in place and available for review.

§335.476. Reports and Record keeping.

All persons required to develop a source reduction and waste minimization plan for a facility under this subchapter shall submit to the commission and the board, concurrent with implementation of the plan under §335.475 of this title (relating to Implementation Dates), an initial executive summary of such plan and a copy of the certification of completeness and correctness in §335.474(1)(H) of this title (relating to Source Reduction and Waste Minimization Plans). Within 30 days of any revision of such plan, a revised executive summary including a copy of a new certificate of completeness and correctness shall be submitted. All owners and operators required to develop a plan under §335.473(1) and (3) (related to Applicability) shall also submit an annual report as defined below under paragraphs (1), (2), and (3) of this section according to the schedule outlined in paragraph (4) of this section. Persons required to develop a source reduction and waste minimization plan for a facility under §335.473(2) (related to Applicability) may meet the annual reporting requirements by submitting their annual waste summary required under 30 TAC 335.9 and by submitting their hazardous waste reduction goals as required under §335.474(K)(ii).

(1) The report shall detail the facility's progress in implementing the source reduction and waste minimization plan and include:

(A) an assessment of the progress toward the achievement of the facility source reduction goal and the facility waste minimization goal;

(B) a statement to include, for facilities described in §335.473(1) of this title (relating to Applicability), the amount of hazardous waste generated and, for facilities described in §335.473(3), the amount of the release of reportable pollutants or contaminants designated under the Texas Solid Waste Disposal Act, the Texas Health and Safety Code Annotated, §361.433© in the year preceding the report, and a comparison of those amounts with the amounts generated or released using 1987 as the base year.

(C) any modification to the plan.

(2) The report may include:

(A) a discussion of the person's previous effort at the facility to reduce hazardous waste or the release of pollutants or contaminants through source reduction or waste minimization;

(B) a discussion of the effect changes in environmental regulations have had on the achievement of the source reduction and waste minimization goals;

- (C) the effect that events the person could not control have had on the achievement of the source reduction and waste minimization goals; and
- (D) a discussion of the operational decisions the person has made that have affected the achievement of the source reduction and waste minimization goals.

(3) The report shall contain a separate component addressing source reduction activities and a separate component addressing waste minimization activities.

(4) The report and the executive summary of the plan shall be submitted according to the following schedule and annually thereafter.

(A) For all facilities meeting the specifications of §335.475(1) of this title (relating to Implementation Dates), the first report will be due on or before March 1, 1994. The report will cover calendar year 1993. Subsequent annual reports will be submitted on or before July 1 of each year.

(B) For all facilities meeting the specifications of §335.475(2), the first report will be due on or before July 1, 1995. The report will cover calendar year 1994.

(C) For all facilities meeting the specifications of §335.475(3), the first report will be due on or before July 1, 1996. The report will cover calendar year 1995.

(D) For all facilities meeting the specifications of §335.475(4), the first report will be due on or before July 1, 1997. The report will cover calendar year 1996.

(E) For all facilities meeting the specifications of §335.475(5), the first report will be due on or before July 1, 1998. The report will cover calendar year 1997.

(5) Base line data from the calendar year 1987 shall be used in developing each of the first reports referred to in paragraph (4) of this section.

(6) The report shall be submitted on forms furnished or approved by the executive directors of the commission and the board and shall contain at a minimum the information specified in paragraph (1) of this section. Upon written request by the facility, the executive directors may authorize a modification in the reporting period.

§335.477. Exemptions.

(a) This subchapter does not apply to:

- (1) conditionally exempt small-quantity generators; and
- (2) facilities regulated by the Railroad Commission of Texas under the Natural Resources Code, §§91.101 or §141.012.

(b) Owners and operators of facilities listed in §335.473 of this title (relating to Applicability), may apply on a case-by-case basis, to the executive directors of the commission and the board for an exemption from this subchapter. The executive directors of the commission and board may grant an exemption if the applicant demonstrates that sufficient reductions have been achieved. If an exemption is granted, it is valid only for the following year, but can be renewed, on an annual basis, by filing a new application. The executive directors' decision will be based upon the following standards and criteria for determining practical economic and technical completion of the plan:

- (1) the facility has reduced the amount of pollutants and contaminants being generated or released by 90 percent since the base year;
- (2) potential impact on human health and the environment of any remaining hazardous waste generated, or pollutant or contaminant released; and
- (3) a demonstration that additional reductions are not economically and technically feasible.

§335.478. Administrative Completeness.

The commission or the board may review a source reduction and waste minimization plan or annual report to determine whether the plan or report complies with this subchapter.

§335.479. Enforcement.

Failure to have a source reduction and waste minimization plan in accordance with this subchapter or failure to submit a source reduction and waste minimization annual report in accordance with this subchapter is a violation.

§335.480. Confidentiality.

(a) A source reduction and waste minimization plan shall be maintained at each facility owned or operated by a person and/or generator who is subject to this subchapter and shall be available to commission or board personnel for inspection. The source reduction and waste minimization plan is not a public record for the purposes of Chapter 424, Acts of the 63rd Legislature, Regular Session, 1973 (Texas Civil Statutes, Article 6252-17a).

(b) The executive summary of the plan and the annual report are public records. On request, the person and/or generator shall make available to the public a copy of the executive summary of the plan or annual report.

(C) If an owner or operator of a facility for which a source reduction and waste minimization plan has been prepared shows to the satisfaction of the commission or board that an executive summary of the plan, annual report, or portion of a summary or report prepared under this subchapter would divulge a trade secret if made public, the commission or board shall classify as confidential the summary, report, or portion of the summary or report.

(d) To the extent that a plan, executive summary, annual report, or portion of a plan, summary, or annual report would otherwise qualify as a trade secret, an action by the commission or board or an employee of the commission or board does not affect its status as a trade secret.

(e) Information classified by the commission or board as confidential under this section is not a public record for purposes of Chapter 424, Acts of the 63rd Legislature, 1973 (Texas Civil Statutes, Article 6252-17a), and may not be used in a public hearing or disclosed to a person outside the commission or board unless a court decides that the information is necessary for the determination of an issue being decided at the public hearing.

Amendments to §335.476

Date Adopted: June 14, 1995

Date Filed with the Secretary of State: June 20, 1995

Date Effective: July 11, 1995

Amendments to §335.474 and §335.476

Date Adopted: November 29, 1995

Date Files with the Secretary of State: December 4, 1995

Date Effective: December 25, 1995

Appendix E

Additional Resources

Additional Resources

TNRCC publications

To order the following documents, call TNRCC publications at (512) 239-0028. These publications are also available via the Internet at <http://www.tnrcc.state.tx.us>.

- *SR/WM Annual Progress Report Manual and Forms* (RG-112) : Assists LQGs and TRI facilities in completing annual reporting required under WRPAs.
- *SR/WM Executive Summary and Certificate of Completeness and Correctness for SQGS* (RG-196): Provides information on how SQGs (who are not TRI reporters) fulfill their requirements under WRPAs.
- *Does the Waste Reduction Policy Act Apply to You?* (RG-209): Assists facilities in determining WRPAs applicability and requirements.

Industrial Pollution Prevention Team

Call (512) 239-3100 for help with WRPAs requirements and ask to speak with someone on the Industrial Pollution Prevention team. We can clarify requirements and assist you in preparing your WRPAs plan, Executive Summary or Annual Progress Report.

Engineering and Technical Services

OPPR staff provides information on innovative technology and serves as a clearinghouse for ideas on pollution prevention technology. On request, staff will go on location for non-regulatory, pollution prevention site visits, which provide industrial facilities a "safe" opportunity to address challenging environmental problems with cost-effective, "real world" solutions.

Results and information from past site visits are available in TNRCC document AS-40, *Pollution Prevention Ideas from Texas Industries*, through TNRCC Publications 512/239-0028 or via the Internet at <http://p2.utep.edu/p2/casestudies/p2main.cfm>. Hosted by the University of Texas at El Paso, this site also offers pollution prevention resource information.

You may also write to us at:

Office of Pollution Prevention and Recycling/TNRCC
IPP/TRI, MC-112
PO Box 13087
Austin TX 78711-3087

EPA pollution prevention guides

Numerous industry-specific and general pollution prevention guides are available through the EPA's Center for Environmental Research Information (CERI). Listed below are some technical guides, which can be ordered directly from CERI (phone: 513-569-7562, FAX: 513-569-7566). CERI also offers many additional topics and information, and a publication list can also be ordered from the above numbers. EPA's Pollution Prevention Information Clearinghouse (PPIC) also has many publications available. A complete listing of their publications can be ordered by contacting PPIC (phone: 202-260-1023, fax: 202-260-0178).

EPA industry-specific pollution prevention guides:

The list below contains pollution prevention guides available as of August 1997. For updated information, please contact EPA's CERI number listed above.

<u>Title</u>	<u>EPA Number</u>
Auto Repair	EPA/625/7-91/013
Automotive Refinishing	EPA/625/7-91/016
Commercial Printing	EPA/625/7-90/008
Dye Manufacturing	EPA/741/B-92/001
Fabricated Metal	EPA/625/7-90/006
Fiberglass and Composite Plastics	EPA/625/7-91/014
Marine Maintenance and Repair	EPA/625/7-91/015
Mechanical Equipment Repair	EPA/625/R-92/008
Metal Fabricated Products	EPA/560/8-92/001A
Metal Finishing	EPA/625/R-92/011
Metal Casting and Heat Treating	EPA/625/R-92/009
Municipal Pretreatment Programs	EPA/625/R-93/006
Non-Agricultural Pesticide Users	EPA/625/R-93/009
Paint Manufacturing	EPA/625/7-90/005
Pesticide Formulations	EPA/625/7-90/004
Pharmaceutical	EPA/625/7-91/017
Photo Processing	EPA/625/7-91/012
Printed Circuit Board Manufacturing	EPA/625/7-90/007
Research and Education	EPA/625/7-90/010
Selected Hospital Wastes	EPA/625/7-90/009
Wood Furniture Manufacturing	EPA/560/8-92/001C

EPA general pollution prevention guides:

Solvent Waste Reduction Alternatives	EPA/625/4-89/021
Facility Pollution Prevention Guide	EPA/600/R-92/088
Organic Coating Removal	EPA/625/R-93/015
Alternatives to Chlorinated Solvents for Cleaning and Decreasing	EPA/625/R-93/016
Cleaning and Degreasing Process Changes	EPA/625/R-93/017
Alternative Metal Finishes	EPA/625/R-94/007
On-Site Solvent Recovery	EPA/600/R-94/026
Mercury Usage and Alternatives in Electrical and Electronics Industries	EPA/600/R-94/047
Evaluating the Potential for Safe Substitutes	EPA/600/R-94/178
Demonstration of Alternative Cleaning Systems	EPA/600/R-95/120
Pollution Prevention Possibilities for Small and Medium Sized Facilities	EPA/600/R-95/070

Examiner Work Book

for the New Mexico Environment Department's Green
Zia Environmental Excellence Program

Words of Welcome

It is a pleasure to welcome you to the 2000 Board of Examiners for the New Mexico Environment Department's Green Zia Environmental Excellence program. As a Green Zia Examiner, you play a crucial role in enhancing New Mexico's competitiveness, performance, and environmental excellence. As a New Mexico Green Zia program member, much is expected of you. The validity and prestige of the Green Zia program rest upon the integrity, thoroughness, commitment, and energy of its Examiners. As volunteers, you are the nucleus of the Program, and we truly value your efforts.

We approach the next century looking forward to new challenges and excitement in the New Mexico Green Zia program. In 2000 we have significantly revised the Criteria for Environmental Excellence in content and format based upon feedback received from 1999 participants. The focus of the program has changed from striving for environmental excellence to continuously improving an organization's approach, deployment and results in the area of pollution prevention. The Criteria have been re-written in question format to better facilitate applicant response and every effort has been made to eliminate redundant requirements between Categories. As a member of the 2000 Board of Examiners, you have the opportunity to help New Mexico organizations take the next step in understanding and implementing the concepts of environmental excellence.

This Handbook is a resource document provided to help you in your job. It is designed to provide you with tools to streamline the examination process and to produce a high-quality, value-added feedback report.

Thank you for lending your support to this important effort. We hope you derive great satisfaction from taking part in this exciting and challenging adventure. We look forward to working with each of you in our mutual quest to improve New Mexico's environment for all of its citizens.

New Mexico Environment Department
Green Zia Program Administrators
Panel of Judges
Staff

SUGGESTED PROCESS FOR SCOREBOOK COMPLETION

The following is an elaboration of the Suggested Process for Evaluating Green Zia Applications presented during Examiner Training.

Step 1: Plan

A. With your Senior Examiner's assistance, complete the following action planning tables:

Team Information:

Name	Address	Eve Phone	Day Phone	Email	Fax	Categories to Champion

Examination Plan

Task/Step	Owner(s)	Due Date	Venue(s)
Develop Examination Plan	Examination Team	C.O.B. May 3, 2000	Examiner Training
Coordinate Consensus Meeting	Sr. Examiner		
Conduct Independent Review and Scoring	Individual Team Members		
Compile Category Feedback	Category Champions		
Send Compiled Category Feedback to Team	Category Champions		
Conduct Consensus Meeting	Examination Team		
Compile Feedback, Scoring and Executive Summary Materials.	Sr. Examiner		
Send completed materials to Green Zia Administrator	Sr. Examiner	No later than 6/15/00	
Site Visit Availability	Examination Team	July 2000	Applicants' Facilities

Step 2: Prepare

- A. Check conflict of interest. Read the eligibility determination form and Organizational Overview with particular attention to the applicant's organization chart, customers, competitors, and suppliers. Notify the Green Zia Program Administrator immediately if you identify any situation, including business, personal, or financial relationships, that could be perceived as affecting your ability to review the applicant fairly and objectively.
- B. Assemble your supplies. To complete an evaluation you will need the following:
 - Green Zia Program Information and Criteria - 2000
 - Application Report
 - 2000 Green Zia Work Book (this document)
 - Calculator
 - Writing implements/marketing tools
 - Watch or clock

Reserve large chunks of time to evaluate the application, which typically takes a total of 20-40 hours. Keep track of your time to record the total hours and report to your Senior Examiner at the end of the Consensus Meeting.
- C. Mark the organization chart and glossary of the application for easy reference.
- D. Review the appropriate Criteria (Commitment or Achievement/Excellence). You will need a working knowledge of all sections (e.g., Criteria, Scoring System, Core Values, and Glossary) in order to properly evaluate an applicant.
- E. Read the entire application report from cover to cover, including the eligibility determination form, the Organizational Overview, and the applicant's response to the Criteria Items.
- F. Reread the Organizational Overview and eligibility determination form, noting (with highlighters or margin notes) the points that are particularly relevant and important to the proper evaluation of the applicant and any emerging key themes. The applicant's responses throughout the application and your evaluation should reflect the key business factors (KBFs) identified by the applicant in its Organizational Overview.
- G. Prepare the Key Business Factors Worksheet (referring to your highlighting or notes) by listing the key business factors for the applicant. Use the headings and order presented in the Green Zia Program Information and Criteria 2000 handbook, pg. 14.

Step 3: Evaluate

- A. Read the Criteria requirements for the Item being reviewed, noting if the Item requests the applicant to discuss an approach and its deployment, or the results of approaches discussed in other parts of the application.
- B. Review the applicant's KBFs. These key factors should already be included on the Key Business Factors Worksheet.
- C. Read the applicant's response to the same Item. Make notes by highlighting key information and writing margin notes. Assess what is written and reasonably supported in the application. If the applicant provides cross-references, or if you find relevant information elsewhere in the application report, consider that information in your assessment of the Item. However, do not make assumptions, positive or negative, that cannot be supported by the information presented in the application report.
- D. Synthesize from your notes the most important observations into 5-8 comments about the applicant's approach/deployment or results for the Item, using the 3-part comment writing guidelines presented during Examiner Training and noted in the Comment Guidelines section of this document.
- E. Record the comments as strengths or opportunities for improvement (OFIs) in the space provided on the Item Worksheet for that Item.
 1. Each of the 5-8 comments should typically consist of 1-3 complete, declarative, and nonprescriptive sentences that use specific examples from the application. Ensure that they relate to the major Item requirements. Link them to the applicant's KBFs, as appropriate.
 2. Answer the "so what" question, indicating the significance of the comment in relation to the evaluation and/or effectiveness of the applicant's performance excellence system.
 3. Record an OFI on any Area to Consider to which the applicant has not responded.
 4. Ensure that all comments are well written and follow the Comment Guidelines presented during Examiner Training and noted in the Comment Guidelines section of this document.
 5. Preface all comments on strengths with a (+ or ++) sign. Use a (– or – –) sign to indicate OFIs. Double ++ and – – indicate particularly important observations that have a major impact on the applicant's score for the Item and/or particular significance to the applicant's performance management system. Designate comments concerning important missing information with a (– or – –). For both strengths and OFIs on each Item, use a, b, c, (1), (2), (3), to indicate the corresponding Area to Consider found in the Item.

- H. Record site visit issues in the space provided on the Item Worksheet. These are major/important issues that should be verified or clarified on site. Issues for on-site **verification** include the applicant's approach, the extent of deployment of the approach, and the results presented. For example, if a strength comment discusses the existence of a systematic process, the team would want to verify that the process exists and operates as presented in the written application.

Issues for on-site **clarification** include information that is unclear or not provided that is *central* to the Item requirements and relevant and important to the applicant's business which may have prevented the Consensus Team from fully and fairly evaluating the applicant. For example, if the Item requires the applicant to present comparison data, but those data are not provided, a site visit issue would be to clarify if the applicant has comparison data and, if so, if it is used and what the data show about the applicant's reported results relative to other organizations.

Step 4: Score

- A. Review your comments, the relative importance of the pluses and minuses, and the Item requirements.
- B. Read the description of the scoring ranges in the appropriate Scoring Guidelines (Commitment or Achievement/Excellence) to assign a percentage score for the Item. The Scoring Guidelines are divided into two parts: Approach/Deployment Items, and Results Items. Note that Approach/Deployment Item scoring ranges are determined by the strength of the applicant's approach, deployment, improvement, and integration. Results scoring ranges are determined by levels, trends, comparisons, and relevance to improving the organization's performance.
- C. Determine the scoring range (0%, 10-20%, 30-40%, 50-60%, 70-80%, 90-100%) which best reflects the comments written about the applicant's level of performance on this Item. Score each Item independently. Do not let your impression of the applicant on other Items influence your evaluation of this Item. Applicants will typically be stronger in some Items than others.
- D. Determine an appropriate score within the scoring range. **For the independent review, use only multiples of 10% (i.e., 10%, 20%, not 15%, 28%).** Enter your percent score in the space provided at the bottom of each Item Scoresheet.

For the consensus review, if using the average, first round percent scores to the nearest whole number. Next, round the point scores to the nearest whole number.

The comments and the score for an Item should be consistent, both in terms of the number of comments distributed between the strengths and the OFIs, and the weight and substance of the comments themselves. For example, the 5-8 comments for an Item scored at 20% would appear predominantly in the OFI section of the Item Worksheet.

- E. Reread the comments to ensure that they are consistent with the score and the language of the scoring range. Alter language/score, as necessary.
- F. Repeat the Evaluate and Score steps for each Item and Category of the appropriate Criteria (Achievement or Achievement/Excellence)
- G. Send Item Worksheets to the designated Category Champion for Compilation

Step 5: Finalize (Consensus Meeting)

- A. Review all Compiled Item Worksheets to ensure that:
 1. comments are consistent within and among Items (an aspect of the application cannot be a strength in one Item and an OFI in the same or another Item); and
 2. comments cover the major points and objectives of the appropriate Criteria, reflect the core values, and focus on what is important to the applicant as determined by the KBFs.
- B. Consense on Strength and OFI comments
- C. Consense on Scoring for each Item
 1. Record each examiner's individual score in the appropriate column on the Achievement/Excellence Scoresheet, or record the team's consensus around the Commitment applicant's response (with a check in the appropriate column).
 2. Record the % Consensus Score in the appropriate column of the Achievement/Excellence Scoresheet or record any team comments in the appropriate column in the Commitment Scoresheet
 3. Compute and record the Item score in the appropriate column of the Achievement/Excellence Scoresheet
 4. Compute and record the Category score in the appropriate column of the Achievement/Excellence Scoresheet
 5. Compute and record a Grand Total by summing the Category point scores.
 6. Verify scores and calculations.
- D. Compile a list of consensed site visit issues, by item.

Step 6: Compile and Return to the Green Zia Program Office (Senior Examiners)

- A. Assemble a paper and/or electronic copy of the Team's Work Products with the pages in the following order:
 - 1. Cover Sheet
 - 2. Executive Summary
 - 3. Compiled and edited feedback for all Items/Categories
 - 4. Appropriate Score Summary Worksheet (Commitment or Achievement/Excellence)
- B. Assemble the compiled list of site visit issues from the team's consensus
- C. Send the entire package to the Green Zia Program Administrator's Office:

Patricia Gallagher

Pollution Prevention/Green Zia Program Coordinator

New Mexico Environment Department

Office of the Secretary

PO Box 26110

Santa Fe, NM 87502

505-827-0677 (phone)

505-827-2836 (fax)

pat_gallagher@nmenv.state.nm.us

COMMENT GUIDELINES

Guidelines for Individual Comments

1. Comment on what is central to the Criteria Item and relevant and important to the applicant based on the key business/school factors. Respond to the basic objectives of the Item. Comment only on the requirements of the Criteria without going beyond.
2. Include examples of processes, programs, deployment and/or results that support the comment
3. Answer the “so what” question; indicate the significance of the comment in relation to the evaluation and/or effectiveness of the applicant’s performance excellence system.
4. Use one to three clear, simple, grammatically correct, and complete sentences. Use notations (a, b, c and +, ++, –, – –). Use vocabulary and phraseology from the Criteria, core values, and Scoring Guidelines.
5. Use a polite, professional, and positive tone.
6. Avoid jargon and acronyms, unless used by the applicant.
7. Use the applicant’s terminology without “parroting” the application.
8. State observations; be non-judgmental — avoid “good,” “bad,” and “inadequate”; be nonprescriptive — refrain from using “could,” “should,” and “would.”
9. Avoid critiquing the style/organization of the application; comment on the approach, deployment, or results of the performance management system.
10. Identify the strengths (using specific examples from the application) or the OFIs (using specific omissions or problems in the application report). If something “is not clear,” give examples of what additional information is needed.
11. If you are commenting on information from a figure or if you refer to a figure, provide the figure number, particularly on results Items.

Guidelines for Item Worksheets

1. Comment on each Item — usually 5-8 comments per Item.
2. Comments drive the numerical score:
 - Balance of strengths and OFIs should reflect score.
 - Comments on low scoring Items should focus on basic information.
 - Comments on higher scoring Items should focus on finer points.
3. Ensure that strengths do not conflict with OFIs in the same or another Item.

Key Business Factors Worksheet

To begin the scoring process, review the Applicant's Organizational Overview and the eligibility determination form. List the key business factors for this applicant using the headings and the order presented in the Program Information and Application Criteria, 2000 Hand Book.

Basic Description of the Enterprise

- **Products and Services**
- **Market**
- **Employees/Facilities**

Division	Employee Count	Facilities
Total		

- **Other**

Customer Requirements

- **Customers**
- **Stakeholders**

Supplier and Partnering Relationships

Competitive Factors

Regulatory Environment

Critical Success Factors

Other

Linkages Chart: "X" Illustrates Potential Linkages Between Category Items																		
Item Number	1.1	1.2	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	7.3
1.1			X		X					X	X	X	X					
1.2								X				X					X	X
2.1	X					X	X	X	X	X	X							
2.2									X	X		X	X		X			
2.3	X											X			X	X		X
3.1			X						X								X	X
3.2			X						X					X	X		X	X
3.3		X	X						X								X	X
4.1			X	X		X	X	X				X		X		X	X	X
4.2	X		X	X								X			X	X	X	X
5.1	X		X														X	X
5.2	X	X		X	X				X	X				X	X		X	X
5.3	X			X											X		X	X
6.1							X		X			X				X		X
6.2			X	X	X		X			X		X	X			X		X
7.1					X				X	X				X	X			X
7.2		X				X	X	X	X	X	X	X	X					X
7.3		X			X	X	X	X	X	X	X	X	X	X	X	X	X	

Item 1.1 Organizational Leadership (75 pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:
Percent Score _____

Item 1.2 Community Leadership	(50 pts) (Approach-Deployment)
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Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 2.1 Strategic Planning for Environmental Improvement (50 pts)
(Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 2.2 Action Planning (50 pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

[illegible]

Item Number:

Percent Score_____

Item 2.3 Integration and Implementation (50 pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

[illegible]

Item Number:

Percent Score_____

Item 3.1 Customer Involvement (25 pts) (*Approach-Deployment*)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

[illegible]

Item Number: _____ **Percent Score** _____

Item 3.2 Supplier Involvement	(25 pts) (Approach-Deployment)
--------------------------------------	---------------------------------------

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 3.3 Others Involvement	(25 pts) (Approach-Deployment)
------------------------------------	---------------------------------------

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 4.1 Information Collection and Management (60 pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 4.2 Analysis and Decision-Making (40 pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

[illegible]

Item Number:

Percent Score_____

Item 5.1 Employee Education and Skill Development	(50 pts) (Approach-Deployment)
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Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 5.2 Employee Involvement (55 pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 5.3 Employee Satisfaction, Value and Well-being (20pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 6.1 Process Characterization and Control (50 pts) (Approach-Deployment)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 6.2 Process Improvement (50 pts) (<i>Approach-Deployment</i>)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score _____

Item 7.1	Environmental Results	(100 pts)
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Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

[illegible]

Item Number: _____ **Percent Score** _____

Item 7.2 Customer, Supplier, Employee and Other Results (150 pts)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

[illegible]

Item Number:

Percent Score_____

Item 7.3 Financial Results (75 pts)

Prepare one Item Worksheet for each Item of the 2000 Green Zia Criteria

#	+ / ++	Area	(+) Strengths
#	- / --	Area	(-) Opportunities for Improvement
			Site Visit Issues

Item Number:

Percent Score_____

SCORING GUIDELINES: Approach and Deployment

SCORE	APPROACH/DEPLOYMENT
0%	<ul style="list-style-type: none"> • no systematic approach evident; anecdotal information
10% to 20%	<ul style="list-style-type: none"> • beginning of a systematic approach to the basic purposes of the Item • major gaps exist in deployment that would inhibit progress in achieving the basic purposes of the Item • early stages of a transition from reacting to problems to a general improvement orientation
30% to 40%	<ul style="list-style-type: none"> • a sound, systematic approach, responsive to the basic purposes of the Item • approach is deployed, although some areas or work units are in early stages of deployment • beginning of a systematic approach to evaluation and improvement of basic Item processes
50% to 60%	<ul style="list-style-type: none"> • a sound, systematic approach, responsive to the overall purposes of the Item • approach is well-deployed, although deployment may vary in some areas or work units • a fact-based, systematic evaluation and improvement process is in place for basic Item processes • approach is aligned with basic organizational needs identified in the other Criteria Categories
70% to 80%	<ul style="list-style-type: none"> • a sound, systematic approach, responsive to the multiple requirements of the Item • approach is well-deployed, with no significant gaps • a fact-based, systematic evaluation and improvement process and organizational learning/ sharing are key management tools; clear evidence of refinement and improved integration as a result of organizational-level analysis and sharing • approach is well-integrated with organizational needs identified in the other Criteria Categories
90% to 100%	<ul style="list-style-type: none"> • a sound, systematic approach, fully responsive to all the requirements of the Item • approach is fully deployed without significant weaknesses or gaps in any areas or work units • a very strong, fact-based, systematic evaluation and improvement process and extensive organizational learning/sharing are key management tools; strong refinement and integration, backed by excellent organizational-level analysis and sharing • approach is fully integrated with organizational needs identified in the other Criteria Categories

SCORING GUIDELINES: Results

SCORE	RESULTS
0%	<ul style="list-style-type: none"> • no results or poor results in areas reported
10% to 20%	<ul style="list-style-type: none"> • some improvements <i>and/or</i> early good performance levels in a few areas • results not reported for many to most areas of importance to your organization's key business requirements
30% to 40%	<ul style="list-style-type: none"> • improvements <i>and/or</i> good performance levels in many areas of importance to your organization's key business requirements • early stages of developing trends and obtaining comparative information • results reported for many to most areas of importance to your organization's key business requirements
50% to 60%	<ul style="list-style-type: none"> • improvement trends <i>and/or</i> good performance levels reported for most areas of importance to your organization's key business requirements • no pattern of adverse trends and no poor performance levels in areas of importance to your organization's key business requirements • some trends <i>and/or</i> current performance levels – evaluated against relevant comparisons <i>and/or</i> benchmarks – show areas of strength <i>and/or</i> good to very good relative performance levels • business results address most key customer, market, and process requirements
70% to 80%	<ul style="list-style-type: none"> • current performance is good to excellent in areas of importance to your organization's key business requirements • most improvement trends <i>and/or</i> current performance levels are sustained • many to most trends <i>and/or</i> current performance levels – evaluated against relevant comparisons <i>and/or</i> benchmarks – show areas of leadership and very good relative performance levels • business results address most key customer, market, process, and action plan requirements
90% to 100%	<ul style="list-style-type: none"> • current performance is excellent in most areas of importance to your organization's key business requirements • excellent improvement trends <i>and/or</i> sustained excellent performance levels in most areas • evidence of industry and benchmark leadership demonstrated in many areas • business results fully address key customer, market, process, and action plan requirements

Green Zia Achievement/Excellence Scoring Sheet

Category/Item	Total Points Avail	Individual Percent Score					Consensus % Scores	Item Score	Category Score
1.0 Leadership	125								
1.1 Organizational Leadership	75								
1.2 Community Leadership	50								
2.0 Planning for Continuous Environmental Improvement	150								
2.1 Strategic Planning for Continuous Environmental Improvement	50								
2.2 Action Planning	50								
2.2 Integration And Implementation	50								
3.0 Customer, Market and Others' Involvement	75								
3.1 Customer Involvement	25								
3.2 Supplier Involvement	25								
3.3 Other's Involvement	25								
4.0 Information and Analysis	100								
4.1 Information Collection and Management	60								
4.2 Analysis and Decision making	40								
5.0 Employee Participation	125								
5.1 Employee Education and Skill Development	50								
5.2 Employee Involvement	55								
5.3 Employee Satisfaction, Value and Well-being	20								
6.0 Process Management	100								
6.1 Process Characterization and Control	50								
6.2 Process Improvement	50								
7.0 Results	325								
7.1 Environmental Results	100								
7.2 Customer, Supplier, Employee and Other Results	150								
7.3 Financial Results	75								
TOTAL SCORE									

Green Zia Commitment Level Scoring Matrix

Category	√*	Examiner Comments/Notes
Category 1: Leadership		
The applicant explains how management commitment to continuous environmental improvement is:		
• Communicated to employees		
• Demonstrated within the organization		
• Communicated to communities		
• Demonstrated in the community		
Category 2: Planning for Continuous Environmental Improvement		
The applicant describes how:		
• Long and short term goals and objectives are identified		
• Long and short term goals and objectives are developed		
• Long and short term goals are implemented		
• Goals and objectives relate to overall business objectives		
Category 3: Customer, Supplier, and Others Involvement		
The applicant describes how the organization:		
• Involves customers and suppliers and others in the development of the company's continuous environmental improvement program		
• Involved in other organizations' continuous environmental improvement program		
Category 4: Information and Analysis		
The applicant describes how the organization:		
• Collect information to make environmental improvement decisions		
• Use information to make environmental improvement decisions		
Category 5: Employee Involvement		
The applicant describes how:		
• Prepare and involve employees in development and implementation of continuous environmental improvement approaches.		
• Involve employees in development and implementation of continuous environmental improvement approaches.		
• Employee value and well-being is considered in developing continuous environmental improvement approach		
Category 6: Process Management		
The applicant describes how the organization:		
• Identifies processes with environmental impacts		
• Analyzes process to address environmental impacts		
• Manages processes to address environmental impacts		
Category 7: Results		
The applicant is developing methods to report environmental performance levels or trends in:		
• Environmental results		
• Customer, Supplier, and Employee and Other results		
• Financial results		
Total checks		

*Place a check mark in the 2nd column of Categories 1-6 where the applicant shows a beginning systematic approach to the primary purposes of the item, and of Category 7 where the applicant shows early signs of reporting key results data.

Criteria for Performance Excellence



integrity



accomplishment

competitiveness



THE MALCOLM BALDRIGE NATIONAL QUALITY AWARD PROGRAM

A Public-Private Partnership

Building active partnerships in the private sector—and between the private sector and all levels of government—is fundamental to the success of the Baldrige National Quality Program in improving national competitiveness. Private-sector support for the Program in the form of funds, volunteer efforts, and participation in information transfer continues to grow.

To ensure the continued growth and success of these partnerships, each of the following organizations plays an important role.

Foundation for the Malcolm Baldrige National Quality Award

The Foundation for the Malcolm Baldrige National Quality Award was created to foster the success of the Program. The Foundation's main objective is to raise funds to permanently endow the Award Program.

Prominent leaders from U.S. organizations serve as Foundation Trustees to ensure that the Foundation's objectives are accomplished. A broad cross section of organizations throughout the United States provides financial support to the Foundation.

National Institute of Standards and Technology

The U.S. Department of Commerce is responsible for the Baldrige National Quality Program and the Award. The National Institute of Standards and Technology (NIST), an agency of the Department's Technology Administration, manages the Baldrige Program. NIST promotes U.S. economic growth by working with industry to develop and deliver the high-quality measurement tools, data, and services necessary for the nation's technology infrastructure. NIST also participates in a unique, government-private-sector partnership to accelerate the development of high-risk technologies that promise significant commercial and economic benefits. Through a network of technology extension centers and field offices serving all 50 states and Puerto Rico, NIST helps small- and medium-sized businesses access the information and expertise they need to improve their competitiveness in the global marketplace.

American Society for Quality

The American Society for Quality (ASQ) assists in administering the Award Program under contract to NIST. ASQ is dedicated to the ongoing development, advancement, and promotion of quality concepts, principles, and techniques. ASQ strives to be the world's recognized champion and leading authority on all issues related to quality. ASQ recognizes that continuous quality improvement will help the favorable positioning of American goods and services in the international marketplace.

Board of Overseers

The Board of Overseers advises the Department of Commerce on the Baldrige National Quality Program. The board is appointed by the Secretary of Commerce and consists of distinguished leaders from all sectors of the U.S. economy.

The Board of Overseers evaluates all aspects of the Program, including the adequacy of the Criteria and processes for determining Award recipients. An important part of the board's responsibility is to assess how well the Program is serving the national interest. Accordingly, the board makes recommendations to the Secretary of Commerce and to the Director of NIST regarding changes and improvements in the Program.

Board of Examiners

The Board of Examiners evaluates Award applications and prepares feedback reports. The Panel of Judges, part of the Board of Examiners, makes Award recommendations to the Director of NIST. The board consists of leading U.S. business, health care, and education experts. NIST selects members through a competitive application process. For 2001, the board consists of about 400 members. Of these, 9 (who are appointed by the Secretary of Commerce) serve as Judges, and approximately 70 serve as Senior Examiners. The remainder serve as Examiners. All members of the board must take part in an Examiner preparation course.

In addition to reviewing applications, board members play a significant role in sharing information about the Baldrige Program. Their membership in hundreds of professional, trade, community, and state organizations helps them disseminate this information.

Award Recipients

Award recipients are required to share information on their successful performance and quality strategies with other U.S. organizations. However, recipients are not required to share proprietary information, even if such information was part of their Award application. The principal mechanism for sharing information is the annual Quest for Excellence Conference.

Award recipients in the 13 years of the Award have been extremely generous in their commitment to improving U.S. competitiveness and furthering the U.S. pursuit of performance excellence. They have shared information with hundreds of thousands of companies, education institutions, health care organizations, government agencies, and others. This sharing far exceeds expectations and Program requirements. Award recipients' efforts have encouraged many other organizations in all sectors of the U.S. economy to undertake their own performance improvement efforts.



Baldridge National Quality Program

National Institute of Standards and Technology • Technology Administration • Department of Commerce

To: U.S. Business Community

From: Harry S. Hertz, Director
Baldridge National Quality Program

Subject: The Baldridge Challenge

“Business as usual” really means challenge and change. Whether your business challenges are e-commerce and the Internet economy, globalization, rapid innovation, outsourcing and supply chain management, cost reduction, or just maintaining your competitive advantage, the Baldridge Criteria can help you address them.

For more than a decade, the Baldridge Criteria have been a tool used by thousands of U.S. organizations to stay abreast of ever-increasing competition and improve performance. Whether your business is small or large, is involved in service or manufacturing, or has one office or multiple sites across the globe, the Criteria provide a valuable framework that can help you assess performance on a wide range of key business indicators: customer, product and service, operational, human resource, and financial. The Criteria can help you align resources; improve communication, productivity, and effectiveness; and achieve strategic goals.

How to begin that first Baldridge assessment? Take a few minutes and scan the questions in the new Organizational Profile on pages 10–11. A discussion of the answers to these questions might be your first Baldridge assessment.

If you are ready to take the full Baldridge challenge, you may perform a self-assessment only or use the self-assessment as the preliminary effort to submitting an Award application. Self-assessment against all seven Categories of the Criteria (see pages 12–28) allows you to identify strengths and to target opportunities for improving processes and results affecting all key stakeholders—including customers, employees, owners, suppliers, partners, and the public. In the most competitive business sectors, organizations with world class business results are able to achieve a score above 700 on the 1,000 point Baldridge scale.

Even if you don’t expect to win the Baldridge Award, submitting an application has valuable benefits. Every applicant receives a detailed feedback report based on an independent, external assessment conducted by a panel of specially trained and recognized experts.

Ultimately, your application may lead to a Baldridge Award. Many Award recipients tell us their greatest rate of improvement occurs the year after receiving the Award. While we make no promises for the future, on average, publicly traded Baldridge Award recipient companies have outperformed the Standard & Poor’s 500 by four to one. If you receive the Baldridge Award, you may publicize and advertise your organization’s winning status.

We make only two requirements of recipients: that you share nonproprietary information from your application summary and participate in the Quest for Excellence Conference in April 2002 so that others might learn from your success.

The Criteria are in your hands . . . so is an incredible opportunity. Why not take the challenge? Regardless of your organization’s past success, when you turn these pages, you turn the corner toward performance excellence. If you want more information, contact me at nqp@nist.gov.

