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Using Benchmarking to Minimize Common DOE Waste Streams

Volume V. Office Paper Waste

Prepared for
U.S. Department of Energy
Office of Waste Management
Environmental Management
Waste Minimization Division

Prepared by
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Abstract

Finding innovative ways to reduce waste streams generated at U.S. Department of Energy (DOE) sites by 50% by the year 2000 is a challenge for DOE's waste minimization efforts. A team composed of members from several DOE facilities used the quality tool known as benchmarking to improve waste minimization efforts. First the team examined office waste generation and handling processes at their sites. Then team members developed telephone and written questionnaires to help identify potential "best-in-class" industry partners willing to share information about their best waste minimization techniques and technologies. The team identified two benchmarking partners, NIKE, Inc., in Beaverton, Oregon, and Microsoft, Inc., in Redmond, Washington. Both companies have proactive, employee-driven environmental issues programs. Both companies report strong employee involvement, management commitment, and readily available markets for recyclable materials such as white paper and nonwhite assorted paper. The availability of markets, the initiative and cooperation of employees, and management support are the main enablers for their programs. At both companies, recycling and waste reduction programs often cut across traditional corporate divisions such as procurement, janitorial services, environmental compliance, grounds maintenance, cafeteria operations, surplus sales, and shipping and receiving. These companies exhibited good cooperation between these functions to design and implement recycling and waste reduction programs.

ACKNOWLEDGMENTS

This report represents the efforts of many participants who shared their talents, time, and resources to further DOE's waste minimization efforts. We thank the following for their contributions:

Industry partners and their representatives:

- Jon Thornburgh, Environmental Engineer, and Jill Hein, Administrative Assistant, Microsoft, Inc., Redmond, Washington
- Leta Winston, Environmental Specialist, and Joyce Gassett, Purchasing Specialist, NIKE, Inc., Beaverton, Oregon

DOE sponsors:

- Kent Hancock and Ker-Chi Chang at DOE EM-334, and Oren Critchfield at DOE/AL

DOE office waste process experts:

- Joy Ash, Recycling Coordinator, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico
- Oscar Blevins, Recycling Coordinator, Brookhaven National Laboratories; Upton, New York
- Sally Raubfogel, Waste Minimization/Pollution Prevention (WMin/PP) Coordinator, Sandia National Laboratories/California, Livermore, California
- Lynn St. Georges, Environmental Compliance Specialist, Westinghouse Hanford, Richland, Washington
- David Wasserman, Waste Reduction Specialist, Lockheed Martin Energy Systems, Oak Ridge National Laboratory, Oak Ridge, Tennessee

Executive Summary

Mission

Recent Executive Orders are challenging U.S. Department of Energy (DOE) facilities to prevent pollution at its source and to use recycled products. DOE continues to seek innovative ways to reduce waste streams generated at DOE sites by 50% by the year 2000.

Project Focus

Sponsored by the DOE's Waste Minimization Division (EM-334), the Benchmarking for Waste Minimization project (1) examines waste minimization techniques and technologies that have been used successfully to minimize office waste, specifically nonwhite assorted paper, and (2) provides this information to affected sites within DOE. Benchmarking was the methodology used for analyzing the internal processes and seeking partners that have successfully improved their waste minimization processes. This report describes the team findings of the best waste minimization practices for nonwhite mixed office paper.

Benchmarking Definition

Benchmarking is the continuous process of improving products, services, and practices by identifying and understanding the current process, exchanging information with recognized leaders in the field, and implementing meaningful improvements. Benchmarking is used by a variety of companies and organizations as a quality improvement tool. The team used a modified 12-step benchmarking process that provided the project framework.

Benchmarking Team

A benchmarking team evaluated the current internal processes used at several DOE facilities for office waste. The team created a process flow chart and defined process metrics. Using telephone surveys and written questionnaires, the team searched for industry partners with similar working environments that had addressed the problems that the team was investigating. The team found two benchmarking partners.

Results

The team visited Microsoft, Inc., in Redmond, Washington and NIKE, Inc., in Beaverton, Oregon to learn about their office waste minimization practices. In general, both companies shared the following elements for success:

- Both companies report strong employee involvement, management commitment, and readily available markets for recyclable materials.
- Because of a flexible management and labor structure, both companies had designed recycling and waste reduction programs that were simple and straightforward as well as cost-effective. The processes involve more direct employee participation and empowerment.
- Recycling and waste reduction programs often cut across traditional corporate divisions such as procurement, janitorial services, environmental compliance, grounds maintenance, cafeteria operations, surplus sales, and shipping and receiving. These companies exhibited good cooperation between these functions to design and implement recycling and waste reduction programs.

Microsoft Results

Microsoft recycles white paper and mixed paper, as well as corrugated cardboard, aluminum, polystyrene, toner cartridges, and other office-related waste.

The paper program is based on a deskside recycling effort. Employees place white paper and nonwhite paper in a specially divided box right at their desks. Employees do not have to leave their chairs to recycle. At night, custodians alternate trash pickup with recyclable paper pickup.

Microsoft tries to control the final waste stream by controlling the waste stream components. For example, only polystyrene plates, cups, and utensils are used in the company cafeteria. The company purchases only beverages in aluminum cans and has eliminated other containers (such as glass or PET-1 plastics).

Microsoft takes advantage of its computer culture by using e-mail to circulate documents electronically instead of on paper, and to put instruction manuals on the computer network instead of using paper copies.

NIKE, Inc. Results

NIKE recycles white paper and mixed paper, as well as corrugated cardboard, aluminum, polystyrene, toner cartridges, and other office-related waste. Employees use a desktop holder to sort waste paper and then carry it to centrally located bins for pickup.

The company makes an effort to use and carefully segregate high-grade papers to ensure recycling at the highest grade possible. NIKE has a strong affirmative procurement policy that emphasizes the purchase of recycled and remanufactured office supplies. For example, NIKE purchases some recycled paper at a cost higher than virgin paper.

NIKE strongly emphasizes employee education and uses promotions and corporate celebrations to highlight and reinvigorate its recycling and environmental efforts.

NIKE manages the waste stream by banning some items and discouraging the use of others. Goldenrod paper and ground wood computer green bar paper are banned from campus. (Both NIKE and Microsoft prefer to call their business facilities "campuses".) Department office supplies are normally paid for from overhead. If a department wants to use an unusual paper, such as colored paper, it must pay for the paper from its own budget.

System Benefits

The partners reported the following benefits of waste minimization:

- Revenue generated by the recycling efforts
- Avoided costs by reducing the amount of waste sent to the landfill
- Improved public relations
- High employee morale

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Acronyms and Definitions

BMP	Best Management Practices
DOE	U.S. Department of Energy
dumpster dive	A person physically inspects every item in a dumpster and records the types of waste and weight of the waste. Dumpster dives can provide a measure of the true nature of the waste and of how much recyclable material is being trashed.
ES&H	Environment, Safety and Health
PP	Pollution Prevention
SEH	Safety, Environment, and Health
SNL/CA	Sandia National Laboratories, California
SNL/NM	Sandia National Laboratories, New Mexico
WMin	Waste Minimization

1.0 Introduction

1.1 Background

Executive Orders

Executive Orders signed by President Clinton require federal government agencies to prevent pollution and to use recycled products. Executive Order 12856 states that "It is the national policy of the United States that whenever feasible, pollution should be prevented or reduced at the source." Executive Order 12873 focuses on federal acquisition, recycling, and waste prevention and is intended "to strengthen the role of the Federal Government as an enlightened, environmentally conscious and concerned consumer."

DOE Waste Minimization Mission

The U.S. Department of Energy (DOE) has placed a high priority on waste minimization and pollution prevention, encouraging waste generators to develop programs and request adequate resources to effect long-term savings. To provide a strategy for meeting these priorities, the DOE created the Waste Minimization/Pollution Prevention Crosscut Plan (DOE, 1994). The plan states that DOE's waste minimization (WMin) mission is

> "To reduce generation and release of DOE multi-media wastes and pollutants by implementing cost-effective waste minimization and pollution prevention technologies, practices, and policies, with partners in government and industry while conducting the Department's operations in compliance with applicable environmental requirements."

DOE Objective

This benchmarking project helps to accomplish one of the major DOE Crosscut Plan Strategic Objectives, which is "to identify and develop technologies and exchange information." The DOE can enhance the effectiveness of WMin efforts by exchanging applicable technologies and information with companies or organizations that are already successful in their WMin/Pollution Prevention approach. A secondary DOE objective is to work closer with U.S. industry.

Waste streams that are common in the DOE complex are logical targets for evaluation because the results can be shared across the complex.

Sponsor

The sponsor of this project is the DOE Waste Minimization Division, EM-334. The division's mission is to plan, coordinate, and develop a DOE-wide Waste Minimization and Pollution Prevention Program that results in a decrease in the amount of wastes produced by the DOE.

Benchmarking Approach

Benchmarking was chosen as the project approach because it

- has proven capabilities as a quality improvement tool,
- provides flexibility,
- may be applied to many different processes, and
- increases ties with U.S. industry.

For a complete definition of benchmarking and an explanation of the process, refer to *Using Benchmarking to Minimize Common DOE Waste Streams, Volume I, Methodology and Liquid Photographic Waste*, SAND93-3992, April 1994.

1.2 Purpose

Project Purpose

The project's purpose was to

- identify common waste streams throughout the DOE,
- provide a forum for the waste generators who produce the same waste stream at different DOE facilities,
- partner with private industry to learn the best waste minimization technologies that have been applied successfully to these waste streams, and
- provide this information to the DOE.

Benchmarking, a quality tool, provided the methodology for analyzing the internal processes and for seeking industry partners that have successfully improved their own waste minimization efforts.

Report Purpose

This report describes the results of the benchmarking effort to identify the best waste minimization practices for managing the office assorted nonwhite paper waste stream.

1.3 Report Structure

This document is Volume V in a series of waste minimization benchmarking project reports. Volume I includes the background, full project scope, benchmarking methodology, project details such as training and survey techniques, and results of the liquid photographic waste team. Other volumes:

Volume II - Used Motor Oil
Volume III - Aqueous Cutting Fluid
Volume IV - Sulfuric Acid in Plating Shops

Continued on the next page...

1.3 Report Structure, continued

The following table describes the report structure:

Report Section	Description
1	Project background and purpose.
2	The generic 12-step benchmarking methodology.
3	Project details and results. **See Sections 3.10 and 3.11 for waste minimization practices, techniques, and recommendations.**
Appendices	Questionnaires used in the project.

2.0 Benchmarking Methodology

Introduction

This section is a brief overview of the generic process of benchmarking, as defined by Sandia's Process Improvement/Benchmarking Team.

Benchmarking Definition

Benchmarking is the continuous process of improving products, services, and practices by

- identifying and understanding customer requirements and process performance,
- exchanging information with recognized leaders (internal and external to the organization),
- implementing meaningful improvements, and
- recalibrating the process by assessing the progress and monitoring the trends and results.

Author Robert Camp has defined benchmarking as "the search for industry 'best practices' that lead to superior performance" (Camp, 1989).

Benchmarking Steps

Figure 2-1 is a flow chart of the 12-step benchmarking methodology used for this project.

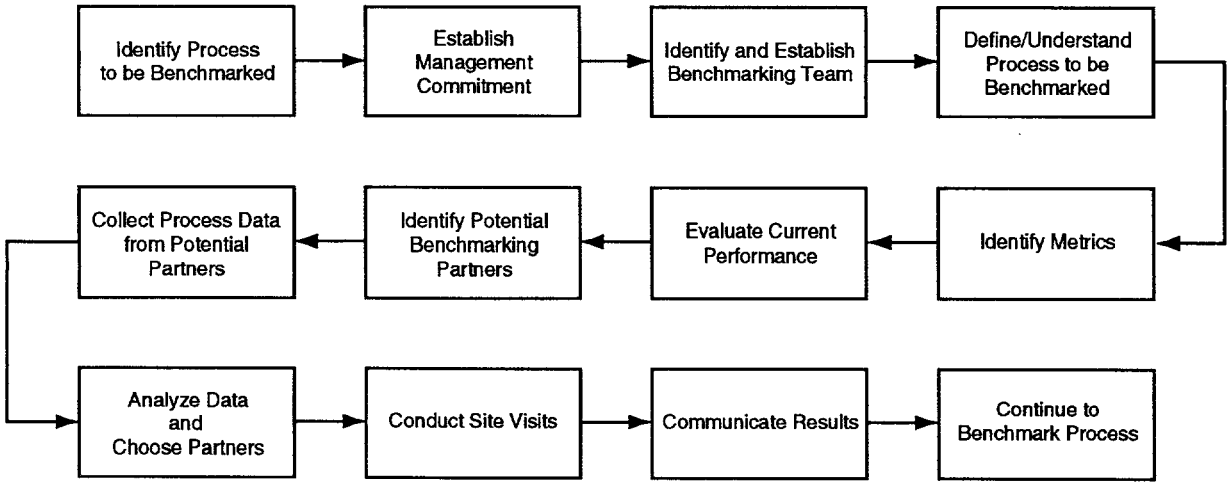

Figure 2-1. 12-Step Benchmarking Methodology

2.1 Defining the Benchmarking Process

Benchmarking Process

The following table shows the steps that comprise the benchmarking process. Steps 1 through 6 reflect internal process improvement. Steps 7 through 12 reflect external activities.