QUEST FOR EXCELLENCE

Quest for Excellence XIII Conference

Each year, Quest for Excellence, the official conference of the Malcolm Baldrige National Quality Award, provides a forum for Baldrige Award recipients to share their exceptional performance practices with worldwide leaders in business, education, health care, and not-for-profit organizations. Quest for Excellence XIII will showcase the year 2000 Award recipients.

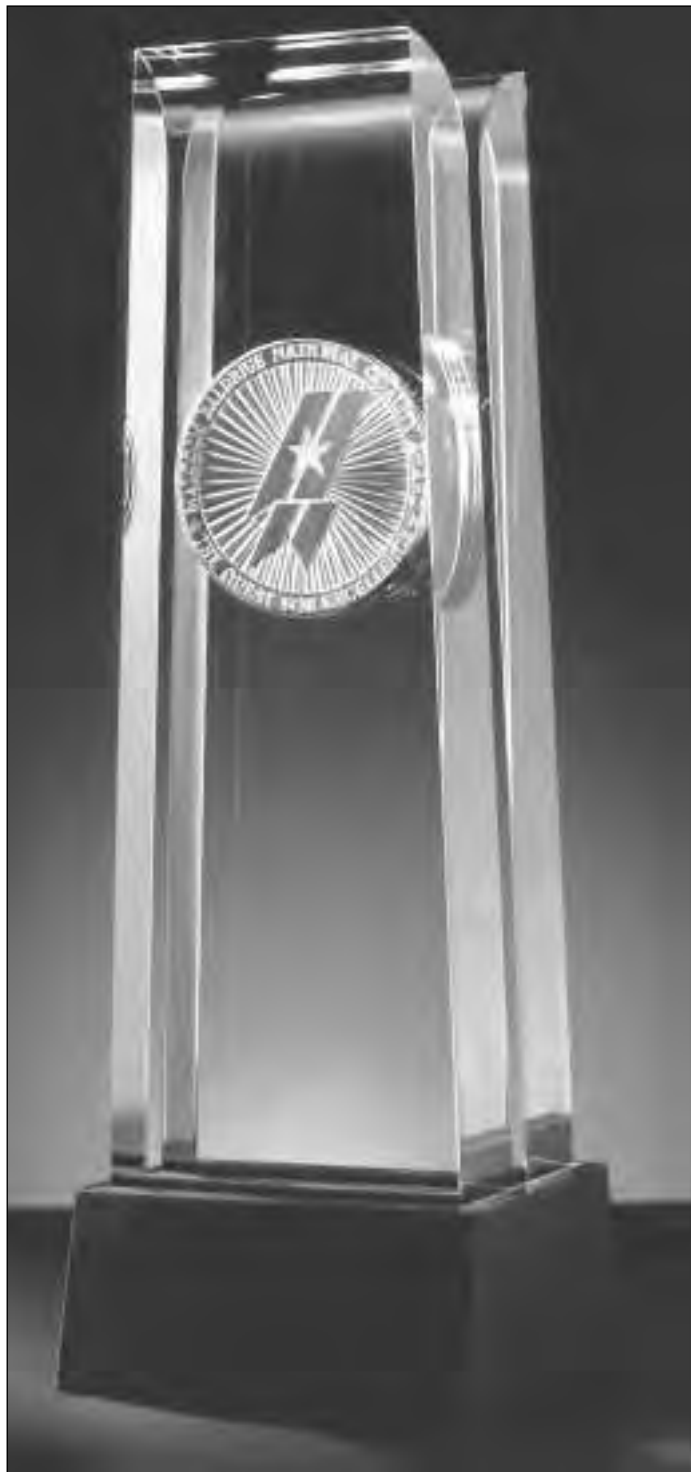
For the last 12 years, executives, managers, and quality leaders have come to this conference to learn how these role model organizations have achieved performance excellence. CEOs and other leaders from the Award recipients give presentations covering all seven Categories of the Baldrige Criteria, their journey to performance excellence, and their lessons learned. At this three-day conference designed to maximize learning and networking opportunities, attendees will be able to interact with Award recipients.

The Quest for Excellence XIII Conference will be held April 22–25, 2001, at the Marriott Wardman Park Hotel in Washington, DC. For further information, contact the Baldrige Program by mail: Baldrige National Quality Program, NIST, Administration Building, Room A600, 100 Bureau Drive, Stop 1020, Gaithersburg, MD 20899-1020; telephone: (301) 975-2036; fax: (301) 948-3716; or E-mail: nqp@nist.gov. For a general overview of the Baldrige National Quality Program, visit its Web site: <http://www.quality.nist.gov>.

The Malcolm Baldrige National Quality Award

The Award crystal, composed of two solid crystal prismatic forms, stands 14 inches tall. The crystal is held in a base of black anodized aluminum with the Award recipient's name engraved on the base. A 22-karat gold-plated medallion is captured in the front section of the crystal. The medal bears the inscriptions "Malcolm Baldrige National Quality Award" and "The Quest for Excellence" on one side and the Presidential Seal on the other.

The President of the United States traditionally presents the Awards at a special ceremony in Washington, DC.



Crystal by Steuben

The Malcolm Baldrige National Quality Award logo and the phrases "Quest for Excellence" and "Performance Excellence" are trademarks and service marks of the National Institute of Standards and Technology.

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Education and health care organizations should use the appropriate Criteria booklets for their respective sectors. See page 53 for ordering information.

If you plan to apply for the Award in 2001, you also will need the booklet entitled
Baldrige Award Application Forms.

Ordering instructions are given on page 53.

Eligibility Forms due—April 5, 2001 Award Applications due—May 31, 2001

We are easy to reach. Our Web address is <http://www.quality.nist.gov>.

2001 CRITERIA: CORE VALUES, CONCEPTS, AND FRAMEWORK

Criteria Purposes

The Criteria are the basis for organizational self-assessments, for making Awards, and for giving feedback to applicants. In addition, the Criteria have three important roles in strengthening U.S. competitiveness:

- to help improve organizational performance practices, capabilities, and results
- to facilitate communication and sharing of best practices information among U.S. organizations of all types
- to serve as a working tool for understanding and managing performance and for guiding planning and opportunities for learning

Criteria for Performance Excellence Goals

The Criteria are designed to help organizations use an aligned approach to organizational performance management that results in

- delivery of ever-improving value to customers, contributing to marketplace success
- improvement of overall organizational effectiveness and capabilities
- organizational and personal learning

Core Values and Concepts

The Criteria are built upon a set of interrelated Core Values and Concepts. These values and concepts, given below, are embedded beliefs and behaviors found in high-performing organizations. They are the foundation for integrating key business requirements within a results-oriented framework that creates a basis for action and feedback.

Visionary Leadership

An organization's senior leaders should set directions and create a customer focus, clear and visible values, and high expectations. The directions, values, and expectations should balance the needs of all your stakeholders. Your leaders should ensure the creation of strategies, systems, and methods for achieving excellence, stimulating innovation, and building knowledge and capabilities. The values and strategies should help guide all activities and decisions of your organization. Senior leaders should inspire and motivate your entire workforce and should encourage all employees to contribute, to develop and learn, to be innovative, and to be creative.

Senior leaders should serve as role models through their ethical behavior and their personal involvement in planning, communications, coaching, development of future leaders, review of organizational performance, and employee recognition. As role models, they can reinforce values and

expectations while building leadership, commitment, and initiative throughout your organization.

Customer-Driven Excellence

Quality and performance are judged by an organization's customers. Thus, your organization must take into account all product and service features and characteristics and all modes of customer access that contribute value to your customers and lead to customer acquisition, satisfaction, preference, referral, and loyalty and to business expansion. Customer-driven excellence has both current and future components: understanding today's customer desires and anticipating future customer desires and marketplace offerings.

Value and satisfaction may be influenced by many factors throughout your customers' overall purchase, ownership, and service experiences. These factors include your organization's relationship with customers that helps build trust, confidence, and loyalty.

Customer-driven excellence means much more than reducing defects and errors, merely meeting specifications, or reducing complaints. Nevertheless, reducing defects and errors and eliminating causes of dissatisfaction contribute to your customers' view of your organization and thus also are important parts of customer-driven excellence. In addition, your organization's success in recovering from defects and mistakes ("making things right for your customer") is crucial to retaining customers and building customer relationships.

Customer-driven organizations address not only the product and service characteristics that meet basic customer requirements but also those features and characteristics that differentiate products and services from competing offerings. Such differentiation may be based upon new or modified offerings, combinations of product and service offerings, customization of offerings, multiple access mechanisms, rapid response, or special relationships.

Customer-driven excellence is thus a strategic concept. It is directed toward customer retention, market share gain, and growth. It demands constant sensitivity to changing and emerging customer and market requirements and to the factors that drive customer satisfaction and retention. It demands anticipating changes in the marketplace. Therefore, customer-driven excellence demands awareness of developments in technology and competitors' offerings, as well as rapid and flexible response to customer and market requirements.

Organizational and Personal Learning

Achieving the highest levels of business performance requires a well-executed approach to organizational and personal learning. Organizational learning includes both continuous improvement of existing approaches and

adaptation to change, leading to new goals and/or approaches. Learning needs to be embedded in the way your organization operates. This means that learning (1) is a regular part of daily work; (2) is practiced at personal, work unit, and organizational levels; (3) results in solving problems at their source (“root cause”); (4) is focused on sharing knowledge throughout your organization; and (5) is driven by opportunities to effect significant change and to do better. Sources for learning include employees’ ideas, research and development (R&D), customers’ input, best practice sharing, and benchmarking.

Organizational learning can result in (1) enhancing value to customers through new and improved products and services; (2) developing new business opportunities; (3) reducing errors, defects, waste, and related costs; (4) improving responsiveness and cycle time performance; (5) increasing productivity and effectiveness in the use of all resources throughout your organization; and (6) enhancing your organization’s performance in fulfilling its public responsibilities and service as a good citizen.

Employees’ success depends increasingly on having opportunities for personal learning and practicing new skills. Organizations invest in employees’ personal learning through education, training, and other opportunities for continuing growth. Such opportunities might include job rotation and increased pay for demonstrated knowledge and skills. On-the-job training offers a cost-effective way to train and to better link training to your organizational needs and priorities. Education and training programs may benefit from advanced technologies, such as computer- and Internet-based learning and satellite broadcasts.

Personal learning can result in (1) more satisfied and versatile employees who stay with the organization, (2) organizational cross-functional learning, and (3) an improved environment for innovation.

Thus, learning is directed not only toward better products and services but also toward being more responsive, adaptive, and efficient—giving your organization marketplace sustainability and performance advantages.

Valuing Employees and Partners

An organization’s success depends increasingly on the knowledge, skills, creativity, and motivation of its employees and partners.

Valuing employees means committing to their satisfaction, development, and well-being. Increasingly, this involves more flexible, high-performance work practices tailored to employees with diverse workplace and home life needs. Major challenges in the area of valuing employees include (1) demonstrating your leaders’ commitment to your employees’ success, (2) recognition that goes beyond the

regular compensation system, (3) development and progression within your organization, (4) sharing your organization’s knowledge so your employees can better serve your customers and contribute to achieving your strategic objectives, and (5) creating an environment that encourages risk taking.

Organizations need to build internal and external partnerships to better accomplish overall goals. Internal partnerships might include labor-management cooperation, such as agreements with unions. Partnerships with employees might entail employee development, cross-training, or new work organizations, such as high-performance work teams. Internal partnerships also might involve creating network relationships among your work units to improve flexibility, responsiveness, and knowledge sharing.

External partnerships might be with customers, suppliers, and education organizations. Strategic partnerships or alliances are increasingly important kinds of external partnerships. Such partnerships might offer entry into new markets or a basis for new products or services. Also, partnerships might permit the blending of your organization’s core competencies or leadership capabilities with the complementary strengths and capabilities of partners.

Successful internal and external partnerships develop longer-term objectives, thereby creating a basis for mutual investments and respect. Partners should address the key requirements for success, means for regular communication, approaches to evaluating progress, and means for adapting to changing conditions. In some cases, joint education and training could offer a cost-effective method for employee development.

Agility

Success in globally competitive markets demands agility—a capacity for rapid change and flexibility. All aspects of e-commerce require and enable more rapid, flexible, and customized responses. Businesses face ever-shorter cycles for the introduction of new/improved products and services, as well as for faster and more flexible response to customers. Major improvements in response time often require simplification of work units and processes and/or the ability for rapid changeover from one process to another. Cross-trained and empowered employees are vital assets in such a demanding environment.

A major success factor in meeting competitive challenges is the design-to-introduction (product/service initiation) cycle time. To meet the demands of rapidly changing global markets, organizations need to carry out stage-to-stage integration (such as concurrent engineering) of activities from research/concept to commercialization.

All aspects of time performance now are more critical, and cycle time has become a key process measure. Other important benefits can be derived from this focus on time; time improvements often drive simultaneous improvements in organization, quality, cost, and productivity.

Focus on the Future

In today's competitive environment, a focus on the future requires understanding the short- and longer-term factors that affect your business and marketplace. Pursuit of sustainable growth and market leadership requires a strong future orientation and a willingness to make long-term commitments to key stakeholders—your customers, employees, suppliers and partners, stockholders, the public, and your community. Your organization's planning should anticipate many factors, such as customers' expectations, new business and partnering opportunities, the increasingly global marketplace, technological developments, the evolving e-commerce environment, new customer and market segments, evolving regulatory requirements, community/societal expectations, and strategic moves by competitors. Strategic objectives and resource allocations need to accommodate these influences. A focus on the future includes developing employees and suppliers, creating opportunities for innovation, and anticipating public responsibilities.

Managing for Innovation

Innovation means making meaningful change to improve an organization's products, services, and processes and to create new value for the organization's stakeholders. Innovation should lead your organization to new dimensions of performance. Innovation is no longer strictly the purview of research and development departments; innovation is important for all aspects of your business and all processes. Organizations should be led and managed so that innovation becomes part of the culture and is integrated into daily work.

Management by Fact

Organizations depend on the measurement and analysis of performance. Such measurements should derive from business needs and strategy, and they should provide critical data and information about key processes, outputs, and results. Many types of data and information are needed for performance management. Performance measurement should include customer, product, and service performance; comparisons of operational, market, and competitive performance; and supplier, employee, and cost and financial performance.

Analysis refers to extracting larger meaning from data and information to support evaluation, decision making, and operational improvement. Analysis entails using data to

determine trends, projections, and cause and effect that might not otherwise be evident. Analysis supports a variety of purposes, such as planning, reviewing your overall performance, improving operations, change management, and comparing your performance with competitors' or with "best practices" benchmarks.

A major consideration in performance improvement and change management involves the selection and use of performance measures or indicators. *The measures or indicators you select should best represent the factors that lead to improved customer, operational, and financial performance. A comprehensive set of measures or indicators tied to customer and/or organizational performance requirements represents a clear basis for aligning all activities with your organization's goals.* Through the analysis of data from your tracking processes, your measures or indicators themselves may be evaluated and changed to better support your goals.

Public Responsibility and Citizenship

An organization's leaders should stress its responsibilities to the public and the need to practice good citizenship. These responsibilities refer to basic expectations of your organization related to business ethics and protection of public health, safety, and the environment. Protection of health, safety, and the environment includes your organization's operations, as well as the life cycles of your products and services. Also, organizations should emphasize resource conservation and waste reduction at the source. Planning should anticipate adverse impacts from production, distribution, transportation, use, and disposal of your products. Effective planning should prevent problems, provide for a forthright response if problems occur, and make available information and support needed to maintain public awareness, safety, and confidence.

For many organizations, the product design stage is critical from the point of view of public responsibility. Design decisions impact your production processes and often the content of municipal and industrial wastes. Effective design strategies should anticipate growing environmental concerns and responsibilities.

Organizations should not only meet all local, state, and federal laws and regulatory requirements, but they should treat these and related requirements as opportunities for improvement "beyond mere compliance." This requires the use of appropriate measures in managing public responsibility.

Practicing good citizenship refers to leadership and support—within the limits of an organization's resources—of publicly important purposes. Such purposes might include improving education and health care in your community, environmental excellence, resource conservation, community service, improving industry and business



practices, and sharing nonproprietary information. Leadership as a corporate citizen also entails influencing other organizations, private and public, to partner for these purposes. For example, your organization might lead or participate in efforts to help define the obligations of your industry to its communities.

Focus on Results and Creating Value

An organization's performance measurements need to focus on key results. Results should be used to create and balance value for your key stakeholders—customers, employees, stockholders, suppliers and partners, the public, and the community. By creating value for your key stakeholders, your organization builds loyalty and contributes to growing the economy. To meet the sometimes conflicting and changing aims that balancing value implies, organizational strategy should explicitly include key stakeholder requirements. This will help ensure that actions and plans meet differing stakeholder needs and avoid adverse impacts on any stakeholders. The use of a balanced composite of leading and lagging performance measures offers an effective means to communicate short- and longer-term priorities, monitor actual performance, and provide a clear basis for improving results.

Systems Perspective

The Baldrige Criteria provide a systems perspective for managing your organization to achieve performance excellence. The Core Values and the seven Baldrige Categories form the building blocks and the integrating mechanism for the system. However, successful management of overall performance requires organization-specific synthesis and alignment. Synthesis means looking at your organization as a whole and builds upon key business requirements, including your strategic objectives and action plans. Alignment means

using the key linkages among requirements given in the Baldrige Categories, including the key measures/indicators.

Alignment is depicted in the Baldrige framework on page 5. Alignment includes your senior leaders' focus on strategic directions and on your customers. It means that your senior leaders monitor, respond to, and manage performance based on your business results. Alignment includes using your measures/indicators to link your key strategies with your key processes and align your resources to improve overall performance and satisfy customers.

Thus, a systems perspective means managing your whole organization, as well as its components, to achieve success.

Criteria for Performance Excellence Framework

The Core Values and Concepts are embodied in seven Categories, as follows:

- 1 Leadership
- 2 Strategic Planning
- 3 Customer and Market Focus
- 4 Information and Analysis
- 5 Human Resource Focus
- 6 Process Management
- 7 Business Results

The figure on page 5 provides the framework connecting and integrating the Categories.

From top to bottom, the framework has the following basic elements.

Organizational Profile

Your Organizational Profile (top of figure) sets the context for the way your organization operates. Your environment, key working relationships, and strategic challenges serve as an overarching guide for your organizational performance management system.

System

The system is composed of the six Baldrige Categories in the center of the figure that define the organization, its operations, and its results.

Leadership (Category 1), Strategic Planning (Category 2), and Customer and Market Focus (Category 3) represent the leadership triad. These Categories are placed together to emphasize the importance of a leadership focus on strategy and customers. Senior leaders set your organizational direction and seek future opportunities for your organization.

Human Resource Focus (Category 5), Process Management (Category 6), and Business Results (Category 7) represent the results triad. Your organization's employees and its key processes accomplish the work of the organization that yields your business results.

All actions point toward Business Results—a composite of customer, financial, and operational performance results, including human resource results and public responsibility.

The horizontal arrow in the center of the framework links the leadership triad to the results triad, a linkage critical to organizational success. Furthermore, the arrow indicates the central relationship between Leadership (Category 1) and Business Results (Category 7). The two-headed arrow indicates the importance of feedback in an effective performance management system.

Information and Analysis

Information and Analysis (Category 4) are critical to the effective management of your organization and to a fact-based system for improving performance and competitiveness. Information and analysis serve as a foundation for the performance management system.

Criteria Structure

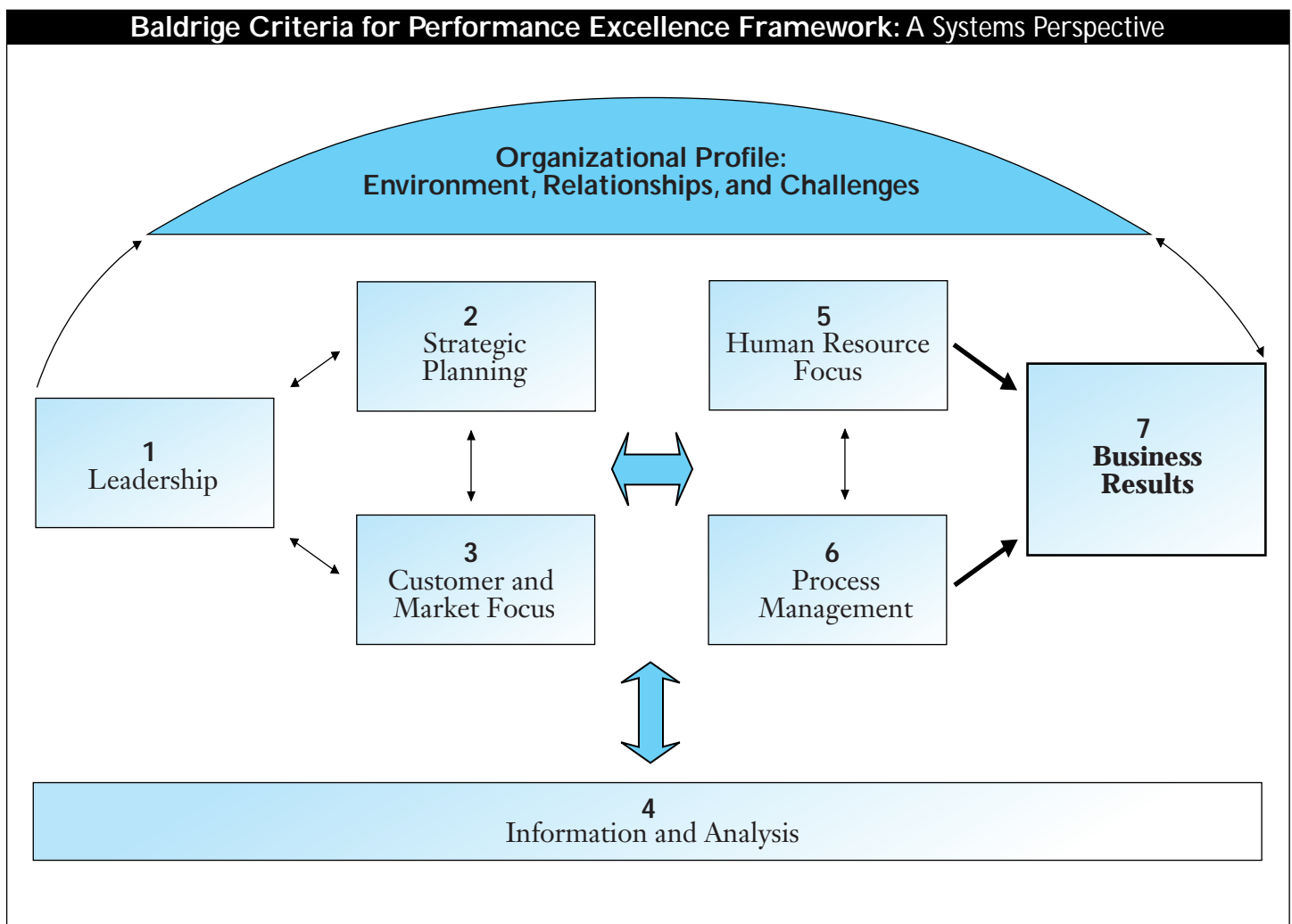
The seven Criteria Categories shown in the figure are subdivided into Items and Areas to Address.

Items

There are 18 Items, each focusing on a major requirement. Item titles and point values are given on page 9. The Item format is shown on page 47.

Areas to Address

Items consist of one or more Areas to Address (Areas). Organizations should address their responses to the specific requirements of these Areas.



KEY CHARACTERISTICS OF THE CRITERIA

1. The Criteria focus on business results.

The Criteria focus on the key areas of business performance, given below.

Business performance areas:

- (1) customer-focused results
- (2) financial and market results
- (3) human resource results
- (4) organizational effectiveness results, including operational and supplier performance

The use of this composite of indicators is intended to ensure that strategies are balanced—that they do not inappropriately trade off among important stakeholders, objectives, or short- and longer-term goals.

2. The Criteria are nonprescriptive and adaptable.

The Criteria are made up of results-oriented requirements. However, the Criteria *do not* prescribe

- that your organization should or should not have departments for quality, planning, or other functions;
- how your organization should be structured; or
- that different units in your organization should be managed in the same way.

These factors differ among organizations, and they are likely to change as needs and strategies evolve.

The Criteria are nonprescriptive for the following reasons:

- (1) The focus is on results, not on procedures, tools, or organizational structure. Organizations are encouraged to develop and demonstrate creative, adaptive, and flexible approaches for meeting basic requirements. Nonprescriptive requirements are intended to foster incremental and major (“breakthrough”) improvements, as well as basic change.
- (2) Selection of tools, techniques, systems, and organizational structure usually depends on factors such as business type and size, your organization’s stage of development, and employee capabilities and responsibilities.
- (3) Focus on common requirements, rather than on common procedures, fosters better understanding, communication, sharing, and alignment, while supporting innovation and diversity in approaches.

3. The Criteria support a systems perspective to maintaining organization-wide goal alignment.

The systems perspective to goal alignment is embedded in the integrated structure of the Core Values and Concepts, the Organizational Profile, the Criteria, and the results-oriented, cause-effect linkages among the Criteria Items.

Alignment in the Criteria is built around connecting and reinforcing measures derived from your organization’s processes and strategy. These measures tie directly to customer value and to overall performance. The use of measures thus channels different activities in consistent directions with less need for detailed procedures, centralized decision making, or process management. Measures thereby serve both as a communications tool and a basis for deploying consistent overall performance requirements. Such alignment ensures consistency of purpose while also supporting agility, innovation, and decentralized decision making.

A systems perspective to goal alignment, particularly when strategy and goals change over time, requires dynamic linkages among Criteria Items. In the Criteria, action-oriented cycles of learning take place via feedback between processes and results.

The learning cycles have four, clearly defined stages:

- (1) planning, including design of processes, selection of measures, and deployment of requirements
- (2) execution of plans
- (3) assessment of progress, taking into account internal and external results
- (4) revision of plans based upon assessment findings, learning, new inputs, and new requirements

4. The Criteria support goal-based diagnosis.

The Criteria and the Scoring Guidelines make up a two-part diagnostic (assessment) system. The Criteria are a set of 18 performance-oriented requirements. The Scoring Guidelines spell out the assessment dimensions—Approach, Deployment, and Results—and the key factors used to assess each dimension. An assessment thus provides a profile of strengths and opportunities for improvement relative to the 18 basic requirements. In this way, assessment leads to actions that contribute to performance improvement in all areas, as described in the shaded box above. This diagnostic assessment is a useful management tool that goes beyond most performance reviews and is applicable to a wide range of strategies and management systems.

CHANGES FROM THE 2000 CRITERIA

The Criteria continue to evolve, seeking to enhance coverage of strategy-driven performance, address the needs of all stakeholders, and accommodate important changes in business needs and practices. The increasing importance of e-commerce, the use of Internet-based interactions, and the alignment of all aspects of your performance management system receive greater attention in the 2001 Criteria. In addition, the Criteria emphasize the roles of data, information, and information and knowledge management and their use in business.

Criteria questions have been better aligned throughout the seven Categories and in the new Organizational Profile to accomplish the purpose of Baldrige self-assessment and external assessment: to determine organizational gaps and alignment in approach and deployment (Categories 1–6) and to determine organizational gaps and strength of performance in results areas (Category 7).

The Organizational Profile, the Criteria Items, and the Scoring Guidelines have been aligned so that the assessment addresses both changing business needs/directions and ongoing evaluation/improvement of key processes. Both are important because prioritized process improvement (“doing things better”) and addressing changing needs (“doing the right business things”) are critical to success in an increasingly competitive environment, and they frequently compete for the same resources.

The most significant changes in the Criteria and the Criteria booklet are summarized as follows:

- The number of Items has been reduced from 19 to 18.
- The number of Areas to Address has been increased from 27 to 29.
- A new Preface entitled Organizational Profile replaces the Business Overview from the 2000 Criteria. Its placement at the front of the Criteria sets your organizational context for responding to the Criteria Items.
- The Glossary of Key Terms continues to be revised and expanded.
- Category 4, Information and Analysis, now includes an Item on information management. The Category has been rewritten to recognize the growing importance of the Internet and e-commerce and your dependence on reliable information from these communication vehicles.
- Category 6, Process Management, now specifically addresses all key product, service, and other business processes.

There have been some changes in all Criteria Items; the most significant changes are highlighted and discussed below.

Preface: Organizational Profile

- This new section, to be completed before addressing the Criteria Items, sets a basis for your Baldrige assessment. It is written in the same question format as the Criteria Items.
- The Organizational Profile is the starting point for self-assessment and for writing an application. It also may be used by itself for an initial self-assessment; if you identify topics for which conflicting, little, or no information is available, it is possible that your assessment need go no further and you can use these topics for action planning.

Category 1: Leadership

- Item 1.1, Organizational Leadership, has been modified to better emphasize the senior leaders’ role in creating and setting the current and future environment and in reviewing organizational performance.

Category 2: Strategic Planning

- You now are asked to respond in terms of your short- and longer-term planning time horizons, recognizing that these horizons are quite different among organizations and industries.
- In Item 2.1, Strategy Development, you now are asked how your strategic objectives align with challenges identified in your Organizational Profile.

Category 3: Customer and Market Focus

- Item 3.2, now Customer Relationships and Satisfaction, places greater emphasis on the key aspects of relationship building: customer acquisition, satisfaction, and retention and business expansion.

Category 4: Information and Analysis

- Item 4.1, now Measurement and Analysis of Organizational Performance, combines Items 4.1 and 4.2 from the 2000 Criteria. This Item continues to stress measuring, analyzing, aligning, and improving performance throughout the organization.
- Item 4.2, Information Management, is a new Item addressing the availability, quality, and accessibility of data and the quality of software and hardware.

Category 5: Human Resource Focus

- Item 5.1, Work Systems, now includes succession planning and a stronger focus on organizing and managing for improved cooperation, communication, and knowledge sharing.

Category 6: Process Management

- Item 6.2, Business Processes, is a new Item that asks you to identify and describe your key nonproduct/nonservice processes that lead to business growth and success. This Item has been added in recognition of the growing importance of processes such as supply chain management, technology acquisition, mergers and acquisitions, research and development, and knowledge management.
- Item 6.3, now Support Processes, was Item 6.2 in 2000. It asks you to identify and describe your key processes that support your daily operations and your employees in delivering products and services.
- Item 6.3 from the 2000 Criteria, Supplier and Partnering Processes, has been discontinued, allowing each organization to address suppliers and partners as appropriate to its business. For many organizations, supply chain management is critical and therefore needs to be addressed as a key business process (Item 6.2).

Category 7: Business Results

- Item 7.1, Customer-Focused Results, now has two Areas to Address, in recognition of the importance of both customer measures and product/service measures to determining customer satisfaction and loyalty.
- Item 7.4, Organizational Effectiveness Results, was Item 7.5 in 2000. This Item now covers a wider range of performance, including Supplier and Partner Results, which was a separate Item (7.4) in 2000. Public Responsibility and Citizenship Results have been made a separate Area to Address in recognition of the importance of these results to the communities served by your organization.

Scoring Guidelines

- Descriptors for the Approach-Deployment scoring ranges have been modified to highlight the importance of addressing evaluation and improvement, as well as changing business needs.

2001 CRITERIA FOR PERFORMANCE EXCELLENCE—ITEM LISTING

P	Preface: Organizational Profile	
	P.1 Organizational Description	
	P.2 Organizational Challenges	
	2001 Categories/Items	Point Values
1	Leadership	120
	1.1 Organizational Leadership	80
	1.2 Public Responsibility and Citizenship	40
2	Strategic Planning	85
	2.1 Strategy Development	40
	2.2 Strategy Deployment	45
3	Customer and Market Focus	85
	3.1 Customer and Market Knowledge	40
	3.2 Customer Relationships and Satisfaction	45
4	Information and Analysis	90
	4.1 Measurement and Analysis of Organizational Performance	50
	4.2 Information Management	40
5	Human Resource Focus	85
	5.1 Work Systems	35
	5.2 Employee Education, Training, and Development	25
	5.3 Employee Well-Being and Satisfaction	25
6	Process Management	85
	6.1 Product and Service Processes	45
	6.2 Business Processes	25
	6.3 Support Processes	15
7		450
	7.1 Customer-Focused Results	125
	7.2 Financial and Market Results	125
	7.3 Human Resource Results	80
	7.4 Organizational Effectiveness Results	120
	TOTAL POINTS	1000

Note: The Scoring System used with the Criteria Items in a Baldrige assessment can be found on pages 45–46.

P Preface: Organizational Profile

The **Organizational Profile** is a snapshot of your organization, the key influences on how you operate, and the key challenges you face.

P.1 Organizational Description

Describe your organization's business environment and your key relationships with customers, suppliers, and other partners.

Within your response, include answers to the following questions:

a. Organizational Environment

- (1) What are your organization's main products and/or services? Include a description of how they are delivered to customers.
- (2) What is your organizational context/culture? Include your purpose, vision, mission, and values, as appropriate.
- (3) What is your employee profile? Include educational levels, workforce and job diversity, bargaining units, use of contract employees, and special safety requirements, as appropriate.
- (4) What are your major technologies, equipment, and facilities?
- (5) What is the regulatory environment under which your organization operates? Include occupational health and safety regulations; accreditation requirements; and environmental, financial, and product regulations.

b. Organizational Relationships

- (1) What are your key customer groups and/or market segments? What are their key requirements for your products and services? Include how these requirements differ among customer groups and/or market segments, as appropriate.
- (2) What are your most important types of suppliers and dealers and your most important supply chain requirements? What are your key supplier and customer partnering relationships and communication mechanisms?

Notes:

N1. Customer group and market segment requirements (P.1b[1]) might include on-time delivery, low defect levels, price reductions, electronic communication, and after-sales service.

N2. Communication mechanisms (P.1b[2]) should be two-way and might be in person, electronic, by telephone, and/or written. For many organizations, these mechanisms might be changing.

Item notes serve three purposes: (1) to clarify terms or requirements presented in Items, (2) to give instructions on responding to the Criteria Item requirements, and (3) to indicate key linkages to other Items. In all cases, the intent is to help you respond to the Item requirements.

P.2 Organizational Challenges

Describe your organization's competitive environment, your key strategic challenges, and your system for performance improvement.

Within your response, include answers to the following questions:

a. Competitive Environment

- (1) What is your competitive position? Include your relative size and growth in your industry and the numbers and types of your competitors.
- (2) What are the principal factors that determine your success relative to your competitors? Include any changes taking place that affect your competitive situation.

b. Strategic Challenges

What are your key strategic challenges? Include operational, human resource, business, and global challenges, as appropriate.

c. Performance Improvement System

How do you maintain an organizational focus on performance improvement? Include your approach to systematic evaluation and improvement of key processes and to fostering organizational learning and knowledge sharing.

Notes:

N1. Factors (P.2a[2]) might include differentiators such as price leadership, design services, e-services, geographic proximity, and warranty and product options.

N2. Challenges (P.2b) might include electronic communication with businesses and end-use consumers, reduced product introduction cycle times, mergers and acquisitions, global marketing and

competition, customer retention, staff retention, and value chain integration.

N3. Performance improvement (P.2c) is an assessment dimension used in the Scoring System to evaluate the maturity of organizational approaches and deployment (see pages 45–46). This question is intended to help you and the Baldrige Examiners set a context for your approach to performance improvement.

Importance of Your Organizational Profile

Your Organizational Profile is critically important because

- it is the most appropriate starting point for self-assessment and for writing an application;
- it helps you identify potential gaps in key information and focus on key performance requirements and business results;
- it is used by the Examiners and Judges in all stages of application review, including the site visit, to understand your organization and what you consider important; and
- it also may be used by itself for an initial self-assessment. If you identify topics for which conflicting, little, or no information is available, it is possible that your assessment need go no further and you can use these topics for action planning.

Page Limit

For Baldrige Award applicants, the Organizational Profile is limited to five pages. These are not counted in the overall application page limit. Typing and format instructions for the Organizational Profile are the same as for the application. These instructions are given in the *Baldrige Award Application Forms* booklet. Ordering information is given on page 53.

1 Leadership (120 pts.)

The **Leadership** Category examines how your organization's senior leaders address values, directions, and performance expectations, as well as a focus on customers and other stakeholders, empowerment, innovation, and learning. Also examined is how your organization addresses its responsibilities to the public and supports its key communities.

1.1 Organizational Leadership (80 pts.)

Approach-Deployment

Describe how senior leaders guide your organization, including how they review organizational performance.

Within your response, include answers to the following questions:

a. Senior Leadership Direction

- (1) How do senior leaders set and deploy organizational values, short- and longer-term directions, and performance expectations, including a focus on creating and balancing value for customers and other stakeholders? Include how senior leaders communicate values, directions, and expectations through your leadership system and to all employees.
- (2) How do senior leaders create an environment for empowerment, innovation, organizational agility, and organizational and employee learning?

b. Organizational Performance Review

- (1) How do senior leaders review organizational performance and capabilities to assess organizational success, competitive performance, progress relative to short- and longer-term goals, and the ability to address changing organizational needs? Include the key performance measures regularly reviewed by your senior leaders. Also, include your key recent performance review findings.
- (2) How are organizational performance review findings translated into priorities for improvement and opportunities for innovation? How are they deployed throughout your organization and, as appropriate, to your suppliers/partners to ensure organizational alignment?
- (3) How do senior leaders use organizational performance review findings to improve both their own leadership effectiveness and your leadership system?

Notes:

N1. Organizational directions (1.1a[1]) relate to strategic objectives and action plans described in Items 2.1 and 2.2.

N2. Senior leaders' organizational performance reviews (1.1b) should be informed by organizational performance analyses described in 4.1b and strategic objectives and action plans described in Items 2.1 and 2.2.

N3. Leadership effectiveness improvement (1.1b[3]) should be supported by formal and/or informal employee feedback/surveys.

N4. Your organizational performance results should be reported in Items 7.1, 7.2, 7.3, and 7.4.

Item responses are assessed by considering the Criteria Item requirements and the maturity of your approaches, breadth of deployment, and strength of your improvement process and results relative to the Scoring System. Refer to the Scoring System information on pages 45–46.

For definitions of the following **key terms**, see pages 29–31: alignment, approach, deployment, empowerment, innovation, measures, performance, senior leaders, stakeholders, and value.

For additional description of this Item, see page 32.

1.2 Public Responsibility and Citizenship (40 pts.)

Approach-Deployment

Describe how your organization addresses its responsibilities to the public and practices good citizenship.

Within your response, include answers to the following questions:

a. Responsibilities to the Public

- (1) How do you address the impacts on society of your products, services, and operations? Include your key processes, measures, and targets for regulatory and legal requirements and for addressing risks associated with your products, services, and operations.
- (2) How do you anticipate public concerns with current and future products, services, and operations? How do you prepare for these concerns in a proactive manner?
- (3) How do you accomplish ethical business practices in all stakeholder transactions and interactions?

b. Support of Key Communities

How do your organization, your senior leaders, and your employees actively support and strengthen your key communities? Include how you identify key communities and determine areas of emphasis for organizational involvement and support.

Notes:

N1. Public responsibilities in areas critical to your business also should be addressed in Strategy Development (Item 2.1) and/or in Process Management (Category 6). Key results, such as results of regulatory/legal compliance or environmental improvements through use of “green” technology or other means, should be reported as Organizational Effectiveness Results (Item 7.4).

N2. Areas of community support appropriate for inclusion in 1.2b might include your efforts to strengthen local community services, education, and health; the environment; and practices of trade, business, or professional associations.

N3. The health and safety of employees are not addressed in Item 1.2; you should address these employee factors in Item 5.3.

For a definition of the following **key term**, see pages 30–31: process.

For additional description of this Item, see page 32.

2 Strategic Planning (85 pts.)

The **Strategic Planning** Category examines how your organization develops strategic objectives and action plans. Also examined are how your chosen strategic objectives and action plans are deployed and how progress is measured.

2.1 Strategy Development (40 pts.)

Approach-Deployment

Describe how your organization establishes its strategic objectives, including enhancing its competitive position and overall performance.

Within your response, include answers to the following questions:

a. Strategy Development Process

- (1) What is your overall strategic planning process? Include key steps, key participants, and your short- and longer-term planning time horizons.
- (2) How do you ensure that planning addresses the following key factors? Briefly outline how relevant data and information are gathered and analyzed to address these factors:
 - customer and market needs/expectations/opportunities
 - your competitive environment and your capabilities relative to competitors
 - technological and other key changes that might affect your products/services and/or how you operate
 - your strengths and weaknesses, including human and other resources
 - your supplier/partner strengths and weaknesses
 - financial, societal, and other potential risks

b. Strategic Objectives

- (1) What are your key strategic objectives and your timetable for accomplishing them? Include key goals/targets, as appropriate.
- (2) How do your strategic objectives address the challenges identified in response to P.2 in your Organizational Profile? How do you ensure that your strategic objectives balance the needs of all key stakeholders?

Notes:

N1. “Strategy development” refers to your organization’s approach (formal or informal) to preparing for the future. Strategy development might utilize various types of forecasts, projections, options, scenarios, and/or other approaches to envisioning the future for purposes of decision making and resource allocation.

N2. “Strategy” should be interpreted broadly. Strategy might be built around or lead to any or all of the following: new products, services, and markets; revenue growth via various approaches, including acquisitions; and new partnerships and alliances. Strategy might be directed toward becoming a preferred supplier, a local supplier in each of your major customers’ markets, a low-cost producer, a

market innovator, and/or a high-end or customized product/service provider.

N3. Challenges (2.1b[2]) addressed in your strategy might include rapid response, customization, lean or virtual manufacturing, rapid innovation, Web-based supplier/customer relationship management, and product/service quality. Responses to Item 2.1 should focus on your specific challenges—those most important to your business success and to strengthening your organization’s overall performance.

N4. Item 2.1 addresses your overall organizational strategy, which might include changes in services, products, and product lines. However, the Item does not address product and service design; you should address these factors in Item 6.1.

For a definition of the following **key term**, see page 31: strategic objectives.

For additional description of this Item, see pages 33–34.

Describe how your organization converts its strategic objectives into action plans. Summarize your organization's action plans and related key performance measures/indicators. Project your organization's future performance on these key performance measures/indicators.

Within your response, include answers to the following questions:

a. Action Plan Development and Deployment

- (1) How do you develop and deploy action plans to achieve your key strategic objectives? Include how you allocate resources to ensure accomplishment of your action plans.
- (2) What are your key short- and longer-term action plans? Include key changes, if any, in your products/services, your customers/markets, and how you operate.
- (3) What are your key human resource plans that derive from your short- and longer-term strategic objectives and action plans?
- (4) What are your key performance measures/indicators for tracking progress relative to your action plans? How do you ensure that your overall action plan measurement system achieves organizational alignment and covers all key deployment areas and stakeholders?

b. Performance Projection

What are your performance projections for your key measures/indicators for both your short- and longer-term planning time horizons? How does your projected performance compare with competitors' performance, key benchmarks, goals, and past performance, as appropriate?

Notes:

N1. Action plan development and deployment are closely linked to other Items in the Criteria. Examples of key linkages are

- Item 1.1 for how your senior leaders set and communicate directions;
- Category 3 for gathering customer and market knowledge as input to your strategy and action plans and for deploying action plans;
- Category 4 for information and analysis to support your key information needs, to support your development of strategy, to provide an effective basis for your performance measurements, and to track progress relative to your strategic objectives and action plans;

- Category 5 for your work system needs; employee education, training, and development needs; and related human resource factors resulting from action plans;
- Category 6 for process requirements resulting from your action plans; and
- Item 7.4 for specific accomplishments relative to your organizational strategy.

N2. Measures/indicators of projected performance (2.2b) might include changes resulting from new business ventures; business acquisitions; new value creation; market entry and shifts; and significant anticipated innovations in products, services, and technology.

For definitions of the following **key terms**, see pages 29–30: action plans, benchmarks, measures and indicators.

For additional description of this Item, see page 34.

3 Customer and Market Focus (85 pts.)

The **Customer and Market Focus** Category examines how your organization determines requirements, expectations, and preferences of customers and markets. Also examined is how your organization builds relationships with customers and determines the key factors that lead to customer acquisition, satisfaction, and retention and to business expansion.

3.1 Customer and Market Knowledge (40 pts.)

Approach-Deployment

Describe how your organization determines requirements, expectations, and preferences of customers and markets to ensure the continuing relevance of your products/services and to develop new opportunities.

Within your response, include answers to the following questions:

a. **Customer and Market Knowledge**

- (1) How do you determine or target customers, customer groups, and/or market segments? How do you include customers of competitors and other potential customers and/or markets in this determination?
- (2) How do you listen and learn to determine key customer requirements (including product/service features) and their relative importance/value to customers' purchasing decisions for purposes of product/service planning, marketing, improvements, and other business development? In this determination, how do you use relevant information from current and former customers, including marketing/sales information, customer retention data, won/lost analysis, and complaints? If determination methods vary for different customers and/or customer groups, describe the key differences in your determination methods.
- (3) How do you keep your listening and learning methods current with business needs and directions?

Notes:

N1. Customer groups (3.1a[1]) might include Web-based customers and/or customers with whom you have direct contact. Key product/service features and purchasing decisions might take into account transactional modes and factors such as confidentiality and security.

N2. If your products/services are sold to or delivered to end-use customers via other businesses such as retail stores or dealers, customer groups (3.1a[1]) should include both the end users and these intermediate businesses.

N3. "Product/service features" (3.1a[2]) refers to all the important characteristics of products/services and to their performance throughout their full life cycle and the full "consumption chain." This includes all

customers' purchase experiences and other interactions with your organization. The focus should be on features that affect customer preference and repeat business—for example, those features that differentiate your products and services from competing offerings. Those features might include price, reliability, value, delivery, customer or technical support, and the sales relationship.

N4. Listening/learning (3.1a[2]) might include gathering and integrating Web-based data and information that bear upon customers' purchasing decisions. Keeping your listening and learning methods current with business needs and directions (3.1a[3]) also might include use of current and new technology, such as Web-based data gathering.

For additional description of this Item, see page 35.

Describe how your organization builds relationships to acquire, satisfy, and retain customers and to develop new opportunities. Describe also how your organization determines customer satisfaction.

Within your response, include answers to the following questions:

a. Customer Relationships

- (1) How do you build relationships to acquire and satisfy customers and to increase repeat business and positive referrals?
- (2) How do you determine key customer contact requirements and how they vary for differing modes of access? How do you ensure that these contact requirements are deployed to all people involved in the response chain? Include a summary of your key access mechanisms for customers to seek information, conduct business, and make complaints.
- (3) What is your complaint management process? Include how you ensure that complaints are resolved effectively and promptly and that all complaints are aggregated and analyzed for use in improvement throughout your organization and by your partners, as appropriate.
- (4) How do you keep your approaches to building relationships and providing customer access current with business needs and directions?

b. Customer Satisfaction Determination

- (1) How do you determine customer satisfaction and dissatisfaction and use this information for improvement? Include how you ensure that your measurements capture actionable information that predicts customers' future business with you and/or potential for positive referral. Describe significant differences in determination methods for different customer groups.
- (2) How do you follow up with customers on products/services and transactions to receive prompt and actionable feedback?
- (3) How do you obtain and use information on your customers' satisfaction relative to customers' satisfaction with competitors and/or benchmarks, as appropriate?
- (4) How do you keep your approaches to determining satisfaction current with business needs and directions?

Notes:

N1. Customer relationships (3.2a) might include the development of partnerships or alliances with customers.

N2. Determining customer satisfaction and dissatisfaction (3.2b) might include use of any or all of the following: surveys, formal and informal feedback, use of customer account histories, complaints, and transaction completion rates. Information might be gathered on the Internet, through personal contact or a third party, or by mail.

N3. Customer satisfaction measurements might include both a numerical rating scale and descriptors for each unit in the scale. Actionable customer satisfaction measurements provide useful information about specific product/service features, delivery, relationships, and transactions that bear upon the customers' future actions—repeat business and/or positive referral.

N4. Your customer satisfaction and dissatisfaction results should be reported in Item 7.1.

For additional description of this Item, see pages 35–36.

4 Information and Analysis (90 pts.)

The **Information and Analysis** Category examines your organization's information management and performance measurement systems and how your organization analyzes performance data and information.

4.1 Measurement and Analysis of Organizational Performance (50 pts.)

Approach-Deployment

Describe how your organization provides effective performance management systems for measuring, analyzing, aligning, and improving performance at all levels and in all parts of your organization.

Within your response, include answers to the following questions:

a. Performance Measurement

- (1) How do you gather and integrate data and information from all sources to support daily operations and organizational decision making?
- (2) How do you select and align measures/indicators for tracking daily operations and overall organizational performance?
- (3) How do you select and ensure the effective use of key comparative data and information?
- (4) How do you keep your performance measurement system current with business needs and directions?

b. Performance Analysis

- (1) What analyses do you perform to support your senior leaders' organizational performance review and your organization's strategic planning?
- (2) How do you communicate the results of organizational-level analysis to work group and/or functional-level operations to enable effective support for decision making?
- (3) How do you align the results of organizational-level analysis with your key business results, strategic objectives, and action plans? How do these results provide the basis for projections of continuous and breakthrough improvements in performance?

Notes:

N1. Performance measurement is used in fact-based decision making for setting and aligning organizational directions and resource use at the work unit, key process, departmental, and whole organization levels.

N2. Comparative data and information sources (4.1a[3]) include benchmarking and competitive comparisons. "Benchmarking" refers to identifying processes and results that represent best practices and performance for similar activities, inside or outside your organization's industry. Competitive comparisons relate your organization's performance to that of competitors in your markets.

N3. Analysis includes examining trends; organizational, industry, and technology projections; and comparisons,

cause-effect relationships, and correlations intended to support your performance reviews, help determine root causes, and help set priorities for resource use. Accordingly, analysis draws upon all types of data: customer-related, financial and market, operational, and competitive.

N4. The results of organizational performance analysis should contribute to your senior leaders' organizational performance review in 1.1b and organizational strategic planning in Category 2.

N5. Your organizational performance results should be reported in Items 7.1, 7.2, 7.3, and 7.4.

For a definition of the following **key term**, see page 29: analysis.

For additional description of this Item, see pages 36–38.

Describe how your organization ensures the quality and availability of needed data and information for employees, suppliers/partners, and customers.

Within your response, include answers to the following questions:

a. Data Availability

- (1) How do you make needed data and information available? How do you make them accessible to employees, suppliers/partners, and customers, as appropriate?
- (2) How do you ensure data and information integrity, reliability, accuracy, timeliness, security, and confidentiality?
- (3) How do you keep your data and information availability mechanisms current with business needs and directions?

b. Hardware and Software Quality

- (1) How do you ensure that hardware and software are reliable and user friendly?
- (2) How do you keep your software and hardware systems current with business needs and directions?

Notes:

N1. Data availability (4.2a) is of growing importance as the Internet and e-business/e-commerce are used increasingly for business-to-business and business-to-consumer interactions and intranets become more important as a major source of organization-wide communications.

N2. Data and information access (4.2a[1]) might be via electronic and other means.

For additional description of this Item, see page 38.

5 Human Resource Focus (85 pts.)

The **Human Resource Focus** Category examines how your organization motivates and enables employees to develop and utilize their full potential in alignment with your organization's overall objectives and action plans. Also examined are your organization's efforts to build and maintain a work environment and an employee support climate conducive to performance excellence and to personal and organizational growth.

5.1 Work Systems (35 pts.)

Approach-Deployment

Describe how your organization's work and jobs, compensation, career progression, and related workforce practices motivate and enable employees and the organization to achieve high performance.

Within your response, include answers to the following questions:

a. Work Systems

- (1) How do you organize and manage work and jobs to promote cooperation, initiative/innovation, your organizational culture, and the flexibility to keep current with business needs? How do you achieve effective communication and knowledge/skill sharing across work units, jobs, and locations, as appropriate?
- (2) How do you motivate employees to develop and utilize their full potential? Include formal and/or informal mechanisms you use to help employees attain job- and career-related development/learning objectives and the role of managers and supervisors in helping employees attain these objectives.
- (3) How does your employee performance management system, including feedback to employees, support high performance and a customer and business focus? How do your compensation, recognition, and related reward/incentive practices reinforce these objectives?
- (4) How do you accomplish effective succession planning for senior leadership and throughout the organization?
- (5) How do you identify characteristics and skills needed by potential employees? How do you recruit, hire, and retain new employees? How do your work systems capitalize on the diverse ideas, cultures, and thinking of the communities with which you interact (your employee hiring and customer communities)?

Notes:

N1. "Employees" refers to your organization's permanent, temporary, and part-time personnel, as well as any contract employees supervised by your organization. Employees include team leaders, supervisors, and managers at all levels. Contract employees supervised by a contractor should be addressed in business or support processes in Category 6.

N2. "Your organization's work" refers to how your employees are organized and/or organize themselves in formal and informal, temporary, or longer-term units. This might include work teams, process teams, customer action teams, problem-solving teams, centers of excellence, functional units, cross-functional

teams, and departments—self-managed or managed by supervisors.

"Jobs" refers to responsibilities, authorities, and tasks of individuals. In some work systems, jobs might be shared by a team.

N3. Compensation and recognition (5.1a[3]) include promotions and bonuses that might be based upon performance, skills acquired, and other factors. Recognition includes monetary and nonmonetary, formal and informal, and individual and group mechanisms.

For a definition of the following **key term**, see page 30: high-performance work.

For additional description of this Item, see pages 38–39.

5.2 Employee Education, Training, and Development (25 pts.)

Approach-Deployment

Describe how your organization's education and training support the achievement of your overall objectives, including building employee knowledge, skills, and capabilities and contributing to high performance.

Within your response, include answers to the following questions:

a. Employee Education, Training, and Development

- (1) How do education and training contribute to the achievement of your action plans? How does your education and training approach balance short- and longer-term organizational objectives and employee needs, including development, learning, and career progression?
- (2) How do you seek and use input from employees and their supervisors/managers on education and training needs and delivery options?
- (3) How do you address in your employee education, training, and development your key organizational needs associated with technological change, management/leadership development, new employee orientation, safety, performance measurement/improvement, and diversity?
- (4) How do you deliver education and training? Include formal and informal delivery, including mentoring and other approaches, as appropriate. How do you evaluate the effectiveness of education and training, taking into account individual and organizational performance?
- (5) How do you reinforce the use of knowledge and skills on the job?

Notes:

N1. Technological change (5.2a[3]) might include computer and Internet literacy.

N2. Education and training delivery (5.2a[4]) might occur inside or outside your organization and involve

on-the-job, classroom, computer-based, distance learning, and/or other types of delivery (formal or informal).

For additional description of this Item, see pages 39–40.

Describe how your organization maintains a work environment and an employee support climate that contribute to the well-being, satisfaction, and motivation of all employees.

Within your response, include answers to the following questions:

a. Work Environment

How do you improve workplace health, safety, and ergonomics? How do employees take part in improving them? Include performance measures and/or targets for each key environmental factor. Also include significant differences, if any, based on varying work environments for employee groups and/or work units.

b. Employee Support and Satisfaction

- (1) How do you determine the key factors that affect employee well-being, satisfaction, and motivation? How are these factors segmented for a diverse workforce and for varying categories and types of employees, as appropriate?
- (2) How do you support your employees via services, benefits, and policies? How are these tailored to the needs of a diverse workforce and different categories and types of employees, as appropriate?
- (3) What formal and/or informal assessment methods and measures do you use to determine employee well-being, satisfaction, and motivation? How do you tailor these methods and measures to a diverse workforce and to different categories and types of employees, as appropriate? How do you use other indicators, such as employee retention, absenteeism, grievances, safety, and productivity, to assess and improve employee well-being, satisfaction, and motivation?
- (4) How do you relate assessment findings to key business results to identify priorities for improving the work environment and employee support climate?

Notes:

N1. Specific factors that might affect your employees' well-being, satisfaction, and motivation (5.3b[1]) include effective employee problem or grievance resolution; safety factors; employees' views of management; employee training, development, and career opportunities; employee preparation for changes in technology or the work organization; the work environment and other work conditions; management's empowerment of employees; information sharing by management; workload; cooperation and teamwork; recognition; services and benefits; communications; job security; compensation; and equal opportunity.

N2. Approaches for employee support (5.3b[2]) might include providing counseling, career development and employability services, recreational or cultural activities, nonwork-related education, day care, job rotation or sharing, special leave for family responsibilities or community service, home safety training, flexible work hours and location, outplacement, and retirement benefits (including extended health care).

N3. Measures/indicators of well-being, satisfaction, and motivation (5.3b[3]) might include data on safety and absenteeism, the overall turnover rate, the turnover rate for customer contact employees, employees' charitable contributions, grievances, strikes, other job actions, insurance costs, worker's compensation claims, and results of surveys. Survey indicators of satisfaction might include employee knowledge of job roles, employee knowledge of organizational direction, and employee perception of empowerment and information sharing. Your results relative to such measures/indicators should be reported in Item 7.3.

N4. Setting priorities (5.3b[4]) might draw upon your human resource results presented in Item 7.3 and might involve addressing employee problems based on their impact on your organizational performance.

For additional description of this Item, see page 40.

6 Process Management (85 pts.)

The **Process Management** Category examines the key aspects of your organization's process management, including customer-focused design, product and service delivery, key business, and support processes. This Category encompasses all key processes and all work units.

6.1 Product and Service Processes (45 pts.)

Approach-Deployment

Describe how your organization manages key processes for product and service design and delivery.

Within your response, include answers to the following questions:

a. Design Processes

- (1) What are your design processes for products/services and their related production/delivery systems and processes?
- (2) How do you incorporate changing customer/market requirements into product/service designs and production/delivery systems and processes?
- (3) How do you incorporate new technology, including e-technology, into products/services and into production/delivery systems and processes, as appropriate?
- (4) How do your design processes address design quality and cycle time, transfer of learning from past projects and other parts of the organization, cost control, new design technology, productivity, and other efficiency/effectiveness factors?
- (5) How do you design your production/delivery systems and processes to meet all key operational performance requirements?
- (6) How do you coordinate and test your design and production/delivery systems and processes? Include how you prevent defects/rework and facilitate trouble-free and timely introduction of products/services.

b. Production/Delivery Processes

- (1) What are your key production/delivery processes and their key performance requirements?
- (2) How does your day-to-day operation of key production/delivery processes ensure meeting key performance requirements?
- (3) What are your key performance measures/indicators used for the control and improvement of these processes? Include how in-process measures and real-time customer and supplier/partner input are used in managing your product and service processes, as appropriate.
- (4) How do you perform inspections, tests, and process/performance audits to minimize warranty and/or rework costs, as appropriate? Include your prevention-based processes for controlling inspection and test costs, as appropriate.
- (5) How do you improve your production/delivery systems and processes to achieve better process performance and improvements to products/services, as appropriate? How are improvements shared with other organizational units and processes and your suppliers/partners, as appropriate?

Notes:

N1. Product and service design, production, and delivery processes differ greatly among organizations, depending on many factors. These factors include the nature of your products and services, technology requirements, issues of modularity and parts

commonality, customer and supplier relationships and involvement, and product and service customization. Responses to Item 6.1 should be based upon the most critical requirements for your business.

N2. Responses to Item 6.1 should include how your customers and key suppliers and partners are involved in your design processes, as appropriate.

N3. The results of operational improvements in your product and service design and delivery processes

should be reported in Item 7.4. Results of improvements in product and service performance should be reported in Item 7.1.

For definitions of the following **key terms**, see pages 29 and 31: cycle time and productivity.

For additional description of this Item, see pages 40–42.

6.2 Business Processes (25 pts.)

Approach-Deployment

Describe how your organization manages its key processes that lead to business growth and success.

Within your response, include answers to the following questions:

a. Business Processes

- (1) What are your key business processes for business growth and success?
- (2) How do you determine key business process requirements, incorporating input from customers and suppliers/partners, as appropriate? What are the key requirements for these processes?
- (3) How do you design and perform these processes to meet all the key requirements?
- (4) What are your key performance measures/indicators used for the control and improvement of these processes? Include how in-process measures and customer and supplier feedback are used in managing your business processes, as appropriate.
- (5) How do you minimize overall costs associated with inspections, tests, and process/performance audits, as appropriate?
- (6) How do you improve your business processes to achieve better performance and to keep them current with business needs and directions? How are improvements shared with other organizational units and processes, as appropriate?

Notes:

N1. Your key business processes are those nonproduct/nonservice processes that are considered most important to business growth and success by your organization's senior leaders. These might include processes for innovation, research and development, technology acquisition, information and knowledge management, supply chain management, supplier partnering, outsourcing, mergers and acquisitions, global expansion, project management, and sales/marketing. The key business processes to be included in Item 6.2 are distinctive to your organization and how you operate.

For additional description of this Item, see page 42.

N2. To provide as complete and concise a response as possible for your key business processes, you might want to use a tabular format identifying the key processes and the attributes of each as called for in questions 6.2a(1)–6.2a(4).

N3. The results of improvements in your key business processes and key business process performance results should be reported in Item 7.4.

Describe how your organization manages its key processes that support your daily operations and your employees in delivering products and services.

Within your response, include answers to the following questions:

a. Support Processes

- (1) What are your key processes for supporting your daily operations and your employees in delivering products and services?
- (2) How do you determine key support process requirements, incorporating input from internal customers, as appropriate? What are the key operational requirements (such as productivity and cycle time) for these processes?
- (3) How do you design these processes to meet all the key requirements?
- (4) How does your day-to-day operation of key support processes ensure meeting key performance requirements?
- (5) What are your key performance measures/indicators used for the control and improvement of these processes? Include how in-process measures and internal customer feedback are used in managing your support processes, as appropriate.
- (6) How do you minimize overall costs associated with inspections, tests, and process/performance audits?
- (7) How do you improve your support processes to achieve better performance and to keep them current with business needs and directions? How are improvements shared with other organizational units and processes, as appropriate?

Notes:

N1. Your key support processes are those that are considered most important for support of your organization's product/service design and delivery processes and daily operations. These might include finance and accounting, facilities management, legal, human resource, and administration processes.

N2. The results of improvements in your key support processes and key support process performance results should be reported in Item 7.4.

For additional description of this Item, see page 42.

7 Business Results (450 pts.)

The **Business Results** Category examines your organization's performance and improvement in key business areas—customer satisfaction, product and service performance, financial and marketplace performance, human resource results, and operational performance. Also examined are performance levels relative to those of competitors.

7.1 Customer-Focused Results (125 pts.)

Results

Summarize your organization's key customer-focused results, including customer satisfaction and product and service performance results. Segment your results by customer groups and market segments, as appropriate. Include appropriate comparative data.

Provide data and information to answer the following questions:

a. Customer Results

- (1) What are your current levels and trends in key measures/indicators of customer satisfaction and dissatisfaction, including comparisons with competitors' levels of customer satisfaction?
- (2) What are your current levels and trends in key measures/indicators of customer-perceived value, customer retention, positive referral, and/or other aspects of building relationships with customers, as appropriate?

b. Product and Service Results

What are your current levels and trends in key measures/indicators of product and service performance that are important to your customers?

Notes:

N1. Customer satisfaction and dissatisfaction results reported in this Item should relate to determination methods and data described in Item 3.2.

N2. Measures/indicators of customers' satisfaction with your products/services relative to customers' satisfaction with competitors might include objective

information and data from your customers and from independent organizations.

N3. Service performance (7.1b) might include measures of success in providing nontraditional services to customers, such as Internet-based services.

For a definition of the following **key term**, see page 31: results.

For additional description of this Item, see page 43.

7.2 Financial and Market Results (125 pts.)

Results

Summarize your organization's key financial and marketplace performance results by market segments, as appropriate. Include appropriate comparative data.

Provide data and information to answer the following questions:

a. Financial and Market Results

- (1) What are your current levels and trends in key measures/indicators of financial performance, including aggregate measures of financial return and/or economic value, as appropriate?
- (2) What are your current levels and trends in key measures/indicators of marketplace performance, including market share/position, business growth, and new markets entered, as appropriate?

Notes:

N1. Responses to 7.2a(1) might include aggregate measures such as return on investment (ROI), asset utilization, operating margins, profitability, profitability by market/customer segment, liquidity, debt to

equity ratio, value added per employee, and financial activity measures.

N2. New markets entered (7.2a[2]) might include offering Web-based services.

For additional description of this Item, see page 43.

7.3 Human Resource Results (80 pts.)

Results

Summarize your organization's key human resource results, including employee well-being, satisfaction, and development and work system performance. Segment your results to address the diversity of your workforce and the different types and categories of employees, as appropriate. Include appropriate comparative data.

Provide data and information to answer the following questions:

a. Human Resource Results

- (1) What are your current levels and trends in key measures/indicators of employee well-being, satisfaction and dissatisfaction, and development?
- (2) What are your current levels and trends in key measures/indicators of work system performance and effectiveness?

Notes:

N1. Results reported in this Item should relate to activities described in Category 5. Your results should be responsive to key process needs described in Category 6 and to your organization's action plans and human resource plans described in Item 2.2.

N2. For appropriate measures of employee well-being and satisfaction (7.3a[1]), see Notes to Item 5.3. Appropriate measures/indicators of employee

development might include innovation and suggestion rates, courses completed, learning, on-the-job performance improvements, and cross-training rates.

N3. Appropriate measures/indicators of work system performance and effectiveness (7.3a[2]) might include job and job classification simplification, job rotation, work layout, and changing supervisory ratios.

For additional description of this Item, see pages 43–44.

7.4 Organizational Effectiveness Results (120 pts.)

Results

Summarize your organization's key performance results that contribute to the achievement of organizational effectiveness. Include appropriate comparative data.

Provide data and information to answer the following questions:

a. Operational Results

- (1) What are your current levels and trends in key measures/indicators of the operational performance of key design, production, delivery, business, and support processes? Include productivity, cycle time, supplier/partner performance, and other appropriate measures of effectiveness and efficiency.
- (2) What are your results for key measures/indicators of accomplishment of organizational strategy?

b. Public Responsibility and Citizenship Results

What are your results for key measures/indicators of regulatory/legal compliance and citizenship?

Notes:

N1. Results reported in 7.4a should address your key operational requirements and progress toward accomplishment of your key organizational performance goals as presented in the Organizational Profile and in Items 1.1, 2.2, 6.1, 6.2, and 6.3. Include results not reported in Items 7.1, 7.2, and 7.3.

N2. Regulatory and legal compliance results reported in 7.4b should address requirements described in Item 1.2.

For additional description of this Item, see page 44.

N3. Results reported in Item 7.4 should provide key information for analysis (Item 4.1) and review (Item 1.1) of your organizational performance and should provide the operational basis for customer-focused results (Item 7.1) and financial and market results (Item 7.2).

GLOSSARY OF KEY TERMS

This Glossary of Key Terms defines and briefly describes terms used throughout the Criteria booklet that are important to performance management.

Action Plans

The term “action plans” refers to specific actions that respond to short- and longer-term strategic objectives. Action plans include details of resource commitments and time horizons for accomplishment. Action plan development represents the critical stage in planning when strategic objectives and goals are made specific so that effective, organization-wide understanding and deployment are possible. In the Criteria, deployment of action plans includes creation of aligned measures for work units. Deployment might also require specialized training for some employees or recruitment of personnel.

An example of a strategic objective for a supplier in a highly competitive industry might be to develop and maintain a price leadership position. Action plans likely would entail design of efficient processes and creation of an accounting system that tracks activity-level costs, aligned for the organization as a whole. Performance requirements might include unit and/or team training in setting priorities based upon costs and benefits. Organizational-level analysis and review likely would emphasize productivity growth, cost control, and quality.

Alignment

“Alignment” refers to consistency of plans, processes, information, resource decisions, actions, results, analysis, and learning to support key organization-wide goals. Effective alignment requires a common understanding of purposes and goals and use of complementary measures and information for planning, tracking, analysis, and improvement at three levels: the organizational level, the key process level, and the work unit level.

Analysis

“Analysis” refers to an examination of facts and data to provide a basis for effective decisions. Analysis often involves the determination of cause-effect relationships. Overall organizational analysis guides process management toward achieving key business results and toward attaining strategic objectives.

Despite their importance, individual facts and data do not usually provide an effective basis for actions or setting priorities. Actions depend on an understanding of relationships, derived from analysis of facts and data.

Approach

“Approach” refers to how an organization addresses the Baldrige Criteria Item requirements, i.e., the methods and processes used by the organization. Approaches are evaluated on the basis of the appropriateness of the methods/processes to the Item requirements, the effectiveness of their use, and their alignment with organizational needs. For further description, see the Scoring System on page 45.

Benchmarks

The term “benchmarks” refers to processes and results that represent best practices and performance for similar activities, inside or outside an organization’s industry. Organizations engage in benchmarking activities to understand the current dimensions of world-class performance and to achieve discontinuous (nonincremental) or breakthrough improvement.

Benchmarks are one form of comparative data. Other comparative data organizations might use include industry data collected by a third party (frequently industry averages), data on competitors’ performance, and comparisons with similar organizations in the same geographic area.

Cycle Time

“Cycle time” refers to the time required to fulfill commitments or to complete tasks. Time measurements play a major role in the Criteria because of the great importance of time performance to improving competitiveness. “Cycle time” refers to all aspects of time performance. Cycle time improvement might include time to market, order fulfillment time, delivery time, changeover time, customer response times, and other key measures of time.

Deployment

“Deployment” refers to the extent to which an organization’s approach is applied to the requirements of a Baldrige Criteria Item. Deployment is evaluated on the basis of the breadth and depth of application of the approach to relevant processes and work units throughout the organization. For further description, see the Scoring System on page 45.

Empowerment

“Empowerment” refers to giving employees the authority and responsibility to make decisions and take actions. Empowerment results in decisions being made closest to the “front line,” where work-related knowledge and understanding reside.

Empowerment is aimed at enabling employees to satisfy customers on first contact, to improve processes and increase productivity, and to better the organization's business results. Empowered employees require information to make appropriate decisions; thus, an organizational requirement is to provide that information in a timely and useful way.

High-Performance Work

"High-performance work" refers to work approaches used to *systematically* pursue ever higher levels of overall organizational and individual performance, including quality, productivity, innovation rate, and cycle time performance. High-performance work results in improved service for customers and other stakeholders.

Approaches to high-performance work vary in form, function, and incentive systems. Effective approaches frequently include cooperation between management and the workforce, which may involve workforce bargaining units; cooperation among work units, often involving teams; self-directed responsibility/employee empowerment; employee input to planning; individual and organizational skill building and learning; learning from other organizations; flexibility in job design and work assignments; a flattened organizational structure, where decision making is decentralized and decisions are made closest to the "front line"; and effective use of performance measures, including comparisons. Many high-performance work systems use monetary and nonmonetary incentives based upon factors such as organizational performance, team and/or individual contributions, and skill building. Also, high-performance work approaches usually seek to align the organization's structure, work, jobs, employee development, and incentives.

Innovation

"Innovation" refers to making meaningful change to improve products, services, and/or processes and create new value for stakeholders. Innovation involves the adoption of an idea, process, technology, or product that is either new or new to its proposed application.

Successful organizational innovation is a multistep process that involves development and knowledge sharing, a decision to implement, implementation, evaluation, and learning. Although innovation is often associated with technological innovation, it is applicable to all key organizational processes that would benefit from change, whether through breakthrough improvement or change in approach or outputs.

Measures and Indicators

The term "measures and indicators" refers to numerical information that quantifies input, output, and performance

dimensions of processes, products, services, and the overall organization (outcomes). Measures and indicators might be simple (derived from one measurement) or composite.

The Criteria do not make a distinction between measures and indicators. However, some users of these terms prefer the term indicator (1) when the measurement relates to performance but is not a direct measure of such performance (e.g., the number of complaints is an indicator of dissatisfaction but not a direct measure of it) and (2) when the measurement is a predictor ("leading indicator") of some more significant performance (e.g., increased customer satisfaction might be a leading indicator of market share gain).

Performance

"Performance" refers to output results obtained from processes, products, and services that permit evaluation and comparison relative to goals, standards, past results, and other organizations. Performance might be expressed in nonfinancial and financial terms.

The Baldrige Criteria address three types of performance: (1) customer-focused, including key product and service performance; (2) financial and marketplace; and (3) operational.

"Customer-focused performance" refers to performance relative to measures and indicators of customers' perceptions, reactions, and behaviors and to measures and indicators of product and service characteristics important to customers. Examples include customer retention, complaints, customer survey results, product reliability, on-time delivery, customer-experienced defect levels, and service response time.

"Financial and marketplace performance" refers to performance relative to measures of cost, revenue, and market position, including asset utilization, asset growth, and market share. Examples include returns on investments, value added per employee, debt to equity ratio, returns on assets, operating margins, cash-to-cash cycle time, other profitability and liquidity measures, and market gains.

"Operational performance" refers to organizational, human resource, and supplier performance relative to effectiveness and efficiency measures and indicators. Examples include cycle time, productivity, waste reduction, regulatory compliance, and community involvement. Operational performance might be measured at the work unit level, key process level, and organizational level.

Process

"Process" refers to linked activities with the purpose of producing a product or service for a customer (user) within or outside the organization. Generally, processes involve combinations of people, machines, tools, techniques, and

materials in a systematic series of steps or actions. In some situations, processes might require adherence to a specific sequence of steps, with documentation (sometimes formal) of procedures and requirements, including well-defined measurement and control steps.

In many service situations, particularly when customers are directly involved in the service, process is used in a more general way, i.e., to spell out what must be done, possibly including a preferred or expected sequence. If a sequence is critical, the service needs to include information to help customers understand and follow the sequence. Service processes involving customers also require guidance to the providers of those services on handling contingencies related to customers' likely or possible actions or behaviors.

In knowledge work such as strategic planning, research, development, and analysis, process does not necessarily imply formal sequences of steps. Rather, process implies general understandings regarding competent performance such as timing, options to be included, evaluation, and reporting. Sequences might arise as part of these understandings.

Productivity

"Productivity" refers to measures of the efficiency of resource use.

Although the term often is applied to single factors such as staffing (labor productivity), machines, materials, energy, and capital, the productivity concept applies as well to the total resources used in producing outputs. The use of an aggregate measure of overall productivity allows a determination of whether the net effect of overall changes in a process—possibly involving resource tradeoffs—is beneficial.

Results

The term "results" refers to outcomes achieved by an organization in addressing the purposes of a Baldrige Criteria Item. Results are evaluated on the basis of current performance; performance relative to appropriate comparisons; the rate, breadth, and importance of performance improvements; and the relationship of results measures to key organizational performance requirements. For further description, see the Scoring System on page 45.

Senior Leaders

The term "senior leaders" refers to an organization's senior management group or team. In many organizations, this consists of the head of the organization and his or her direct reports.

Stakeholders

The term "stakeholders" refers to all groups that are or might be affected by an organization's actions and success. Examples of key stakeholders include customers, employees, partners, stockholders, and local/professional communities.

Strategic Objectives

The term "strategic objectives" refers to an organization's articulated aims or responses to address major change/improvement, competitiveness issues, and/or business advantages. Strategic objectives generally are focused externally and relate to significant customer, market, product/service, or technological opportunities and challenges. Broadly stated, they are what an organization must achieve to remain or become competitive. Strategic objectives set an organization's longer-term directions and guide resource allocations and redistributions.

See the definition of "action plans" on page 29 for the relationship between strategic objectives and action plans and for an example of each.

Systematic

"Systematic" refers to approaches that are repeatable and use data and information so that improvement and learning are possible. In other words, approaches are systematic if they build in the opportunity for evaluation and learning and thereby permit a gain in maturity. For use of the term, see the Scoring Guidelines on page 46.

Value

"Value" refers to the perceived worth of a product, service, process, asset, or function relative to cost and relative to possible alternatives.

Organizations frequently use value considerations to determine the benefits of various options relative to their costs, such as the value of various product and service combinations to customers. Organizations need to understand what different stakeholder groups value and then deliver value to each group. This frequently requires balancing value for customers and other stakeholders, such as stockholders, employees, and the community.

2001 CRITERIA: CATEGORY AND ITEM DESCRIPTIONS

Leadership (Category 1)

Leadership addresses how your senior leaders guide your organization in setting organizational values, directions, and performance expectations. Attention is given to how your senior leaders communicate with employees, review organizational performance, and create an environment that encourages high performance. The Category also includes your organization's responsibilities to the public and how your organization practices good citizenship.

1.1 Organizational Leadership

Purpose

This Item examines the key aspects of your organization's leadership and the actions of your senior leaders to create and sustain a high-performance organization.

Requirements

You are asked how your senior leaders set and deploy values, short- and longer-term directions, and performance expectations and balance the expectations of customers and other stakeholders. This includes how leaders create an environment for empowerment, innovation, organizational agility, and learning.