Step	Activity
1	**Identify Process to be Benchmarked** The process selected must be narrow enough in scope that it is manageable. The process must be important to the work or business function and be customer-focused because a substantial amount of resources (i.e., personnel, time, and funds) are required to conduct the benchmarking study. The result must improve the process and add value.
2	**Establish Management Commitment** Management is defined as the person(s) who has the authority to allocate resources (personnel, time, and funds) and who is ultimately responsible for the outcome of the benchmarking activity. Management • has the responsibility to make the effort to understand the fundamentals of benchmarking and to demonstrate a willingness to implement the results; • needs to support the team and its recommendations with resources, encouragement, and commitment; and • has the right to expect frequent updates from the benchmarking team (e.g., verbal reports, meeting minutes, reports, periodic presentations).
3	**Identify and Establish Benchmarking Team** The benchmarking team members include • **process experts** who have extensive knowledge of the process through their daily jobs (these are the people impacted by any changes); • **resource personnel** such as facilitators, trainers, quality or benchmarking consultants, information specialists, and technical writers; and • a **project leader** who guides the benchmarking process. The team may need training in benchmarking techniques, including process definition, the benchmarking process, quality tools, questionnaire design, and interviewing techniques. The team members must understand their roles and responsibilities and commit to a common team purpose or goal. The members must attend and participate in all meetings and complete their assignments. *Continued on the next page...*

Step	Activity
4	**Define and Understand the Process to be Benchmarked** The team defines the process through an understanding of important process elements: inputs, outputs, suppliers, and customers. The customer drives the business, and therefore the team needs to understand the customers' wants, needs, and expectations. The team's final output for this step includes a process flow chart depicting the work flow and the relationships between people and organizations. The output from this step lays the foundation for the remainder of the benchmarking activity.
5	**Identify Metrics** The metrics must be meaningful to the process. Example metrics include customer requirements, cost, cycle time, and quality. Metrics, when possible, should be consistent with established standards (i.e., industrial, national, international). The process metrics aid in evaluating and assessing the current process. Strength and weakness trends developed from the metrics can identify areas for improvement and provide guidance and direction for selecting improvements to be implemented. Effective metrics provide guidance for developing survey tools for benchmarking partners.
6	**Evaluate Current Performance** The metrics help to identify the process areas to be improved and the nature of the improvements. The team may need to develop a decision matrix for ranking the improvements. A cost/benefit or return-on-investment analysis may be required to evaluate whether the benchmarking process should be continued. If the recommendation for implementation of the appropriate process improvements is made, it is necessary to monitor the trends and results. Benchmarking does not automatically assume that outside partners are required.
7	**Identify Potential Benchmarking Partners** Based on the metrics collected from the internal process, the team needs to identify and establish criteria for "best in class" partner selection criteria. The team can identify potential partners through numerous resources: database searches and contacts with external organizations, knowledgeable individuals, suppliers, and customers. The team needs to identify a sufficient pool of partners to determine the few they will visit. Partners that have better processes are not always easily found. A team may discover that their own processes are better than those of the potential partners. *Continued on the next page...*

Step	Activity
8	**Collect Process Data from Potential Partners** The team develops surveys to obtain preliminary information from potential partners. Surveys may consist of questionnaires, telephone interviews, or face-to-face interviews. (Normally, site interviews are reserved for Step 10.) The survey questions are based on the process metrics and criteria established for selecting partners. Up-front planning on how to analyze the quantitative and qualitative data is essential for developing good surveys.
9	**Analyze Data and Choose Partners** The preliminary data are used to select partners for site visits and interviews. The project leader compares the data gathered from the potential partners to the metrics and criteria set by the team. The final partner(s) must have a process that is applicable to various DOE sites. The project leader should make direct comparisons of the data, process parameters, and constraints. The team analyzes the data and determines weighting and ranking criteria in order to select the final partners. If the team cannot find a partner that can provide substantial process improvements, the team needs to rethink the project. The team may decide • to repeat several steps, which would involve revising the criteria, expanding the pool of potential partners, collecting new process data, and re-analyzing the data in the search to find appropriate partners; or • to conduct an internal evaluation; or • to terminate the benchmarking effort.
10	**Conduct Site Visits** To gain the maximum benefit from partner site visits, careful and thorough preparation is essential. Preparation includes, but is not limited to, determining appropriate interviewees, assigning team interviewing roles, developing a list of questions and a meeting agenda, and determining how to handle the interview data. The site visit is an opportunity for two-way communication between the benchmarking team and each partner. During the site visit, the team conducts an in-depth interview. It is essential that the team develop an effective interview guide for each partner before the site visit. After all partners' information is collected, the quantitative and qualitative data are analyzed. A decision matrix may be used to identify and select the partners' practices to be incorporated. *Continued on the next page...*

Step	Activity
11	**Communicate Results** The team reports results to upper management and all involved parties and develops an action plan that describes the team's recommendations, methods for implementation, and implementation costs and schedule. The findings need to be adaptable to the process and the organization's culture and constraints. The improvements need to be monitored and evaluated.
12	**Continue to Conduct Benchmarking of Process** The best process today may not be the best process tomorrow. Depending on the amount of change in the process, customer requirements, competition, technological advances, and changing business practices, it is important to revisit the process, or specific aspects of the process, periodically.

Reference

This section is an adaptation of Section 2 of the report, *Benchmarking the Property Inventory Process at Sandia National Laboratories*, SAND92-2565 (Ramirez and Hill, 1993). It describes the generic process of benchmarking, as defined by Sandia's Process Improvement/Benchmarking Department.

Benchmarking Details

For details on the benchmarking methodology used for this project, refer to *Volume I, Methodology and Liquid Photographic Waste*, SAND93-3992, April 1994. For a copy of Volume I, contact the author at (505) 844-8956 or through the Environmentally Conscious Life Cycle Systems Department, Sandia National Laboratories, Albuquerque, New Mexico, 87185.

3.0 Office Paper Waste Benchmarking Results

Adaptation of Benchmarking Methodology

The 12 steps of the benchmarking methodology listed in Section 2 provided the framework for this project.

Benchmarking is a flexible process that lets each team adapt the standard procedure to the unique needs of the project.

The following chapter describes how the office waste team used the benchmarking process to collect information on Best Management Practices and other techniques and technologies for minimizing office waste, particularly nonwhite paper, within DOE.

3.1 Step 1: Identify Process to be Benchmarked

DOE's Waste-Generating Activities

Figure 3-1 illustrates four major types of waste-generating activities within the DOE, including:

- mission-related,
- waste management,
- environmental remediation, and
- infrastructure-related.

Infrastructure-related activities are the DOE's "landlord" activities as shown in the lower portion of Figure 3-1. Infrastructure-related activities were chosen because they have not yet received the same DOE-wide attention that the other three waste-generating activities have received. These activities produce DOE-wide waste streams that are also produced in industry. Therefore, they are ideal activities for benchmarking because appropriate industry partners should be easy to identify and locate.

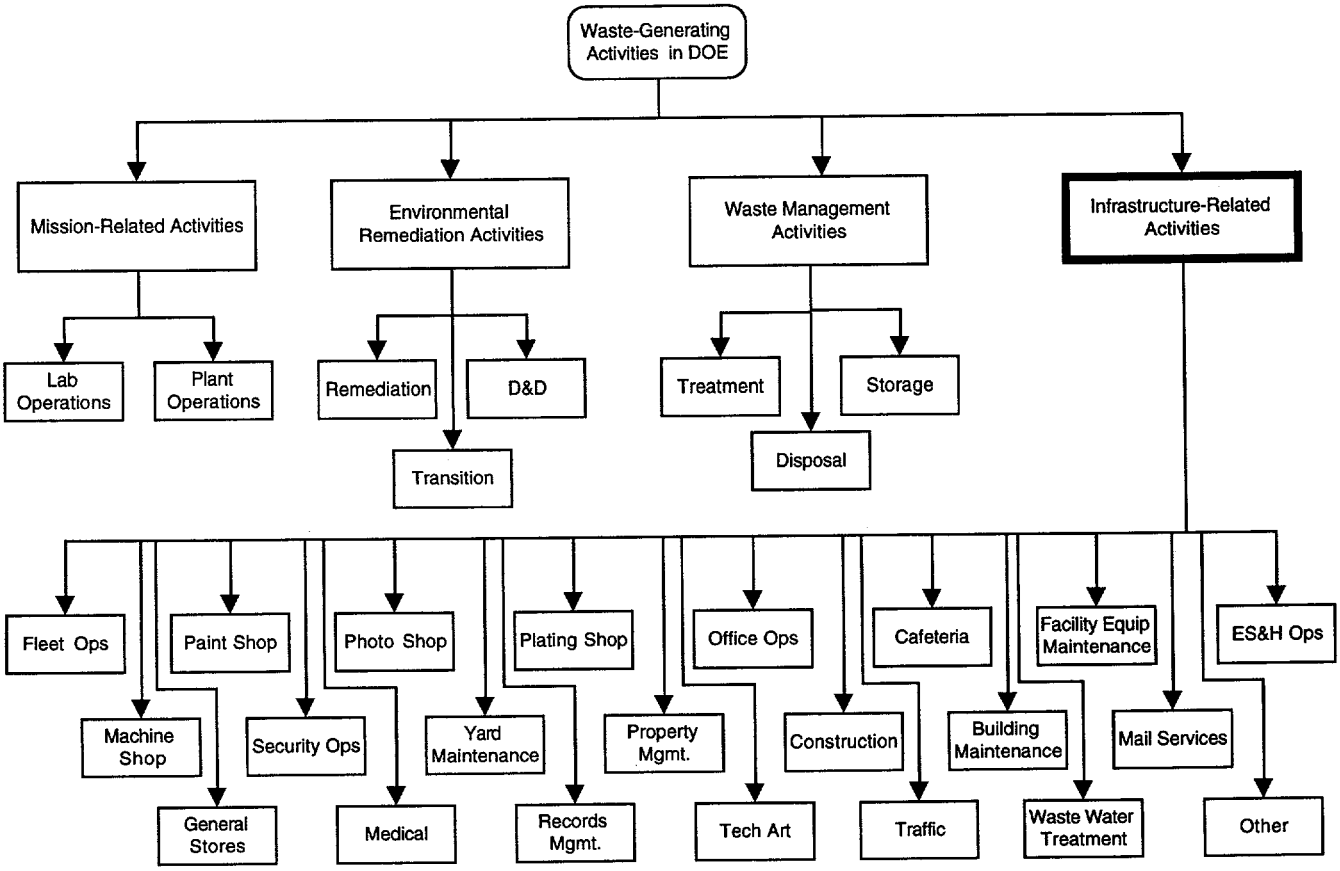

Figure 3-1. Waste-Generating Activities in DOE

Identification of Common Waste Streams

Initial activities centered on collecting information on as many DOE waste streams as possible. Refer to Volume I for the detailed rationale for selecting office waste as one of the waste streams for benchmarking.

When the benchmarking team gathered for the first workshop, one of the tasks was to identify all office waste streams. Paper was the largest waste stream in volume, and the most common among the sites. Because of the widespread availability of white paper recycling, the team decided to narrow the process focus to assorted nonwhite paper (see definition below).

Assorted nonwhite paper was chosen for benchmarking for the following reasons:

- Assorted nonwhite paper is a common concern throughout the DOE.
- Paper, even recyclable paper, is a major part of DOE's waste stream. Despite the availability of recycling programs, employees still throw away paper that could be recycled.
- Paper costs are rapidly increasing. Source reduction methods are needed to alleviate rising costs.
- DOE facilities are faced with limited landfill space and landfill closures.
- Increased costs for landfill space are driving the need for better methods and strategies for source reduction, reuse, and recycling.

Definitions

For purposes of this project, the following definitions apply:

White paper - White paper is paper without pigment or ground wood. Examples include unbound bond paper, copier paper, computer paper, green bar and lined paper, and white nonwindowed envelopes.

Assorted nonwhite paper:

- Colored (pastel, dark, goldenrod, fluorescent)
- Newspaper and other paper containing ground wood (such as newsprint, some tablets, and computer paper)
- Paper cups
- Paper towels
- Tissues
- "Stickies"
- Magazines
- Phone books
- Paper bags
- Shipping packaging materials
- Lined and unlined tablet paper
- Catalogs
- Journals
- Brochures
- Glossy paper
- Waxed paper

Continued on the next page...

Definitions, continued

Assorted nonwhite paper (continued):

- Paper with gummed labels
- Fax paper
- Brown envelopes
- Dividers
- Card stock
- Blueprint paper
- Paper boards (e.g. tablet backing and pencil boxes)
- Plastic-coated paper
- Photographs
- Construction paper
- Paper bound with non-water-soluble glue
- Carbonless forms
- Carbon paper

Note: Cardboard was considered a separate waste stream.

☞ OUTCOME OF BENCHMARKING STEP 1:

Process chosen for benchmarking:

- Assorted nonwhite paper

3.2 Step 2: Establish Management Commitment

Strong DOE Commitment

Because of DOE's emphasis on waste minimization, management commitment was a positive element in this project. The DOE sponsor for this project is the Waste Minimization Division, EM-334. Management support included the following:

- Headquarters provided project funding and guidance.
- The Albuquerque Field Office provided support through the WMin coordinator.
- Site management allowed the process experts the time to participate.
- Sandia management provided benchmarking expertise and trainers.

☞ OUTCOME OF BENCHMARKING STEP 2:
DOE management committed resources at local, regional, and national levels.

3.3 Step 3: Identify and Establish Benchmarking Team

Team Members

A benchmarking team usually consists of a project leader, process experts, management, and support personnel. Not all team members are required to participate at all times. Some team members may perform more than one role, as needed, for the team at large and for smaller subteams.

Finding Team Members

The project leader used the following sources to find benchmarking team members:

- Contacts within the DOE
- Proceedings from waste minimization conferences
- Discussions with site waste minimization coordinators

Roles and Responsibilities

The following table outlines suggested roles and responsibilities needed for a benchmarking effort.

Role	Responsibilities
Project Leader	Plan, organize, assign tasks, and oversee the benchmarking project.
Process Experts	Provide professional expertise on the target process during the workshops, contact industry partners, and conduct site interviews.
DOE Management	Set policy and provide support, personnel, time, and funding.
Trainers/Facilitators	Teach participants benchmarking techniques and lead workshops and work sessions to accomplish goals.
Information Specialist	Aid the search for potential benchmarking partners through database searches.
Writer/Recorder	Document the benchmarking process by recording workshop activities and provide support for the project leader, as needed.

Continued on the next page...

Team Roster

The following table lists the office waste team members:

Team Member	Title	Location
Joy Ash	Recycling Coordinator, Process Expert	Sandia National Laboratories/New Mexico, Albuquerque, New Mexico
Oscar Blevins	Recycling Coordinator, Process Expert	Brookhaven National Laboratory, Upton, New York
Diane Leek	Technical Writer, Writer/Recorder	Tech Reps, Inc., Albuquerque, New Mexico
Victoria Levin	Project Leader, Environmentally Conscious Life Cycle Systems, Trainer/Facilitator	Sandia National Laboratories/New Mexico, Albuquerque, New Mexico
Sally Raubfogel	Waste Minimization/ Pollution Prevention Coordinator, Process Expert	Sandia National Laboratories/California, Livermore, California
Lynn St. Georges	Environmental Compliance Specialist, Process Expert	Westinghouse Hanford, Richland, Washington
David Wasserman	Waste Reduction Specialist, Process Expert	Lockheed Martin Energy Systems, Oak Ridge National Laboratory, Oak Ridge, Tennessee

☞ OUTCOME OF BENCHMARKING STEP 3:
Planning team, benchmarking team, and interview team successfully assembled.

3.4 Step 4: Define and Understand the Process to be Benchmarked

Process Foundation

Step 4 lays the foundation for all future activity. The team must define and understand the existing process before examining another company's process. This step establishes the baseline from which to measure performance gaps.

Workshop Activities and Goals

The project leader, process experts, and support staff attended a series of workshops that provided training and work sessions for the entire team, covering several benchmarking steps.

The goals of the first workshop were to

- Define and understand the process to be benchmarked (Step 4),
- Create a flow chart of the generic process (Step 4),
- Define the metrics of the process (Step 5), and
- Define the criteria for choosing potential partners (Step 7).

The table below summarizes the workshop activities. A detailed description of the activities follows the table.

Stage	Activity
1	Workshop facilitator directed team-building exercises to integrate the team into a cooperative, working unit.
2	Workshop facilitator trained the team in the benchmarking methodology so that team members understood the group process, the task, the commitment, and the work involved to complete the project.
3	Team members developed a flow chart of the process to be benchmarked.

Continued on the next page...

Stage 1 — Team Building

Team Building

The team-building exercise resulted in a team name, motto, logo (see Figure 3-2), and mission statement.

Team Name	The W.O.W. (Watch Office Waste) Team
Motto	Office Waste: Control the Flow
Goal Statement	The "watch office waste" team will make recommendations to DOE operations offices across the complex to reduce the amount of office paper waste, primarily assorted nonwhite paper. The goal is to reduce landfilled/incinerated assorted nonwhite paper waste by at least 50% by the year 2000 through source reduction, reuse, and recycling.

Figure 3-2. Logo for the W.O.W. Team

Stage 2 — Train the Process Experts

The process experts were chosen for their knowledge of their fields and the tasks they perform in their daily jobs. However, they needed training in the benchmarking process.

Stage 3 — Create a Consensus Flow Chart

Process Flow Chart

The process experts came from a variety of sites that had different procedures and department structures. However, office waste management was a common problem for all sites. The team needed to create a flow chart that expressed the process "big picture." The facilitator helped the group define the process parameters.

Process Parameters

All processes have the following common parameters:

- Inputs
- Suppliers
- Outputs
- Customers

The team used the parameters above to help them define the particular process that produces the office waste stream. For each parameter, the team listed ideas, and then evaluated each component to confirm that it was directly related to the office waste stream. The final lists are shown below.

Inputs

Inputs for the office waste stream include two major factors:

- The **materials** that compose the waste stream and
- The **drivers** that exist within DOE. Drivers are the regulations and administrative practices that either require or allow the materials to be used.

The two categories are separated:

Materials:

- Colored papers
- Mail
  - windowed envelopes
  - brown paper (heavy stock)
  - card stock, covers of manuals
- Glossy paper—magazines, journals, brochures
- Catalogs
- Newspapers
  - carried on-site
  - produced on-site
  - mailed on-site
- Telephone books, including internal and commercial
- Cardboard
- Mixed paper—plastic and paper
- Post-its™
- Food packaging—(not wet)
- Paper towels, cups, plates, napkins
- Packaging paper
- Reports
- Gummed labels—gum backing on liners
- Company bulletin

Continued on the next page...

Inputs, continued

Inputs for the office waste stream, continued:

Materials, continued:

- Outdated and current forms
- Books
- Review material
- Classified documents
- Telephone messages
- Planners, calendars, desk manuals
- Personal use—invitations, birthday cards, items brought on site by employees
- Charitable solicitations
- Pay checks/stubs

Drivers:

- Regulations
- DOE commitments
- Public information
- Reporting requirements
- Audits
- Paper trail requirements
- Internal procedures
- Annual appraisals
- Filing
- Distribution lists
- The need to put things on paper

Suppliers

Suppliers for the office waste stream include:

- Form manufacturer
- Paper distributor
- Office supply
- General Accounting Office
- DOE
- Regulators
- Public
- Phone company
- Outside entities—the companies and agencies that send mail
- Employees
- Food services/vending machines
- Publishers
- Sales representatives
- Product manufacturers
- Company/corporate policy
- In house-information, memos, training
- Janitorial suppliers
- Accounting companies

Customers

Some of the participating DOE facilities do not recycle assorted nonwhite paper waste. The customer of this office waste stream is site-dependent, and may be:

- the landfill or
- the recycling contractor.

Outputs

Outputs of the assorted nonwhite paper waste stream include:

- waste paper that goes to the landfill or a recycler

Flow Chart

After the lists were finalized, the team created a flow chart (Figure 3-3) that diagrams the assorted nonwhite paper waste generation and handling process.

☞ OUTCOME OF BENCHMARKING STEP 4:

Assorted nonwhite paper process inputs, outputs, customers, and suppliers were identified. A flow chart of the generic process was completed.

Flow of Paper Products Through an Organization

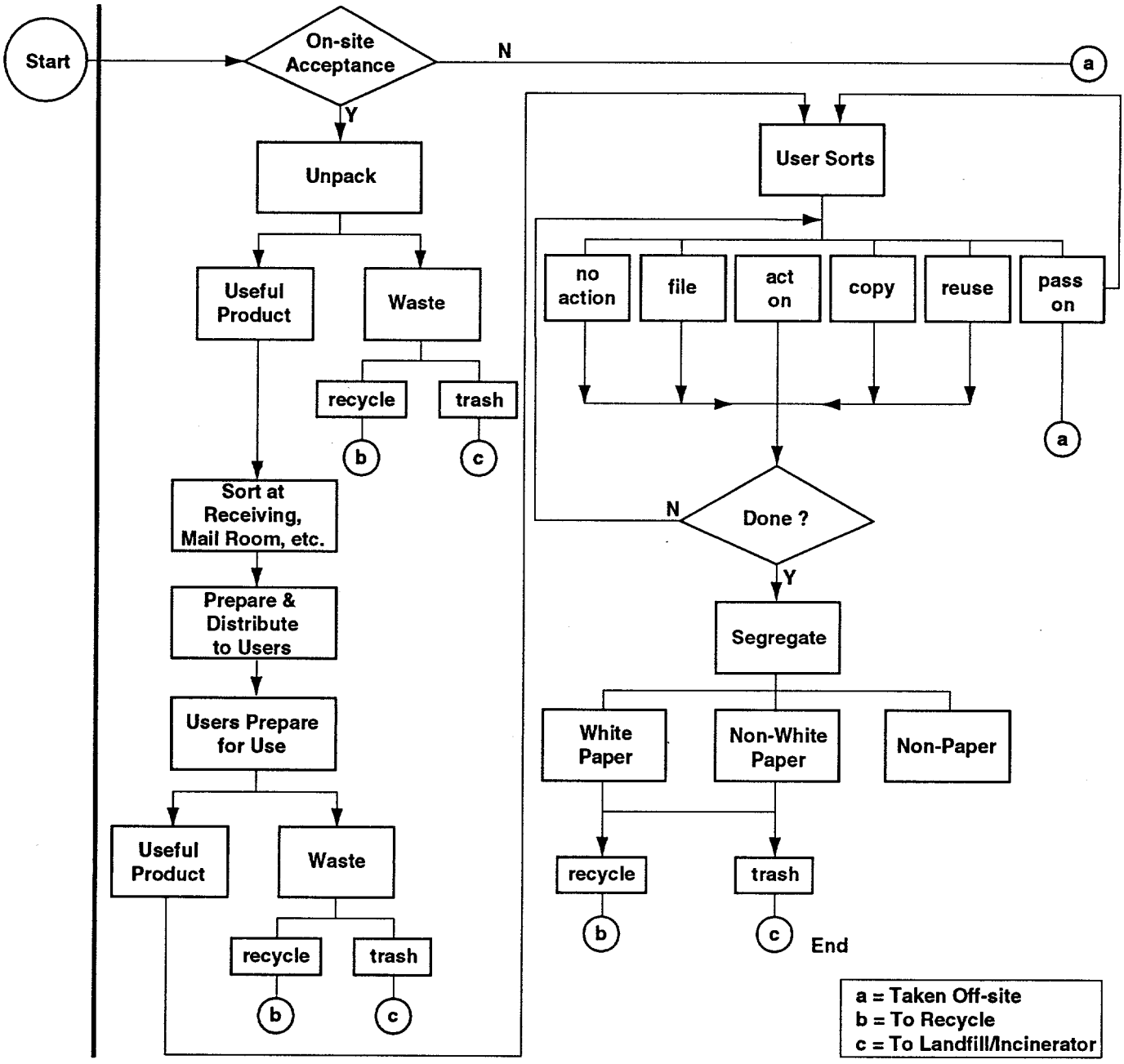

Figure 3-3. Assorted NonWhite Paper Waste Generation and Handling Process

3.5 Step 5: Identify Metrics

Definition

Metrics provide measures of a process against a standard. Metrics allow evaluation and assessment of existing performance and provide points of contrast after the lessons learned from the benchmarking activity have been applied.