You also are asked how your senior leaders review organizational performance, what key performance measures they regularly review, and how review findings are used to drive improvement and innovation, including improvement in your leaders' effectiveness.

Comments

- Leadership's central roles in setting values and directions, creating and balancing value for all stakeholders, and driving performance are the focus of this Item. Success requires a strong orientation to the future and a commitment to both improvement and innovation. Increasingly, this requires creating an environment for empowerment and agility, as well as the means for rapid and effective application of knowledge.
- The organizational review called for in this Item is intended to cover all areas of performance. This includes not only how well you currently are performing but also how well you are moving toward the future. It is anticipated that the review findings will provide a reliable means to guide both improvement and opportunities for innovation that are tied to your organization's key objectives, success factors, and measures. Therefore, an important component of your senior leaders' organizational review is the translation of the review findings into an action agenda sufficiently specific for deployment throughout your organization and to your suppliers/partners and key customers.

1.2 Public Responsibility and Citizenship

Purpose

This Item examines how your organization fulfills its public responsibilities and encourages, supports, and practices good citizenship.

Requirements

You are asked how your organization addresses its current and future impacts on society in a proactive manner and how you accomplish ethical business practices in all stakeholder interactions. The impacts and practices are expected to cover all relevant and important areas—products, services, and operations.

You also are asked how your organization, your senior leaders, and your employees identify, support, and strengthen your key communities as part of good citizenship practices.

Comments

- An integral part of performance management and improvement is proactively addressing legal and regulatory requirements and risk factors. Addressing these areas requires establishing appropriate measures/indicators that senior leaders track in their overall performance review. Your organization should be sensitive to issues of public concern, whether or not these issues are currently embodied in law.
- Citizenship implies going beyond a compliance orientation. Good citizenship opportunities are available to organizations of all sizes. These opportunities include encouraging and supporting your employees' community service.
- Examples of organizational community involvement include influencing the adoption of higher standards in education by communicating employability requirements to schools and school boards; partnering with other businesses and health care providers to improve health in the local community by providing education and volunteer services to address public health issues; and partnering to influence trade, business, and professional associations to engage in beneficial, cooperative activities, such as sharing best practices to improve overall U.S. global competitiveness and the environment.

Strategic Planning (Category 2)

Strategic Planning addresses strategic and action planning and deployment of plans. The Category stresses that customer-driven quality and operational performance are key strategic issues that need to be integral parts of your organization's overall planning.



Specifically,

- customer-driven quality is a strategic view of quality. The focus is on the drivers of customer satisfaction, customer retention, new markets, and market share—key factors in competitiveness, profitability, and business success.
- operational performance improvement contributes to short-term and longer-term productivity growth and cost/price competitiveness. Building operational capability—including speed, responsiveness, and flexibility—represents an investment in strengthening your competitive fitness.

The Criteria emphasize that improvement and learning need to be embedded in work processes. The special role of strategic planning is to align work processes with your organization's strategic directions, thereby ensuring that improvement and learning reinforce organizational priorities.

The Strategic Planning Category examines how your organization

- understands the key customer, market, and operational requirements as input to setting strategic directions. This helps to ensure that ongoing process improvements and change are aligned with your organization's strategic directions.
- optimizes the use of resources, ensures the availability of trained employees, and bridges short-term and longer-term requirements that may entail capital expenditures, technology development or acquisition, and supplier development.
- ensures that deployment will be effective—that there are mechanisms to transmit requirements and achieve alignment on three levels: (1) the organization/executive level, (2) the key process level, and (3) the work unit/individual job level.

The requirements in the Strategic Planning Category encourage strategic thinking and acting—to develop a basis

for a distinct competitive position in the marketplace. *These requirements do not imply formalized plans, planning systems, departments, or specific planning cycles.* They also do not imply that all your improvements could or should be planned in advance. An effective improvement system combines improvements of many types and degrees of involvement. This requires clear strategic guidance, particularly when improvement alternatives, including major change, compete for limited resources. In most cases, setting priorities depends heavily on a cost rationale. However, you also might have critical requirements, such as public responsibilities, that are not driven by cost considerations alone.

2.1 Strategy Development

Purpose

This Item examines how your organization sets strategic directions and develops your strategic objectives, guiding and strengthening your overall performance and competitiveness.

Requirements

You are asked to outline your organization's strategic planning process, including identifying key participants, key steps, and your planning time horizons. You are asked how you consider key factors that affect your organization's future. These factors cover external and internal influences on your organization. You are asked to address each factor and outline how relevant data and information are gathered and analyzed.

You also are asked to summarize your key strategic objectives and your timetable for accomplishing them. Finally, you are asked how these objectives address the challenges outlined in your Organizational Profile.

Comments

- This Item calls for basic information on the planning process and for information on all the key influences, risks, challenges, and other requirements that might affect your organization's future opportunities and directions—taking as long-term a view as possible. This approach is intended to provide a thorough and realistic context for the development of a customer- and market-focused strategy to guide ongoing decision making, resource allocation, and overall management.
- This Item is intended to cover all types of businesses, competitive situations, strategic issues, planning approaches, and plans. The requirements explicitly call for a future-oriented basis for action but do not imply formalized planning, planning departments, planning cycles, or a specified way of visualizing the future. Even if your organization is seeking to create an entirely new business situation, it is still necessary to set and to test the objectives that define and guide critical actions and performance.

- This Item emphasizes competitive leadership, which usually depends on revenue growth and operational effectiveness. Competitive leadership requires a view of the future that includes not only the markets or segments in which your organization competes but also how it competes. *How it competes* presents many options and requires that you understand your organization's and your competitors' strengths and weaknesses. Although no specific time horizons are included, the thrust of this Item is sustained competitive leadership.
- An increasingly important part of strategic planning is projecting the future competitive environment. Such projections help to detect and reduce competitive threats, to shorten reaction time, and to identify opportunities. Depending on the size and type of business, maturity of markets, pace of change, and competitive parameters (such as price or innovation rate), organizations might use a variety of modeling, scenarios, or other techniques and judgments to anticipate the competitive environment.

2.2 Strategy Deployment

Purpose

This Item examines how your organization converts your strategic objectives into action plans to accomplish the objectives and how your organization assesses progress relative to these action plans. The aim is to ensure that your strategies are deployed for goal achievement.

Requirements

You are asked how you develop and deploy action plans that address your organization's key strategic objectives, including the allocation of needed resources. You are asked to summarize your key short- and longer-term action plans. Particular attention is given to changes in products/services, customers/markets, and how you operate. You also are asked about your key human resource plans that will enable accomplishment of your strategic objectives and action plans.

You are asked to give your key measures/indicators used in tracking progress relative to the action plans and how you use these measures to achieve organizational alignment and coverage of all key work units and stakeholders. Finally, you are asked to provide a projection of key performance measures/indicators. As part of this projection, you are asked how your projected performance compares with competitors' performance, key benchmarks, goals, and past performance.

Comments

- This Item asks how your action plans are developed and deployed. Accomplishment of action plans requires resources and performance measures, as well as the alignment of work unit and supplier/partner plans. Of

central importance is how you achieve alignment and consistency—for example, via key processes and key measurements. Also, alignment and consistency are intended to provide a basis for setting and communicating priorities for ongoing improvement activities—part of the daily work of all work units. In addition, performance measures are critical for tracking performance. Action plans include human resource plans that support your overall strategy.

- Key changes in your products/services or customers/markets might include Web-based or e-commerce initiatives, integrated within or separate from your current business.
- Examples of possible human resource plan elements are
 - a redesign of your work organization and/or jobs to increase employee empowerment and decision making
 - initiatives to promote greater labor-management cooperation, such as union partnerships
 - initiatives to foster knowledge sharing and organizational learning
 - modification of your compensation and recognition systems to recognize team, organizational, stock market, customer, or other performance attributes
 - education and training initiatives, such as developmental programs for future leaders, partnerships with universities to help ensure the availability of future employees, and establishment of technology-based training capabilities
- Projections and comparisons in this Item are intended to encourage your organization to improve its ability to understand and track dynamic, competitive performance factors. Through this tracking process, your organization should be better prepared to take into account its rate of improvement and change relative to competitors' and relative to your own targets or stretch goals. Such tracking serves as a key diagnostic management tool.
- In addition to improvement relative to past performance and competitors' performance, projected performance also might include changes resulting from new business ventures, entry into new markets, e-commerce initiatives, product/service innovations, or other strategic thrusts.

Customer and Market Focus (Category 3)

Customer and Market Focus addresses how your organization seeks to understand the voices of customers and of the marketplace. The Category stresses relationships as an important part of an overall listening, learning, and performance excellence strategy. Your customer satisfaction and dissatisfaction results provide vital information for understanding your customers and the marketplace. In many cases, such results and trends provide the most meaningful

information, not only on your customers' views but also on their marketplace behaviors—repeat business and positive referrals.

3.1 Customer and Market Knowledge

Purpose

This Item examines your organization's key processes for gaining knowledge about your current and future customers and markets, with the aim of offering relevant products and services, understanding emerging customer requirements and expectations, and keeping pace with marketplace changes and changing ways of doing business.

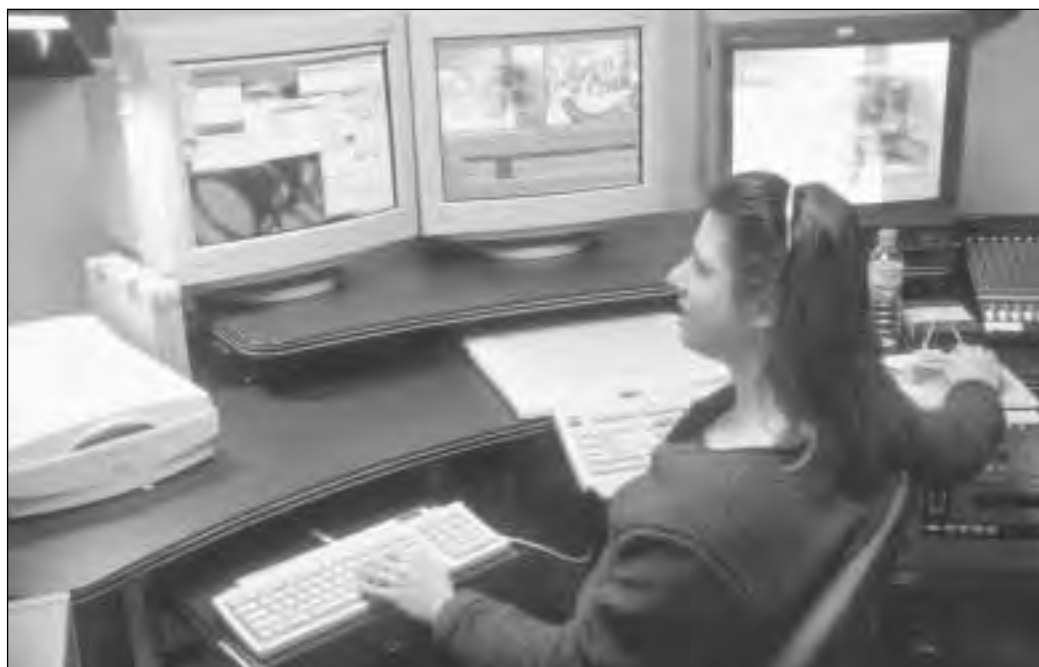
Requirements

You are asked how you determine key customer groups and how you segment your markets. You are asked how you consider potential customers, including your competitors' customers. You are asked how you determine key requirements for and drivers of purchase decisions and how you determine key product/service features. You also are asked how these determinations include relevant information from current and former customers.

Finally, you are asked how you keep your customer listening and learning methods current with your changing business needs and directions.

Comments

- In a rapidly changing competitive environment, many factors may affect customer preference and loyalty and your interface with customers in the marketplace. This makes it necessary to listen and learn on a continuous basis. To be effective, listening and learning need to be closely linked with your organization's overall business strategy.



- Knowledge of customer groups and market segments allows your organization to tailor listening and learning strategies and marketplace offerings, to support and tailor your marketing strategies, and to develop new business.
- A relationship strategy may be possible with some customers but not with others. Differing relationships may require distinctly different listening and learning strategies. The use of e-commerce is rapidly changing many marketplaces and may affect your listening and learning strategies, as well as your definition of customer groups and market segments.
- Selection of listening and learning strategies depends on your organization's key business factors. Increasingly, companies interact with customers via multiple modes. Some frequently used modes include focus groups with key customers; close integration with key customers; interviews with lost customers about their purchase decisions; use of the customer complaint process to understand key product and service attributes; won/lost analysis relative to competitors; and survey/feedback information, including information collected on the Internet.

3.2 Customer Relationships and Satisfaction

Purpose

This Item examines your organization's processes for building customer relationships and determining customer satisfaction, with the aim of acquiring new customers, retaining existing customers, and developing new market opportunities.

Requirements

You are asked how you build relationships to acquire and satisfy customers and to develop repeat business and positive referrals.

You are asked how you determine key customer contact requirements and how these vary for different modes of access. As part of this response, you are asked to describe key access mechanisms for customers to seek information, conduct business, and make complaints. You are asked how customer contact requirements are deployed along the entire response chain.

You are asked to describe your complaint management process. This description should include how you ensure prompt and effective problem resolution. The description also should cover how all complaints are

aggregated and analyzed for use in improvement throughout your organization and by your partners, as appropriate.

You are asked how you keep your approaches to relationship building and customer access current with your changing business needs and directions.

You are asked how you determine customer satisfaction and dissatisfaction, including how you capture actionable information that reflects customers' future business and/or positive referral.

You are asked how you follow up with customers regarding products/services and recent transactions to receive prompt and actionable feedback.

You are asked how you obtain and use information on customer satisfaction relative to satisfaction with competitors and/or benchmarks so you can gauge your performance in the marketplace.

Finally, you are asked how you keep your methods for determining customer satisfaction current with your changing business needs and directions.

Comments

- This Item emphasizes how you obtain actionable information from customers. Information that is actionable can be tied to key product, service, and business processes and be used to determine cost/revenue implications for setting improvement and change priorities.
- Complaint aggregation, analysis, and root cause determination should lead to effective elimination of the causes of complaints and to setting priorities for process, product, and service improvements. Successful outcomes require effective deployment of information throughout the organization.
- In determining customers' satisfaction, a key aspect is their comparative satisfaction with competitors and competing or alternative offerings. Such information might be derived from your own comparative studies or from independent studies. The factors that lead to customer preference are of critical importance in understanding factors that drive markets and potentially affect longer-term competitiveness.
- Changing business needs and directions might include new modes of customer access, such as the Internet. In such cases, key contact requirements might include online security for customers and access to personal assistance.

Information and Analysis (Category 4)

The Information and Analysis Category is the main point within the Criteria for all key information about effectively measuring and analyzing performance to drive improvement and organizational competitiveness. In the simplest

terms, Category 4 is the "brain center" for the alignment of your organization's operations and its strategic objectives. Central to such use of data and information are their quality and availability. Furthermore, since information and analysis might themselves be primary sources of competitive advantage and productivity growth, the Category also includes such strategic considerations.

4.1 Measurement and Analysis of Organizational Performance

Purpose

This Item examines your organization's selection, management, and use of data and information for performance measurement and analysis in support of organizational planning and performance improvement. The Item serves as a central collection and analysis point in an integrated performance measurement and management system that relies on financial and nonfinancial data and information. The aim of measurement and analysis is to guide your organization's process management toward the achievement of key business results and strategic objectives.

Requirements

You are asked how you gather and integrate data and information for monitoring daily operations and supporting organizational decision making and how you select and use measures for tracking those operations and overall organizational performance. You also are asked how you select and use comparative data and information to help drive performance improvement. These requirements address the major components of an effective performance measurement system.

You are asked what analyses you perform to support your senior leaders' assessment of overall organizational performance and your strategic planning. You are asked how the results of organizational-level analysis are communicated to support decision making throughout your organization and are aligned with your business results, strategic objectives, and action plans.

Finally, you are asked how you keep your organization's performance measurement system current with changing business needs and directions.

Comments

- Alignment and integration are key concepts for successful implementation of your performance measurement system. They are viewed in terms of extent and effectiveness of use to meet your performance assessment needs. Alignment and integration include how measures are aligned throughout your organization, how they are integrated to yield organization-wide data/information, and how performance measurement requirements are deployed by your senior leaders to track work group and process-level performance on key measures targeted for organization-wide significance and/or improvement.

- The use of comparative data and information is important to all organizations. The major premises for use are (1) your organization needs to know where it stands relative to competitors and to best practices, (2) comparative and benchmarking information often provides the impetus for significant (“break-through”) improvement or change, and (3) comparing performance information frequently leads to a better understanding of your processes and their performance. Benchmarking information also may support business analysis and decisions relating to core competencies, alliances, and outsourcing.
- Your effective selection and use of comparative data and information require (1) determination of needs and priorities; (2) criteria for seeking appropriate sources for comparisons—from within and outside your organization’s industry and markets; and (3) use of data and information to set stretch goals and to promote major, nonincremental (“breakthrough”) improvements in areas most critical to your organization’s competitive strategy.
- Individual facts and data do not usually provide an effective basis for setting organizational priorities. This Item emphasizes that close alignment is needed between your analysis and your organizational performance review and between your analysis and your organizational planning. This ensures that analysis is relevant to decision making and that decision making is based on relevant data and information.
- Action depends on understanding cause-effect connections among processes and between processes and business/performance results. Process actions and their results may have many resource implications. Organizations have a critical need to provide an effective analytical basis for decisions because resources for improvement are limited and cause-effect connections are often unclear.
- Analyses that your organization conducts to gain an understanding of performance and needed actions may vary widely depending on your type of organization, size, competitive environment, and other factors. Examples of possible analyses include
 - how product and service quality improvement correlates with key customer indicators such as customer satisfaction, customer retention, and market share



- cost/revenue implications of customer-related problems and effective problem resolution
- interpretation of market share changes in terms of customer gains and losses and changes in customer satisfaction

- improvement trends in key operational performance indicators such as productivity, cycle time, waste reduction, new product introduction, and defect levels
- relationships between employee/organizational learning and value added per employee
- financial benefits derived from improvements in employee safety, absenteeism, and turnover
- benefits and costs associated with education and training, including Internet-based, or e-learning, opportunities
- benefits and costs associated with improved organizational knowledge management and sharing
- how the ability to identify and meet employee requirements correlates with employee retention, motivation, and productivity
- cost/revenue implications of employee-related problems and effective problem resolution
- individual or aggregate measures of productivity and quality relative to competitors’
- cost trends relative to competitors’
- relationships among product/service quality, operational performance indicators, and overall financial performance trends as reflected in indicators such as operating costs, revenues, asset utilization, and value added per employee

- allocation of resources among alternative improvement projects based on cost/benefit implications or environmental/community impact
 - net earnings derived from quality, operational, and human resource performance improvements
 - comparisons among business units showing how quality and operational performance improvement affect financial performance
 - contributions of improvement activities to cash flow, working capital use, and shareholder value
 - profit impacts of customer retention
 - cost/revenue implications of new market entry, including global market entry or expansion
 - cost/revenue, customer, and productivity implications of engaging in and/or expanding e-commerce/e-business and use of the Internet and intranets
 - market share versus profits
 - trends in economic, market, and shareholder indicators of value
- The availability of electronic data and information of many kinds (e.g., financial, operational, customer-related, accreditation/regulatory) and from many sources (e.g., internal, third party, and public sources; the Internet; Internet tracking software) permits extensive analysis and correlations. Effectively utilizing and prioritizing this wealth of information are significant organizational challenges.

4.2 Information Management

Purpose

This Item examines how your organization ensures the availability of high-quality, timely data and information for all your key users—employees, suppliers/partners, and customers.

Requirements

You are asked how you make data and information available and accessible to your user communities. You are asked how you ensure that the data and information have all the characteristics your users expect: reliability, accuracy, timeliness, and appropriate levels of security and confidentiality.

You also are asked how you ensure that your hardware systems and software are reliable and user friendly so that access is facilitated and encouraged.

Finally, you are asked how you keep your data availability mechanisms, software, and hardware current with changing business needs and directions.

Comments

- Managing information can require a significant commitment of resources as the sources of data and information grow dramatically. The expanding use of electronic

information within organizations' operations, as part of organizational knowledge networks, from the Internet, and in business-to-business and business-to-consumer communications challenges organizational abilities to ensure reliability and availability in a user-friendly format.

- Data and information are especially important in business networks, alliances, and supply chains. Your responses to this Item should take into account this use of data and information and should recognize the need for rapid data validation and reliability assurance, given the increasing use of electronic data transfer.

Human Resource Focus (Category 5)

Human Resource Focus addresses key human resource practices—those directed toward creating and maintaining a high-performance workplace and toward developing employees to enable them and your organization to adapt to change. The Category covers human resource development and management requirements in an integrated way, i.e., aligned with your organization's strategic objectives. Your human resource focus includes your work environment and your employee support climate.

To reinforce the basic alignment of human resource management with overall strategy, the Criteria also cover human resource planning as part of overall planning in the Strategic Planning Category.

5.1 Work Systems

Purpose

This Item examines your organization's systems for work and jobs, compensation, employee performance management, motivation, recognition, communication, and hiring, with the aim of enabling and encouraging all employees to contribute effectively and to the best of their ability. These systems are intended to foster high performance, to result in individual and organizational learning, and to enable adaptation to change.

Requirements

You are asked how you organize and manage work and jobs to promote cooperation, initiative/innovation, and flexibility. You are asked how you achieve effective communication and knowledge/skill sharing. You also are asked how your managers and supervisors motivate employees to develop and utilize their full potential, including the mechanisms you use to attain job- and career-related learning objectives.

You are asked how your employee performance management system, including feedback to employees, supports high performance and a customer/business focus. This should include how compensation, recognition, and related practices reinforce these objectives.

You are asked how you accomplish effective succession planning for senior leadership and others.



Finally, you are asked how you identify the capabilities needed by potential employees and how you recruit, hire, and retain new employees. Your considerations should include the ability of your work system to benefit from the diverse ideas and cultures of your communities.

Comments

- High-performance work is characterized by flexibility, innovation, knowledge and skill sharing, alignment with organizational objectives, customer focus, and rapid response to changing business needs and requirements of the marketplace. The focus of this Item is on a workforce capable of achieving high performance. In addition to enabled employees and proper work system design, high-performance work requires ongoing education and training, as well as information systems that ensure proper information flow. To help employees realize their full potential, many organizations use individual development plans prepared with each employee and addressing his/her career and learning objectives.
- Work and job factors for your consideration include simplification of job classifications, cross-training, job rotation, use of teams (including self-directed teams), and changes in work layout and location. Also important is effective communication across functions and work units to ensure a focus on customer requirements and to ensure an environment with trust, knowledge sharing, and mutual respect.
- Compensation and recognition systems should be matched to your work systems. To be effective, compensation and recognition might be tied to demonstrated skills and/or to peer evaluations. Compensation and recognition approaches also might include profit sharing, rewarding exemplary team or unit performance, and linkage to customer satisfaction and loyalty measures or other business objectives.

- The requirements of high-performance work, coupled with the challenges of tight labor markets, necessitate more attention to succession planning and hiring profiles. This should include and capitalize on diversity factors.

5.2 Employee Education, Training, and Development

Purpose

This Item examines the education, training, and on-the-job reinforcement of knowledge and skills of your organization's workforce, with the aim of meeting ongoing needs of employees and a high-performance workplace.

Requirements

You are asked how education and training tie to your action plans, including how education and training balance short- and longer-term individual and organizational objectives. You are asked how you seek and use input on education and training needs and delivery from those most directly benefitting—employees and their supervisors/managers.

You are asked how you address key organizational needs associated with technological change, management/leadership development, orientation of new employees, safety, performance improvement, and diversity.

You are asked how you deliver and evaluate education and training, taking into account individual and organizational performance. Finally, you are asked how you reinforce knowledge and skills on the job.

Comments

- Depending on the nature of your organization's work, employees' responsibilities, and the stage of organizational and personal development, education and training needs might vary greatly. These needs might include gaining skills for knowledge sharing, communications, teamwork, problem solving, interpreting and using data, meeting customer requirements, process analysis and simplification, waste and cycle time reduction, and setting priorities based on strategic alignment or cost/benefit analysis. Education needs also might include basic skills, such as reading, writing, language, arithmetic, and, increasingly, basic computer skills.
- Education and training delivery might occur inside or outside your organization and could involve on-the-job, classroom, computer-based, or distance learning, as well as other types of delivery. Training also might occur through developmental assignments within or outside your organization.
- When you evaluate education and training, you should seek effectiveness measures as a critical part of the evaluation. Such measures might address the impact on individual, unit, and organizational performance; the impact on customer-related performance; and a cost/benefit analysis of the training.

- Although this Item does not specifically ask you about training for customer contact employees, such training is important and common. It frequently includes learning critical knowledge and skills in the following areas: your products, services, and customers; how to listen to customers; recovery from problems or failures; and how to effectively manage customer expectations.

5.3 Employee Well-Being and Satisfaction

Purpose

This Item examines your organization's work environment, your employee support climate, and how you determine employee satisfaction, with the aim of fostering the well-being, satisfaction, and motivation of all employees while recognizing their diverse needs.

Requirements

You are asked how you ensure a safe and healthful work environment for all employees, taking into account their differing work environments and associated requirements. Special emphasis is placed on how employees contribute to identifying important factors and to improving workplace safety. You also are asked to identify appropriate measures and targets for key environmental factors so that status and progress can be tracked.

You are asked how you determine the key factors that affect employee well-being, satisfaction, and motivation. Included is how these factors are segmented for a diverse workforce and different categories/types of employees. In addition, you are asked how your services, benefits, and policies support employee well-being, satisfaction, and motivation based upon a holistic view of this key stakeholder group. Special emphasis is placed on the variety of approaches you use to satisfy a diverse workforce with differing needs and expectations.

You are asked to describe formal and/or informal assessment methods and measures you use to determine employee well-being, satisfaction, and motivation. This description should include how you tailor these methods and measures to a diverse workforce and how you use other indicators (e.g., employee turnover) to support your assessment. Finally, you are asked how you relate assessment findings to key business results to identify key priorities.

Comments

- Most organizations, regardless of size, have many opportunities to contribute to employees' well-being, satisfaction, and motivation. Some examples of services, facilities, activities, and other opportunities are personal and career counseling; career development and employability services; recreational or cultural activities; formal and informal recognition; nonwork-related education; day care; special leave for family responsibilities and/or community service; flexible work hours and benefits packages;

outplacement services; and retiree benefits, including extended health care and access to employee services.

- Although satisfaction with pay and satisfaction with promotion are important, these two factors generally are not sufficient to ensure overall employee satisfaction, motivation, and high performance. Some examples of other factors to consider are effective employee problem and grievance resolution; employee development and career opportunities; work environment and management support; workload; communication, cooperation, and teamwork; job security; appreciation of the differing needs of diverse employee groups; and organizational support for serving customers.
- In addition to direct measures of employee satisfaction and well-being through formal or informal surveys, some other indicators include absenteeism, turnover, grievances, strikes, Occupational Safety and Health Administration (OSHA) reportables, and worker's compensation claims.

Process Management (Category 6)

Process Management is the focal point within the Criteria for all key work processes. Built into the Category are the central requirements for efficient and effective process management: effective design; a prevention orientation; linkage to suppliers and partners and a focus on supply chain integration; operational performance; cycle time; and evaluation, continuous improvement, and organizational learning.

Agility, cost reduction, and cycle time reduction are increasingly important in all aspects of process management and organizational design. In simplest terms, "agility" refers to your ability to adapt quickly, flexibly, and effectively to changing requirements. Depending on the nature of your organization's strategy and markets, agility might mean rapid changeover from one product to another, rapid response to changing demands, or the ability to produce a wide range of customized services. Agility also increasingly involves decisions to outsource, agreements with key suppliers, and novel partnering arrangements. Flexibility might demand special strategies, such as implementing modular designs, sharing components, sharing manufacturing lines, and providing specialized training. Cost and cycle time reduction often involve agile process management strategies. It is crucial to utilize key measures for tracking all aspects of your overall process management.

6.1 Product and Service Processes

Purpose

This Item examines your organization's key product and service design and delivery processes, with the aim of improving your marketplace and operational performance.

Requirements

You are asked to identify your key design processes for products and services and their related production and delivery processes. You are asked how you address key requirements, such as customer/market requirements and new technology, including e-technology. You also are asked how you address key factors in design effectiveness, including cost control, cycle time, and learning from past design projects. Finally, you are asked how you ensure that design processes cover all key operational performance requirements and appropriate coordination and testing to ensure effective product/service launch without need for rework.

You are asked to identify your key production/delivery processes, their key performance requirements, and key performance measures. These requirements and measures are the basis for maintaining and improving your products, services, and production/delivery processes. You also are asked how you perform inspections, tests, and audits to minimize rework and warranty costs, and you are asked about your prevention-based processes for minimizing the need for inspections, tests, and audits. Finally, you are asked how you improve your production/delivery systems and processes to achieve better processes and products/services.

Comments

- Your design approaches could differ appreciably depending on the nature of your products/services—whether the products/services are entirely new, variants, or involve major or minor process changes. You should consider the key requirements for your products and services. Factors that might need to be considered in design include safety, long-term performance, environmental impact, “green” manufacturing, measurement capability, process capability, manufacturability, maintainability, variability in customer expectations requiring product/service options, supplier capability, and documentation. Effective design also must consider cycle time and productivity of production and delivery processes. This might involve detailed mapping of manufacturing or service processes and redesigning (“re-engineering”) those processes to achieve efficiency, as well as to meet changing customer requirements.
- This Item calls for information on the incorporation of new technology, including e-technology. E-technology might include sharing information with suppliers/partners, communicating with customers and giving them continuous (24/7) access, and automated information transfer from in-service products requiring maintenance in the field.
- Many organizations need to consider requirements for suppliers/partners at the design stage. Overall, effective design must take into account all stakeholders in the value chain. If many design projects are carried out in parallel or if your organization’s products utilize parts, equipment, and facilities that are used for other products, coordination of resources might be a major concern, but it also might offer a means to significantly reduce unit costs and time to market.
- Coordination of design and production/delivery processes involves all work units and/or individuals who will take part in production/delivery and whose performance materially affects overall process outcome. This might include groups such as R&D, marketing, design, product/process engineering, and key suppliers.
- This Item calls for information on the management and improvement of key production/delivery processes. The information required includes a description of the key processes, their specific requirements, and how performance relative to these requirements is determined and maintained. Increasingly, these requirements might include the need for agility—speed and flexibility—to adapt to change.
- Specific reference is made to in-process measurements and customer/supplier interactions. These measurements and interactions require the identification of critical points in processes for measurement, observation, or interaction. These activities should occur at the earliest points possible in processes to minimize problems and costs that may result from deviations from expected performance. Achieving expected performance frequently requires setting performance levels or standards to guide decision making. When deviations occur, corrective action is required to restore the performance of the process to its design specifications. Depending on the nature of the process, the corrective action could involve technical and/or human considerations. Proper corrective action involves changes at the source (root cause) of the deviation. Such corrective action should minimize the likelihood of this type of variation occurring again or elsewhere in your organization. When customer interactions are involved, differences among customers must be considered in evaluating how well the process is performing. This might entail allowing for specific or general contingencies, depending on the customer information gathered. This is especially true of professional and personal services.
- This Item also calls for information on how processes are improved to achieve better performance. Better performance means not only better quality from your customers’ perspective but also better financial and operational performance—such as productivity—from your organization’s perspective. A variety of process improvement approaches are commonly used. These approaches include (1) sharing successful strategies across your organization, (2) process analysis and research (e.g., process mapping, optimization experiments, error proofing), (3) research and development results, (4) benchmarking, (5) using alternative technology, and (6) using information from customers of the processes—within and outside your organization. Process

improvement approaches might utilize financial data to evaluate alternatives and set priorities. Together, these approaches offer a wide range of possibilities, including complete redesign (“re-engineering”) of processes.

6.2 Business Processes

Purpose

This Item examines your organization’s key nonproduct/nonservice business processes, with the aim of improving business success.

Requirements

You are asked to identify your key business processes and their design requirements. You are asked how your organization’s key business processes are designed and performed to meet all your requirements and how you incorporate input from customers and suppliers/partners, as appropriate.

You are asked to identify your key performance measures for the control and improvement of your business processes, including how in-process measures and customer and supplier feedback are used.

You are asked how you minimize costs associated with inspections, tests, and audits through use of prevention-based processes. Finally, you are asked how you improve your business processes to achieve better performance and to keep them current with your changing business needs and directions.

Comments

- Your key business processes are those nonproduct/nonservice processes that are considered most important to business growth and success by your senior leaders. These processes frequently relate to an organization’s strategic objectives and critical success factors. Key business processes might include processes for innovation, research and development, technology acquisition, information and knowledge management, supply chain management, supplier partnering, outsourcing, mergers and acquisitions, global expansion, project management, and sales/marketing. Given the diverse nature of these processes, the requirements and performance characteristics might vary significantly for different processes.
- For many organizations, supply chain management is a growing factor in achieving productivity and profitability goals and overall business success. Suppliers and partners are receiving increasing strategic attention as organizations re-evaluate their core functions. Supplier processes should fulfill two purposes: to help improve the performance of suppliers and partners and also on specific actions to help them contribute to your organization’s improved performance. Supply chain management might include processes for supplier selection, with the aim of reducing the total number of suppliers and increasing preferred supplier and partnering agreements.

6.3 Support Processes

Purpose

This Item examines your organization’s key support processes, with the aim of improving your overall operational performance.

Requirements

You are asked to identify your key support processes and their design requirements. You are asked how your organization’s key support processes are designed to meet all your requirements and how you incorporate input from internal customers, as appropriate. You also are asked how day-to-day operation of your key support processes ensures meeting the key requirements, including how in-process measures and internal customer feedback are used.

You are asked how you minimize costs associated with inspection, tests, and audits through use of prevention-based processes. Finally, you are asked how you improve your key support processes to achieve better performance and to keep them current with your changing business needs and directions.

Comments

- Your support processes are those that support your daily operations and your product and/or service delivery but are not usually designed in detail with the products and services. The support process requirements usually do not depend significantly on product and service characteristics. Support process design requirements usually depend significantly on your internal requirements, and they must be coordinated and integrated to ensure efficient, effective linkage and performance. Support processes might include finance and accounting, facilities management, legal services, human resource services, public relations, and other administrative services.
- This Item calls for information on how your organization evaluates and improves the performance of your key support processes. Four approaches frequently used are (1) process analysis and research, (2) benchmarking, (3) use of alternative technology, and (4) use of information from customers of the processes. Together, these approaches offer a wide range of possibilities, including complete redesign (“re-engineering”) of processes.

Business Results (Category 7)

The Business Results Category provides a results focus that encompasses your customers’ evaluation of your organization’s products and services, your overall financial and market performance, and results of all key processes and process improvement activities. Through this focus, the Criteria’s purposes—superior value of offerings as viewed by your customers and the marketplace, superior organizational performance as reflected in your operational and financial indicators, and organizational and personal

learning—are maintained. Category 7 thus provides “real-time” information (measures of progress) for evaluation and improvement of processes, products, and services, in alignment with your overall organizational strategy. Item 4.1 calls for analysis of business results data and information to determine your overall organizational performance.

7.1 Customer-Focused Results

Purpose

This Item examines your organization’s customer-focused performance results, with the aim of demonstrating how well your organization has been satisfying your customers and delivering product and service quality that lead to satisfaction, loyalty, and positive referral.

Requirements

You are asked to provide current levels, trends, and appropriate comparisons for key measures/indicators of customer satisfaction and dissatisfaction, including comparisons with your competitors’ levels of customer satisfaction. You are asked to provide data and information on customer loyalty (retention), positive referral, and customer-perceived value.

You also are asked to provide levels and trends in key measures/indicators of product and service performance. Such results should be for key drivers of your customers’ satisfaction and retention.

Comments

- This Item focuses on the creation and use of all relevant data to determine and help predict your organization’s performance as viewed by your customers. Relevant data and information include customer satisfaction and dissatisfaction; retention, gains, and losses of customers and customer accounts; customer complaints and warranty claims; customer-perceived value based on quality and price; customer assessment of access and ease of use (including courtesy in service interactions); and awards, ratings, and recognition from customers and independent rating organizations.
- This Item includes measures of product and service performance that serve as indicators of customers’ views and decisions relative to future purchases and relationships. These measures of product and service performance are derived from customer-related information gathered in Items 3.1 and 3.2.
- Product and service measures appropriate for inclusion might be based upon the following: internal quality measurements, field performance of products, data collected from your customers by other organizations on ease of use or other attributes, or customer surveys on product and service performance.
- The correlation between product/service performance and customer indicators is a critical management tool with multiple uses: (1) defining and focusing on key



quality and customer requirements; (2) identifying product/service differentiators in the marketplace; and (3) determining cause-effect relationships between your product/service attributes and evidence of customer satisfaction and loyalty, as well as positive referrals. The correlation might reveal emerging or changing market segments, the changing importance of requirements, or even the potential obsolescence of offerings.

7.2 Financial and Market Results

Purpose

This Item examines your organization’s financial and market results, with the aim of understanding your marketplace challenges and opportunities.

Requirements

You are asked to provide levels, trends, and appropriate comparisons for key financial, market, and business indicators. Overall, these results should provide a complete picture of your financial and marketplace success and challenges.

Comments

- Measures reported in this Item are those usually tracked by senior leadership on an ongoing basis to assess your organization’s performance.
- Appropriate financial measures and indicators might include revenue, profits, market position, cash-to-cash cycle time, earnings per share, and returns. Marketplace performance measures might include market share, measures of business growth, new product and geographic markets entered (including exports), entry into e-commerce markets, and the percentage of sales derived from new products.

7.3 Human Resource Results

Purpose

This Item examines your organization’s human resource results, with the aim of demonstrating how well your organization has been creating and maintaining a positive,

productive, learning, and caring work environment for all employees.

Requirements

You are asked to provide current levels, trends, and appropriate comparisons for key measures/indicators of employee well-being, satisfaction, dissatisfaction, and development.

You also are asked to provide data and information on the performance and effectiveness of your organization's work system.

Comments

- Results reported might include generic or organization-specific factors. Generic factors might include safety, absenteeism, turnover, satisfaction, and complaints (grievances). For some measures, such as absenteeism and turnover, local or regional comparisons might be appropriate.
- Organization-specific factors are those you assess for determining your employees' well-being and satisfaction. These factors might include the extent of training or cross-training or the extent and success of self-direction.
- Results measures reported for work system performance might include improvement in job classification, job rotation, work layout, and local decision making. Results reported might include input data, such as extent of training, but the main emphasis should be on data that show effectiveness of outcomes.