Metrics

After the process flow chart was created (see Step 4), the facilitator led the team through a discussion of metrics.

The group decided that the following metrics were relevant:

Paper In:

- Quantity of copier paper purchased per year/site-wide in tons
- Quantity of other paper purchased per year/site-wide in tons
- Quantity of cardboard purchased

Facilities/Logistics:

- Number of employees
- Number of workers that use office space

Metrics that Affect Paper Waste Production:

- Estimated number of tons of:
  - solid waste to landfill/year
  - paper waste to landfill/year
  - white paper recycled/year
  - assorted nonwhite paper recycled/year
  - cardboard recycled/year

Metrics that Affect Paper Waste Reduction:

- number of employees with e-mail capabilities
- number of employees that use e-mail
- number of e-mail all-employee mailings
- number of hard copy all-employee mailings
- number of commercial telephone books issued per year
- number of copy machines
- number of copy machines with double-sided capabilities
- average number of copies per machine per year
- volume of mail that enters the site each week
- volume of mail that leaves the site each week
- number of lbs. of trash generated by each person per week
- number of interactive computer-based trainings available
- number of hard copy manual-based trainings available

NOTE: Not all the metrics are easily obtainable within DOE.

☞ OUTCOME OF BENCHMARKING STEP 5:

The team defined assorted nonwhite paper waste process metrics to provide the measures of the internal process.

3.6 Step 6: Evaluate Current Performance

Information Exchange

The team performed an informal evaluation of each site's performance by exchanging information and comparing activities and processes. Each process expert had the opportunity to discuss and explain site processes during the first workshop. A summary of office waste information at the participating DOE facilities is shown in Table 3.1.

☞ OUTCOME OF BENCHMARKING STEP 6:

- Individual team members shared information on each site's process and established network contacts for future problem solving.

Table 3.1 Summary of Office Waste Minimization Efforts at the Participating DOE Facilities

DOE Facilities	Recycle: What DOE Recycles Note: Office-related items only	Recycle: How DOE Recycles	Reuse: What DOE Reuses
Brookhaven	White paper, computer paper, cardboard, glass bottles, aluminum cans, and toner cartridges.	Every building has a drop-off area for recyclables. One contractor collects and recycles everything except toner cartridges, which are refurbished by the manufacturer. Recyclable and trash pickup days alternate.	Not part of the department program.
Hanford	Mixed paper, including white paper, newsprint, magazines, and phone books; cardboard; batteries; software packages and diskettes; toner cartridges	Scrap paper items are collected in desktop trays at the employee's workstation. Employees take the trays to recycling bins.	Moving boxes, office supplies, eyeglasses (through the local Lions Club), packing peanuts, mailing envelopes, 3-ring binders
ORNL	White paper, mixed paper (including phone books), corrugated cardboard, toner cartridges, #1 and #2 plastics (in two laboratories), aluminum cans, lead-acid batteries, fluorescent tubes.	Employees place recyclables in hallway bins. A nonprofit recycler picks up white paper. A nonprofit community organization picks up aluminum cans. Laborers pick up toner cartridges every 6 weeks from drop points in buildings.	A computer billboard "swap shop" lists computer equipment, office supplies, furniture, and lab equipment available to other departments.
Sandia/CA	White paper, colored paper, computer paper, aluminum cans, and toner cartridges.	Each office has boxes for paper recycling. Receptacles for aluminum cans are clearly labeled. A contractor collects, mixes, and destroys all paper for post-consumer products. Aluminum can recycling is voluntary and proceeds go to SNL/CA's holiday spirit program.	Toner cartridges are refurbished and repurchased. Usable computer equipment and office furniture are sent to reapplication for other departments, or, if completely unwanted, resold.
Sandia/NM	White paper, computer paper, cardboard, aluminum cans, toner cartridges, video cassettes.	Employees place nonsensitive white paper recycling boxes in hallways. Custodians move recycle boxes to cages in a central location. Custodians collect and recycle aluminum cans. Broken-down cardboard boxes are placed in wire cages and removed to a central location. A contractor takes all white paper and cardboard for recycling. (Note: The process will change in January 1996.)	Toner cartridges are refurbished and repurchased. Usable computer equipment and office furniture are sent to reapplication for other departments, or, if completely unwanted, resold. Some computer equipment is donated to public schools and universities. Part of the problem is having storage space until a need arises for old equipment.

Table 3.1 Summary of Office Waste Minimization Efforts at the Participating DOE Facilities, continued

DOE Facilities	Program Beginnings	Department Description Note: Other departments may handle similar or additional duties related to Pollution Prevention.	Facility Description
Brookhaven	The program was initiated by management in 1989 when the on-site landfill closed.	A recycling coordinator and three custodial supervisors are responsible for managing office waste collection.	3,500 employees, 137 buildings, and 5000 acres in the DOE complex.
Hanford	Program started in 1990 and is growing fast.	2 full-time Material Control Specialists	16,000 employees in 420 buildings within 560 square miles
ORNL	In 1990, employees in the Environmental Sciences Division wanted to see white paper and aluminum cans recycled. In 1992, the program was institutionalized.	The Pollution Prevention Program has 2 full-time employees and 1 contract employee who promote pollution prevention, waste reduction, and recycling; give technical assistance; and report to management	5,000 employees in 45 buildings on 200 acres
Sandia/CA	Program was initiated by DOE requirements.	The WMin/PP Coordinator is responsible for all waste minimization and pollution prevention.	970 employees, 300 contractors, 30 buildings, and 413 acres in the DOE complex.
Sandia/NM	Began as a volunteer effort in late 1980s.	A recycling coordinator handles all office waste efforts.	8,800 employees, 1,500-2,000 contractors, 600 buildings, and 2,842 acres in the DOE complex.

Table 3.1 Summary of Office Waste Minimization Efforts at the Participating DOE Facilities, continued

DOE Facilities	Employee Education Program	Employee Incentives	E-mail availability and estimated % of use
Brookhaven	Inform new employees of recycling procedures when hired.	None.	60% estimated e-mail availability and use.
Hanford	Weekly site newspaper prints pollution prevention and recycling articles monthly, sometimes more frequently. Weekly recycling information sent via e-mail. Training course on property reutilization, disposal, and recycling. Information posted on the Local Area Network.	None.	Available to all employees except many craft workers and subcontractors. Level of use varies.
ORNL	New employees receive a coffee mug and an environmental issues information packet listing contact names, and attend a 20 minute seminar on the recycling program. A quarterly newsletter highlights environmental issues.	Awards program for employees that do excellent jobs, although the emphasis is on hazardous waste.	90% available, and 90% of those use e-mail.
Sandia/CA	New hires receive orientation on waste minimization and pollution prevention.	None.	95% estimated e-mail availability and use.
Sandia/NM	Weekly columns in the corporate bulletin, displays, and festivities such as Earth Day and Sandia Day are used to promote waste minimization.	None.	70% estimated e-mail availability and use.

Table 3.1 Summary of Office Waste Minimization Efforts at the Participating DOE Facilities, continued

DOE Facilities	Waste Stream Management Practices (For example, ban purchases of items that are difficult to recycle.)	Nonwhite Paper Program Features	Effect on Worker Productivity
Brookhaven	None.	Mixed paper is picked up by a contractor (5 tons/month).	95% of the workers had no complaints and were enthused about the program.
Hanford	A PP representative screens purchase requisitions of a chemical nature to check for available on-site surplus, if a less hazardous substitute exists, or if less product will suffice.	Employees segregate newsprint, magazines, and phone books. All other office paper goes in one bin and is later sorted by the recycling vendor.	None.
ORNL	Hazardous waste, such as aerosol cans, is managed more proactively than nonhazardous waste. However, the department has made a big push not to use colored paper. Yellow legal pads are banned. Distribution for phone books is dropping.	Bins are in hallways with signs listing appropriate paper sources. However, the program is still new and people are throwing inappropriate items such as 3-ring binders and plastic viewgraphs into the paper bins.	None.
Sandia/CA	E-mail is encouraged, including an electronic bulletin board for site-wide announcements. Double-sided copying is encouraged.	Most paper is mixed and recycled. Exclusions: Commercial telephone books, magazines, paper plates, etc.	The majority of workers did not complain and were happy to be involved in a recycling program.
Sandia/NM	Affirmative procurement allows for purchase of products containing both pre- and post-consumer goods, such as remanufactured toner cartridges.	None.	Employees do want to recycle, but the current system is outdated and is not user friendly.

Table 3.1 Summary of Office Waste Minimization Efforts at the Participating DOE Facilities, continued

DOE Facilities	Measuring Program Effectiveness	Program Costs	Affirmative Procurement Efforts
Brookhaven	• Avoided landfill tonnage • Recycling as many waste streams as possible • Cost avoidance figures	No additional personnel hired to run the program. High initial investment in recycling bins ($35,000).	No affirmative procurement.
Hanford	• Number of participating buildings and employees • Total volume of recycled materials • Avoided landfill tonnage. (Landfill is scheduled to close in 12/95.) • Revenued earned	For paper program: one employee approximately 20-30 hours per week. Vendor supplies all equipment, labor, and transportation, and pays Hanford a percentage of the market value.	Paper, cement containing fly ash, retread tires, lubrication oils, and recycled insulation.
ORNL	• Quantity of paper recycled • Amount of waste sent to landfill, what is going to landfill, and what is diverted from the landfill. • Revenue earned, for example, toner cartridge program (the biggest revenue-producer.)	One-third of an FTE, plus costs of recycling contractors. The cardboard program is labor intensive, requiring 2 FTEs to pick up cardboard stacked next to building dumpsters.	An affirmative procurement committee aggressively seeks recycled products in contracts.
Sandia/CA	• Avoided landfill tonnage • Revenue from can recycling • Revenue saved on purchase of reused toner cartridges.	Higher price on post-consumer paper products and initial investment in recycling bins ($300/bin).	Affirmative procurement corporate team in place. Purchases post-consumer office products when available.
Sandia/NM	• Avoided landfill tonnage • Revenue from recycling • Overall employee interest in recycling, which is measured by the number of calls in response to weekly recycling tips in corporate newsletter, such as how to dispose of household cleaners.	All funding for recycling programs has been deleted from the FY96 budget. The contractor will have to supply containers for recycling and employees will need to participate more.	Affirmative procurement corporate team in place, which provides a catalog of Just-in-Time products that contain pre- and post-consumer waste.

3.7 Step 7: Identify Potential Benchmarking Partners

Search Parameters

Criteria are defined as standards on which a judgment or decision may be based (Webster's, 1985). The team developed criteria to be used to identify appropriate potential partners. Defining criteria limited the search to partners that fit the team's needs.

Criteria

The W.O.W. team defined the following criteria for ideal potential partners:

- Had at least 300 office employees
- Had a waste minimization/pollution prevention program
- Had multiple buildings/locations
- Was willing to participate
- Generated office paper waste
- Had a continental U.S. location
- Was in a state with restricted landfill availability
- Tracked purchases, recycled items, and amount of material recycled or landfilled
- Had strong management support
- Had performed a baseline study prior to implementation

Information Sources for Identifying Potential Partners

A variety of methods and sources for identifying potential partners, including the following, were used:

- Literature search by an information specialist
- Process experts' suggestions
- Trade associations or publications

☞ OUTCOME OF BENCHMARKING STEP 7:
A list of 25 potential partners was finalized.

3.8 Step 8: Collect Process Data from Potential Partners

Data Collection Methods

In benchmarking, the main tool for gathering initial process data from potential partners is a questionnaire, either verbal or written. Both types were used for this project.

Questionnaire Development Training

The benchmarking team learned questionnaire development techniques and how to define the questions to pose to potential partners.

Refer to Volume I, Appendix B, for an abbreviated training guide on questionnaire development techniques. Refer to Appendix A in this volume for the final telephone and written questionnaires used in this project.

Questionnaire Development Process

The group discussed what information would help them find the benchmarking partners. The group needed two questionnaires:

- a telephone questionnaire to act as a filter to determine industry partner interest and broad suitability, and
- a written questionnaire that would elicit detailed information to help determine the final candidates for site visits.

Results

Of the 25 initial contacts made by the W.O.W. Team by telephone, 12 of the companies

- had processes that were appropriate for comparison to the DOE's process as defined by the process experts, and
- were willing to participate.

Written questionnaires were sent to these companies. Of the 12 written questionnaires sent, 3 were returned. (This return rate of 25% is below the average return rate of 30-60% for prescreened written questionnaires.)

☞ OUTCOME OF BENCHMARKING STEP 8:
The team conducted 25 telephone questionnaires. Twelve written questionnaires were sent to potential partners. Three were returned.

3.9 Step 9: Analyze Potential Partners' Data and Choose Partners

Choosing Benchmarking Partners

The questionnaires were evaluated. The final partners both demonstrated:

- a commitment to waste minimization in several areas (not just paper).
- a major decrease in disposal volume after implementation of new processes.
- ideas or technology that provided new information.
- methods for preventing and handling assorted nonwhite paper waste.
- a willingness to allow the project results to be published.

Through the telephone questionnaires and written questionnaires, NIKE, Inc., and Microsoft, Inc., both reported:

- cooperation and encouragement from upper management,
- unique methods of handling paper and other waste stream recycling, and
- a comprehensive approach to corporate waste streams.

For the reasons listed above, the project leader chose NIKE and Microsoft as the two benchmarking partners.

☞ OUTCOME OF BENCHMARKING STEP 9:
The benchmarking partners for the office waste stream were:

- NIKE, Inc., in Beaverton, Oregon
- Microsoft, Inc., in Redmond, Washington

3.10 Step 10: Conduct Site Visits

Team Visits Partners

The interview team, a subset of the benchmarking team, received training on interview techniques, rules of conduct, and agenda development skills. The interview team visited Microsoft, Inc., and NIKE, Inc., to gather information on best management practices and techniques for reducing office waste.

- For an abbreviated training guide on on-site interviewing techniques, refer to Volume I, Appendix D.
- For the W.O.W. Team's final interview question set, refer to Appendix B of this document.

Findings

Both companies have proactive, employee-driven environmental issues programs. Both companies report strong employee involvement, management commitment, and readily available markets for recyclable materials such as white paper and nonwhite assorted paper. The availability of markets, the initiative and cooperation of employees, and management support are the main enablers for these programs.

Efforts to control office waste streams are highly complementary and it was difficult to focus on one stream to the exclusion of other streams. The team decided to gather all the information available and present it in the report.

Because of a flexible management and labor structure, both companies had designed recycling and waste reduction programs that were simple and straightforward as well as cost-effective.

At both companies, recycling and waste reduction programs cut across traditional corporate divisions such as procurement, janitorial services, environmental compliance, grounds maintenance, cafeteria operations, surplus sales, and shipping and receiving. These companies exhibited good cooperation between these functions in designing and implementing recycling and waste reduction programs.

3.10.1 Microsoft, Inc., Site Visit

Company Introduction

Microsoft, Inc., designs, develops, markets, and supports a wide range of personal computer operating systems, applications, development tools, languages, hardware peripherals, and books. Its world headquarters is located in Redmond, Washington, on a campus of 26 buildings on 265 acres. The work activities at this site focus on research and development and administration. Approximately 7,000 employees are located at the site, almost all of them office workers. The facilities continue to expand rapidly. Three new office buildings were completed in the past year.

Background

Waste minimization programs at Microsoft began as volunteer efforts by concerned employees to recycle aluminum cans and white paper. A full-time employee was hired in 1988 to manage the recycling program, which began as a "feel-good" program to meet employees' requests. In 1992, an environmental engineer was hired to integrate waste minimization in more areas of the corporation. The Safety, Environment, and Health (SEH) Department, which administers waste minimization programs, has become a revenue-producer, reaping $150,000 above program costs in FY94. Roughly 60 percent of Microsoft's corporate waste is diverted from the landfill as a result of recycling and reuse efforts, affecting 13 waste streams. At Microsoft, initiating a new project related to environmentally conscious issues is a business decision.

Safety, Environment, and Health Department

The SEH Department consists of 3 members. Only one person (the environmental engineer) works for SEH full-time; the other two have additional duties for other departments. The part-time manager handles environmental issues such as compliance with laws and regulations. The environmental engineer proactively seeks solutions to corporate environmental concerns, including landscaping and minimizing construction waste. An administrative assistant tracks recyclables, handles employee education, and answers employee inquiries. The SEH Department is responsible for:

- recycling and reuse
- solid waste reduction and disposal
- landscaping oversight
- land use
- conservation
- emergency response

The department is funded through Facilities, which is an overhead cost.

Management Support and Influence

Upper management demonstrates its support by funding SEH programs. The SEH Department reports no upper management resistance to its efforts; however, the department must provide cost-effective solutions and valid justification for programs. For each new program, the environmental engineer is empowered to develop the idea and perform a cost analysis. Approval is given by the department manager.

Continued on the next page

3.10.1 Microsoft, Inc., Site Visit, continued

Management Support and Influence, continued

The environmental engineer contracts with recycling companies and writes and oversees the budget. Employees have the power to make program decisions. Although a specific return-on-investment time frame is not required, the environmental engineer estimates that all programs have had a one- to five-year return on investment.

What Microsoft Recycles

Microsoft recycles the following **paper-related office waste**:

- **Paper.** A deskside recycling program encourages employees to place **white paper** and **mixed paper** (also called office pack) in a special box in their offices. (The box has a divider separating white paper and mixed paper.)

- **Corrugated cardboard.** A rapidly expanding work force creates a large waste stream of packing boxes for computer hardware and office equipment. Employees write "recycle" on boxes and place them in the hall for custodial staff to collect.

Microsoft recycles the following **food-related office waste**:

- **Aluminum.** Microsoft has a free beverage program for employees. Each area kitchenette refrigerator holds a variety of beverages. Vendors supply all beverages in aluminum cans. Each kitchenette has an aluminum recycling bin, but employees may have a deskside aluminum recycling box, if desired. The company handles 30 cubic yards of aluminum daily.

- **Polystyrene.** The kitchenettes and company cafeteria stock polystyrene plates, cups, utensils, bowls, and lids. No paper or other plastics are used. About 75% of the total waste generated is recycled.

Microsoft recycles the following **computer equipment**:

- **Computer hardware.** Broken circuit boards are recycled for precious metal reclamation.

- **Computer cables.** Damaged computer cables are recycled for copper.

- **CD-ROMs**. Employees place CD-ROMs in a receptacle in the Mail/Copy room. (A recycler can melt and reuse them in products that can utilize nonoptical grade lexan.)

Microsoft also recycles **organic debris** from landscaping. **Grass clippings, shrubbery cuttings, and landscaping refuse** are sent off-site to be ground and composted for topsoil enrichment.

Continued on the next page..

3.10.1 Microsoft, Inc., Site Visit, continued

What Microsoft Reuses

Microsoft reuses the following **computer equipment** related to the office waste stream:

- **Computer hardware.** Obsolete but functioning hardware is donated to schools or charities or sold in the company store.
- **Computer cables.** Undamaged computer cables are picked up and reused through the Help Desk.
- **Floppy disks.** Disks are degaussed and donated to schools.
- **Obsolete software.** WORN (written once, read never) disks are degaussed and resold. The packaging and manuals are recycled.

Microsoft reuses the following **miscellaneous equipment** related to the office waste stream:

- **Toner cartridges.** Employees label cartridges "recycle" and place them in the Mail/Copy room. A vendor remanufactures the cartridges for resale.
- **Videotapes.** Employees e-mail the appropriate department when they have obsolete videotapes. Tapes are erased and resold to other Microsoft departments for 29 cents each.

Paper Program Features

The company supplies:

- **Deskside recycling.** Employees do not have to leave their chairs to recycle. They place paper in the deskside recycle box instead of the trash can. The SEH believes the program is successful because it is easy for employees to participate.
- **Special recycle box.** A corrugated cardboard recycle box is equipped with a divider to separate **white paper** and **mixed paper**. The side of the box is printed with what material is acceptable and not acceptable.
- **Pickup every other night.** The custodial staff removes paper from each person's recycle box every other night. (Trash is picked up on alternate nights.)
- **Bins.** Bins are available in all Mail/Copy rooms for white paper and mixed paper.

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3.10.1 Microsoft, Inc., Site Visit, continued

Program Process

To implement the entire program, Microsoft relies on the following process:

- Employees place recyclables in:
  - deskside boxes (paper and aluminum)
  - the hallway (cardboard boxes),
  - bins in the Mail/Copy rooms (floppy disks, toner cartridges),
  - bins in the cafeteria and kitchenettes (polystyrene and aluminum).

  All bins are marked with object-oriented stickers that include words and pictures of acceptable items, like the icons on computer screens.

- Employees e-mail the correct department when they have odd or infrequent items such as videotapes or computer hardware.

- Employees take used floppy disks, CD-ROMS, and spent toner cartridges to bins in the Mail/Copy room.

- Mail/Copy room stockers pick up the floppy disks and toner cartridges during their normal stocking rounds.

- Custodians gather recyclables (paper, aluminum, and cardboard) from offices and hallways every other night.

- Custodians place the collected items in tow carts and transport them to the central recycling facility. Exception: Confidential white paper is locked in a building. The recycler picks up the container when it is full. Extremely confidential paper is shredded before placement in recycling containers.

- The central recycling facility has compactors and 40-cubic-yard containers on a paved area. The facility is adjacent to a major street to allow easy access for vendors' trucks. Workers operate the compactors during the day so the noise does not annoy nearby residents.

- When a 40-cubic-yard container is full, an employee notifies the appropriate vendor for pickup.

- A vendor truck drives to the facility, picks up the container, takes it and empties it, and returns the container to Microsoft.

E-mail Is Communications Backbone

Microsoft employees have had 100% e-mail access for 10 years. The company culture demands communications by e-mail. E-mail is a major source reduction method because:

- Memos are rarely in paper form.
- Many documents are circulated as attachments, not hard copies.
- Few employees print e-mail because it is more convenient to have it online.

Continued on the next page...

3.10.1 Microsoft, Inc., Site Visit, continued

E-mail Is Communications Backbone, continued

E-mail access lets employees contact the SEH group, make suggestions, ask for recycling services, and contact an employee group that focuses on conservation and other environmental issues. For example, when the deskside recycling program first began, the boxes' dimensions were incorrect, which made it difficult to recycle standard sized paper. Employees let the SEH Department know immediately.

Program Benefits

The environmental engineer reported the following program benefits:

- The company **saves money** by avoiding landfill costs and by reusing items.
- The company **generates revenue** from white paper, mixed paper, corrugated cardboard, aluminum, precious metals, and other waste streams.
- **Quality** at Microsoft is high because the company makes an effort to keep employee morale high. Microsoft employees want to work for a company that is aggressive in its waste minimization program.

Managing the Waste Stream

The company controls the waste stream outcome by exercising some control over the waste stream input. The SEH Department decided to create the desired waste stream by banning the undesirable elements.

In the past, Microsoft had another recycle bin for PET-1 plastics, tin, and glass. However, the company had to pay a recycler to remove these items. Also, one dirty yogurt container could contaminate the entire recycle bin. Microsoft decided to eliminate these streams altogether. The two major waste stream management efforts were:

- The existing free beverage program was a tool the company used to help eliminate the undesirable glass and plastics. As part of Microsoft policy, the corporation supplies all employees with unlimited free beverages, such as soda, tea, coffee, juice, etc. Because beverages are free, employees do not bring unacceptable packaging such as glass and plastic soda bottles from home. One popular beverage maker told Microsoft that it used glass bottles only. Microsoft told the company that if it wanted to do business with Microsoft, aluminum cans were required. The company now supplies its products in aluminum cans.

- Only polystyrene is used in the cafeteria and office kitchenettes for cups, plates, and utensils. The SEH Department worked with the cafeteria food vendor to effect this change.

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3.10.1 Microsoft, Inc., Site Visit, continued

Affirmative Procurement

Microsoft spends $3 million per year on products containing recycled materials, mainly mail and office supplies. The products cost the same as or less than virgin products that meet Microsoft's specifications. However, Microsoft would not spend more money to buy recycled products. The corporate procurement department negotiates aggressively with paper product suppliers, specifying the products and the price desired. Microsoft uses its leverage as a large customer to its advantage.