7.4 Organizational Effectiveness Results

Purpose

This Item examines your organization's other key operational performance results, with the aim of achieving organizational effectiveness, attaining key organizational goals, and demonstrating good organizational citizenship.

Requirements

You are asked to provide current levels, trends, and appropriate comparisons for key measures/indicators of operational and strategic performance that support the ongoing achievement of results reported in Items 7.1 through 7.3.

You also are asked to provide data and information on your organization's regulatory/legal compliance and citizenship.

Comments

- This Item encourages your organization to develop and include unique and innovative measures to track business development and operational improvement. However, all key areas of business and operational performance should



be evaluated by measures that are relevant and important to your organization.

- Measures/indicators of operational effectiveness and efficiency might include reduced emission levels, waste stream reductions, by-product use, and recycling; internal responsiveness indicators such as cycle times, production flexibility, lead times, set-up times, and time to market; business-specific indicators such as innovation rates and increased use of e-technology, product/process yields, and delivery performance to request; supply chain indicators such as reductions in inventory and/or incoming inspections, increases in quality and productivity, improvements in electronic data exchange, and reductions in supply chain management costs; third-party assessment results such as ISO 9000 audits; and indicators of strategic goal achievement.
- Measures should include environmental and regulatory compliance and noteworthy achievements in these areas, as appropriate. Results also should include indicators of support for key communities and other public purposes.
- If your organization has received sanctions or adverse actions under law, regulation, or contract during the past three years, the incidents and their current status should be summarized.

SCORING SYSTEM

The scoring of responses to Criteria Items (Items) and Award applicant feedback are based on three evaluation dimensions: (1) Approach, (2) Deployment, and (3) Results. Criteria users need to furnish information relating to these dimensions. Specific factors for these dimensions are described below. Scoring Guidelines are given on page 46.

Approach

“Approach” refers to how you address the Item requirements—the *method(s)* used. The factors used to evaluate approaches include

- the appropriateness of the methods to the requirements
- the effectiveness of use of the methods and the degree to which the approach
 - is repeatable, integrated, and consistently applied
 - embodies evaluation/improvement/learning cycles
 - is based on reliable information and data
- alignment with your organizational needs
- evidence of beneficial innovation and change

Deployment

“Deployment” refers to the *extent* to which your approach is applied. The factors used to evaluate deployment include

- use of the approach in addressing Item requirements relevant and important to your organization
- use of the approach by all appropriate work units

Results

“Results” refers to *outcomes* in achieving the purposes given in Items 7.1–7.4. The factors used to evaluate results include

- your current performance
- your performance relative to appropriate comparisons and/or benchmarks
- rate and breadth of your performance improvements
- linkage of your results measures to important customer, market, process, and action plan performance requirements identified in your Organizational Profile and in Approach-Deployment Items

Item Classification and Scoring Dimensions

Items are classified according to the kinds of information and/or data you are expected to furnish relative to the three evaluation dimensions given above.

The two types of Items and their designations are

- | | |
|------------------------|----------------------------|
| 1. Approach-Deployment | Approach-Deployment |
| 2. Results | Results |

Approach and Deployment are linked to emphasize that descriptions of Approach should always indicate the Deployment—consistent with the *specific requirements* of the

Item. Although Approach and Deployment dimensions are linked, feedback to Award applicants reflects strengths and/or opportunities for improvement in either or both dimensions.

Results Items call for data showing performance levels, relevant comparative data, and improvement trends for key measures/indicators of organizational performance. Results Items also call for data on breadth of performance improvements, i.e., on how widespread your improvement results are. This is directly related to the Deployment dimension; if improvement processes are widely deployed, there should be corresponding results. A score for a Results Item is thus a composite based upon overall performance, taking into account the rate and breadth of improvements and their importance. (See next paragraph.)

“Importance” as a Scoring Factor

The three evaluation dimensions described previously are critical to evaluation and feedback. However, another critical consideration in evaluation and feedback is the importance of your reported Approach, Deployment, and Results to your key business factors. The areas of greatest importance should be identified in your Organizational Profile and in Items such as 2.1, 2.2, 3.1, 6.1, 6.2, and 7.4. Your key customer requirements and key strategic objectives and action plans are particularly important.

Assignment of Scores to Your Responses

The following guidelines should be observed in assigning scores to your Item responses:

- All Areas to Address should be included in your Item response. Also, responses should reflect what is important to your organization.
- In assigning a score to an Item, first decide which scoring range (e.g., 50 percent to 60 percent) best fits the overall Item response. Overall “best fit” does not require total agreement with each of the statements for that scoring range. Assigning the actual score *within* the range requires evaluating whether the Item response is closer to the statements in the next higher or next lower scoring range.
- An Approach-Deployment Item score of 50 percent represents an approach that meets the overall objectives of the Item and that is deployed to the principal activities and work units covered in the Item. Higher scores reflect maturity (cycles of improvement), integration, and broader deployment.
- A Results Item score of 50 percent represents a clear indication of improvement trends and/or good levels of performance in the principal results areas covered in the Item. Higher scores reflect better improvement rates and/or levels of performance, better comparative performance, and broader coverage and integration with business requirements.

SCORING GUIDELINES

SCORE	APPROACH-DEPLOYMENT
0%	<ul style="list-style-type: none"> ■ No systematic approach is evident; information is anecdotal.
10% to 20%	<ul style="list-style-type: none"> ■ The beginning of a systematic approach to the basic purposes of the Item is evident. ■ Major gaps exist in deployment that would inhibit progress in achieving the basic purposes of the Item. ■ Early stages of a transition from reacting to problems to a general improvement orientation are evident.
30% to 40%	<ul style="list-style-type: none"> ■ An effective, systematic approach, responsive to the basic purposes of the Item, is evident. ■ The approach is deployed, although some areas or work units are in early stages of deployment. ■ The beginning of a systematic approach to evaluation and improvement of basic Item processes is evident.
50% to 60%	<ul style="list-style-type: none"> ■ An effective, systematic approach, responsive to the overall purposes of the Item and your key business requirements, is evident. ■ The approach is well deployed, although deployment may vary in some areas or work units. ■ A fact-based, systematic evaluation and improvement process is in place for improving the efficiency and effectiveness of key processes. ■ The approach is aligned with your basic organizational needs identified in the other Criteria Categories.
70% to 80%	<ul style="list-style-type: none"> ■ An effective, systematic approach, responsive to the multiple requirements of the Item and your current and changing business needs, is evident. ■ The approach is well deployed, with no significant gaps. ■ A fact-based, systematic evaluation and improvement process and organizational learning/sharing are key management tools; there is clear evidence of refinement and improved integration as a result of organizational-level analysis and sharing. ■ The approach is well integrated with your organizational needs identified in the other Criteria Categories.
90% to 100%	<ul style="list-style-type: none"> ■ An effective, systematic approach, fully responsive to all the requirements of the Item and all your current and changing business needs, is evident. ■ The approach is fully deployed without significant weaknesses or gaps in any areas or work units. ■ A very strong, fact-based, systematic evaluation and improvement process and extensive organizational learning/sharing are key management tools; strong refinement and integration, backed by excellent organizational-level analysis and sharing, are evident. ■ The approach is fully integrated with your organizational needs identified in the other Criteria Categories.

SCORE	RESULTS
0%	<ul style="list-style-type: none"> ■ There are no results or poor results in areas reported.
10% to 20%	<ul style="list-style-type: none"> ■ There are some improvements <i>and/or</i> early good performance levels in a few areas. ■ Results are not reported for many to most areas of importance to your organization's key business requirements.
30% to 40%	<ul style="list-style-type: none"> ■ Improvements <i>and/or</i> good performance levels are reported in many areas of importance to your organization's key business requirements. ■ Early stages of developing trends and obtaining comparative information are evident. ■ Results are reported for many to most areas of importance to your organization's key business requirements.
50% to 60%	<ul style="list-style-type: none"> ■ Improvement trends <i>and/or</i> good performance levels are reported for most areas of importance to your organization's key business requirements. ■ No pattern of adverse trends and no poor performance levels are evident in areas of importance to your organization's key business requirements. ■ Some trends <i>and/or</i> current performance levels—evaluated against relevant comparisons <i>and/or</i> benchmarks—show areas of strength <i>and/or</i> good to very good relative performance levels. ■ Business results address most key customer, market, and process requirements.
70% to 80%	<ul style="list-style-type: none"> ■ Current performance is good to excellent in areas of importance to your organization's key business requirements. ■ Most improvement trends <i>and/or</i> current performance levels are sustained. ■ Many to most trends <i>and/or</i> current performance levels—evaluated against relevant comparisons <i>and/or</i> benchmarks—show areas of leadership and very good relative performance levels. ■ Business results address most key customer, market, process, and action plan requirements.
90% to 100%	<ul style="list-style-type: none"> ■ Current performance is excellent in most areas of importance to your organization's key business requirements. ■ Excellent improvement trends <i>and/or</i> sustained excellent performance levels are reported in most areas. ■ Evidence of industry and benchmark leadership is demonstrated in many areas. ■ Business results fully address key customer, market, process, and action plan requirements.

For a definition of the following **key term**, see page 31: systematic

2001 CRITERIA RESPONSE GUIDELINES

The guidelines given in this section are offered to assist Criteria users in responding most effectively to the requirements of the 18 Criteria Items. Writing an application for the Baldrige Award involves responding to these requirements in 50 or fewer pages.

The guidelines are presented in three parts:

- (1) General Guidelines regarding the Criteria booklet, including how the Items are formatted
- (2) Guidelines for Responding to Approach-Deployment Items
- (3) Guidelines for Responding to Results Items

General Guidelines

1. Read the entire Criteria booklet.

The main sections of the booklet provide an overall orientation to the Criteria, including how responses are to be evaluated for self-assessment or by Award Examiners. You should become thoroughly familiar with the following sections:

- Criteria for Performance Excellence (pages 10–28)
- Scoring information (pages 45–46)

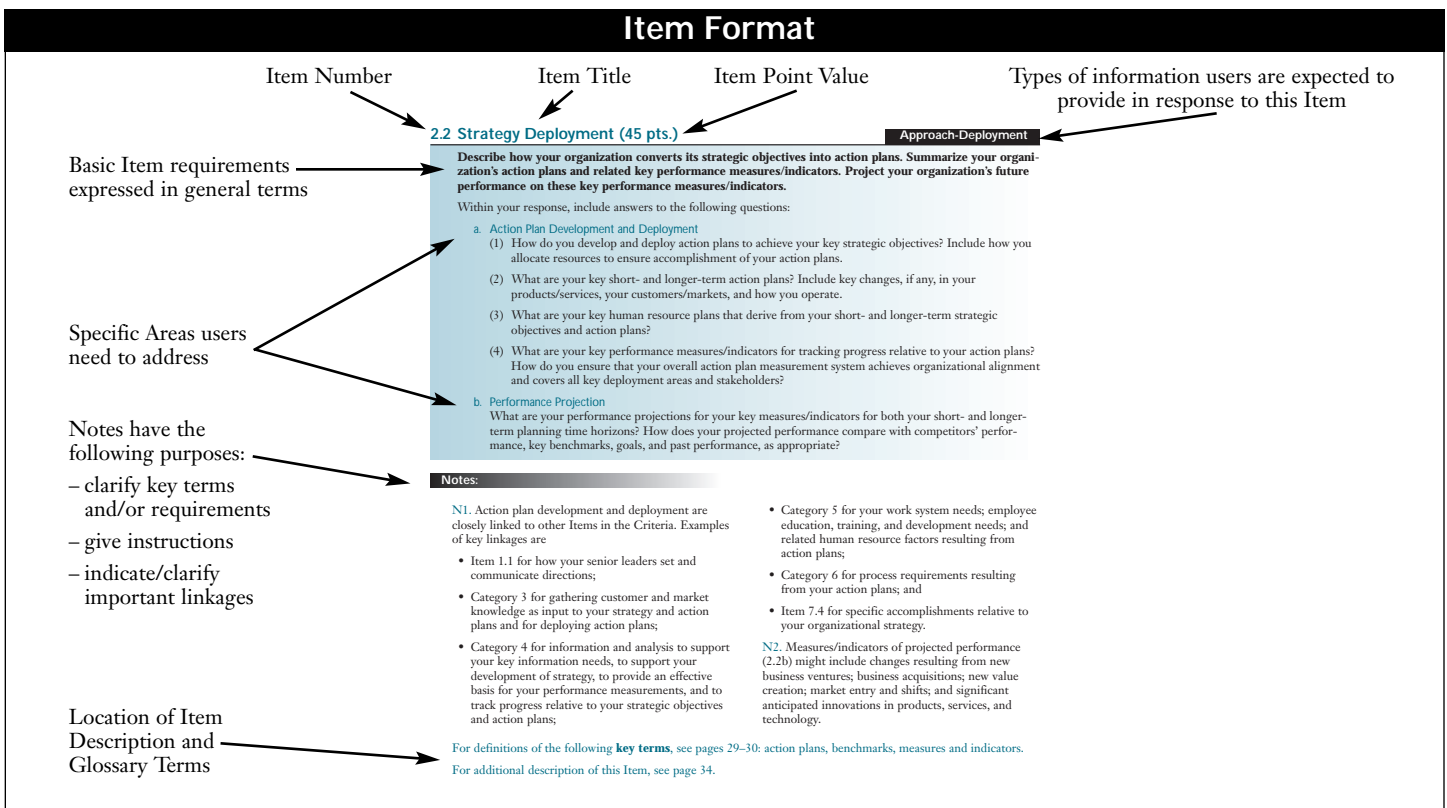
- Glossary of Key Terms (pages 29–31)
- Category and Item Descriptions (pages 32–44)

2. Review the Item format and understand how to respond to the Item requirements.

The Item format (see figure below) shows the different parts of Items, the role of each part, and where each part is placed. It is especially important to understand the Areas to Address and the Item Notes. Each Item and Area to Address is described in greater detail in a separate section (pages 32–44).

Each Item is classified either **Approach-Deployment** or **Results**, depending on the type of information required. Guidelines for responding to Approach-Deployment Items are given on pages 48–49. Guidelines for responding to Results Items are given on pages 49–50.

Item requirements are presented in question format. Some questions include modifying statements. Responses to an Item should contain answers to all questions and to modifying statements; however, each question need not be answered separately. Responses to multiple questions within a single Area to Address may be grouped, as appropriate to your organization.



3. Start by preparing the Organizational Profile.

The Organizational Profile is the most appropriate starting point for initiating a self-assessment or for writing an application. The Organizational Profile is intended to help everyone—including organizations using the Criteria for self-assessment, application writers, and reviewers—to understand what is most relevant and important to your organization's business and to its performance. The questions to address in responding to the Organizational Profile are on pages 10–11.

Guidelines for Responding to Approach-Deployment Items

Although the Criteria focus on key performance results, these results by themselves offer little *diagnostic* value. For example, if some results are poor or are improving at rates slower than your competitors', it is important to understand *why* this is so and *what* might be done to accelerate improvement.

The purpose of Approach-Deployment Items is to permit diagnosis of your organization's most important processes—the ones that yield fast-paced organizational performance improvement and contribute to key business results. Diagnosis and feedback depend heavily on the content and completeness of Approach-Deployment Item responses. For this reason, it is important to respond to these Items by providing your key process information. Guidelines for organizing and reviewing such information follow.

1. Understand the meaning of “how.”

Approach-Deployment Items include questions that begin with the word “how.” *Responses should outline your key process information, such as methods, measures, deployment, and evaluation/improvement/learning factors.* Responses lacking such information, or merely providing an example, are referred to in the Scoring Guidelines as “anecdotal” information.

2. Understand the meaning of “what.”

Two types of questions in Approach-Deployment Items begin with the word “what.” The first type of question requests basic information on key processes and how they work. Although it is helpful to include *who* performs the work, merely stating *who* does not permit diagnosis or feedback. The second type of question requests information on *what* your key findings, plans, objectives, goals, or measures are. These questions set the context for showing alignment in your performance management system. For example, when you identify key strategic objectives, your

action plans, human resource development plans, some of your results measures, and results reported in Category 7 should be expected to relate to the stated strategic objectives.

3. Write and review response(s) with the following guidelines and comments in mind.

- Show that activities are *systematic*.

Approaches that are systematic are repeatable and use data and information so that improvement and learning are possible. In other words, approaches are systematic if they build in the opportunity for evaluation and learning and thereby permit a gain in maturity.

- Show deployment.



Deployment information should summarize what is done in different parts of your organization. Deployment can be shown compactly by using tables.

- Show focus and consistency.

There are four important factors to consider regarding focus and consistency: (1) the Organizational Profile should make clear what is important; (2) the Strategic Planning Category, including the strategic objectives and action plans, should highlight areas of greatest focus and describe how deployment is accomplished; (3) descriptions of organizational-level analysis and review (Items 4.1 and 1.1) should show how your organization analyzes and reviews performance information to set priorities; and (4) the Process Management Category should highlight processes that are key to your overall performance. *Showing focus and consistency in the Approach-Deployment Items and tracking corresponding measures in the Results Items should improve business performance.*

- Respond fully to Item requirements.

Missing information will be interpreted as a gap in approach and/or deployment. All Areas to Address should be addressed. Individual components of an Area to Address may be addressed individually or together.

4. Cross-reference when appropriate.

As much as possible, each Item response should be self-contained. However, responses to different Items might be mutually reinforcing. It is then appropriate to refer to the other responses rather than to repeat information. In such cases, key process information should be given in the Item requesting this information. For example, employee education and training should be described in detail in Item 5.2. Discussions about education and training elsewhere in your application would then reference but not repeat details given in your Item 5.2 response.

5. Use a compact format.

Applicants should make the best use of the 50 application pages permitted. Applicants are encouraged to use flowcharts, tables, and “bullets” to present information concisely.

6. Refer to the Scoring Guidelines.

Considerations in the evaluation of Item responses include the Criteria Item requirements and the maturity of the approaches, breadth of deployment, alignment with other elements of your performance management system, and strength of the improvement process relative to the Scoring Guidelines. Therefore, you need to consider both the Criteria and the Scoring Guidelines.

Guidelines for Responding to Results Items

The Criteria place the greatest emphasis on results. The following information, guidelines, and example relate to effective and complete reporting of results.

1. Focus on the most critical business results.

Results reported should cover the most important requirements for your business success, highlighted in your Organizational Profile and in the Strategic Planning and Process Management Categories.

2. Note the meaning of the four key requirements from the Scoring Guidelines for effective reporting of results data:

- *trends* to show directions of results and rates of change
- *performance* levels on a meaningful measurement scale
- *comparisons* to show how results compare with those of other, appropriately selected organizations
- *breadth and importance of results* to show that all important results are included

3. Include trend data covering actual periods for tracking trends.

No minimum period of time is specified for trend data. Trends might span five years or more for some results. For important results, new data should be included even if trends and comparisons are not yet well established.

4. Use a compact format—graphs and tables.

Many results can be reported compactly by using graphs and tables. Graphs and tables should be labeled for easy

interpretation. Results over time or compared with others should be “normalized,” i.e., presented in a way (such as use of ratios) that takes into account various size factors. For example, reporting safety trends in terms of lost work days per 100 employees would be more meaningful than total lost work days if the number of employees has varied over the time period or if you are comparing your results to organizations differing in size.

5. Integrate results into the body of the text.

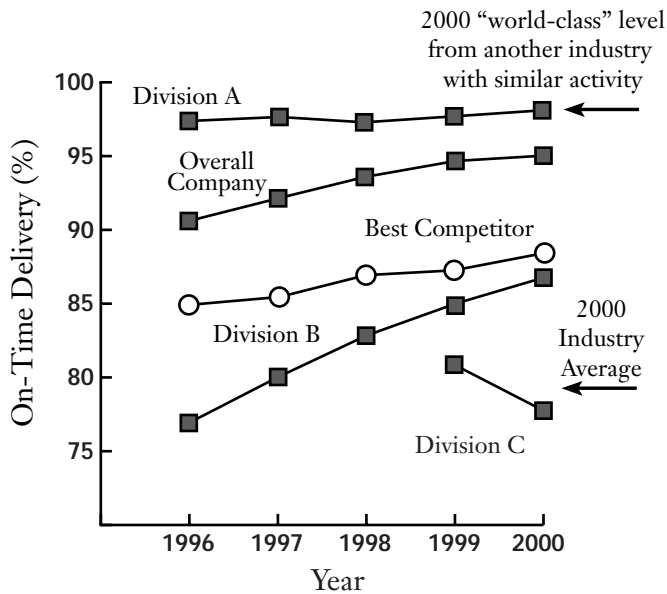
Discussion of results and the results themselves should be close together in an Award application. *Trends that show a significant positive or negative*



change should be explained. Use figure numbers that correspond to Items. For example, the third figure for Item 7.1 would be Figure 7.1-3. (See the example in the figure that follows.)

The following graph illustrates data an organization might present as part of a response to Item 7.1, Customer-Focused Results. In the Organizational Profile, the organization has indicated on-time delivery as a key customer requirement.

Figure 7.1-3 On-Time Delivery Performance



Using the graph, the following characteristics of clear and effective data reporting are illustrated:

- A figure number is provided for reference to the graph in the text.
- Both axes and units of measure are clearly labeled.
- Trend lines report data for a key customer requirement—on-time delivery.
- Results are presented for several years.
- Appropriate comparisons are clearly shown.
- The company shows, using a single graph, that its three divisions separately track on-time delivery.

To help interpret the Scoring Guidelines (page 46), the following comments on the graphed results would be appropriate:

- The current overall company performance level is excellent. This conclusion is supported by the comparison with industry competitors and with a “world-class” level.
- The company shows excellent improvement trends.
- Division A is the current performance leader—showing sustained high performance and a slightly positive trend. Division B shows rapid improvement. Its current performance is near that of the best industry competitor but trails the “world-class” level.
- Division C—a new division—is having early problems with on-time delivery. (The company briefly should explain these early problems.)

APPLYING FOR THE MALCOLM BALDRIGE NATIONAL QUALITY AWARD

The Malcolm Baldrige National Quality Award is an annual Award to recognize U.S. organizations for performance excellence.

Award Purpose

The Award promotes

- awareness of performance excellence as an increasingly important element in competitiveness
- information sharing of successful performance strategies and the benefits derived from using these strategies

Award Participation

The Award eligibility categories include

- manufacturing businesses
- service businesses
- small businesses
- education organizations
- health care organizations

Copies of the Education Criteria and Health Care Criteria are available, and ordering information can be found on page 53.

Three awards may be given in each category each year.

To participate in the Award process, an organization must submit an application package that addresses the Criteria for Performance Excellence (pages 10–28).

Application Requirements

Applicants need to submit an application package that consists of three parts:

- a validated Eligibility Certification Form
- a completed Application Form
- an application report consisting of an Organizational Profile and responses to the Criteria

Detailed information and the necessary forms are contained in the *Baldrige Award Application Forms* booklet. Ordering instructions for this booklet are given on page 53.

Application Review

Applications are reviewed and evaluated by members of the Board of Examiners, who adhere to strict rules regarding conflict of interest, in a four-stage process:

Stage 1 - independent review and evaluation by at least five members of the board

Stage 2 - consensus review and evaluation for applications that score well in Stage 1

Stage 3 - site visits to applicants that score well in Stage 2

Stage 4 - Judges' review and recommendations of Award recipients

Feedback to Applicants

Each Award applicant receives a feedback report at the conclusion of the review process. The feedback report is a written assessment by an evaluation team of leading U.S. experts.

The feedback report contains an applicant-specific listing of strengths and opportunities for improvement based on the Criteria. Used by companies, education organizations, and health care organizations as part of their strategic planning processes, the feedback report helps organizations focus on their customers and improve overall performance. Feedback is one of the most important parts of the Baldrige Award process; it provides a pathway for improvement.

Feedback reports are mailed at various times during the Award cycle, based on the stage of review an application reaches in the evaluation process. Strict confidentiality is observed at all times and in every aspect of application review and feedback.

Award Recipients

Award recipients may publicize and advertise their Awards. Recipients are expected to share information about their successful performance strategies with other U.S. organizations.

If your organization is applying in the education or health care category, refer to the appropriate sector-specific Criteria booklet and the *Baldrige Award Application Forms*. Ordering information is on page 53.

SUMMARY OF BUSINESS ELIGIBILITY CATEGORIES AND RESTRICTIONS

Important Facts about Applying for the Award

- Criteria contained in this booklet should be used only for the business eligibility categories (manufacturing, service, and small business).
- The following is a summary of the eligibility rules for the business categories. Summaries of the eligibility rules for the education and health care categories are in their respective Criteria booklets. For-profit education or health care organizations may apply under the service or small business categories, as appropriate, using these Criteria or under the health care or education categories, using their respective Criteria. If there is a question on eligibility, check the complete eligibility rules in the *Baldrige Award Application Forms* or call the Baldrige National Quality Program Office at (301) 975-2036.
- Whatever your Award eligibility category, you will need to obtain a copy of the *Baldrige Award Application Forms* before proceeding. Ordering instructions are given on page 53.

Basic Eligibility

Public Law 100-107 establishes the three business eligibility categories for the Award: manufacturing, service, and small business. Any for-profit business and some subunits headquartered in the United States or its territories, including U.S. subunits of foreign companies, may apply for the Award. Eligibility is intended to be as open as possible. For example, publicly or privately owned organizations, domestic or foreign-owned entities, joint ventures, corporations, sole proprietorships, and holding companies may apply. Not eligible in the business category are local, state, and federal government agencies; trade associations; professional societies; and not-for-profit organizations.

Business Award Eligibility Categories

Manufacturing: Companies or some subunits (see section below on subunits) that produce and sell manufactured products or manufacturing processes and producers of agricultural, mining, or construction products.

Service: Companies or some subunits (see section below on subunits) that sell services.

Small Business: Companies or some subunits engaged in manufacturing and/or the provision of services that have 500 or fewer employees.

Eligibility of Subunits

A subunit is a unit or division of a larger (parent) company. Subunits of companies in the manufacturing, service, or small business eligibility categories might be eligible. To be eligible, the subunit must have more than 500 employees, or have more than 25 percent of the employees of the parent, or have been independent prior to being acquired by its

parent. In the last case, it must continue to operate largely independently under its own identity.

The subunit must be self-sufficient enough to be examined in all seven Criteria Categories, and it must be a discrete business entity that is readily distinguishable from other parts of the parent organization. It cannot be primarily an internal supplier to other units in the parent company or be a business support function (e.g., sales, distribution, legal services).

Other Restrictions on Eligibility

Location: Although an applicant may have facilities outside the United States or its territories, or it may receive support from its parent, in the event of a site visit, the applicant must ensure that the appropriate people and information are available for examination in the United States. This information is needed to document the operational practices associated with all of its major business functions. In the event that the applicant receives the Award, it must be able to share information on the seven Criteria Categories at the Quest for Excellence Conference and at its U.S. facilities. Sharing beyond the Quest for Excellence Conference is on a voluntary basis.

Multiple-Application Restrictions: A subunit and its parent may not both apply for Awards in the same year. In some cases, more than one subunit of a parent may apply. If the size of the *parent*, including all of its subunits, is

- 0–1000 employees, 1 applicant per parent per eligibility category may apply
- 1001–20,000 employees, 2 applicants per parent per eligibility category may apply
- over 20,000 employees, 2 applicants per parent per eligibility category for the first 20,000, plus 1 per 20,000 or fraction thereof above 20,000 per eligibility category, may apply

Future Eligibility Restrictions: If an organization or a subunit that has more than 50 percent of the total employees of the parent receives an Award, the organization and all its subunits are ineligible to apply for another Award for a period of five years. If a subunit receives an Award, that subunit and all its subunits are ineligible to apply for another Award for a period of five years. After five years, Award recipients are eligible to reapply for the Award or to reapply “for feedback only.”

Eligibility Validation

Potential applicants must have their eligibility validated prior to applying for the Award. Potential applicants for the 2001 Award are encouraged to submit their Eligibility Forms as early as possible after they are available but no later than April 5, 2001. This form is contained in the *Baldrige Award Application Forms*.

HOW TO ORDER COPIES OF BALDRIGE PROGRAM MATERIALS

Note: If you are planning to apply for the Award, you will need the *Baldrige Award Application Forms* in addition to the Criteria booklet.

Individual Orders

Individual copies of the Criteria booklets and the *Baldrige Award Application Forms* can be obtained free of charge from

Baldrige National Quality Program
National Institute of Standards and Technology
Administration Building, Room A600
100 Bureau Drive, Stop 1020
Gaithersburg, MD 20899-1020
Telephone: (301) 975-2036
Fax: (301) 948-3716
E-mail: nqp@nist.gov

Bulk Orders

Multiple copies of the *2001 Criteria for Performance Excellence* booklets may be ordered in packets of 10 for \$29.95 plus shipping and handling from the American Society for Quality (ASQ).

2001 Business Criteria—Item Number T1105
2001 Education Criteria—Item Number T1106
2001 Health Care Criteria—Item Number T1107

How to Order

ASQ offers four convenient ways to order:

- For fastest service, call toll free (800) 248-1946 in the United States and Canada (in Mexico, dial toll free 95-800-248-1946). Have item numbers, your credit card or purchase order number, and (if applicable) ASQ member number ready.
- Or fax your completed order form to ASQ at (414) 272-1734.
- Or mail your order to ASQ Customer Service Department, P.O. Box 3066, Milwaukee, WI 53201-3066.
- Or order online by accessing ASQ's Web site at <http://www.asq.org>.

Payment

Your payment options include check, money order, U.S. purchase order, VISA, MasterCard, or American Express. Payment must be made in U.S. currency; checks and money orders must be drawn on a U.S. financial institution. All international orders must be prepaid. Please make checks payable to ASQ.

Shipping Fees

The following shipping and processing schedule applies to all orders.

Order Amount	U.S. Charges	Canadian Charges
0–\$34.99	\$ 4.25	\$ 9.25
\$35.00–\$99.99	6.50	11.50
Over \$100.00	12.50*	17.50*

- There is an additional charge of 25 percent of the total order amount for shipments outside the United States and Canada.
- Orders shipped within the continental United States and Canada where UPS service is available will be shipped UPS.
- Please allow one to two weeks for delivery. International customers, please allow six to eight weeks for delivery.
- Your credit card will not be charged until your items are shipped. Shipping and processing are charged one time, up front, for the entire order.

**If actual shipping charges exceed \$12.50 (\$17.50 Canadian), ASQ will invoice the customer for the additional expense.*

Baldrige Educational Materials

Each year, the Baldrige National Quality Program develops materials for training members of the Board of Examiners and for sharing information on the successful performance excellence strategies of the Award recipients. The following items are a sample of the educational materials that may be ordered from ASQ.

Case Studies

The case studies are used to prepare Examiners for the interpretation of the Criteria and the Scoring System. The case studies, when used with the Criteria, illustrate the Award application and review process. The case study packet contains the case study and six additional documents: an executive summary, the related *Criteria for Performance Excellence* booklet, the case study scorebook, the case study feedback report, the *Handbook for the Board of Examiners*, and the *Scorebook for Business, Education, and Health Care*. These documents provide information related to scoring, Criteria responses, examination processes, and site visit procedures, as well as illustrate the format for an application. A variety of case study packets are available, including the following:

2000 Education Case Study Packet: Coyote Community College (based on the *2000 Education Criteria for Performance Excellence*)

Item Number T1090: \$49.95 plus shipping and handling

1999 Business Case Study Packet: Collin Technologies (based on the *1999 Criteria for Performance Excellence*)

Item Number T1079: \$49.95 plus shipping and handling

Education Case Study Packet: Ridgecrest School District (based on the *1995 Education Pilot Criteria*)

Item Number T1023: \$7.28 plus shipping and handling

Health Care Case Study Packet: Pinnacle Health Plan (based on the *1995 Health Care Pilot Criteria*)

Item Number T1029: \$7.28 plus shipping and handling

Award Recipients' Videos

The Award recipients' videos are a valuable resource for gaining a better understanding of performance excellence and quality achievement. The videos provide background

information on the Baldrige National Quality Program, highlights from the annual Award ceremony, and interviews with representatives from the Award recipients' organizations. Information on the 2000 Award recipients' video is provided below. Videos about Award recipients from other years also are available from ASQ.

2000—Item Number TA997 \$ 20.00
(Available May 2001)

How to Order Educational Materials

To order a case study packet (Coyote Community College, Collin Technologies, Ridgecrest School District, Pinnacle Health Plan, or others), bulk orders of the 2001 Criteria booklet, or the Award recipients' videos, contact

ASQ Customer Service Department
P.O. Box 3066
Milwaukee, WI 53201-3066
Telephone: (800) 248-1946
Fax: (414) 272-1734
E-mail: asq@asq.org
Web address: <http://www.asq.org>



FEES FOR THE 2001 AWARD CYCLE

Eligibility Certification Fees

The eligibility certification fee is \$150 for all potential business applicants. This fee is nonrefundable.

Application Fees

- manufacturing business category—\$5000
- service business category—\$5000
- small business category—\$2000
- supplemental sections—\$2000

Detailed information on fees is given in the *Baldrige Award Application Forms*.

Site Visit Review Fees

Site visit review fees will be set when the visits are scheduled. Fees depend on the number of Examiners assigned and the duration of the visit. Site visit review fees for applicants in the small business category will be charged at one-half of the rate charged for applicants in the manufacturing and service categories. These fees are paid only by those applicants reaching the site visit stage.

Eligibility Forms due—April 5, 2001
Award Applications due—May 31, 2001

The Baldrige National Quality Program welcomes your comments on the Criteria or any of the Baldrige Award processes. Please address your comments to

2001 Criteria for Performance Excellence
Baldrige National Quality Program
National Institute of Standards and Technology
Administration Building, Room A600
100 Bureau Drive, Stop 1020
Gaithersburg, MD 20899-1020

or E-mail: nqp@nist.gov

or Web address: <http://www.quality.nist.gov>

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NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.

THE MALCOLM BALDRIGE NATIONAL QUALITY IMPROVEMENT ACT OF 1987—PUBLIC LAW 100-107

The Malcolm Baldrige National Quality Award was created by Public Law 100-107, signed into law on August 20, 1987. Public Law 100-107 led to the creation of a new public-private partnership. Principal support for the program comes from the Foundation for the Malcolm Baldrige National Quality Award, established in 1988.

The Award is named for Malcolm Baldrige, who served as Secretary of Commerce from 1981 until his death in 1987. His managerial excellence contributed to long-term improvement in efficiency and effectiveness of government.

The Findings and Purposes Section of Public Law 100-107 states that

- “ 1. the leadership of the United States in product and process quality has been challenged strongly (and sometimes successfully) by foreign competition, and our Nation’s productivity growth has improved less than our competitors’ over the last two decades.
2. American business and industry are beginning to understand that poor quality costs companies as much as 20 percent of sales revenues nationally and that improved quality of goods and services goes hand in hand with improved productivity, lower costs, and increased profitability.
3. strategic planning for quality and quality improvement programs, through a commitment to excellence in manufacturing and services, are becoming more and more essential to the well-being of our Nation’s economy and our ability to compete effectively in the global marketplace.
4. improved management understanding of the factory floor, worker involvement in quality, and greater emphasis on statistical process control can lead to dramatic improvements in the cost and quality of manufactured products.
5. the concept of quality improvement is directly applicable to small companies as well as large, to service industries as well as manufacturing, and to the public sector as well as private enterprise.
6. in order to be successful, quality improvement programs must be management-led and customer-oriented, and this may require fundamental changes in the way companies and agencies do business.
7. several major industrial nations have successfully coupled rigorous private-sector quality audits with national awards giving special recognition to those enterprises the audits identify as the very best; and
8. a national quality award program of this kind in the United States would help improve quality and productivity by
- A. helping to stimulate American companies to improve quality and productivity for the pride of recognition while obtaining a competitive edge through increased profits;
 - B. recognizing the achievements of those companies that improve the quality of their goods and services and providing an example to others;
 - C. establishing guidelines and criteria that can be used by business, industrial, governmental, and other organizations in evaluating their own quality improvement efforts; and
 - D. providing specific guidance for other American organizations that wish to learn how to manage for high quality by making available detailed information on how winning organizations were able to change their cultures and achieve eminence.”

The Baldrige National Quality Program thanks the following 1999 Award recipients for the use of the photographs in this booklet: BI, The Ritz-Carlton Hotel Company, STMicroelectronics-Region Americas, and Sunny Fresh Foods.

Baldrige National Quality Program

**Baldrige National Quality Program
National Institute of Standards and Technology
Technology Administration
United States Department of Commerce**

Administration Building, Room A600
100 Bureau Drive, Stop 1020
Gaithersburg, MD 20899-1020



The National Institute of Standards and Technology (NIST) is a nonregulatory federal agency within the Commerce Department's Technology Administration. NIST's primary mission is to strengthen the U.S. economy and improve the quality of life by working with industry to develop and apply technology, measurements, and standards. The Baldrige National Quality Program (BNQP) at NIST is a customer-focused federal change agent that enhances the competitiveness, quality, and productivity of U.S. organizations for the benefit of all citizens. BNQP develops and disseminates evaluation criteria and manages the Malcolm Baldrige National Quality Award. It also provides global leadership in promoting performance excellence and in the learning and sharing of successful performance practices, principles, and strategies.

Call BNQP for

- information on improving the performance of your organization
- information on applying for the Baldrige Award
- information on becoming a Baldrige Examiner
- information on the Baldrige Award recipients
- individual copies of the Criteria for Performance Excellence—Business, Education, and Health Care (no cost)
- information on BNQP educational materials

Telephone: (301) 975-2036; Fax: (301) 948-3716; E-mail: nqp@nist.gov;
Web address: <http://www.quality.nist.gov>

American Society for Quality

611 East Wisconsin Avenue
P.O. Box 3005
Milwaukee, WI 53201-3005

The American Society for Quality (ASQ) advances individual and organizational performance excellence worldwide by providing opportunities for learning, quality improvement, and knowledge exchange. ASQ administers the Malcolm Baldrige National Quality Award under contract to NIST.

Call ASQ to order

- bulk copies of the Criteria
- case studies
- Award recipients' videos

Telephone: (800) 248-1946; Fax: (414) 272-1734; E-mail: asq@asq.org
Web address: <http://www.asq.org>

Design: RCW Communication Design Inc.

excellence

...