Staff

Custodians and food workers are contracted through vendors. Landscaping grounds workers are Microsoft employees.

Employee Education

Every employee receives:

- A "Microsoft Recycles" flyer that lists all the items that Microsoft recycles or reuses and instructs employees on how to tap into that resource. The flyer also offers conservation tips and information about Microsoft's environmental program.
- Recycle boxes for paper and aluminum. These boxes are "standard issue" for every office.
- Support from "admins." For each working group, Microsoft relies on "admins" that perform administrative work so that developers and engineers do not have to do it. The admins are the "hub" of each group, providing support and information so the developers stay focused. The admins provide a network for information distribution. The environmental engineer estimates that 90% of them are receptive to the SEH department and work with SEH.

Employee Participation and Effects on Worker Productivity

Participation in the program is not mandatory. However, peer pressure is strong from coworkers when employees do not comply with the program.

The SEH department estimates that employee participation is high. At the start of the deskside paper recycling program, some employees expressed dissatisfaction with deskside pickup because they had been using their recycle boxes as a temporary filing system. The environmental engineer estimates that they adjusted to the new program in about a month.

Worker productivity is not impacted negatively because employees take so little time to recycle. They do not have to leave their offices.

Measuring Success

Microsoft uses software produced by Data Access and Consulting, Inc., to record program data and provide reports. The reports include a recycling value report (in dollars), a recycling tonnage report, a cost avoidance report (dollars not spent on landfill), and waste stream reduction (tonnage diverted from the landfill). The software lets users specify the types of recyclables to be included. Users may also create their own subtotal structure, for example, by building, by facility, by city, or corporation-wide. The SEH Department uses the software to report to upper management.

3.10.1 Microsoft, Inc., Site Visit, continued

Costs

The program costs are limited to the salaries of the SEH Department. Recycling has not added to the cost of janitorial services because recycling and trash pickup are done on alternate nights. The costs of recycler pickup are offset by the revenue generated by the waste stream. The only stream that does not produce revenue is the polystyrene waste stream, because of the food contamination. Microsoft's geographic location ensures good markets for recyclables.

3.10.2 NIKE, Inc., Site Visit

Company Introduction

World headquarters for NIKE, Inc., is located in Beaverton, Oregon. NIKE's campus is located on 183 acres in a complex of 12 buildings with 2400 employees. NIKE is the world's leading producer of athletic footwear and apparel. No manufacturing is done at this site: all employees are involved in administrative roles or research, design, and development.

Background

Recycling and environmentally conscious efforts began with a white paper recycling effort in the Records Department in 1983. Rather than throwing away obsolete office records, the department began to recycle white paper. Since then, employees at NIKE have participated in a variety of environmentally centered programs, with volunteer employees taking leadership.

N.E.A.T.: NIKE Environmental Action Team

In 1992, after the company moved to its present location, corporate-sponsored environmental issues were centralized in the NIKE Environmental Action Team (N.E.A.T.). The department consists of four environmental specialists, one director, and one administrative person. Each specialist has an area of expertise; for example, one person handles compliance issues, such as laws, regulations, and Material Safety Data Sheets.

All special projects eventually move out of the N.E.A.T. group. An idea or program may be developed and implemented by N.E.A.T., but eventually, the idea is championed by another group. For example, N.E.A.T. initiated the Reuse-A-Shoe program, which lets consumers return worn-out NIKE shoes. The company recycles the used NIKE shoes into sports surfaces that may be used for play grounds, running tracks, street hockey and other sports. The oversight for this project moved from the N.E.A.T. department to Sports Marketing.

Corporate-wide Efforts

Each NIKE facility worldwide has a designated member of the Environmental Action Representatives (EARS) who reports monthly to the N.E.A.T. Department on environmental related actions and activities. The representative is responsible for setting up volunteer employee groups, dealing with recycling, and educating employees. EARS members also voice concerns and issues they would like to have addressed corporate-wide. N.E.A.T. employs a full-time environmentalist in Europe.

Local Employee Volunteers

NIKE has a strong grassroots volunteer employee group called the Eco-team that is concerned with environmental issues. Members include employees from purchasing, environmental services (custodial services), production, accounting, food service, sales, advertising, and other departments. The Eco-team helped stage NIKE's "Green Daze," a celebration during Earth Day 1995. They also performed a dumpster dive for each building to determine the actual trash components. Eco-team volunteers degaussed a backlog of videotapes for donation, as well as other projects.

A voluntary "spring cleaning day" encourages employees to recirculate unused office supplies and furniture and move obsolete records and papers into the recycling stream or off-site storage.

3.10.2 NIKE, Inc., Site Visit, continued

Local Employee Volunteers, continued

Employees participate voluntarily in a highway cleanup program and other scheduled environmentally related volunteer activities.

NIKE's Paper Program

NIKE makes an effort to use and carefully segregate high-grade papers to ensure recycling at the highest grade possible. NIKE recycles the following paper types:

- **Cardboard** - Corrugated cartons, brown packing material, shopping bags (no food waste), brown wrap paper, brown envelopes
- **Coated Stock** - Shiny, coated paper: advertising slicks, brochures, pamphlets, magazines, catalogs
- **Computer printout** - 11 x 14 7/8" white or green bar paper. **Note:** Ground wood green bar is banned from campus because of its limited recyclability.
- **White Ledger** - letterhead, copy machine paper, laser printout, 50% recycled content papers, top sheet of carbonless forms, adding machine tape
- **Colored Ledger** - pastel-colored copy paper, carbonless forms, colored index cards, manila file folders (no labels). This category includes white paper that has colored printing on it. **Note:** Goldenrod and fluorescent paper is banned from campus.
- **Newsprint** - Clean, with the normal shiny inserts
- **Mixed Waste** - When paper is downgraded from a higher level, it falls into the mixed waste category.

Paper sources that NIKE does not recycle:
Books; carbon paper; paper towels and tissues; Pendaflex folders; thermal fax paper; paper ream wrappers; tablet backs; bright/fluorescent papers; labels; photographic paper; X-rays; transparencies; butcher wrap; and plastic, lacquered, wax, or foil-covered paper

Handling Food-Related Office Waste

NIKE recycles the following **food-related office waste**:

- Aluminum cans. Each quarter, a different local charity is selected for the program. On a weekly basis, the charity picks up returnable cans and redeems them for cash. The charity may keep the money earned if it reports to NIKE the monies received.
- Glass, polystyrene (from cups in office area kitchenettes), and tin (steel cans). Environmental Services provides sorting of recyclables for pickup by the municipal waste collectors or the polystyrene hauler.

3.10.2 NIKE, Inc., Site Visit, continued

Handling Food-Related Office Waste, continued

The cafeteria and delicatessen use washable plates, utensils, and glasses. Employees receive a discount in the delicatessen and cafeteria when they bring their own mugs.

What NIKE Reuses

Nike reuses:

- **Pallets.** A local businessman picks up reusable pallets for resale and broken pallets for wood reclamation. The cost to NIKE is about $100 per year, the diverted landfill is estimated at 10 tons per year, and the avoided cost is approximately $1,250 per year.
- **Office Supplies.** Pendaflex folders, paper clips, file folders, three-ring binders.
- **Toner cartridges.** The toner cartridge effort stresses "remanufactured" toner cartridges to ensure a high-quality product. Employees resisted the idea of "reused" toner cartridges because they did not think the quality would be acceptable. However, the remanufactured cartridges have proven to be of high quality and cost less than new cartridges.
- **Video cassettes.** Old videotapes are degaussed and reused internally or donated to schools or nonprofit organizations.
- **Yard waste.** Landscape contracts require mulching or composting instead of landfill disposal.
- **Shipping packaging.** Procurement does not buy many boxes or packaging for shipping. The shipping room reuses the boxes and polystyrene packaging material sent to NIKE.

Employee Education

NIKE emphasizes employee education in the following ways:

- The **employee handbook** contains information on how to reduce, reuse, and recycle at NIKE. The handbook encourages employees to post or e-mail memos, use two-sided copying, and turn off computer equipment at the end of the day. The handbook informs employees of NIKE's effort to donate used furnishings, equipment, production overruns, or discontinued items to nonprofit organizations. Employees are encouraged to reuse paper that has printing on one side.
- NIKE has adopted the **slogan**, "Just Recycle It" to promote environmental efforts.
- When the new world headquarters opened in 1992, N.E.A.T. held **orientations** for all employees to stress the importance of environmental efforts.

Continued on the next page...

3.10.2 NIKE, Inc., Site Visit, continued

Employee Education, continued

NIKE emphasizes employee education, continued:

- N.E.A.T. has **published guidelines** that describe methods to reduce, reuse, and recycle office waste to help other divisions of NIKE implement an effective anti-office-waste program.

- NIKE stresses **continuing promotions** to renew employee involvement in the program. In honor of Earth Day, N.E.A.T. hosts Green Daze, an annual event to promote environmental awareness and programs for employees. During 1995's Green Daze, the results of a building-by-building dumpster dive were published.

- N.E.A.T. also hosts annually a "Thirst Thursday," an informal after-work social time for employees. A participating department promotes awareness and educates the group on the pertinent programs and issues.

- N.E.A.T. **informs employees** about the success of the environmental programs taking place locally and around the world.

Employee Incentives

The following employee incentives are in place to encourage employees to participate in the program:

- Employees receive "NIKE Bucks" for reducing car usage by participating in car pools, biking, walking, running, or skating to and from work.

  The Nike Bucks coupons may be applied at the food service building or at the company store for NIKE shoes, clothing, and other items. About 12% of employees participate on a regular basis.

- During Green Daze, NIKE sponsors a raffle and awards raffle tickets for participating in activities such as ride sharing, filling out an environmental crossword, turning off computers at night, submitting an environmental idea or innovation to N.E.A.T., going on a nature walk of the Beaverton campus, recycling a pair of NIKE shoes, and for participating in the Reuse-A-Shoe Street Hockey Tournament.

- NIKE gives new employees coffee mugs to discourage use of throwaway cups in the office. Employees receive a discount in the food service building for bringing their own mugs.

- N.E.A.T. publicizes the buildings that have the worst record for recycling, based on the results of the dumpster dives.

- Participation is voluntary. However, peer pressure is high at NIKE. "Personal harassment is very effective," reported one environmental specialist.

3.10.2 NIKE, Inc., Site Visit, continued

Management Support and Influence

Employees drive the program, but management has demonstrated its commitment to environmental issues. Management provided funding for the N.E.A.T. Department and employee education, and purchased recycling bins, compactors, and related equipment. However, management enforced aesthetic guidelines concerning the color and design of the recycling bins and for signs on the recycle bins.

Program Benefits

The benefits of NIKE's program are:

- **Good public relations.** NIKE has received an award from the City of Portland for its efforts in energy efficiency, water conservation, wetlands enhancement, waste reduction and recycling, and transportation (promoting less use of cars to and from work).
- **Community outreach.** Local charities benefit from the aluminum can recycling revenue and the reuse of office equipment and supplies.
- **Saving money.** Waste is diverted from the landfill, avoiding hauling costs.
- **Generating revenue** from white paper, corrugated cardboard, and other waste streams.

Measuring Success

NIKE uses software produced by Data Access and Consulting, Inc., to record program data and provide reports. The reports include a recycling value report (in dollars), a recycling tonnage report, a cost avoidance report (dollars not spent on landfill), and a waste stream reduction report (tonnage diverted from the landfill). The software lets users specify the types of recyclables. Users may also create their own subtotal structure, for example by building, by facility, by city, or corporate-wide; or by function of facility, for example retail, distribution, or office.

The environmental specialist estimates that 48% of the waste generated at the main campus is diverted from the landfill. The main campus recycling program diverted 409 tons in the last fiscal year. Recycling resulted in $51,800 in revenue above costs, including landfill costs avoided. A nearby NIKE footwear distribution center has a 91% recycling rate (mostly from cardboard), with a savings of $318,000 annually.

Biggest Concern: Paper

Excessive paper use is NIKE's biggest concern in office waste. The dumpster dive in March 1995 revealed that 30% of the trash was recyclable material, most of it paper. Other trash components included corrugated cardboard, aluminum cans, and bottles, which are all recyclable at NIKE. Reusable items such as 3-ring binders were also in the trash. N.E.A.T. saw these results as a call to provide a second wave of education. Also, N.E.A.T. felt that improving the recycle bin signage would help reduce these throwaways.

3.10.2 NIKE, Inc., Site Visit, continued

Managing the Waste Stream

NIKE uses the following strategies to affect the front end of the waste stream in order to manage the final waste stream:

- Paper cups are banned from campus because only 30% of the paper fiber can be reclaimed. (Recyclable polystyrene cups are supplied instead.)
- Goldenrod paper and ground wood computer green bar paper are banned.
- Most office supply costs are paid for from overhead. To encourage less use of colored paper, departments must pay for colored paper out of their own budgets.

How NIKE Reduces Paper Generation

NIKE reduces paper sources through the following techniques:

- Instead of a paper payables and receivables system, NIKE uses Electronic Data Interchange whenever possible. This electronic data transfer process has eliminated 115 printed pages daily in one application alone.
- External Phone Books - NIKE has reduced the number of phone books on campus by limiting the number delivered every year. The phone books are shared by a "neighborhood" of approximately eight offices or cubicles.
- On-line bulletin board for employee notices.
- Some computer programs do not have print capabilities in order to prevent paper generation.
- Some corporate forms are on-line, such as expense reports, personnel requisitions, internal job applications, network changes, and many Information System Department forms.
- Two-sided copies are encouraged and most copy machines have two-sided capabilities.

Paper Recycling Process

To implement the white paper and mixed paper program, NIKE relies on the following process:

- New hires receive a small desktop organizer with slots for white paper and nonwhite paper. (The organizer is supplied free by the paper recycler.) Employees carry the sorted paper to the recycle bins in the copy rooms (one or two per floor). Each neighborhood also has a white ledger recycling bin. (80% of all paper fiber in use at NIKE is white.)
- NIKE management is concerned about the aesthetics of recycling. The recycling paraphernalia must match the master design scheme, which is keyed to a black and eastern maple motif. All recycle bins are black or sandalwood with adhesive lettering. The tall, sleek bins were custom-designed and custom-made for NIKE world headquarters.

Continued on the next page...

3.10.2 NIKE, Inc., Site Visit, continued

Paper Recycling Process, continued

- NIKE Environmental Services (custodial) staff empty the recycle containers every evening if necessary. The custodians load paper, cardboard, and other recyclables onto custom enclosed carts made of recycled fiberglass. The carts are hooked together like railroad cars for transport to the loading dock for centralized recycling. At the dock, the items are sorted into containers for pickup by vendors. (A nonprofit organization picks up aluminum cans.)

- The paper recycler supplies giant cages for paper and comes twice a week for pickup.

Custom Recycling Equipment

In addition to the human resources that NIKE invests in environmental issues and efforts, NIKE invests dollars in custom recycling containers, supplies, and custom program equipment, such as the fiberglass recycling containers used to move waste to the loading docks for pickup. (Only cardboard is compacted.)

Affirmative Procurement

NIKE has an active affirmative procurement policy. Last year, it purchased 45 items containing recycled content, spending $300 million on recycled products. Pricing is not a major issue. For example, the recycled paper that procurement purchases costs 8% more than virgin, but NIKE is willing to spend the money. However, all paper costs increased 40% over the last year, and that decision may be revisited.

E-mail

E-mail is used extensively at NIKE for:

- internal phone directories
- job postings
- internal communications, such as memos

However, not all employees have e-mail access or share the same proficiency level. The environmental specialist estimates that 80-90 percent of employees have e-mail access.

Future Plans

Future plans for NIKE include:

- Working more closely with the forms department so that the forms created are easy to recycle.

- Contracting with one vendor to take all recyclable waste streams, including the less desirable ones, such as polystyrene. The decision to contract will be based on service offered, confidentiality in handling paper, and how the company uses the recycling markets.

- Providing an opportunity for NIKE employees to bring their hard-to-recycle items from home because volume is the key to successful programs.

3.11 Step 11: Communicate Results

Overview

This section presents the Best Management Practices (BMPs) learned from the site visits.

Normally, Step 11 of the benchmarking methodology includes implementing improvements and monitoring the results. In this case, implementation is not within the project scope. Section 3.10 provides the results of the site visits, and this section lists the best management practices used by the partners so that individual sites may create their own implementation plans. BMPs generated by the team are also included.

3.11.1 Best Management Practices at Microsoft, Inc.

Policy Best Management Practices

The following BMPs related to policy were described by Microsoft, Inc.:

- Make decisions at the right level. The environmental engineer develops ideas, performs a cost analysis, and receives approval from the next level of management. The environmental engineer contracts with recycling companies and writes and oversees the budget. Staff can make decisions.

- Plan for waste minimization. New buildings at Microsoft are being constructed with waste minimization considerations, both in the building process (minimizing construction debris) and in the building design for waste minimization programs (ease of recycling, etc.). Using duplicate building plans also reduces waste. Some buildings are duplicates of others, so the lessons learned from one design may be applied again.

- Limit the items coming into the waste stream to control the outgoing waste stream. For example, Microsoft has eliminated PET-1 plastic bottles, tin, and glass. Those items are not available in the company cafeteria or office area kitchenettes.

- Work with the cafeteria vendor (or staff) to institute polystyrene recycling.

- Work with procurement to write contracts that help waste minimization.

- Work closely with the local county solid waste department. Microsoft received a grant from the King County Solid Waste Department to perform a "dumpster dive" to analyze waste stream components. The working relationship between Microsoft and the county is excellent because Microsoft is willing to participate in county projects.

- Negotiate contracts for office supplies aggressively, using the company's stature as a volume buyer to lower prices and improve service.

- Create programs that make financial sense. As long as the environmental engineer creates programs that pay back the corporation, the environmental efforts will continue.

3.11.1 Best Management Practices at Microsoft, Inc., continued

Program Best Management Practices

The following BMPs related to the program were described by Microsoft, Inc.:

- Provide deskside pickup for recyclables so that employees' required effort is minimal. The deskside recycling effort at Microsoft has made it easy for employees to participate by placing recycling boxes in their offices.
- Label recycling containers with words and pictures so employees are not confused about which items are acceptable.
- Use e-mail to circulate memos and documents.
- Use computer networks to store electronic versions of software manuals.
- Have a central consolidation area with easy access so vendors can quickly access the containers.
- Use appropriate-size bins (40-cubic-yard containers with compactors) for consolidating recyclables.
- Let the people who handle the supply of the items administer their recycling as well. For example, Mail/Copy room stockers remove floppy disks and toner cartridges and handle their recycling. Dead computer boards are collected at the computer repair shop, and, when the bin fills up, one of the technicians takes them to a 40-cubic-yard container at the recycling center. Microsoft has found that it takes very little extra effort beyond what would be required if all material was handled as trash. The savings and revenue generated far exceed the extra costs incurred with pickup and handling.
- Call recycling vendors when bins are full instead of following a regular schedule for pickup to save on trucking costs and to conserve gasoline.

Enablers

The factors that enable Microsoft to have a successful program are:

- Recycling markets are easily available in the area.
- Employees want to have programs that make Microsoft an environmentally conscious corporation.
- The strong computer-oriented culture enables paper reduction by switching to electronic documents.
- Residents in this geographic area have a strong environmental orientation.

Continued on the next page...

3.11.1 Best Management Practices at Microsoft, Inc., continued

Barriers

Initially, the Microsoft environmental engineer could not identify any barriers, but when pressed, reported the following:

- Finding a vendor for polystyrene was difficult.
- A few employees were reluctant to change their behavior. Making the program easy to use reduces this barrier.

3.11.2 Best Management Practices at NIKE, Inc.

Policy Best Management Practices

The following BMPs related to policy were described at NIKE, Inc.:

- Employee training is the best investment to make in an environmental program. The extensive employee training and N.E.A.T. outreach have involved employees.
- Management must commit resources, including personnel and dollars.
- Management needs to take a stand on unpopular issues to divert the "heat" associated with unpopular decisions from a department, such as procurement. Management has taken a stand on hard issues such as the use of colored paper. Fluorescent and goldenrod papers have been banned from campus, thanks to management.
- Management must be willing to listen and study proposals.
- The environmental department should work with other large companies in the area to find markets and learn new ideas.

Program Best Management Practices

The following best management practices related to the program were described by NIKE, Inc.:

- More rules work better. Give people specific information on what kind of paper is acceptable and what kind is not.
- Stage events such as Earth Day celebrations, highway cleanups, and other "green" events to increase employee awareness and recharge the program by involving people.
- Find champions in other departments to run environmentally conscious programs after they have been initiated and stabilized. Do not keep programs concentrated in an "environmental" department. Help other departments become involved and make this way of doing business a part of all departments.
- Have a program to contact businesses to remove names from their mailing lists of employees who no longer work for the company or do not want the publication.
- Have an electronic bulletin board for job postings, cafeteria menus, calendars, phone lists, car pool match lists, employee classifieds, events, discounts, volunteer opportunities, etc.
- Have a central consolidation point with compactors and large containers for better vendor access.

Continued on the next page...

3.11.2 Best Management Practices at NIKE, Inc., continued

Program Best Management Practices, continued

- Improve communications with the purchasing and forms departments to ensure that what they create fits in with the recycling effort.
- When special projects generate a large waste stream, keep the recycling efforts going. Too often, corporations suspend recycling when a special project is under way. NIKE tries to take advantage of special projects. When NIKE performed a major equipment upgrade, there was a huge influx of cardboard boxes. They placed a temporary drop box for all excess packaging in the office area where the equipment was unpacked and installed.
- Use a project approach to narrow the focus and make statistics and results more accessible.

Enablers

The factors that enable NIKE to have a successful program are:

- Recycling markets are easily available in the area.
- Proactive sorting keeps the paper relatively contaminant free. High grade sorting increases vendor acceptance of the paper, thereby increasing revenue.
- Employees want to have aggressive reduce/reuse/recycle programs. Their requests are supported by management.
- Employee resistance is very low because of the "Just Do It" corporate culture, and the employee training.

Barriers

NIKE identified very few barriers:

- A small percentage of employees do not care about these types of programs and do not participate.
- Small volume waste streams are difficult to recycle.
- Recycling low grades of paper is difficult.

3.11.3 Ideas Generated for Best Management Practices at DOE Sites

Suggested Best Management Practices

During the course of the benchmarking workshops, the team also collected ideas for BMPs that could be applied to DOE facilities. The ideas gathered included:

- Stress methods for paper source reduction instead of recycling paper. Not generating the paper in the first place is preferable to recycling. These methods include:
  - Train employees on the best ways to use e-mail for circulating documents, notifications, and memos.
  - Enforce policies that promote two-sided copying.
  - Switch to video training or computer-interactive training that relies less on hard copy manuals.
  - Switch from paper telephone directories to on-line computer telephone directories.
  - Use electronic forms instead of hard copy forms.
  - Use routing lists for hard copy documents instead of making multiple copies.
  - Share training materials.
  - Restrict distribution lists.
  - Reuse paper in laser printers.
- To reduce incoming paper:
  - Order one library copy of professional magazines and journals instead of individual copies for staff members.
  - Cut down on junk mail by removing your company's name from mailing lists.
  - Order a limited number of in-house and commercial telephone books instead of one for each employee.
- To enhance current recycling/reuse programs:
  - Place garbage cans near recycle bins so people don't use recycle bins for garbage.
  - Take lids off trash containers and make sure recycle bins have lids so that people must make an effort to recycle. This helps eliminate contamination in the recycle bins by discouraging people from carelessly tossing trash into a recycle bin.
  - Ban styrofoam cups from the facility.
  - Reuse scrap paper in notepads.
  - Adopt a policy that promotes excess as the first source of supply. Ask employees to check for excess supplies before they write a purchase order for new products.

Continued on the next page...

3.11.3 Ideas Generated for Best Management Practices at DOE Sites

Suggested Best Management Practices, continued

Ideas collected for best management practices for use at DOE facilities, continued:

- To increase community awareness and take advantage of existing resources:
  - Join efforts with the local community. One DOE site is part of the local city recycling coalition.
  - Let a nonprofit community organization earn money for recycling aluminum cans. The program promotes community goodwill and provides a no-cost vendor.

☞ OUTCOME OF BENCHMARKING STEP 11:
Program and policy BMPs were collected from the benchmarking partners, as were the enablers and barriers encountered by the partners.

3.12 Step 12: Continue to Conduct Benchmarking of Process

Ongoing Process

Normally, benchmarking is an ongoing process. The best waste minimization technology today may be outmoded and outclassed by new developments. This step is not currently being pursued by the team at large because of cost and schedule constraints, but would be necessary for actual process improvements.