The Green Zia Environmental Excellence Program

Program Information and Application Criteria, 2001

The Green Zia Environmental Excellence Program
New Mexico Environment Department
Office of the Secretary
PO Box 26110
1190 St. Francis Drive
Santa Fe, NM 87502
(505) 827-0677
(505) 827-2836
pat_gallagher@nmenv.state.nm.us

"It is not possible to repeat too often that waste is not something which comes after the fact...picking up and reclaiming scrap left over after production is a public service, but planning so that there will be no scrap is a higher public service."

Henry Ford, 1924

Acknowledgements

The 2001 Green Zia Criteria was revised through the efforts of the following people:

- John Bartlit, NM Citizens for Clean Air and Water
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- Scott Seydel, Emcore
- Brian Thompson, Los Alamos National Laboratory
- Jeff Weinrach, JCS/Novation
- Cathy Tyson, NM Environment Department
- Debra McElroy, NM Environment Department
- Dawn Reed, Management IQ
- Dr. Robert Pojasek, Pojasek and Associates

This work was conducted in collaboration with the New Mexico Pollution Prevention Advisory Council.

The Green Zia Environmental Excellence Program is closely modeled after the highly successful Quality New Mexico Program. We are fortunate to have such a strong model for business, education and healthcare improvement in our state. We believe that quality approaches are essential to maintaining quality of life in New Mexico and we are grateful for the work that Quality New Mexico is doing.

The Green Zia Environmental Excellence Program is supported by funding provided by the US Environmental Protection Agency and the U.S. Department of Energy. Special thanks are extended to Eli Martinez, Joy Campbell and Rob Lawrence for their support of this program.

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The New Mexico Pollution Prevention Advisory Council:

Peter Alexander, Rebuild New Mexico
Dominic Annetta, Do Paso Corporation
Jean Arya, Public Service of New Mexico
John Bartlit, NM Citizens for Clean Air and Water
Carol Belcher, NM Facility Managers Association
Troy Bradley, Comet Cleaners, Albuquerque
J.D. Bullington, Association of Commerce & Industry
Chris Campbell, Waste Management Education and Research Consortium
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Alice Darilek, NM State Engineer's Office
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Will Hoffman, City of Albuquerque Solid Waste Department
Bob Hogrefe, Albuquerque Public Works Department
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Scott Seydel, MicoOptical Devices
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Tom Starke, Los Alamos National Laboratory
Brian Thompson, Los Alamos National Laboratory
Mike Sweitzer, Department of Energy
Lynda Taylor, Southwest Research and Information Center
Ron Taylor, Photo Systems
Jeff Weinrach, JCS/Novation
Chris Wentz, Energy, Minerals and Natural Resources Department

2000 Green Zia Environmental Excellence Program Recognition Winners

The winners are in two categories, Achievement and Commitment.

Achievement Recognition Winners:

- Cannon Air Force Base
- Cottonwood Printing, Albuquerque
- Holloman Air Force Base
- Intel Corporation, Rio Rancho
- Los Alamos National Laboratory, Weapon Component Technology
- Los Alamos National Laboratory, Environmental Science and Waste Technology
- Los Alamos National Laboratory, High Explosives Science and Technology Group, Los Alamos
- McKinley Paper, Prewitt
- Philips Semiconductors, Albuquerque
- Sumitomo Sitix Silicon, Inc., Albuquerque
- Sumitomo/Silmax, Albuquerque
- Westinghouse, Waste Isolation Division, Carlsbad

Commitment Recognition Winners:

- Aramark Corporation, Los Alamos
- Comet Cleaners, Silver City Comet Cleaners, Silver City
- Honeywell Defense Avionics, Albuquerque
- Hydroscope Inc., Albuquerque
- Kirtland Air Force Base, Defense Threat Reduction Agency
- Kirtland Air Force Base, Recycling Tiger Team
- Los Alamos National Laboratory, Business Operations Division
- Los Alamos National Laboratory, Human Resources Division
- Los Alamos National Laboratory, Transition Manufacturing and Safety Equipment Project
- Los Alamos National Laboratory, Facilities and Waste Operations, Diversified Facilities
- Navajo Refining, Artesia
- New Mexico State University, Carlsbad
- Rebuild New Mexico, Albuquerque
- Sandia National Laboratories, Sustainable Design Program
- Sandia National Laboratories, Machine Shop
- Sandia National Laboratories, Environmentally Preferable Purchasing Program
- Sandia National Laboratories, Steam Plant
- URS Radian, Albuquerque

1999 Green Zia Environmental Excellence Program Recognition Winners

The winners are in two categories, Achievement and Commitment.

Achievement Recognition Winners:

- Cottonwood Printing, Albuquerque
- Denman and Associates, Santa Fe
- Intel Corporation, Rio Rancho
- Los Alamos National Laboratory, Transuranic Waste Inspectible Storage Project, Los Alamos
- McKinley Paper, Prewitt
- Philips Semiconductors, Albuquerque
- Sumitomo Sitix Silicon, Inc., Albuquerque
- Sumitomo/Silmax, Albuquerque
- Westinghouse, Waste Isolation Division, Carlsbad

Commitment Recognition Winners:

- Academy Corporation, Albuquerque
- B. F. Goodrich Data Systems, Albuquerque
- Comet Cleaners, Albuquerque
- G&K Services, Albuquerque
- Holloman Air Force Base
- Honeywell Defense Avionics, Albuquerque
- Los Alamos National Laboratory, Environmental Management Division, Los Alamos
- Los Alamos National Laboratory, High Explosives Science and Technology Group, Los Alamos
- MTM Technology Solutions, Inc, Albuquerque
- Navajo Refining, Artesia
- Phelps-Dodge, Hidalgo, Playas
- San Cristobal Ranch Foundation, San Cristobal
- United States Postal Service, Albuquerque Customer Service Center, Albuquerque

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Matt Hunt, Enterprise Performance Improvement Consulting

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Brian Thompson, Los Alamos National Laboratory
Susan Watkins, Los Alamos National Laboratory
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Examiners:

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Chris Campbell, WERC
Dominique Cartron
Margo Covington, Covington Consulting

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Beverly Martin, Los Alamos National Laboratory
Rayo McCollough, McCollough Consulting
Debra McElroy, New Mexico Environment Department
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John O'Connell, New Mexico Environment Department
John Parker, New Mexico Environment Department
Linda Paul, Los Alamos National Bank
Annie Porras, Cottonwood Printing
Jay Stimmel, Los Alamos National Laboratory
Tim Stirrup, Radian International
Mark Tardiff, Neptune & Company, Inc.
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RoseAnn Thompson, WERC
Rita Trujillo, New Mexico Environment Department
Cathy Tyson, New Mexico Environment Department
Tamera Van Horn Bedford, CO Department of Health and Environment
Dianne Wilburn, Los Alamos National Laboratory
Rosilee Winn, New Mexico Environment Department
Cindy Woodin, Westinghouse Waste Isolation Division

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Green Zia Environmental Excellence Program
Application Cover Form

Company: _____

Address: _____
(Street Name, PO Box, or Apt #)

(City, State, and Zip Code)

Primary Contact (for questions on application):

Work Number: _____

Fax #

E-Mail Address: _____

Level of award or recognition you are applying for:

- ☐ Commitment Recognition Level
- ☐ Achievement Recognition
- ☐ Environmental Excellence Award Level

Have you won a Green Zia Recognition in the past? What level?

Please submit seven (7) copies of your application to the address below. Applications must be received by 5:00 pm, Friday, May 11, 2001. Copies may also be emailed at the address below. Please submit check to cover applicable application fee (see program guidance for more information) with the application (please note that checks are made to NMSU, while applications should be addressed to NMED). Check and application can be submitted together.

Purchase orders or checks for application fees should be made out to NMSU/WERC. Please call Chris Campbell at 505-843-4251 for tax id numbers, vendor numbers, etc.

The applications must be sent to the following address:

Patricia Gallagher
Green Zia Environmental Excellence Program
Office of the Secretary
New Mexico Environment Department
PO Box 26110
1190 St. Francis Drive
Santa Fe, NM 87502
505-827-0677, 505-827-2836 (fax)
pat_gallagher@nmenv.state.nm.us

.....

The Green Zia Environmental Excellence Program

Environmental excellence through continuous improvement: assuring a healthy environment and a healthy economy for New Mexico

Introduction

The Green Zia Environmental Excellence Program is a voluntary program designed to support and assist all New Mexico businesses to achieve environmental excellence through continuous improvement and effective energy management. The program encourages integration of environmental excellence into business operations and management practices through the establishment of a prevention-based environmental management system. The Governor of New Mexico makes recognitions and awards annually to organizations that successfully participate in the program. Large and small organizations may participate.

Why Apply?

- Get an independent assessment of your organization's environmental performance.
- Understand how your organization can reach new levels of environmental excellence while satisfying customers.
- Understand how environmental activities can be integrated into overall business practices.
- Learn to improve efficiency and productivity by adopting proactive environmental management techniques.
- Achieve morale-boosting recognition and awards and enhance your competitive position.

The Green Zia Program is administered by the New Mexico Environmental Alliance, a partnership of state, local and federal agencies, academia, private industry and environmental advocacy groups.

The basic premise of the Green Zia Environmental Excellence Program is that waste is the result of inefficiency and by reducing waste, an organization can increase its productivity and therefore, its profits. Likewise, the environmental benefit is clear: waste that is never created does not pollute.

The Green Zia Program emphasizes the establishment of a *system* to provide a framework for continuous environmental improvement that will assure compliance and reduce or eliminate pollution. The Green Zia Program is based on the Malcolm Baldrige Business Performance Excellence Criteria and the Quality New Mexico program. It is the only program of its kind nationally and helps participants integrate environmental decision making into core business practices.

The Green Zia Core Values and Criteria provide a valuable self-assessment framework to help organizations understand environmental excellence and measure their progress toward its achievement. Applicants receive a feedback report from their examiner team which helps identify program strengths and opportunities for improvement. Tools, training and on-site technical assistance are available to organizations to help them develop their programs. Assistance is available through the Green Zia Program (505) 827-0677, or through the Pollution Prevention Technical Resource Center at (505) 843-4251.

The Green Zia Environmental Excellence Program is a multi-year program. An organization that works through the Green Zia Program from the beginning Commitment Level through the Achievement Level and then ultimately to the Green Zia Environmental Excellence Award, will gain a thorough understanding of environmental and energy-associated issues that will affect its bottom line. The participating organization will also establish a system that helps them address environmental issues in cost-effective ways, based on sound business practices. Participants that achieve the Green Zia Environmental Excellence Award will be on par with environmental leaders worldwide and will demonstrate that companies can profit from sound environmental performance.

Who Should Participate in This Program?

Any business, organization or community will benefit by participating in the Green Zia Environmental Excellence Program, regardless of size. Any operation that generates waste or uses resources such as electricity or water can strive for continuous environmental improvement.

Communities can use the Green Zia Environmental Excellence Program to work with local businesses to meet community environmental and economic sustainability goals. As well, local governments can apply the Green Zia Program to operations such as fleet maintenance, waste handling and other operations to reduce waste and save money! Other types of organizations, such as economic development organizations and environmental groups, can also benefit from using the tools associated with the Green Zia Program. The Green Zia Program assessment tools are fun and easy-to-use.

What is Pollution Prevention?

Simply put, pollution prevention means not creating a waste in the first place. Pollution prevention is achieved by the efficient use of resources, including raw materials, energy, water and even time and distance. Efficient use of materials includes the *amount* of the material used, the *type* of material used, and *how* or even *why* the material is used or handled in the process. The goal is to produce a product or deliver a service as efficiently as possible, with the least amount of wasted materials or and the least impact on worker health and safety and the environment.

Pollution prevention translated into business or manufacturing language means many things: loss prevention, waste reduction, improved efficiency, materials conservation, water conservation, energy efficiency, energy conservation, renewable energy use, hazard reduction, manufacturing efficiency, just-in-time manufacturing, scrap reduction, inventory control, good housekeeping, formulation efficiency, world class manufacturing, inventory waste reduction, batch maximization (or optimization), quality improvement, quality maximization, "zero inventory", globally competitive, "zero emissions", "zero defects", "green productivity" (from Asia), "green chemistry", continuous improvement *The bottom line is that pollution prevention or improved efficiency in labor, materials, and energy use can help businesses save money and help protect the environment at the same time.*

What is Effective Energy Management?

Effective energy management is a comprehensive term that includes many diverse, related activities. It encompasses measures to reduce energy consumption, as well as the purchase or use renewable energy (*i.e.*, from solar, wind, geothermal and biomass resources). The important point is that effective energy management minimizes or eliminates pollution and reduces operating costs.

Reductions in energy consumption can be accomplished by organizations in a

variety of ways. These include, but are not limited to, monitoring and assessment of energy usage; designation of an “Energy Manager” for each facility or group of facilities; establishment of education and training programs to effect changes in employee behavior (as it pertains to energy use); efficiency improvements to lighting, heating/cooling systems, motors and other energy-consuming equipment; purchase of energy-efficient vehicles and products such as EnergyStar™ appliances, computers, etc.; formation and use of carpools by employees; adoption of telecommuting and/or flexible schedule policies; scheduling custodial services to coincide with normal business hours; use of native landscaping to enhance building efficiency; and strict adherence to manufacturers’ recommended maintenance schedules for energy-related equipment. Thus, there are numerous mechanisms available for an organization to reduce its consumption of energy or to use it more wisely.

In addition, effective energy management can entail the purchase or use of renewable energy. Clean sources of energy such as that produced from the sun, wind, or earth generate less pollution than conventional energy resources. As a result, the purchase or use of renewable energy results in protection of the environment.

What is Environmental Excellence?

Environmental excellence means that an organization can demonstrate best-in-class environmental performance, beyond mere compliance with environmental, health and safety regulations. Environmental excellence has two aspects: internal and external. The internal aspect refers to activities within the facility boundary such as compliance assurance and continuous improvement of processes, products and services to significantly reduce or eliminate impacts to the environment and worker health and safety on an ongoing basis. This also includes water and energy conservation. The external aspect takes a broader look of the organization’s activities beyond the boundaries of the facility in a stewardship role such as interaction and support of community, product and process life-cycle analysis, resource efficiency, environmental enhancement and sustainability.

Environmental excellence is best achieved through a well-integrated environmental management system. A prevention-based environmental management system relies on thorough knowledge of processes and a structure for continuous improvement to reduce or eliminate wastes. A well-designed system incorporates leadership, both organizational and community; planning; customers’, suppliers’, and others’ involvement; information and analysis; employee involvement; process management; and results. This system takes advantage of existing business management approaches to improve environmental performance. An organization with this kind of system in place is well on its way to environmental excellence.

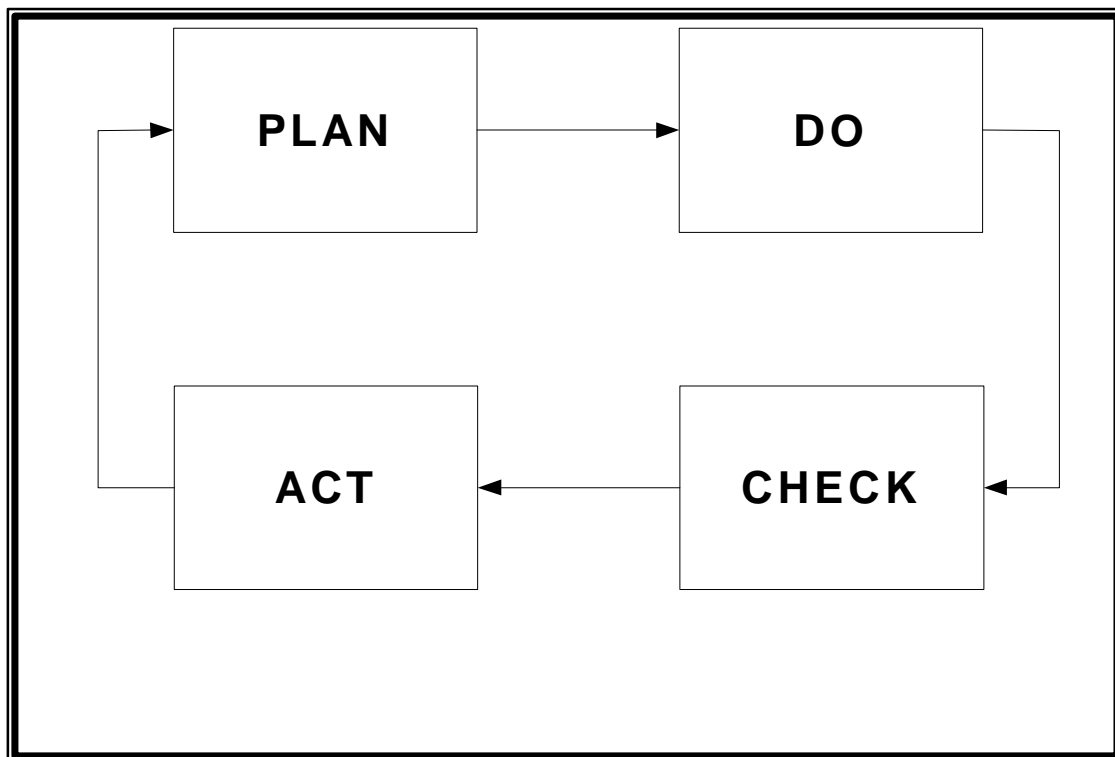
What Makes Up a System for Continuous Improvement?

A systems approach provides a framework for continuous environmental improvement. Continuous improvement, over time, will lead an organization to environmental excellence.

Continuous Improvement can be envisioned and implemented through the “Deming Cycle” named after W. Edwards Deming who developed this particular approach in the 1950’s to improve business processes. The cycle consists of four primary stages:

- *Plan* – Design or revise processes and/or process components to improve results
- *Do* – Implement the plan and measure its performance
- *Check (Study)* – Assess the measurements and report the results to decision-makers
- *Act* – Decide on changes needed to improve the process

Repeat the cycle on an ongoing basis to assure continuous improvement.



The Green Zia Program stresses the importance of a sound, systematic approach to environmental decision-making that is well deployed throughout the organization and is supported by results that measure the success of the system.

There are three dimensions to an environmental management system:

- **APPROACH** - How the organization responds to the requirements of the environmental management system as outlined in the Green Zia Core Values and Criteria.
- **DEPLOYMENT** - The extent to which the organization uses the approach, for example, limited in major operations or throughout the organization.
- **RESULTS** - The outcomes achieved by the approach.

Approach

"Approach" refers to the *method(s)* used. The factors used to evaluate approaches include:

- appropriateness of the methods to the requirements
- effectiveness of use of the methods. Degree to which the approach:
 - is systematic, integrated, and consistently applied
 - embodies evaluation/improvement/learning cycles
 - is based on reliable information and data
- alignment with organizational needs
- evidence of innovation

Deployment

"Deployment" refers to the *extent* to which your approach is applied in the organization. The factors used to evaluate deployment include:

- use of the approach in addressing requirements relevant to your organization, to what degree or what stage approaches are being implemented (time element: just beginning to be used or mature)
- use of the approach by all appropriate work units (horizontal)
- use of the approach from management to engineers to support staff (vertical).

Results

"Results" refers to *outcomes* in achieving the purposes of the system. The factors used to evaluate results include:

- current performance
- performance relative to appropriate comparisons and/or benchmarks
- rate, breadth, and importance of performance improvements
- linkage of results measures to key organization performance requirements.

A Few Keys to Success

- Remember that Continuous Improvement is the means to achieve environmental excellence. Plan, Do, Check and Act cycles are essential. You are never finished with continuous improvement!
- Start small and build on successes. Good results for organizations in the process of developing an environmental management system include:
 - Having a plan for continuous environmental improvement and consistently following it;
 - Successful deployment of environmental performance improvement plan.
- Good systems are can be described, measured and improved!

Green Zia and ISO 14001

Organizations with ISO 14001 certification or are considering obtaining ISO 14001 certification should understand that ISO 14001 and the Green Zia Program can work together to build an outstanding environmental management system that drives performance excellence.

ISO 14001 is a type of voluntary environmental management system that is sponsored by the Organization for Standardization. ISO 14001 guides the user in developing a formal set of procedures and policies that define how an organization will *manage* its potential impacts on the natural environment. Organizations may self certify to ISO 14001 or they may have received a third-party certification.

ISO 14001 identifies conformance and non-conformance practices according to ISO's requirements and specifications. ISO 14001 is a management standard, not a performance standard. As an international standard, organizations seeking ISO certification may see a benefit in seeking international recognition and market share.

The Green Zia Program is a results-driven program that demonstrates that organizations can profit from sound environmental performance. The Green Zia Program provides an entire integrated environmental management system tied to leadership, planning, information usage, employees, customers, suppliers, market

requirements, performance and key business indicators. The Green Zia Program enhances competitiveness, shared learning, continuous improvement, and overall business results.

Differences between Green Zia and ISO 14001

Important differences between the Green Zia Program and ISO 14001 include:

- ISO 14001 tends to be production processes and inward-oriented.
- Green Zia criteria are results, employee, marketing, financial analysis, strategic planning, and heavily top management oriented, and they are outward-looking.

Focus:

- ISO 14001 focuses on establishment, conformance and improvement of process.
- Green Zia focuses on improvement of the entire integrated system and of overall environmental results.

Scope:

- ISO 14001 looks at design and production processes and directly-associated support activities.
- Green Zia looks at the entire management system including: leadership; planning, use of information and measurements; employee involvement; involvement of customers and other parties; and management of key business processes.

Prevention Strategy

- ISO 14001 encourages corrective action to fix non-conformances and to prevent recurrence of problems, “Prevention of pollution”.
- Green Zia seeks continuous environmental improvement using continuous improvement in all aspects of the business, including lessons learned and feedback reports, “Prevention-based approach”.

Responsibility Levels

- ISO 14001 is usually lead by technical specialists in the environmental department.
- Green Zia works best if lead by an executive management team supported by environmental department personnel.

Organizations with ISO 14001 certification have a strong foundation for an effective environmental management system. These organizations should perform well in the Green Zia Criteria Category 4 Information and Analysis and Category 6 Process Management. ISO 140001 should address some of the other criteria categories as well, but to a lesser extent.

Organizations with ISO 14001-certification can use the Green Zia Program to expand and improve the system and integrate environmental management and performance into core business practices. Use of the Green Zia Program in conjunction with ISO 14001 certification can help an organization move from a management standard to a performance based-system.

The Green Zia Program Award and Recognition Levels

The Green Zia Environmental Excellence Program is a public recognition and technical assistance program that acknowledges and supports businesses or organizations with a vision and desire to move towards environmental excellence and long-term environmental and economic sustainability. Participants can enter the program at any one of three levels—***Commitment, Achievement, or Excellence***. The levels are designed to engage businesses at all stages of environmental management system implementation, and to encourage progressively higher system development. Organizations that submit applications that meet appropriate program criteria are recognized at an annual ceremony, with those achieving the highest, or Excellence level, receiving the Governor’s award. Special acknowledgements are made to organizations that participate for consecutive years, regardless of their award or recognition level. The goal of the Green Zia Program is to encourage organizations to improve their environmental programs over time.

It is important to understand that the Green Zia Program sets higher than usual standards for its awards and recognitions. The Commitment Recognition level requires a strong affirmation from an organization’s leadership to pursue a path of environmental excellence and an indication that a systematic approach is beginning to be put in place. The Achievement Recognition level, equivalent to most state and national awards programs, requires that an organization implement a comprehensive, prevention-based environmental management system that can show documented environmental improvements. The Governor’s Green Zia Excellence Award level is currently unequaled among environmental recognition programs. At this level, an organization is required to show full integration of an effective prevention-based environmental management system, substantial documentation of results related to continuous environmental improvement, as well as internalization of the Program’s Core Values. The Excellence Award “raises the bar” to a new level, and an organization that works through the Green Zia Criteria, continually building and improving the environmental management system, will undoubtedly attain this level of excellence along with all of the

commensurate benefits of increased efficiency. These benefits include significant cost savings, “best-in-class” environmental performance results, and leadership in environmental excellence with the tools to meet the challenges of the new millennium.

The three levels of the Green Zia Environmental Excellence Program are described below in greater detail. Organizations select a level and prepare an application based on the expectations set out for that level of the program. Applications are reviewed by a team of trained examiners, who make recommendations to a panel of judges. The judges make the ultimate determination about whether an organization has met the requirements of the level to which they have applied.

Commitment Recognition Level: The organization's management has made a strong commitment to prevention and/or effective energy management and is in the process of creating a framework for a prevention-based environmental management system. Few, if any, measurable results are expected at this level, although reporting of early or anecdotal results is encouraged. Instead, the focus is on development of the organization's continuous environmental improvement program.

Participants at this level receive a Green Zia Commitment Certificate signed by the organization's senior manager and the Governor of New Mexico.

Achievement Recognition Level: An organization has a prevention-based environmental management system in place, the system is becoming more integrated into the organization as a whole, and the organization can show results that demonstrate progress towards environmental excellence, in keeping with its key business requirements. This includes integration of environment management into existing business systems as outlined in the criteria categories. The Achievement Recognition Level also emphasizes the measurement of results to show positive performance and improvement trends in many areas of the organization, in alignment with its key business requirements. Achievement also means that the organization is beginning to establish systematic evaluation and improvement processes to assure organizational learning and improvement of its overall environmental management system.

Participants that successfully apply at the Achievement Recognition Level may use the Green Zia window sticker and the Green Zia logo in advertising.

Governor's Green Zia Environmental Excellence Award: The organization is considered "best in class" in environmental performance in New Mexico. The organization has a fully integrated prevention-based environmental management system in place that is well deployed throughout the organization. The organization can demonstrate good to excellent environmental results for most areas of importance to its key business requirements and can demonstrate

sustained improvement and performance trends. As well, Excellence Award winners should have no adverse trends or poor environmental performance.

As an Excellence Award winner, the organization demonstrates leadership in innovative and effective approaches to environmental issues, employs "best practices" throughout the organization to assure exemplary environmental performance, examines product and service design to reduce or eliminate impacts to the environment, and actively supports environmental excellence in its community. Excellence winners are asked to serve as mentors in the business community to encourage environmental excellence, beyond what they might be doing as part of their existing excellence program.

Excellence Award winners should also demonstrate that they have systematic evaluation and improvement processes in place to assure organizational learning and improvement of the overall prevention-based environmental management system.

Winners at this level are given the highly prestigious Governor's Green Zia Environmental Excellence Award. An organization that receives this award will be on par with world leaders in environmental excellence.

Green Zia Pollution Prevention Partnership certificate: Organizations that continue to participate in the Green Zia Program receive special partnership recognition along with the Commitment and Achievement Recognitions and Excellence Awards. This partnership program is designed to acknowledge an organization's continued participation in the Green Zia Program as it works through the recognition and award levels. It is understood that organizations may not apply each year to the program while they focus their efforts on specific organizational improvements. The Pollution Prevention Partnership provides a means to support pollution prevention efforts in the state through mentorship, training, outreach, pilots and other support activities. Each Pollution Prevention Partner will receive a certificate showing the number of years of consecutive participation in the Green Zia Program.

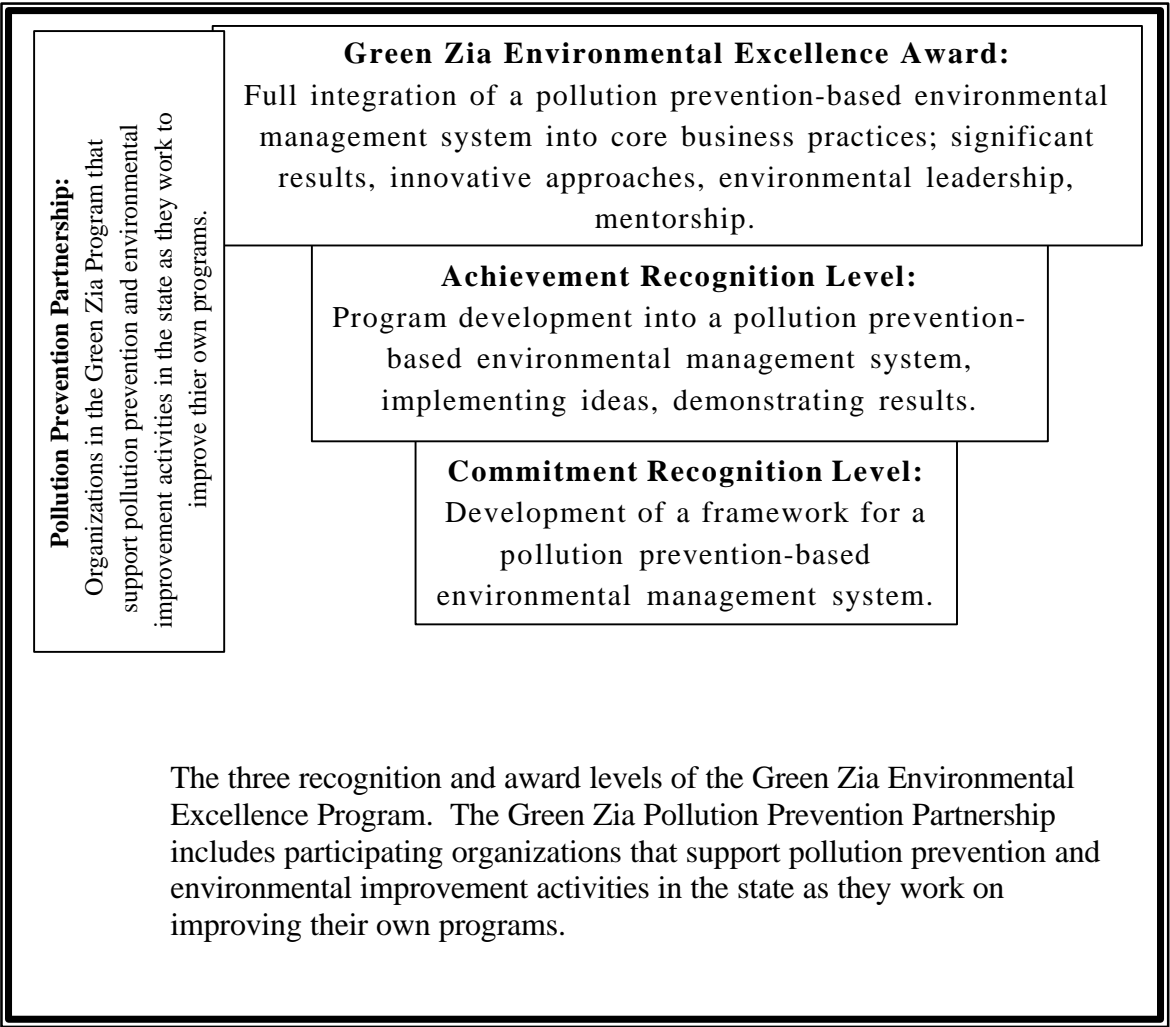
The progression through the three levels provides a framework for continuous improvement over time, contributes to a thorough understanding of environmental issues and helps organizations build on their own learning in terms of achieving improved environmental performance. This progression helps an organization understand and appreciate the concepts of continuous improvement and how they can be applied over time to realize the maximum economic and environmental benefit.

As with exercise, environmental excellence benefits are not realized with a single act. This program is about getting and being "in great shape" with the environment. Excellence is demonstrated through one's actions and decisions along the journey. It is this journey that the Green Zia Program recognizes and

encourages. Also, change takes time, and the Green Zia Program recognizes and promotes this critical continuous improvement principle.

Eligibility

Any organization that operates in the State of New Mexico can apply for the Green Zia Environmental Excellence Program.



Small Business Considerations

Small businesses are encouraged to participate in the Green Zia Environmental Excellence Program. Small businesses tend to have fewer financial and human resources to deal with environmental issues. At the same time, environmental compliance may be a significant issue for small businesses in terms of cost, time and understanding complex regulations. The Green Zia Program can help small businesses deal with their environmental issues in ways that reduce waste and associated costs as well as increase profitability. The program can also help small businesses reduce their energy usage and associated costs.

At first glance, the Green Zia Environmental Excellence Program may seem daunting and complex for a small business. However, a small business can develop a prevention-based environmental management system that can meet their needs. The Nothing to Waste Program provides tools to build such a program and is offered through the Green Zia Program. The Nothing to Waste Program was specifically developed for use by very small businesses, even one-person businesses.

The Core Values and Criteria of the Green Zia Program provide a framework for small businesses to reach environmental excellence. The key is to understand how the criteria apply to a small business setting. A small business is only required to meet the intent of the criteria in ways that are relevant to their key business factors.

For small businesses, the following considerations apply:

- Understand the environmental and energy-associated issues that are relevant to the business
- Effective, informal processes may be in place to support the program
- Continuous improvement is key
- Results demonstrate continuous improvement over time
- The Organizational Overview will set the tone for a small business

A small business clearly will have different environmental issues and key business factors than a large manufacturer. The small business may have informal processes in place to conduct planning, process management and employee, customer and supplier involvement. These processes are all valuable in the Green Zia Program if they help the business improve its environmental performance. For example, strategic planning in a small business may occur once each year at the dinner table. The key is that environmental improvement is part of this informal planning process and that environmental improvement projects

are developed, implemented and tracked. A small business may not own a computer and may rely on effective, less sophisticated information management systems, such as a logbook. The logbook works well for tracking solvent purchases, and recording waste disposal information, as well as keeping receipts from the waste disposal companies. This information can be used to show waste reduction and cost reduction results over time as the business reduces its solvent use. The key is to have improvement processes in place and be able to demonstrate how the processes help the small business continuously improve its environmental performance.

An example of a small business Commitment Recognition application is available upon request from the Green Zia Program by calling 505-827-0677. Also, small businesses are strongly encouraged to contact the Green Zia/Pollution Prevention Technical Resource Center for assistance in setting up a Green Zia Program. Please call 505-843-4251 (in Albuquerque) for more information.

Application and Review Process

Information on how to prepare an application, application deadlines and an explanation of the review process is explained in this chapter.

How to Prepare an Application

The purpose of the application process is for an organization to conduct an assessment of its program, gain feedback from examiners to improve their program and receive public recognition for its successes. Applicants may apply using either the Commitment Recognition Criteria or the Achievement/Excellence Criteria. It is important that an organization address the criteria that best represent the current state of their environmental management system in order to receive the most value-added feedback report.

This is a multi-year program that stresses continuous improvement; companies are strongly encouraged to apply each year to achieve progressively higher levels of recognition within the Green Zia Environmental Excellence Program. For example, an organization with only the beginnings of an environmental management system or with an interest in reducing its energy usage should address the Commitment level criteria, which involves answering ten questions. Organizations with more developed environmental systems should address the more detailed Achievement/Excellence criteria.

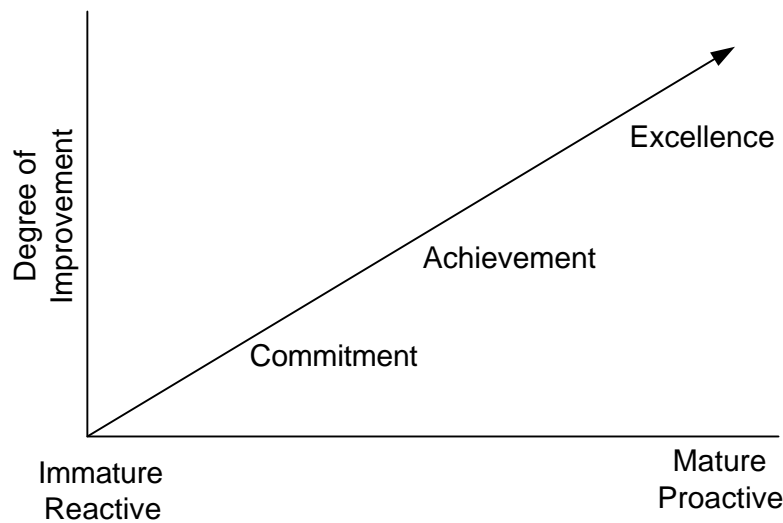
An organization receiving commitment recognition may spend the next year developing its program, implementing opportunities, and measuring results. At this point, the organization is encouraged to apply for the Achievement Recognition level. The organization can then continue progressing and improving its prevention-based environmental management system until it receives the Green Zia Environmental Excellence Award.

An organization can apply for any level as many times as it takes to attain the level. Organizations may only apply and be accepted at the Commitment Recognition level two times; after that they must apply to the Achievement Recognition or Excellence Award levels. There is no limit to the number of years

that an organization can participate at the Achievement Recognition and Excellence Award levels, as long as the organization can demonstrate continuous improvement from the subsequent year and show sustained results and positive performance trends. Organizations may also participate in the Green Zia Pollution Prevention Partnership during years when they are applying and also during years when they do not submit an application. The Partnership provides an opportunity to promote pollution prevention and environmental improvement in the state.

Organizations applying at the Achievement Recognition or Excellence Award levels are expected to address the criteria as they pertain to their organizations and accurately reflect the programs they have in place. The Examiner Team will prepare feedback reports based on the application, and the Board of Judges will make all recognition/award determinations based on the feedback reports.

It may take an organization several years to achieve the Excellence Award; so many organizations will remain at the Achievement Recognition Level for a period of years. This has no bearing on how “good” an organization’s program is, but reflects the time it often takes to develop a program to the Excellence Award standard and to cross the threshold from Achievement to Excellence. Continuous environmental quality improvement techniques will help an organization move across this threshold.



The progression of the Green Zia Environmental Excellence Program

Approach/Deployment and Results

The criteria are organized into seven categories. Categories 1-6 refer to the approach and deployment processes. “Approach” refers to the particular process that is in place, and “deployment” refers to the degree to which the approach is applied throughout the organization and the extent to which the approach is being used. Category 7 refers to results, which flow from the approach and deployment processes addressed in categories 1-6. For example, an approach to develop a strategic plan for environmental excellence could involve meetings with management and staff to identify long-term environmental improvement opportunities. Deployment could address whether each business unit is involved in these meetings or whether the meetings happen on a regular or sporadic basis. The results from these meetings could reflect staff involvement and participation or economic and environmental results from the implementation of the plan.

Application page limits (*including* exhibits and attachments) are:

Organizational Overview: 7 pages

Commitment: 10 pages

Achievement and Excellence: 50 pages

Application Writing Tips

Please note that you should describe the system that your organization has in place and not try to address criteria questions that have not yet been incorporated into your system. It is helpful to *briefly* explain why some of questions in “Areas to Consider” do not apply to your organization. Also, feel free to discuss your organizational practices that go beyond the criteria!

The page limits given above are a maximum. Please be concise in the application and address the criteria questions directly, in a way that allows the team of examiners to clearly understand your organization's program. Try to use graphics to explain the most important processes or systems for analysis and improvement: this will help the examiners understand your organization's program better. Also, the criteria are crosscutting. It is perfectly acceptable to refer to other sections of the application if information pertaining to the question is in another section. Also, one process may be used to address several items or several categories within the application. It should not be assumed that a unique process must exist for every criterion.

Applicants with parent companies or other facilities in other states or countries should describe the system they have in place and the results they have achieved at the New Mexico facility only. It is important to describe how the New Mexico facility interacts with the parent organization and what types of environmental or other related requirements flow from the parent organization, and how the New Mexico facility responds to those requirements.

Organizations that are resubmitting applications should address information from prior applications to show improvements and action. This is important for documenting continuous improvement of the approach and deployment system and the results.

Applicants should refer to core values throughout the application-writing process. Core values support and guide the overall program, and efforts should be made to internalize the core values into the program.

Application Writing Tips

- ✓ Begin with the end in mind.
- ✓ Treat the application writing like REAL WORK!
- ✓ Understand the meaning of “How”
 - Different from “WHAT”
 - Process oriented: What are the steps you use to do something
 - Use flow charts or other graphics to describe “how”
 - Can use example to demonstrate deployment of “how”

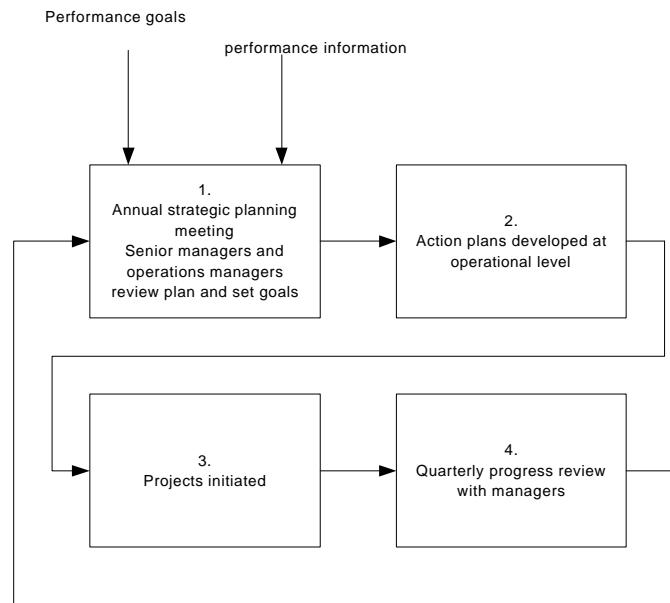
Approach/Deployment (Categories 1-6)

- Understand the meaning of “how”
- Show the what and how
- Show that activities are systematic
- Show focus and consistency
- Cross-reference
- Use flowcharts, tables and bullets
- Refer to Scoring Guidelines

Results (Category 7)

- Focus on critical business results
- Consider trends, levels, comparisons, breadth
- Include actual periods
- Use tables and graphs
- Use meaningful captions
- Show performance against goals
- Tie results to process
- Show historical trends
- Show relationship between environmental and fiscal results
- Avoid anecdotal results (stories)

Criteria Question: How does your organization identify, develop and implement long-term and related short-term goals and objectives for continuous environmental improvement? How do these goals and objectives relate to your organization's overall business objectives?



Description of Deployment: Strategies and Action Plans are communicated to employees at monthly all hands meetings and through regular email notification. Environmental goals are developed with other company goals during strategic planning meetings and environmental issues are included in all action plan development.

Example of a graphic showing approach and description of deployment.

Organizational Overview

Each applicant must provide an organizational overview to describe the key business factors that the organization must address in terms of their environmental concerns.

A well-prepared organizational overview will help the examiners understand which criteria questions are most appropriate in the application and why this is the case. This is particularly important for small business applications.

The Organizational Overview should not exceed seven pages and will not be counted in the overall page count of your application.

The Organizational Overview must include a graphic representation of your environmental management system which shows how the different parts of the system link, interact and support each other. This should represent the high level (or 10,000') view of your system. This overview can help you understand how linkages support the overall system as well as identify gaps in the system that you can address. This high level view will also help your examiner team understand how your system works together as well.

The Organizational Overview is an outline of how your business addresses environmental excellence. It should address what environment, health and safety concerns are most important to the organization, key influences on how the organization operates its environment, health and safety programs, and where the organization is headed with respect to environmental excellence. *The Organizational Overview is a statement of what is relevant and important to your organization and its environment, health and safety performance.*

The Organizational Overview is critically important because:

- It is the most appropriate starting point for self-assessment and for writing an application. It helps you focus on key business and environmental excellence performance requirements and results; and
- The Examiners and Judges use it in all stages of application review and during the site visit.

Guidelines for Preparing the Organizational Overview

The Organizational Overview consists of five sections as follows:

1. Basic Description of Your Organization

This section should provide information on:

- Your products and services and their environment, health and safety regulatory compliance needs;
- The size and location(s) of your organization and whether it is publicly or privately owned;
- Your organizational culture: purpose, vision, mission, and values, as it relates to environmental excellence;
- Your major markets: local, regional, national, or international; and principal customer types: consumers, other businesses, government, etc. and the degree to which they have demanded environmental excellence from the organization;
- Your employee base, including number, types, educational level, and special environment, health and safety requirements;
- Your relations with other interested parties on environment, health and safety issues;
- The major equipment, facilities, and technologies used in your organization, including energy-related equipment such as lighting, heating/cooling units, motors, etc.; and
- The regulatory environment affecting you: occupational health and safety, environmental, financial, and product, etc.

If your organization is a subunit of a larger organization, describe:

- The organizational relationship to your "parent" and percent of employees the subunit represents;

- How your products and services relate to those of your "parent" and/or other units of the "parent" organization; and
- Key environmental excellence support services, if any, that your "parent" organization provides.

2. *Customer and Interested Party Requirements*

This section should provide information on:

- Key customer and market requirements (for example, open permit process, availability of environmental monitoring information, status of compliance, availability or incidence reports, responses to complaints, and after-sales environmental services) for products and services. Briefly describe all important environment, health and safety requirements, and note significant differences, if any, in requirements among customer groups and/or market segments. (Note any special relationships, such as P2 partnerships, with customers or interested party groups.)

3. *Supplier and P2- partnering Relationships*

This section should provide information on:

- Types and numbers of suppliers of goods and services and their involvement in environmental excellence matters;
- The most important types of suppliers, P2 partners, and other businesses;
- Voluntary P2-related programs they are involved with: and
- Any limitations, special relationships, or special requirements that may exist with some or all suppliers and P2 partners that affect your environmental excellence program.

4. *Competitive Situation*

This section should provide information on:

- Numbers and types of competitors that have active environmental excellence efforts;
- Your relative environmental excellence position in the industry;
- Principal factors that determine your prevention-focused program competitive success, such as productivity growth, cost reduction, energy usage, and product innovation as compared to others in the industry; and
- Environment, health and safety changes taking place that affect competition, such as growing global competition.

5. *Strategic Context*

This section should provide information, as appropriate, on:

- Major new environmental excellence thrusts, such as changes in products or entry into new markets or segments;
- New prevention-focused business alliances;
- Introduction of new P2 technologies;

- Changes in environment, health and safety strategy; and
- Unique environmental excellence factors.

Guidelines for Responding to Approach/Deployment Items (Categories 1-6 of the Criteria)

The Criteria focus on key performance results. However, results by themselves offer little *diagnostic* value. For example, if some results are poor or are improving at rates slower than the competition's, it is important to understand *why* this is so and *what* might be done to accelerate improvement.

The purpose of Approach-Deployment Items is to permit diagnosis of the organization's most important environmental management and waste prevention processes – the ones that enable fast-paced performance improvement and contribute to key results. Diagnosis and feedback depend heavily upon the *content* (approach) and *completeness* (deployment) of Approach-Deployment Item responses. For this reason, it is important to respond to these Items by providing key process information. Guidelines for organizing and reviewing such information follow.

1. Understand the meaning of "how."

Items requesting information on approach include questions that begin with the word "how." Responses should outline key process information such as methods, measures, deployment, and evaluation/improvement/learning factors. Responses lacking such information, or merely providing an example, are referred to in the Scoring Guidelines as anecdotal information.

2. Write and review response(s) with the following guidelines and comments in mind:

- Show *what* and *how*.
It is important to give basic information about *what* the key processes are and *how* they work. Although it is helpful to include *who* performs the work, merely stating *who* does not permit diagnosis or feedback. For example, stating, "customer and other interested party satisfaction data are analyzed by the Environmental Management or EHS Department", does not permit diagnosis or feedback on how or why this is done. Strengths and opportunities for improvement cannot be given based on this limited information.
- Show that activities are *systematic*.
Approaches that are systematic are repeatable and use data and information for improvement and learning. In other words, approaches are systematic if they "build in" evaluation and learning, and thereby gain in maturity.
- Show deployment.
Deployment information should summarize what is done in different parts of the organization. It should also convey the extent to which processes are utilized and should be supported by results even at a preliminary level. Deployment can be shown compactly by using tables.

3. Cross-reference when appropriate.

Each Item response should, as much as possible, be self-contained. However, some responses to different Items might be mutually reinforcing. It is then appropriate to refer to the other responses, rather than to repeat information. In such cases, key process information should be given in the Item requesting this information. For example, employee education and training should be described in detail in Item 5.1. References elsewhere to education and training would then reference, but not repeat, this detail.

4. Use a compact format.

Applicants should make the best use of the application page limits. Applicants are encouraged to use flow-charts, tables, and "bullets" to present information.

5. Refer to the Scoring Guidelines.

The evaluation of Item responses is accomplished by considering the Criteria Item requirements and the maturity of the approaches, breadth of deployment, and strength of the improvement process relative to the Scoring Guidelines. Therefore, Criteria users need to consider both the Criteria and the Scoring Guidelines.

Guidelines for Responding to Results Items (Category 7 of the Criteria)

The Criteria place great emphasis on results. The following information, guidelines, and example relate to effective and complete reporting of results.

1. Focus on the most critical results.

Results reported should cover the most important requirements for business success, highlighted in the Organizational Overview, and in the Strategic Planning and Process Management Categories.

2. Note the meaning of the four key requirements from the Scoring Guidelines for effective reporting of results data.

- *Trends* to show directions of results and rates of change;
- *Performance levels* on a meaningful measurement scale;
- *Comparisons* to show how results compare with those of other, appropriately selected organizations; and
- *Breadth of results* to show that all important results are included.

3. Include trend data covering actual periods for tracking trends.

No minimum period of time is specified for trend data. Trends might span five years or more for some results. However, for important results, new data should be included even if trends and comparisons are not yet well established.

4. Use a compact format – graphs and tables.

Many results can be reported compactly by using graphs and tables. Graphs and tables should be labeled for easy interpretation. Results over time or compared with others should be "normalized" – presented in a way (such as use of ratios) that takes into account various size factors. For example, reporting safety trends in

terms of lost workdays per 100 employees would be more meaningful than total lost workdays, if the number of employees has varied over the time period, or if you are comparing your results to organizations varying in size.

5. *Integrate results into the body of the text.*

Discussion of results and the results themselves should be close together in an application. *Trends that show a significant positive or negative change should be explained.* Use figure numbers that correspond to Items. For example, the third figure for Item 7.1 would be Figure 7.1-3.

Commitment Recognition Application Guidelines

At the Commitment Recognition level, an organization is starting to develop a prevention-based environmental management *system* or is committed to reduce its energy usage. An organization may have no experience with pollution prevention but is in the first stages of putting environmental improvement approaches in place. These approaches may not be continuous during these early stages but would likely become continuous as environmental improvement is realized. Likewise, an organization at this level may have some pollution prevention successes, but they may not have been achieved systematically.

Companies applying at the Commitment Recognition level should address the ten questions of the Commitment Recognition criteria. At this level, no results are expected because the environmental management system is under development, therefore "Category 7: Results" does not apply, although applicants are encouraged to share anecdotal results at this level and are also encouraged to share expected results.

An organization that strives to receive the Commitment Recognition may be able to do so by using the Green Zia tools (described briefly at the end of these guidelines) in their organization to support their program, with some additional program elements as outlined in the Commitment Criteria. In the 1999 Green Zia Program, organizations using problem solving and decision-making tools tended to score higher than organizations that did not use these tools. Other systematic approaches to pollution prevention or environmental management may also be employed to help an organization attain this recognition level. It is very important that the organization clearly describes how a *systematic approach* will be integrated into their business practices, including what steps have already been taken to initiate the approach.

Commitment to establishing a system to manage and improve environmental performance and evidence of action are key to the Commitment Recognition Level.

Achievement Recognition Application Guidelines

An organization that receives the Achievement Recognition has shown progress in the implementation and expansion of its prevention-based environmental management system and can demonstrate measurable environmental improvement results. Achievement Recognition applicants should refer to the scoring guidelines to gain a sense of where their program is in terms of development. To attain the Achievement Recognition level, an organization will be expected to score somewhere around 300-600 cumulative points including both the approach/deployment and results scoring bands. It is important to understand the differences between scoring bands (percent ranges) in the scoring guidelines on pages 62-63. The different bands tend to reflect the maturity of the environmental management system. Each item is assigned a percent score based on the level of approach/deployment or results and the demonstration of the core values.

An organization at the Achievement Recognition level has developed sound, systematic approaches to environmental excellence that are well deployed in critical areas of operation and are in early stages of deployment in other areas of the organization.

The Achievement Recognition level emphasizes the measurement of results that show positive performance and improvement trends in many areas of the organization, in alignment with its key business requirements. As such, a successful application should detail the measures used, how they are tracked, the improvements they show, and how they relate to their approach/deployment systems. At the Achievement Recognition level, organizations should have no pattern of adverse environmental trends and no poor environmental performance levels in areas of importance to the organization's key business requirements.

For problem areas of the past, such as corrective action sites or operations with chronic compliance problems, the Achievement Recognition application should be able to demonstrate improvement trends for these areas, showing the relationship between these improvements and the workings of the environmental management system.

Achieving compliance alone is not sufficient to attain the Achievement Recognition level. Applicants must be showing results that demonstrate beyond compliance performance through waste reduction and pollution prevention.

Achievement Recognition also means that the organization is beginning to establish systematic evaluation and improvement processes to assure organizational learning and improvement of its overall environmental management system.

Achievement Recognition applicants should review the full criteria and answer all questions that pertain to them. The Achievement Recognition application should reflect the degree of deployment of the prevention-based environmental management system. Achievement applicants are expected to address the general concepts in the criteria “items,” though not every question in the “areas to consider.” Achievement applicants are encouraged to read through the “areas to consider” to gain a greater understanding of the intention of the “item.”

Establishment of an environmental management system, cycles of learning and improvement, demonstration of progress, deployment of approaches, evidence of action and results are key to the Achievement Recognition level.

Green Zia Environmental Excellence Award Application Guidelines

An organization that receives the Governor’s Green Zia Environmental Excellence Award has a fully integrated, prevention-based environmental management system with no significant gaps. The organization also has systematic evaluation and improvement processes in place to assure organizational learning and improvement of its overall environmental management system.

Excellence Award winners will be expected to score somewhere around 600 to 700 cumulative points for both approach/ deployment and results. It is important to understand the differences between scoring bands in the scoring guidelines on pages 62 and 63. The different bands tend to reflect the maturity of the environmental management system. Each item is assigned a percent score based on the level of approach/deployment or results and the demonstration of the core values. Such scores reflect a program that has sound approach and deployment systems in place with no significant gaps. As well, the organization demonstrates environmental improvement trends and good to excellent environmental performance results in most to all areas of importance to the organization’s key business requirements. Sustaining good to excellent environmental performance over time is also important at the Excellence Award level.

At the Excellence Award level, an organization will have in place a mature environmental management system. The Excellence Award level system emphasizes the measurement of results to show good to excellent performance in areas of importance to the organization’s key business requirements; results

address the environmental aspects of most key customer, market, stakeholder and process requirements; most environmental improvement trends and/or current performance trends are sustained over time; and many to most trends and /or current levels evaluated against relevant comparisons and/or benchmarks show areas of environmental leadership and very good relative environmental performance (“best-in-class” performance). As well, Excellence Award winners should have no adverse trends or poor environmental performance levels and should have no unresolved environmental compliance issues.

The Excellence Award also means that the organization is an environmental leader in its community by supporting environmental projects, establishing meaningful and effective communication with key communities and stakeholders; understanding community environmental issues and taking action to contribute to environmental improvements in the community as appropriate; and mentoring businesses with fewer resources to promote environmental excellence as appropriate.

The Excellence Award reflects the degree of deployment, integration and applied continuous improvement of the prevention-based environmental management system with significant results. Excellence applicants are expected to address the “areas to consider” under individual items. Excellence applicants are not expected to address every “area to consider”, but should address the ones that are applicable to the organization. However, at the Excellence level, a system in place should address multiple requirements of the item. Also, the systematic approaches in place are well integrated among approach/deployment criteria categories.

**Best-in-Class Performance is key for the Governor’s
Environmental Excellence Award.**

Application Submission Information

Applications are submitted to the Green Zia Environmental Excellence Program. Applications for the 2001 Green Zia Program and Recognitions are due by May 11, 2001. Applications must include the Application Cover Form, applicable fees, an Organizational Overview and then address the Green Zia Criteria at the appropriate level to which the applicant is applying. The applicant must submit seven (7) copies of their application (the seven copies are distributed to the examination team). Double-sided copies are encouraged. Electronic copies may also be submitted in lieu of paper copies. Applications must be received no later than 5:00 pm, Friday, May 11, 2001.

The following application fees apply (this is assessed on organization as a whole and not individual units within a larger organization):

Organizations over 1,000 employees:.....	\$150.00
Organizations between 1,000 and 100 hundred employees:.....	\$100.00
Organizations between 100 and 50 employees:.....	\$75.00
Organizations with fewer than 50 employees:.....	no fee

Purchase orders or checks for application fees should be made out to NMSU/WERC. Please call Chris Campbell at 505-843-4251 for tax id numbers, vendor numbers, etc.

The applications must be sent to the following address:

Patricia Gallagher
Green Zia Environmental Excellence Program
Office of the Secretary
New Mexico Environment Department
PO Box 26110
1190 St. Francis Drive
Santa Fe, NM 87502
505-827-0677, 505-827-2836 (fax)
pat_gallagher@nmenv.state.nm.us

Please contact Patricia Gallagher at 505-827-0677 if you have any questions about the application process. Also, a public domain listserv is established to answer questions on the Green Zia Program, application preparation and any other questions. We encourage your active participation on this listserv and ask that participants share their ideas and insights on the Green Zia Program through this

listserve. The listserve address is greenzia@lanl.gov. You may be added to this listserve by contacting ware@lanl.gov.

Review Process

A panel of trained volunteer examiners reviews applications for the Green Zia Recognition and Award Program. The examiners come from a wide variety of backgrounds, including state agencies, federal facilities, local governments, private industry, academia, and environmental and community groups.

Reviews are conducted in teams with experienced team leaders. The teams score each application through a consensus approach. In order to receive a positive review, an organization must demonstrate that a particular process is in place; being anecdotal is not sufficient. Please review the scoring guidelines to gain a sense of what is expected at each level. At the Excellence/Achievement levels, the team of examiners provides a percent score for each item in criteria and this score is totaled for a cumulative score. At the Commitment Recognition level, the examiners use a checklist to determine the strength of the application against the Commitment Criteria questions.

Examiners may conduct site visits to verify information provided by companies in their applications. Site visits are discretionary at the Achievement Recognition level, and mandatory at the Environmental Excellence Award level.

Examiners are held to a high standard of discretion regarding the applications they are charged with. Examiners may not reveal which applications they review, even to other teams within the Green Zia Program. Examiners may have no conflict of interest with an applicant.

Examiners prepare a “feedback report” for each organization whose application is reviewed. The report provides detailed information, including review team comments on the organization’s strengths and opportunities for improvement in the area of environmental performance.

The feedback report is an invaluable asset to the applicant organization as it provides insights from an outside team of experts. This is a great opportunity to receive free consulting on your environmental excellence program.

A panel of judges drawn from the Green Zia Advisory Council and other appropriate people makes final award determinations. Judges have extensive knowledge of pollution prevention and quality concepts. The Governor makes Green Zia Awards each fall.

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Introduction to the Green Zia Core Values and Criteria

Six core values form the basis of environmental excellence. Seven categories provide the framework for achieving continuous environmental improvement. These core values and criteria should be addressed in the Green Zia Environmental Excellence Program application.

Green Zia Core Values and Criteria

Applicants must consider the Green Zia Core Values and Criteria as they prepare their applications. Core Values are the guiding principles, or essence, of the program. The Green Zia Award Criteria form the infrastructure upon which an organization, through its application, is evaluated. In addressing these criteria, implementation of the Core Values throughout the application is essential. Core Values convey what must be present if an organization's environmental management system is to succeed. The Criteria walk you through the structure of an environmental management system that is integrated throughout the organization.

<p>Core Values = Principles Criteria = Framework</p>
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The Green Zia Core Values

The Six Core Values of the Green Zia Environmental Excellence Program are:

- Leadership Commitment
- Efficient Product, Service and Process Design
- Continuous Improvement and Organizational and Personal Learning
- Valuing Employees and Partners
- Management by Fact
- Sustainability

Core Value: Leadership Commitment

Senior leaders should create clear and visible values and a vision of environmental excellence for the organization. Leaders should ensure the creation of strategies, systems and methods for achieving environmental excellence. These values and strategies should help guide all activities and decisions throughout the organization. Environmental excellence requires strategies that set environmental performance goals that go beyond mere compliance with environment and health and safety regulations.

Senior leaders should inspire and motivate your entire workforce and encourage all employees to develop, learn, and innovate in the pursuit of the organization's vision of environmental excellence. By serving as role models through ethical behavior and proactive, environmental thinking, senior leaders demonstrate their commitment to the values and strategies that result in environmental excellence. Leaders should demonstrate strong commitment to continuous environmental improvement by:

- Providing adequate financial and human resources to assure implementation of action plans.
- Taking a long-term view of the future regarding community environmental and economic sustainability through company and personal policies of good environmental stewardship.
- Sponsoring community environmental activities, mentoring other businesses, partnering on innovative regulatory approaches, and creating a "shared learning" environment.

Core Value: Efficient Product, Service and Process Design

Efficient product, service and process design is the cornerstone of environmental excellence as it provides the most effective opportunity to incorporate resource efficiency throughout the organization to reach the maximum environmental and economic benefits.

Good business through design anticipates the environmental impacts of an organization's activities, production processes, products and services and takes steps to reduce or eliminate these impacts through design improvements. Efficient design opportunities may be found throughout the organization, from major design, production and delivery processes to support areas such as building design and maintenance, energy use and transportation.

Efficient design should consider process improvements such as reduction in cycle time, production line distance, process simplification, packaging of raw materials and final products, and the efficient use of all resources that are required in the process. Other considerations include the use or purchase of renewable forms of energy such as solar, wind, or geothermal resources or purchase of recycled or locally available materials that support local economies.

Good business through design addresses cost savings and cost avoidance by preventing problems and reducing waste at the design stage. An understanding of the **full cost** and **risks** of a waste or production process will help prioritize opportunities for and will lead to better business decisions.

Good business by design means using customer requirements to design and deliver products and services more efficiently. Two-way communication with vendors and suppliers is also important. In addition, benchmarking world-class processes may lead to break-through improvements in design.

Design should consider the overall impact of the product or service on the environment in terms of both the resources required to produce and deliver the product or service, as well as its expected life, performance, and reuse or disposal. Design that considers and minimizes the environmental impacts of the product or service through its life cycle will result in cleaner communities and increased customer satisfaction.

Good business by design should also consider high value reuse opportunities for waste products not eliminated through process efficiency improvements. An organization may be able to create new markets and high value products for its own waste material. Design consideration should be given to the ability of waste material to break down into environmentally beneficial or benign materials to eliminate persistent or long term environmental or health problems.

Core Value: Continuous Improvement and Organizational and Personal Learning

In this dynamic world, it is critical to be able to adapt to the changing business and economic environment to achieve best-in-class performance. Environmental excellence is achieved through organizational learning, which includes both continuous improvement of existing approaches, and adaptation to change, leading to new goals and approaches. Learning needs to be embedded in the way your organization operates. This means that learning is a part of daily work; is practiced at personal, work unit, and organizational levels; results in solving problems at the root cause of a waste or efficiency problem; and is driven by opportunities to effect significant change and to do better. Sources for organizational learning include employee's ideas, R&D, customer and vendor input, non-traditional stakeholders such as youth and future generations, sharing of best practices, and benchmarking.

Organizational learning can result in enhancing value to customers by lessening the environmental impact of your operations through reducing errors, defects, waste, and related costs. You may also develop new business opportunities, new and improved products and services as a result of organizational learning. Enhancing your ability to fulfill public responsibilities and serve as a good citizen in your key communities provides your organization the opportunity to be a role model to others, thereby increasing your influence over the quality of the environment in which your employees work and live.

Employees' contributions to environmental excellence depend on having opportunities for personal learning. Organizations invest in employee personal learning through education, training and other opportunities for growth, such as job rotation, on-the-job training, etc.

Personal learning results in satisfied, versatile employees who remain with your organization and are inspired to innovate and improve processes from an environmental impact standpoint.

Thus, learning is directed not only toward better products and services and less environmental impact, but also toward being more responsive, adaptive, and efficient—giving your organization marketplace and resource sustainability.

Continuous Improvement can be envisioned and implemented through the “Deming Cycle” named after W. Edwards Deming who developed this particular approach in the 1950's to improve business processes. The cycle consists of four primary stages:

- ◆ *Plan* – Design or revise processes and/or process components to improve results
- ◆ *Do* – Implement the plan and measure its performance
- ◆ *Check (Study)* – Assess the measurements and report the results to decision-makers
- ◆ *Act* – Decide on changes needed to improve the process

In association with the Core Value of Management By Fact (the effective use of results and data in the decision-making process), the utility of the Deming Cycle or comparable approaches to continuous improvement and learning will result in significant and sustainable process improvement.

Core Value: Valuing Employees and Partners

An organization's environmental excellence success depends increasingly on the knowledge, skills, innovative creativity, and motivation of its workforce. Valuing employees means committing to their satisfaction, development and well-being. The encouragement of employee learning, participation, innovation, and creativity builds employee knowledge of overall operations and processes and how they link and support each other. A prevention-based environmental management system creates a framework for employee involvement in process analysis, problem solving, decision-making and implementation on a continuous basis. Employee involvement in all aspects of this system helps ensure their buy-in to the continuous improvement process and the ultimate success of the organization's environmental excellence program.

An organization demonstrates employee value by creating and maintaining a safe and healthy workplace. Prevention practices create a safer working environment and cleaner communities for employees and their families. Increased employee awareness of the state of the workplace environment helps improve employees' knowledge of risks and health and safety concerns in the workplace. Greater understanding of risks and health and safety concerns will lead to improvements in these areas as well as better conformance to environment, health and safety standards by employees.

Employee incentives should be created to reward good ideas, participation, and the reporting of problems. Employee training needs should be identified and met to assure quality participation, and proper facilitation support should be provided, beyond the training, to help employees use process analysis, problem-solving and decision-making tools. The organization can also benefit by communicating its environmental ethic to all employees and developing procedures that support this ethic. Employees can extend this ethic to their daily lives by being encouraged to work in the community to support environmental improvement projects.

Organizations need to build internal and external partnerships to better accomplish environmental excellence. Internal partnerships might include labor-management cooperation, as well as employee high-performance work teams. For example, partnerships between those responsible for waste management and those responsible for production process operations are essential for identifying the sources of waste and devising the appropriate pollution prevention measures to reduce that waste.

External partnerships might be with customers and suppliers. For example, an organization may develop a partnership with a major supplier to deliver goods with less packaging. Partnerships can also be effective mechanisms to communicate the organization's environmental ethic, extending the idea of environmental excellence to customers, employees, vendors, contractors and suppliers and communities. Other partnerships may include working with regulatory oversight agencies to develop strategies to improve environmental performance in a mutually beneficial fashion.

Successful internal and external partnerships develop long-term environmental objectives, thereby creating the basis for mutual investment and respect. Partners should address the key requirements for success, means for regular communication, approaches to evaluating progress, and means for adapting to changing conditions.

Organizations need to build internal and external partnerships to assure meaningful engagement of all interested parties to better accomplish their overall environmental excellence goals. The development of internal partnerships creates networks that improve flexibility, responsiveness and knowledge sharing. External partnerships with suppliers, vendors and customers and others, such as community representatives, can also provide valuable input into process improvements and product development, as well as bring a broader perspective to the program.

Internal partnerships are essential to develop a fully integrated prevention-based environmental management system. Through such a partnership, both parties gain a broader understanding of the environmental aspects of the process. As well, partnerships between administrative services such as procurement and the production areas can help employees understand the environmental impacts of purchasing decisions.

Partnerships with customers can help meet the goal of excellence in delivery of services, production and product design. Customer feedback on product performance and level of "greenness" can thus be encouraged. In return, reciprocal support can be provided by participating in the customer's own environmental improvement efforts.

This may include communicating improvement goals clearly with regulators and requesting input into ways to improve operations. Partnerships with oversight agencies may include regulation development and initiatives such as the Trust and Partnering group that intends to facilitate better understanding between regulators and regulated community. Other initiatives might include Project XL, Climate Wise, Rebuild America/Rebuild New Mexico, Energy Star, Alliance for Green Development, Sustainable Albuquerque, or the Pollution Prevention in Permitting Project, and many more.

Partnerships indirectly related to the organization may also produce beneficial outcomes. For example, working with organizations such as schools, economic development agencies, or local governments can encourage broader environmental responsibility and organizational and community learning. This type of activity is especially relevant to sustainable development goals that will be met at the community level.

Core Value: Management by Fact

The core value "Management by Fact" is key to making environmental improvement decisions that are aligned with the organization's strategy and are relevant to the organization's key environmental performance areas.

Because environmental excellence is the ultimate goal of this program, the measurements and measurement systems employed must derive from the organization's own strategy for achieving environmental excellence. This will allow the organization to easily provide critical data and information about key processes, outputs, and pollution prevention results. Data must be timely and accurate to make informed decisions. Information systems should be developed to track data that provide links to and measure progress in program criteria areas. Data should be collected in the following areas:

- Customer, supplier, community, and other external stakeholder involvement;
- Environmental aspects of operations and processes
- Competitive comparisons (benchmarking);
- Employee involvement;
- Energy consumption and patterns of use;
- Cost and financial.

Analysis refers to extracting larger meaning from data and information to support evaluation, decision-making, and operational improvement. More specifically, it can aid in environmental planning, review of overall environmental performance, determining cause and effect, evaluating environmental trends, and comparison of

environmental performance with competitors or with “best practices” benchmarks. Analysis will also be used to assure validation of information.

A major consideration in environmental improvement involves the selection and use of environmental performance measures or indicators that can help show progress toward pollution prevention and other environmental improvement activities. The measures or indicators selected should best represent the factors that lead to improved operational and financial performance, as well as customer satisfaction and community involvement. Selection of performance measures should include input from management, employees, suppliers, and other stakeholders, such as community members. The selected measures or indicators themselves should be evaluated and changed, if necessary, through a continuous improvement process to better support the organization’s goals and objectives.

Core Value: Sustainability

Sustainability or sustainable development seeks to meet the needs of the present without compromising the ability of future generations to meet their needs. Forward-thinking organizations understand the increasing value of preserving natural systems and raw materials and operating in ways that place zero drain on world resources. Organizations should contribute to a growing economy that provides equitable opportunities for satisfying livelihoods and a safe, healthy and high quality of life for current and future generations. They should work to protect the environment, its natural resource base, and the functions and vitality of natural systems on which all life depends (*from President’s Council for Sustainable Development*).

Sustainable development considers the balance of three aspects in making decisions: environment, economics and social equity. Each aspect is critical in assuring sustainability. Sustainability considers the environmental, and health and safety effects of material use and operations from a life-cycle point of view including the impacts of products from raw material extraction and processing, shipping, manufacturing, and packaging to product use and ultimate disposal. Also considered are water and energy use, land development and transportation trends and the individual’s effect on the environment. Social equity addresses local conditions such as environmental justice. Sustainability considers global social and environmental conditions that affect the planet’s health as a whole including climate change, resource availability and equity and preservation of critical habitat such as rain forests.

To meet the goal of sustainability, emphasis is placed on resource efficiency, resource productivity and environmental enhancement. Internally a company examines use of safer or renewable raw materials and works with suppliers to assure a feedstock of raw materials derived from sustainable practices. Process

improvements are maximized to move towards zero waste, zero discharge, and zero defects. Products and services are designed to maximize product life and serviceability, and remanufacturing or recycling options. Products that are ultimately disposed break down into environmentally beneficial or benign materials. Water use efficiency and discharge quality is maximized. Energy use considers the amount of energy used to make the product or provide the service, the amount of energy required in product use, and the source of energy to encourage clean and renewal energy use. Resource use to support the facility is also considered including landscaping, lighting, heating and cooling, food preparation, cleaning and building maintenance.

Resource productivity means obtaining the same amount of utility or work from a product or process while using less material and energy (*Natural Capitalism*, 1999, Louvins, Louvins, and Hawken, Little, Brown and Company). Similarly, resource efficiency considers the amount of output a process provides per unit of input, including waste. Maximizing resource productivity and efficiency help to move towards sustainability through improved resource use.

Beyond the facility boundary, sustainability considers the local environmental and economic conditions of the community and supports improvements and increased communication with community groups. Facility locations consider impacts of the building site including wetlands, minimal transportation distances, carpooling, telecommuting and flexible schedules to reduce impacts on the community as a whole. Organizations support local economies by buying materials locally and encouraging the purchase of recycled or green products and supplies. For example, development of high-value use of small diameter timber supports local, low-income forest community economies in New Mexico. Also, the organization responds to critical community issues such as water or air quality through actions internally, through employee involvement in the community and through supporting community improvement activities. Mentoring of other businesses also helps to contribute to the overall sustainability of the community.

Sustainability includes innovation in the development of new products and services. Natural materials and systems are examined as potential models for new material development or management techniques. Organizations understand the true cost and value of natural resources and make business decisions based on that knowledge.

Sustainability also includes the action of individuals on the environment in regard to purchases and practices at home, transportation, schools and in civic activities. Other parties interested in promoting sustainability may view it from three principal perspectives:

1. Something for the organizations to commit to;
2. Something that the community should foster - sustainable communities; and
3. Something that needs to be internalized in our personal lives.

The Green Zia Criteria

Applicants must address these criteria in preparing their Green Zia Environmental Excellence Program applications. Two sets of criteria are offered: Commitment and Achievement/Excellence.

Introduction to the Criteria

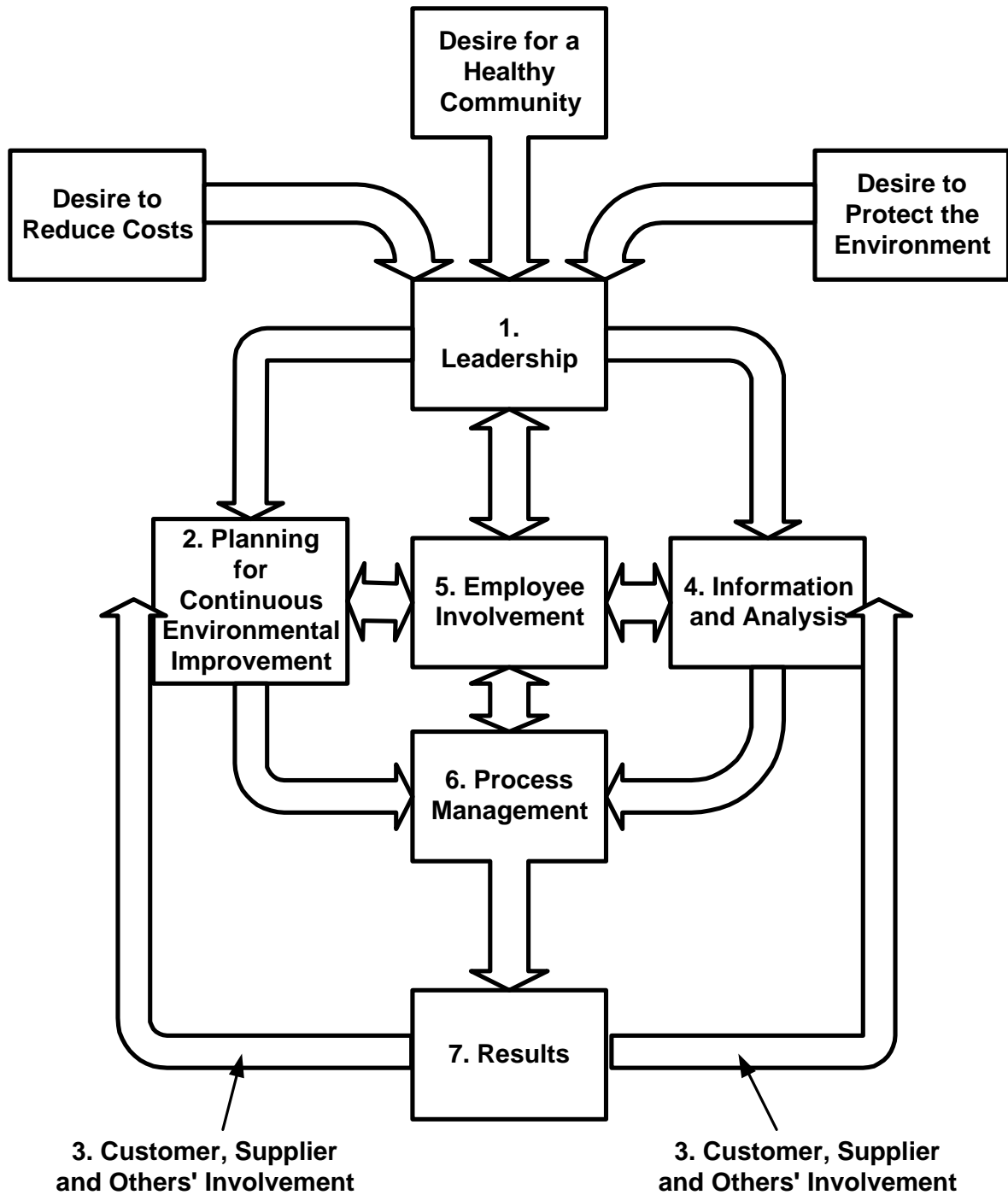
The criteria are organized into seven categories necessary for a prevention-based environmental management system, including:

- Leadership
- Planning for Continuous Environmental Improvement
- Customer, Suppliers and Others Involvement
- Information and Analysis
- Employee Involvement
- Process Management
- Results

Each of the seven categories addresses key elements of a prevention-based environmental management system. There are 18 Criteria Items within the seven categories at the Achievement/Excellence levels. It is important to understand that all the categories are linked in a system, for example leadership sets the vision for prevention, which is incorporated into strategic planning. Action plans are developed as part of strategic planning that involves employee training or participation. Process management requires employee, customer or supplier input and process improvements may require capital budgeting. Information management such as materials accounting or activity-based costing is linked to process analysis and strategic planning. Results can be measured from all categories to assess the success of the system and identify opportunities for improvement. Core values and criteria are revised each year, meaning that the program itself can benefit from continuous improvement.

The systems approach emphasizes the relationships and interdependence of the Criteria, as illustrated below.

The Green Zia Environmental Excellence Program A Systems Perspective



Green Zia Commitment Recognition Criteria

Commitment applicants must answer ten questions that address the basic elements of a prevention-based environmental management system.

Introduction

The Commitment Recognition Level acknowledges organizations that have made a strong commitment to continuous environmental improvement or effective energy management. Organizations at this level are beginning to. Organizations at this level are beginning to put a prevention-based environmental management system in place that will allow them to improve environmental performance. Applicants should address ten questions that link to the seven criteria categories of the Green Zia Program. These questions capture the core concepts that an organization needs to consider to establish a prevention-based environmental management system.

Applicants should become familiar with all of the Core Values of the Green Zia Program as they design their program. All Core Values are relevant to the different categories; however, some are more applicable than others. The most relevant core values are highlighted for each category.

Refer to the Achievement Recognition and Excellence Award Criteria and the detailed descriptions of the Core Values for insight on the different categories.

Commitment Category 1: Leadership

How do senior leaders communicate and demonstrate their commitment to continuous environmental improvement within the organization and in the community?

Key Core Values: Leadership Commitment, Continuous Improvement and Organizational and Personal Learning, Sustainability

Commitment Category 2: Planning for Continuous Environmental Improvement

How does your organization identify, develop and implement long-term and related short-term goals and objectives for continuous environmental improvement? How do these goals and objectives relate to your organization's overall business objectives?

Key Core Values: Efficient Product, Service and Process Design; Continuous Improvement and Organizational and Personal Learning; Management by Fact, Sustainability.

Commitment Category 3: Customer, Supplier and Others Involvement

How does your organization involve customers, suppliers and others in the development and implementation of your continuous environmental improvement approach? How is your organization involved in other organizations' continuous environmental improvement programs?

Key Core Value: Valuing Employees and Partnerships

Commitment Category 4: Information and Analysis

How does your organization collect and use information to make continuous environmental improvement decisions?

Key Core Value: Management by Fact

Commitment Category 5: Employee Involvement

How does your organization prepare and involve employees in the development and implementation of your continuous environmental improvement approaches? How are the employees' value and well-being considered in your continuous environmental improvement approach?

Key Core Value: Valuing Employees and Partnerships

Commitment Category 6: Process Management

How does your organization identify, analyze and manage processes to address environmental impacts?

Key Core Value: Efficient Product, Service and Process Design, Sustainability

Commitment Category 7: Results

What are your organization's real and anticipated results related to your improvement approach?

Key Core Value: Management by Fact

Green Zia Achievement Recognition and Excellence Award Criteria

Organizations applying at the Achievement Recognition and Excellence Award levels must address all criteria questions, to the extent that they pertain to the prevention-based environmental management system they have in place.

Category 1. Leadership (125 pts.)

This category examines how management vision and commitment to continuous environmental improvement is communicated and demonstrated to employees and how the vision is translated into strategic plans. This category also examines how your organization's senior leaders communicate and demonstrate its vision and commitment to the environment in the community.

Item 1.1 Organizational Leadership (75 pts) (Approach-Deployment)

How is your organization's senior leaders' vision and commitment to continuous environmental improvement demonstrated to employees, suppliers, customers, oversight agencies and other interested parties through management involvement, strategic plans, alignment of resources, performance measures and management review?

Areas to consider:

- (a) How does management demonstrate commitment to continuous environmental improvement on par with other major organizational goals through policy statements, incorporation and integration into other programs and other activities?
- (b) How does management conduct proactive communication with regulatory agencies, employees, customers, lenders, suppliers, investors or other interested parties to improve environmental performance, and gain support for and communicate related successes?
- (c) How does management provide support for continuous environmental improvement at all levels of your organization and how is it integrated into core business practices?
- (d) How does management assure that continuous environmental improvement is incorporated into strategic plans, action plans, and performance measures and how does management review results and assure that they are tracked throughout your organization?
- (e) How does management address energy monitoring and use within its facilities through policies, plans, and behavioral directives?

Note:

1. Linkages may include Items 2.1, 2.3, 4.2, 5.1, 5.2, and 5.3.

Item 1.2 Community Leadership (50 pts) (Approach-Deployment)

How does your organization support environmental issues and activities in the community and how does it communicate and demonstrate its continuous environmental improvement goals and performance to the community?

Areas to consider:

- (a) How does your organization support community-based environmental protection and sustainability activities in the community? If such activity is not occurring in a community, how does your organization encourage the establishment of such programs through civic groups or other business activities? How does it align its own operations to support such initiatives?
- (b) How does your organization address Environmental Justice issues and gain an overall understanding of existing environmental problems or circumstances such as air quality or water availability specific to the community? How does it develop strategies to reduce its operational impacts on these issues? How does your organization work with others in a competitive and collaborative way to conserve resources in the community?
- (c) How does your organization participate in community redevelopment (through programs such as Brownfields Redevelopment) and local economic development through siting of facilities and community enhancement to reduce overall environmental impacts to the community?
- (d) How does your organization support mentoring of other businesses in the community to promote pollution prevention and continuous environmental improvement?
- (e) How does your organization set affirmative procurement goals such as buying “green” products or products with recycled content? How does your organization use its affirmative procurement goals to support local businesses by purchasing locally available materials to support the local economy; waste exchanges; and other related activities such as industrial ecology, value-added reuse of materials, and recycling?
- (f) How does your organization communicate its environmental performance with the community through annual reports, town meetings, web pages, or other means?

Notes:

- 1. Community involvement focuses on encouraging and fostering involvement of employees, the community and others in the organization’s continuous environmental improvement program.
- 2. Linkages may include Items 3.3, 5.2, 7.2 and 7.3.

Category 2. Planning for Continuous Environmental Improvement (150 pts)

This category examines how environmental improvement and energy management goals are systematically integrated into your organization's strategic planning process. This category also examines how your organization develops action plans to address specific environmental improvement issues and how the development of these plans relates to your organization's strategic planning process. This category also examines how the action plans and the continuous environmental improvement components of the strategic plans are deployed.

Item 2.1 Strategic Planning for Environmental Improvement (50 pts) (Approach-Deployment)

How does your organization use its prevention-based environmental management system to set strategic direction for continuous environmental improvement and effective energy management?

Areas to consider:

- (a) How does your organization use information from the environmental management system in other planning initiatives such as capital budgeting, procurement strategies, strategic planning, marketing and sales management, accounting, productivity improvement and other top management initiatives?
- (b) How are employees included in the environmental component of the planning process?
- (c) How are vendors, suppliers, customers and other stakeholders involved in the environmental component of the planning process, for example: two-way relationships with vendors for inventory control, just-in-time manufacturing, use of safe materials and other areas?
- (d) How does your organization consider the long-term environmental impact of the business on environmental sustainability and how does your organization considers environmental sustainability in the design of products or processes over time (Zero Impact/Zero Waste, Design for Environment (DfE), The Natural Step, the Six E's, Six Sigma, Factor Ten, or other sustainability programs)?
- (e) How does your organization anticipate and mediate external impacts, such as life-cycle analysis and others?
- (f) How does your organization address compliance with safety, health, environmental and other applicable regulations as part of the planning process?

Note:

1. Linkages may include Items 1.1, 3.1, 3.2, 3.3, 4.1, 4.2, 5.1 and 6.2.

Item 2.2 Action Planning (50 pts) (Approach-Deployment)

How does your organization develop action plans for specific continuous environmental improvement and energy management activities?

Areas to consider:

- (a) How are action plans developed to support process analysis and improvement efforts?
- (b) How are employees included in the development of action plans?
- (c) How are suppliers, vendors, customers and other interested parties included in the development of action plans?
- (d) How do action plans address regulatory compliance issues?
- (e) How is the action plan development system assessed and improved?

Note:

1. Linkages may include Items 4.1, 4.2, 5.2 and 6.2.

Item 2.3 Integration and Implementation (50 pts) (*Approach-Deployment*)

How are your organization's strategic plans and action plans for environmental improvement integrated and implemented?

Areas to consider:

- (a) How are action plans implemented, documented and tracked for success?
- (b) How are action plans modified to address continuous quality improvement?
- (c) How are action plans communicated to the employees, the community and the other interested parties, as appropriate?
- (d) How are resources (financial and human) aligned to support environmental improvement efforts?
- (e) How are action plans linked to your organization's strategic planning process?
- (f) How are the environmental results of the program (both successes and failures) reported back to your organization to assure organizational learning and how is this information used to improve the prevention-based environmental management system (for example, using successes or failures to develop action plans for next year).
- (g) How is the environmental management system formally maintained and improved? How is the environmental management system audited by either internal or external auditors?

Note:

1. Linkages may include Items 1.1, 5.2, 6.2, 7.1 and 7.3.

Category 3. Customer, Supplier and Others Involvement (75 pts)

This category examines how your organization involves customers and suppliers in the development of your organization's continuous environmental improvement approach. This category also examines how the organization identifies potential customers through marketing of its environmental successes and through the development of new markets for waste materials. This category also considers how your organization communicates with oversight agencies and other interested parties as it improves its overall environmental and energy-associated performance.

Item 3.1 Customer Involvement (25 pts) (Approach-Deployment)

How does your organization communicate its efforts to improve the environmental performance of a product, process or service to its customers? Also, how does your organization involve its customers and seek customer feedback to improve performance and quality standards of products, production processes and services within the context of continuous environmental improvement? Also how does your organization identify potential new customers through marketing strategies for "green" products and secondary markets for waste materials?

Areas to consider:

- (a) How does your organization communicate with customers regarding continuous environmental improvement and attempts to improve environmental performance to date? How does the organization assess customer needs and satisfaction regarding the environmental aspects of products, services or processes?
- (b) How does your organization solicit and use customer feedback for improvement in product or service quality and performance standards and incorporate that feedback into the prevention-based environmental management system? How does your organization work with customers to identify ways to deliver services or products with less environmental impacts?
- (c) How does your organization work with customers to exercise effective product stewardship by informing them of the elements of effective stewardship, partnering with them to encourage effective stewardship, and working with them to assess the life cycle of the materials (including yours) that are in their products.
- (d) How does your organization support the pollution prevention or environmental improvement efforts of its customers?
- (e) How does your organization market its "green" products, processes or services (through advertisements, web pages, etc.) to increase potential customers and markets?
- (f) How does your organization develop new markets and increase its customer base by converting wastes to products through onsite product development; working with other companies that convert waste to useful products; participating in feasibility studies; or by working with universities to enter into collaborative research projects to find ways to make products from waste?

Notes:

- 1. Customer involvement includes existing customers and potential customers that may be gained through "green" marketing strategies or through new product/market development from waste materials.
- 2. Linkages may include Items 2.1, 4.1, 7.2 and 7.3.

Item 3.2 Supplier Involvement (25 pts) (Approach-Deployment)

How does your organization involve its vendors and suppliers to improve performance and quality standards of products, production processes and services within the context of continuous environmental improvement?

Areas to consider:

- (a) How are suppliers, contractors and vendors involved in development and improvement of products, services and processes as part of your continuous environmental improvement program?
- (b) How does your organization evaluate suppliers, contractors and vendors for their environmental performance and their commitment to effective energy management?
- (c) How does your organization support the pollution prevention or environmental improvement efforts of suppliers, consultants, contractors and vendors?

Note:

1. Linkages may include Items 2.1, 4.1, 6.1, 6.2, 7.2 and 7.3.

Item 3.3 Others Involvement (25 pts) (Approach-Deployment)

How does your organization identify and work with interested parties to communicate and improve environmental performance?

Areas to consider:

- (a) How does your organization work with environmental, health and safety oversight agencies to manage compliance in a mutually beneficial fashion?
- (b) How does your organization communicate continuous environmental improvement goals and action plans to interested parties to gain feedback, support and buy-in?
- (c) How does your organization develop systematic processes for timely reporting of monitoring results, spills or other reportable activities to appropriate stakeholders to minimize environmental harm or exposure?
- (d) How does your organization works with oversight agencies and other interested parties to develop regulations and compliance approaches to improve overall environmental results and to incorporate prevention-first philosophies (Trust and Partnering, Project XL, P4 projects)?
- (e) How does your organization provide an annual third party, independent evaluation of success made in the continuous environmental improvement program and how are results communicated to interested parties?

Notes:

1. This Item does not include employees who are covered in Category 5.
2. "Others Involvement" may include regulatory agencies, non-governmental organizations, public interest groups, environmental advocacy groups or neighborhood associations and others.
3. Linkages may include Items 1.2, 2.1, 4.1, 7.2 and 7.3.

Category 4. Information and Analysis (100 pts)

This category examines how your organization uses information to identify and evaluate environmental and energy-associated aspects of product, service or production processes. This category also examines how information is used to assess service, product or process performance and to identify areas for improvement based on environmental considerations and comparative information.

Item 4.1 Information Collection and Management (60 pts) (Approach-Deployment)

How does your organization select, collect and manage information to understand the environmental and energy-associated aspects associated with the design or production of a product or service?

Areas to consider:

- (a) How does your organization calculate raw material input, material flow and non-product outputs (wastes) from processes to measure resource use efficiency and environmental losses?
- (b) How does your organization determine environment, health and safety requirements and other aspects associated with a product, service or production process (for example, customer specifications, military specification, inventory) that may affect environmental performance or operations?
- (c) How does your organization use its accounting system to understand the true cost of a product, service or production process?
- (d) How does your organization determine the environmental or other related impacts of a product, service or production process through its life (life-cycle analysis/life-cycle impacts)?
- (e) How does your organization use information to document organization-wide environmental activities?
- (f) How is competitor analysis on green trends tracked and considered in product design?

Notes:

- 1. Information in this category may be based on factors such as cost, regulatory compliance, materials use, resource availability, risk reduction, productivity and other information.
- 2. This item refers to activity-based costing or full cost accounting to understand environmental costs.
- 3. Linkages may include Items 2.1, 2.2, 3.1, 3.2, 3.3, 5.2, 6.1, 7.1, 7.2 and 7.3.

Item 4.2 Analysis and Decision-Making (40 pts) (Approach-Deployment)

How does your organization use information to make decisions on service, product design and process improvements as part of the continuous environmental improvement approach? How does your organization use comparative information or benchmarking to improve environmental and energy-associated performance of services, production processes or product design and strive to be best in class?

Areas to consider:

- (a) How does your organization analyze information to prioritize areas for improvement?
- (b) How does your organization use information related to action plan development, deployment and results to identify organization-wide areas for improvement (waste reduction, toxicity reduction, productivity improvements, risk reduction, energy use reduction, use of renewable energy, reduced liability, regulatory compliance, performance measures)?
- (c) How does your organization use comparative information to assess and improve the environmental performance of production processes, services or product design as part of the prevention-based environmental management system?
- (d) How does your organization use comparative information to set strategic directions for continuous environmental improvement, improve overall organization performance and improve the prevention-based environmental management system (best practices, best of class goals, benchmarking, sharing of successes)?
- (e) How does your organization evaluate competitors and market trends in the formulation of its environmental strategies?

Notes:

- 1. This item focuses on how the organization uses information to make decisions as part of the continuous environmental improvement approach.
- 2. Linkages may include Items 1.1, 2.1, 2.2, 5.2, 6.2, 7.1, 7.2 and 7.3.

Category 5. Employee Involvement (125 pts)

This category examines how employee skills are developed and how employee input is included in continuous environmental improvement planning and implementation. This category also examines how employee value and well-being is considered in developing continuous environmental improvement goals and action plans.

Item 5.1 Employee Education and Skill Development (50 pts) (Approach-Deployment)

How does the organization assess skill levels and provide training and education to employees to enable them to actively participate in the continuous environmental improvement approach?

Areas to consider:

- (a) How are employees' skills assessed and how are education and training needs determined and aligned to the continuous environmental improvement approach?
- (b) How does your organization's employee training program promote employee input to improve environmental and energy performance beyond compliance with regulatory requirements through creative thinking, problem solving, knowledge of new technologies and other skills?
- (c) How does your organization increase employees' awareness of compliance issues to improve compliance performance?
- (d) How does your organization's training program encourage employees to share and disseminate the ethic of environmental excellence and effective energy management at home, in their schools and in their community?
- (e) How is the organization's environmental training program assessed and improved?

Note:

1. Linkages may include Items 1.1, 2.1, 2.3, 7.2 and 7.3.

Item 5.2 Employee Involvement (55 pts) (Approach-Deployment)

How is employee input included in all aspects of the environmental management system including the development and implementation of action plans? Also, how are employees involved in non-operational ways to meet the organization's environmental and energy goals or to address community-specific problems?

Areas to consider:

- (a) How are employees involved in product, service and process design for continuous environmental improvement and effective energy management?
- (b) How does your organization provide encourage and support (through facilitation, etc) broad employee involvement in continuous environmental improvement efforts?
- (c) How are employees involved in the development of action plans and how are human resources aligned to implement action plans?
- (d) How does your organization ensure that employees are up-to-date in your organization's successes relative to continuous environmental improvement goals?
- (e) How does your organization encourage employee participation, as part of work duties, to address specific community environmental issues such as air quality, water or other issues (car pooling, telecommuting during Air Quality non-attainment days, water conservation during droughts, etc)?

Note:

1. Linkages may include Items 1.1, 1.2, 2.2, 2.3, 4.1, 4.2, 6.1, 6.2, 7.2 and 7.3.

Item 5.3 Employee Satisfaction, Value and Well-being (20pts) (Approach-Deployment)

How does your organization consider employee value and well-being as part of the continuous environmental improvement approach?

Areas to consider:

- (a) How does the organization consider the “inside work environment” (employee health and safety concerns) equally with the “outside environment” (traditional environmental concerns) when designing work areas or making process improvement decisions?
- (b) How does the organization gather input from employees on the work environment as it pertains to environmental issues?
- (c) How does your organization provide incentives to motivate and reward employee participation in the organization’s environmental improvement program (awareness programs, monetary incentives, rewards, bonuses)?
- (d) How does the organization assist employees in dealing with life issues that can impact their ability to work (wellness programs, employee assistance programs, flex-time)?
- (e) How does the organization assess employee satisfaction with its environmental improvement program? How is this information used to improve employee involvement in the environmental improvement program?

Notes:

- 1. Employee value and well-being may include meaningful participation in process improvements resulting in a safer and healthier workplace, reduced chemical use and exposures, safety issues, office design to increase productivity and reduce waste (such as lighting, heating and air conditioning, natural lighting), employees’ perception of greater value through this program and other issues.
- 2. Linkages may include Items 1.1, 2.2, 6.2, 7.2 and 7.3.

Category 6. Process Management (100 pts)

This category examines how your organization systematically evaluates its processes to identify environmental impacts and to meet relevant environmental, health and safety requirements. This category also examines how your organization systematically controls and improves its processes to reduce or eliminate environmental impacts as part of the continuous environmental improvement and effective energy management approach.

Item 6.1 Process Characterization and Control (50 pts) (Approach-Deployment)

How does your organization systematically analyze its processes to understand environmental impacts and their causes? Also, how does your organization control the operations of processes to reduce potential environmental impacts?

Areas to consider:

- (a) How does your organization conduct process analysis of all pertinent processes to identify environmental issues and how does this analysis become part of daily operations?
- (b) How does your organization involve employees, customers and suppliers in process analysis?
- (c) How does your organization operate processes to reduce the potential for failure or losses and maintain efficiency?
- (d) How does your organization use its environmental management system to manage processes in day-to-day operations to promote pollution prevention and energy efficiency, assure compliance with environmental and health and safety regulations, and meet corporate environmental, health and safety compliance goals?
- (e) How does your organization conduct process analysis of corrective actions or other non-operational problem areas to identify environmental issues?
- (f) How does your organization improve its process analysis system?

Note:

1. Linkages may include Items 4.1, 5.2, 7.1 and 7.3.

Item 6.2 Process Improvement (50 pts) (Approach-Deployment)

How does your organization systematically analyze its processes to identify, develop and implement improvement projects to reduce or eliminate environmental impacts and increase efficient use of resources such as raw materials, water and energy efficiently as part of the organization's continuous environmental improvement approach?

Areas to consider:

- (a) How does your organization systematically prioritize areas for continuous environmental improvement of pertinent processes and how does improvement become part of daily operations?
- (b) How does your organization develop action plans to improve processes?
- (c) How does your organization correlate energy efficiency and conservation with waste minimization or other environmental improvements?
- (d) How does your organization involve employees, customers and suppliers to identify and implement process improvements?
- (e) How does your organization manage processes to exceed corporate environmental performance goals?
- (f) How does your organization use compliance results to continually improve processes?
- (g) How does your company communicate information on improvement projects (both success and failures) to assure organizational learning?
- (h) How does your organization uses benchmarking as part of ongoing process improvement activities?
- (i) How does your organization improve its process improvement system?

Note:

1. Linkages may include Items 2.2, 4.2, 5.2, 5.3, 7.1 and 7.3.

Category 7. Results (325 pts)

This category examines your organization's environmental performance in key areas: environmental results; customer, supplier, employee and other results; and financial results.

Item 7.1 Environmental Results (150 pts)

Summarize your organization's environmental and energy-associated results.

Areas to consider:

- (a) Summarize current levels and trends in use of materials.
- (b) Summarize current levels and trends in waste generation.
- (c) Summarize current levels and trends of water conservation and energy conservation measures.
- (d) Summarize current levels and trends in productivity related to environmental improvement efforts.
- (e) Summarize current levels and trends in efficiency related to environmental improvement efforts.
- (f) Summarize current levels and trends in employee satisfaction, skill development and involvement related to environmental improvement efforts.
- (g) Summarize current levels and trends of compliance, regulatory requirements, and workplace safety.
- (h) Summarize current levels and trends of environmental, safety and health impact of your processes, products or services.
- (i) Summarize current levels and trends related to your organization's environmental, health and safety and prevention performance measures.
- (j) Summarize levels and trends of other environmental results achieved through your prevention-based environmental management system.
- (k) Summarize current levels and trends related to energy conservation, energy efficiency, and renewable energy usage.

Note:

- 1. Linkages may include Items 2.3, 4.1, 4.2, 5.3, 6.1, 6.2, and 7.3.

Item 7.2 Customer, Supplier, Employee and Other Results (100 pts)

Summarize customer, employee, community, supplier, market and other interested parties results within the context of the continuous environmental improvement approach.

Areas to consider:

- (a) Summarize current levels and trends in customer satisfaction or dissatisfaction in the performance and quality of your organization's service, products or production processes.
- (b) Summarize current trends and results in interested parties or others' involvement in your organization's continuous environmental improvement approach.
- (c) Summarize current trends and results in marketing related to continuous environmental improvement.
- (d) Summarize current levels and trends in market expansion or new market development for green products or waste-to-product activities.
- (e) Summarize current levels and trends of supplier and vendor environmental performance resulting from your organization's continuous environmental improvement outreach efforts.
- (f) Summarize current levels and trends of environmental and economic performance in the surrounding community resulting from your organization's continuous environmental improvement outreach.

- (g) Summarize current levels and trends of employee involvement and satisfaction resulting from your organization's continuous environmental improvement approach.
- (h) Summarize current levels and trends of other results related to the continuous environmental improvement approach but not listed above.

Note:

1. Linkages may include Items 1.2, 3.1, 3.2, 3.3, 4.2, 5.1, 5.2, 5.3 and 7.3.

Item 7.3 Financial Results (75 pts)

Summarize your organization's financial performance results related to the implementation of your continuous environmental improvement approach.

Areas to consider:

- (a) Summarize current levels and trends in financial investments related to continuous environmental improvement efforts.
- (b) Summarize current levels and trends in cost savings and cost avoidance through the implementation of a prevention-based environmental management system.

Note:

1. Financial results have linkages across most categories. Also, results in items 7.1 and 7.2 may also have related financial results that should be reported as well in 7.3.

2000 Categories/Items	Point Values
1 Leadership	125
1.1 Organizational Leadership	75
1.2 Community Leadership	50
2 Planning for Continuous Environmental Improvement	150
2.1 Strategy Planning for Environmental Improvement	50
2.2 Action Planning	50
2.3 Integration and Implementation	50
3 Customer, Supplier and Others Involvement	75
3.1 Customer Involvement	25
3.2 Supplier Involvement	25
3.2 Others Involvement	25
4 Information and Analysis	100
4.1 Information Collection and Management	60
4.2 Analysis and Decision-Making	40
5 Employee Involvement	125
5.1 Employee Education and Skill Development	50
5.2 Employee Involvement	55
5.3 Employee Satisfaction, Value and Well-being	20
6 Process Management	100
6.1 Process Characterization and Control	50
6.2 Process Improvement	50
7 Results	325
7.1 Environmental Results	150
7.2 Customer, Supplier, Employee and Others Results	100
7.3 Financial Results	75
TOTAL POINTS	1000

Scoring System¹

The scoring of responses to Criteria Items (Items) and Award applicant feedback are based on three evaluation dimensions: (1) Approach; (2) Deployment; and (3) Results. Criteria users need to furnish information relating to these dimensions. Specific factors for these dimensions are described below. Scoring Guidelines are given in the Scoring Guidelines section.

Approach

"Approach" refers to how you address the Item requirements – the *method(s)* used. The factors used to evaluate approaches include:

- appropriateness of the methods to the requirements
- effectiveness of use of the methods. Degree to which the approach:
 - is systematic, integrated, and consistently applied
 - embodies evaluation/improvement/learning cycles
 - is based on reliable information and data
- alignment with organizational needs
- evidence of innovation

Deployment

"Deployment" refers to the *extent* to which your approach is applied in the organization. The factors used to evaluate deployment include:

- use of the approach in addressing requirements relevant to your organization, to what degree or what stage approaches are being implemented (time element: just beginning to be used or mature)
- use of the approach by all appropriate work units (horizontal)
- use of the approach from management to engineers to support staff (vertical).

Results

"Results" refers to *outcomes* in achieving the purposes given in the Item. The factors used to

¹ The Green Zia Environmental Excellence Program is adapted from the scoring methods from the 1999 Malcolm Baldrige Quality Program.

evaluate results include:

- current performance
- performance relative to appropriate comparisons and/or benchmarks
- rate, breadth, and importance of performance improvements
- linkage of results measures to key customer, market, process, and action plan performance requirements identified in the Business Overview and in Approach/Deployment Items

Item Classification and Scoring Dimensions

Items are classified according to the kinds of information and/or data you are expected to furnish relative to the three evaluation dimensions.

The two types of Items and their designations are:

1. Approach/Deployment
2. Results

Approach and Deployment are linked to emphasize that descriptions of Approach should always indicate the Deployment – consistent with the *specific requirements* of the Item. Although Approach and Deployment dimensions are linked, feedback to Award applicants reflects strengths and/or opportunities for improvement in either or both dimensions.

Results Items call for data showing performance levels and trends on key measures and/or indicators of organizational performance. However, the evaluation factor, "breadth" of performance improvements, is concerned with how widespread your improvement results are. This is directly related to the Deployment dimension. That is, if improvement processes are widely deployed, there should be corresponding results. A score for a Results Item is thus a weighted composite based upon overall performance, taking into account the breadth of improvements and their importance. (See next section.)

"Importance" as a Scoring Factor

The three evaluation dimensions described previously are critical to evaluation and feedback. However, evaluation and feedback also must consider the importance of your reported Approach, Deployment, and Results to your key business factors. The areas of greatest importance should be identified in the Business Overview. Your key environmental concerns and key strategic objectives and action plans are particularly important.

Assignment of Scores to Your Responses

Green Zia Award Examiners observe the following guidelines in assigning scores to applicants' responses:

- “Areas to Consider” should be addressed in the Item response. Also, responses should reflect what is important to your organization;
- In assigning a score to an Item, an Examiner first decides which scoring range (e.g., 50% to 60%) best fits the overall Item response. Overall "best fit" does not require total agreement with each of the statements for that scoring range. Actual score *within* the range depends upon an Examiner's judgment of the closeness of the Item response in relation to the statements in the next higher and next lower scoring ranges;
- An Approach/Deployment Item score of 50% represents an approach that meets the *basic* objectives of the Item and that is deployed to the principal activities and work units covered in the Item. Higher scores reflect maturity (cycles of improvement), integration, and broader deployment; and
- A Results Item score of 50% represents a clear indication of improvement trends and/or good levels of performance in the principal results areas covered in the Item. Higher scores reflect better improvement rates and/or levels of performance, and better comparative performance as well as broader coverage.

SCORING GUIDELINES: Approach and Deployment

SCORE	APPROACH/DEPLOYMENT
0%	<ul style="list-style-type: none"> no systematic approach evident; anecdotal information
10% to 20%	<ul style="list-style-type: none"> beginning of a systematic approach to the basic purposes of the Item major gaps exist in deployment that would inhibit progress in achieving the basic purposes of the Item early stages of a transition from reacting to problems to a general improvement orientation
30% to 40%	<ul style="list-style-type: none"> a sound, systematic approach, responsive to the basic purposes of the Item approach is deployed, although some areas or work units are in early stages of deployment beginning of a systematic approach to evaluation and improvement of basic Item processes
50% to 60%	<ul style="list-style-type: none"> a sound, systematic approach, responsive to the overall purposes of the Item approach is well-deployed, although deployment may vary in some areas or work units a fact-based, systematic evaluation and improvement process is in place for basic Item processes approach is aligned with basic organizational needs identified in the other Criteria Categories
70% to 80%	<ul style="list-style-type: none"> a sound, systematic approach, responsive to the multiple requirements of the Item approach is well-deployed, with no significant gaps a fact-based, systematic evaluation and improvement process and organizational learning/sharing are key management tools; clear evidence of refinement and improved integration as a result of organizational-level analysis and sharing approach is well-integrated with organizational needs identified in the other Criteria Categories
90% to 100%	<ul style="list-style-type: none"> a sound, systematic approach, fully responsive to all the requirements of the Item approach is fully deployed without significant weaknesses or gaps in any areas or work units a very strong, fact-based, systematic evaluation and improvement process and extensive organizational learning/sharing are key management tools; strong refinement and integration, backed by excellent organizational-level analysis and sharing approach is fully integrated with organizational needs identified in the other Criteria Categories

SCORING GUIDELINES: Results

SCORE	RESULTS
0%	<ul style="list-style-type: none"> no results or poor results in areas reported
10% to 20%	<ul style="list-style-type: none"> some improvements <i>and/or</i> early good performance levels in a few areas results not reported for many to most areas of importance to your organization's key business requirements
30% to 40%	<ul style="list-style-type: none"> improvements <i>and/or</i> good performance levels in many areas of importance to your organization's key business requirements early stages of developing trends and obtaining comparative information results reported for many to most areas of importance to your organization's key business requirements
50% to 60%	<ul style="list-style-type: none"> improvement trends <i>and/or</i> good performance levels reported for most areas of importance to your organization's key business requirements no pattern of adverse trends and no poor performance levels in areas of importance to your organization's key business requirements some trends <i>and/or</i> current performance levels – evaluated against relevant comparisons <i>and/or</i> benchmarks – show areas of strength <i>and/or</i> good to very good relative performance levels business results address most key customer, market, and process requirements
70% to 80%	<ul style="list-style-type: none"> current performance is good to excellent in areas of importance to your organization's key business requirements most improvement trends <i>and/or</i> current performance levels are sustained many to most trends <i>and/or</i> current performance levels – evaluated against relevant comparisons <i>and/or</i> benchmarks – show areas of leadership and very good relative performance levels business results address most key customer, market, process, and action plan requirements
90% to 100%	<ul style="list-style-type: none"> current performance is excellent in most areas of importance to your organization's key business requirements excellent improvement trends <i>and/or</i> sustained excellent performance levels in most areas evidence of industry and benchmark leadership demonstrated in many areas business results fully address key customer, market, process, and action plan requirements

Green Zia Tools and Technical Assistance

Tools and technical assistance are available to help you establish and improve your environmental excellence program.

Green Zia Program Tools

Tools to establish a basic, systematic prevention-based environmental management system support the Green Zia Program. The tools are in two categories: the "Systems Approach to Pollution Prevention"² and a simplified version for small businesses, the "Nothing to Waste" Program³. These tools provide a basic framework for an on-going prevention-based environmental management system.

The structured analysis tools featured in the Systems Approach facilitate process analysis, problem solving, and decision-making. They provide a framework for your organization to identify pollution prevention opportunities on an ongoing basis. Management and employees utilize the tools in teams in order to gain a complete understanding of their operations.

The Systems Approach tools are widely used quality program tools that provide an excellent means to integrate pollution prevention into an organization's business activities. Many companies are already using these same tools in their quality programs.

² The "Systems Approach to Pollution Prevention" was developed by Dr. Robert Pojasek, President of Pojasek and Associates.

³ The Green Zia Nothing to Waste manual was adapted from the Nothing to Waste Program which was originally developed as a project of Working Capital, Grove Hall NDC, Green Island/Vernon Hill CDC, Tufts University New England Environmental Network, Cambridge Environmental, Inc and Dr. Robert Pojasek with funding provided by the US Environmental Protection Agency.

The Nothing to Waste Program is a simplified version of the “Systems Approach to Pollution Prevention”, for use in small businesses. The Nothing to Waste Program explains how a very small business can use quality tools to improve all aspects of their business, with an emphasis on environmental improvements. The program walks a business through these tools from process analysis through action planning for implementation. A copy of this program can be downloaded from the web site: www.pollutionprevention.com or by calling Patricia Gallagher at 505-827-0677.

Any type of organization from a small, one-person shop to a major manufacturer or federal facility can use the Green Zia Program tools.

The Green Zia Tools (aka Systems Approach or Nothing to Waste):

Tool 1: *Process Mapping* illustrates the steps that resources pass through as they are transformed into final product. Process maps allow an organization to identify all inputs and outputs from a process. This makes wastes, discharges, emissions and other losses evident, and leads to a better understanding of the processes. With process mapping, environment, health and safety requirements can also be identified for each work step. Processes that people perform and information flow can also be captured on the process maps. These process maps can serve as templates for resource accounting and activity-based costing.

Tool 2: *Activity-Based Costing* identifies the true costs of wastes, discharges, emissions and other losses. It also helps organizations identify areas to target for pollution prevention by assigning dollar values to these losses. Full-cost accounting provides information to help gain management attention and support for environment, health and safety improvements.

Tool 3: *Root Cause Analysis* gets at the nature of the problem. The employees can use a cause and effect diagram that highlights why and where losses occur in a process. This information helps participants focus on specific areas for improvement. Root cause analysis promotes discussion and helps gather information on problems from a complete range of possible contributing factors, including machines (technology), materials, methods, and people.

Tool 4: *Developing Alternatives* by using a tool like brainwriting helps participants generate as many P2 alternatives as possible for addressing the wastes, discharges, emissions or other losses. This tool aims to produce many potential ideas, rather than focusing on a single “right” answer.

Tool 5: *Selecting an Alternative* involves using a tool like “bubble-up/bubble-down. This tool helps the employee team prioritize alternatives to determine the optimal P2 solution for the selected P2 opportunity. Factors such as cost, ease of implementation and effectiveness are considered in evaluating and prioritizing the alternatives.

Tool 6: *Action Plans* detail each step that needs to be taken to implement the alternative chosen for reducing or eliminating the waste, discharge, emission or other loss. Action plans allow companies to track progress and provide a platform against which to audit environmental excellence program implementation.

* Information on these tools can be found on the Internet at <http://www.PollutionPrevention.com>

Technical Assistance and Green Zia Program Training

Technical assistance is available for businesses to help them use the Green Zia tools and implement pollution prevention or other improvement opportunities. Training in both the tools and the Green Zia Program application process are offered across the state. Classes that lead businesses through the tools are offered through community college continuing education programs and through other venues such as on-site training, community workshops, and industry-specific training.

Very small businesses can work as a team in facilitated Green Zia Groups to work through the tools, teaching other team members about their business operations. In turn, the other team members can provide feedback and offer ideas from a different perspective. Consultants and other technical assistance providers who are proficient in the use of the Green Zia tools may offer this service to companies in New Mexico.

The Green Zia Pollution Prevention/Technical Resource Center has been established to help you develop a pollution prevention program and to help you work through the Green Zia Program. Information on the latest prevention techniques and technologies as well as onsite assistance, a website and a listserve are available through the Resource Center. The Resource Center is administered through the Waste-management Education and Research Consortium in collaboration with the Energy, Minerals and Natural Resources Department and the Environment Department as part of the Green Zia Environmental Excellence Program. Please contact Chris Campbell, in Albuquerque at 843-4251 for information.

Businesses are encouraged to work with the free technical assistance programs through the New Mexico Environment Department and the City of Albuquerque to answer compliance questions or to implement pollution prevention opportunities.

Technical Assistance Contacts:

Green Zia Environmental Excellence Program:	505-827-0677
Green Zia/P2 Technical Resource Center:	505-843-4251

Energy, Mineral and Natural Resources Department

Energy Efficiency:	505-827-7804
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Environment Department

Air Quality Small Business Assistance Program:	505-827-2859
Hazardous Waste On-Site Assistance:	505-827-1558
Recycling:	505-827-2883
Underground Storage Tanks:	505-476-3779

State Engineer's Office

Water Conservation:	505-827-3879
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City Of Albuquerque/Bernalillo County Area Businesses

Environmental Health Department	
Hazardous Waste Assistance:	505-768-2636
Air Quality Assistance:	505-768-1964

Public Works Department

Pollution Prevention Program:	505-873-7004
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Green Zia Company Profiles

*Profiles of successful programs in New
Mexico*