4.0 Conclusions and Recommendations

Results and Recommendations

Because results and recommendations are an integral part of the benchmarking effort, they are included in the main body of the report.

> See Sections 3.10 and 3.11 for the results of the benchmarking project for office waste and recommendations for best management practices.

Learning Process

The benchmarking process is also a learning process. As the project progresses, the most important quality for a team to have is the ability to be flexible, to shift gears, and to handle the unexpected. This section is written for benchmarking project leaders or team members to help them anticipate and hopefully avoid pitfalls in future benchmarking efforts.

4.1 Lessons Learned

Modifying the Methodology

A full benchmark is a long and rigorous process; the team had to modify the benchmarking process to accommodate the needs of the customer, DOE management. Several steps of the benchmark process can be successfully modified, but none can be eliminated. Implementation, which is a major part of traditional benchmarking, could not be accomplished with this project because the team used a consensus process rather than a specific process. The process information was gathered from a variety of sites, so there was no way to write an implementation plan that would apply to more than one site.

Benchmarking Lessons Learned

The project leader and team members reported the following lessons learned:

- In office waste, the entire program is interrelated. Nonwhite paper does not exist alone, but as a subcategory of an entire paper effort that is dependent on employee participation, management cooperation, and the availability of recycling markets.

- By contrasting DOE facilities with industry, team members got a clear indication of the barriers DOE facilities face. "We accept the barriers as fact, as part of the landscape, but these are actually artificial barriers and we should get over them, not try to live with them," said one team member.

Continued on the next page...

4.2 Value and Benefit

Greatest Benefit

The process experts felt that the greatest benefit of the benchmarking process was the opportunity to network with their peers and share process and operations information. Members of the interview team felt that the ability to go on-site provided information not available from telephone or written questionnaires. Some best practices and techniques learned in site visits were not part of the main interview, and provided helpful information about other waste streams and solutions.

Value of Workshop

The participants identified how the workshop helped them to:

- learn new ideas through hearing about other sites' processes, and
- gain a networking opportunity for sharing ideas.

The new efforts that resulted from this project:

- One participant is planning to start a disk recycling program, based on information gathered during the site visits.
- All participants hope to use e-mail more effectively to transfer documents instead of sending hard copies.
- Another participant is planning to add waste minimization information to new employee orientations.

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Appendix A
Telephone and Written Questionnaires

PREFACE: The following pages are copies of the

- telephone questionnaire used by the process experts to conduct the telephone interviews to narrow the field of potential partners. The first page of the telephone questionnaire contains information for the process expert about the purpose of the questionnaire. The second page provides a suggested "script" for the process expert to use to introduce him/herself. The telephone questionnaire follows, with a section for a table of contacts.

- written questionnaire sent to the potential partners selected through the telephone interviews. A cover letter tailored to each company accompanied the written questionnaire.

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Telephone Survey for the WOW Team

Overview For the Process Expert Making the Calls

➢ The Objectives are to:

- identify potential partners and
- eliminate inappropriate or inapplicable companies by determining if they meet the criteria

➢ The Big Question:

How well does the company meet the criteria?
Are they reducing, reusing, and recycling their office paper effectively?

➢ Main Points--

We need to explain who we are and what we are trying to do without scaring potential partners.

The company must have an operational waste minimization program for assorted non-white paper.

Definitions:

white

White paper is paper without pigment or ground wood. Examples include unbound bond paper, copier paper, computer paper, green bar and lined paper, and white non-windowed envelopes.

Paper containing **ground wood** is paper like newsprint, with a very low fiber content.

Assorted non-white paper

Colored (pastel, dark, goldenrod, fluorescent), newspaper, paper containing ground wood, paper cups, paper towels, tissues, "stickies", magazines, phone books, paper bags, shipping packaging materials, lined and unlined tablet paper, catalogs, journals, brochures, glossy paper, waxed paper, paper with gummed labels, fax paper, brown envelopes, dividers, card stock, blueprint paper, paper boards like tablet backing and pencil boxes, plastic-coated, photographs, construction paper, paper bound with non-water-soluble glue, carbonless forms, and carbon paper.

Corrugated Cardboard is not part of this survey. It is considered a separate waste stream.

Identification Statement --State who we are and what we are trying to do.

Please feel free to prepare your own script. This script suggests the topics you may want to discuss.

Script

Who and what

I am _____ with (_____ your facility). I belong to a group that is trying to find the **best ways to minimize assorted non-white paper waste**. This group is a team of people from Department of Energy facilities across the country (New Mexico, New York, Tennessee, Washington, and California.) I am a _____ (job title). All of the team members work in the waste minimization field.

Sponsor

Victoria Levin is the project leader. She works for the Environmentally Conscious Life Cycle Systems Department at Sandia National Laboratories, a DOE research facility in Albuquerque, New Mexico.

Bench-marking Method

We are using a method called benchmarking to help us learn from industry partners. We are contacting companies in U.S. industry that we hope to learn from in the area of assorted non-white paper waste. We are trying to gather new ideas about waste minimization that we can incorporate into our practices.

Explain Phone Q

We are using this telephone questionnaire to help us find companies that are doing an excellent job of minimizing assorted non-white paper waste. The telephone questions are designed to help us find companies that have facilities similar to the ones we work in so the information will be valid for our organization.

Optional: scope

This team is part of a larger project that is looking at a variety of waste streams and better waste minimization techniques. For example, other teams have worked on sulfuric acid waste and motor oil waste.

Instructions

Find out if you are speaking to the right person. Use the table on the next page to record all the people you had to talk to and write down the "final" or "right" person.

Commit-ment

I am calling to find out if your company would be interested in participating in a telephone survey. It should take about 10 minutes. The survey involves answering a few questions today with the possibility of being sent a written, more detailed questionnaire in the future. We hope to eventually partner with companies that deal effectively with assorted non-white paper waste.

Instructions

Answer any questions about who we are and what we are doing. Refer them to Victoria Levin (505) 844-8956, fax (505) 844-1723 if there are any questions you can't answer.

Telephone Questionnaire Contact Page

Team member name: _____

Name of the Company I am calling: _____

Location of the Company: _____

Date	Person Contacted	Title	Phone Number

Person that is the final contact:

Name: _____

Phone Number: _____ **Title:** _____

FAX: _____

Definitions are on Page 1

1. Does your facility generate office paper waste?
   - ❑ No. (If no, thank them for their time and terminate the call.)
   - ❑ Yes. (If yes, go on.)

2. Do you have a waste minimization program?
   - ❑ No. (If no, thank them for their time and terminate the call.)
   - ❑ Yes. (If yes, answer the following related questions:)

   2.a Does the program include paper?
   - ❑ No. (If no, thank them for their time and terminate the call.)
   - ❑ Yes. (If yes, continue with 2.b)

   2.b Is the waste minimization policy written down?
   - ❑ No.
   - ❑ Yes.

3. Do you track your paper purchases?
   - ❑ No.
   - ❑ Yes.

4. How much paper do you recycle every year?
   _____ tons/year in white paper
   _____ tons/year in other types of paper (not cardboard)

5. How much paper do you send to the landfill?
   _____ tons/year

6. How many employees do you have at your location? (Employees include contractors.)
   _____

   6.a How many of these are office employees?
   _____

Definitions are on Page 1

Continued on the next page.....

7. Describe what your company is doing with your paper. (**Note to Callers**: The categories are at the top of the table and we want to break it down by paper type.)

	Source reduction	Reuse	Recycling	Landfill	Other
White					
Assorted non-white					
Other					

NOTE to Callers: Explain a little more about benchmarking and what it entails.

Explain what it would mean to participate.

We have just finished the main part of the questionnaire.

Let me explain a little bit more about benchmarking. It provides a way to achieve quality in an organization. First, the benchmarking team looks at its own process and tries to improve it as much as the team can. In the second part of the benchmarking process, the team looks outside of the organization to find another company that is doing a better job than they are. The team tries to find a company that is willing to help them learn better practices and techniques, which in this case is minimizing assorted non-white paper waste.

Our team has already performed an examination of our internal process. We have reached the stage where we are seeking companies that we can learn from. This telephone survey is the first step. Next, we will analyze the results of this questionnaire and we will send a written questionnaire to the companies that want to participate.

The written questionnaire goes into more detail about waste minimization and the assorted non-white paper process.

The written questionnaire results will be analyzed. The team will then ask a few companies if they are willing to have visitors to their facilities for a short visit to see the process first hand.

Answer questions they may have

Do you have any questions for me about benchmarking?

Now, let me ask you the final question:

8. Would your company be willing to participate in a written survey?
   - ❑ No.
   - ❑ Yes.

Closing remarks

Thank you for your time. We really appreciate your cooperation.

Ask for the detailed mailing address for the written questionnaire.

Name & Position: _____

Company: _____

Address _____

City, State, ZIP: _____

Questionnaire for Sandia National Laboratories
Assorted Non-White Paper Waste Minimization Benchmarking Project

Instructions

Please fill out the following questionnaire and **return by fax** by March 29, 1995 to:

Victoria Levin, c/o Diane Leek FAX: (505) 260-1163
For more information, call Victoria Levin at (505) 844-8956.

Mailing address:
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MS 0730
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Albuquerque, NM 87185-0730

NOTE:
If your company has more than one geographical area (for example, an office in Seattle and an office in Atlanta), you may answer the questions for one site. Choose the site that is the best model for your paper waste minimization program.

Questionnaire Design

This questionnaire was designed to be easy to complete. Most of the questions may be answered by checking boxes. Some of the questions request statistical information, such as volume of paper purchased and disposed of. Our focus is on assorted non-white paper, but we are also collecting related information on white paper and other office waste streams.

We Welcome Your Comments
If you need more room to add comments, please use the space provided on the last page, or attach additional pages.

This questionnaire is from:

Your Name Here:_____

Company Name: _____

Address: _____

City, State, ZIP Code: _____

Phone:_____ FAX:_____

Definitions

For the purposes of this questionnaire, we are using the following definitions:

White paper

White paper is paper without pigment or ground wood. Examples include unbound bond paper, copier paper, computer paper, green bar and lined paper, and white non-windowed envelopes

Paper containing **ground wood** is paper like newsprint, with a very low fiber content.

Corrugated Cardboard is NOT part of this survey. It is considered a separate waste stream.

Assorted non-white paper

Colored (pastel, dark, goldenrod, fluorescent), newspaper, paper containing ground wood (such as newsprint), paper cups, paper towels, tissues, "stickies" such as Post-its™, magazines, phone books, paper bags, shipping packaging materials, lined and unlined tablet paper, catalogs, journals, brochures, glossy paper, waxed paper, paper with gummed labels, fax paper, brown envelopes, dividers, card stock, blueprint paper, paper boards like tablet backing and pencil boxes, plastic-coated, photographs, construction paper, paper bound with non-water-soluble glue, carbonless forms, and carbon paper.

1.0 Policy

1.1 Is your company policy regarding office waste minimization/pollution prevention written down?

- ❑ Yes. If yes, please attach a copy when you return this questionnaire.
- ❑ No

1.2 What does your office waste minimization program encompass?

- ❑ White paper
- ❑ Assorted non-white paper
- ❑ Other. Please list:

_____

_____

_____

_____

1.3 Please rank the importance of the following waste minimization options in your company policy. Rate "1" as the most important, "4" as the least important.

____ Recycling
____ Source Reduction
____ Reuse
____ Other. Please explain:

_____
_____
_____
_____

1.4 How does management support the paper waste minimization effort?

❑ Provides funding for labor
❑ Provides funding for supplies (such as bins)
❑ Provides employee education
❑ Other, such as:

_____
_____
_____

1.5 Was the program started by employees or was it initiated by management?

❑ Employee-initiated
❑ Management-initiated

1.6 Please estimate the level of employee participation in the paper waste minimization effort:

❑ 25%
❑ 50%
❑ 75%
❑ Almost 100%
Comments: _____
_____

1.7 How long has your paper waste minimization program been in effect?

_____

2.0 Source Reduction

2.1 Is source reduction part of your waste minimization program?

❑ Yes. Go to 2.2 to identify the Source Reduction Methods used by your company.
❑ No. Go to question 3.0

2.2 Method: Reduce Incoming Paper

Check all boxes that apply:

- ❑ Order one library copy of magazines and journals instead of individual copies for staff members
- ❑ Send subscriptions to magazines or journals to employee's home address rather than business address
- ❑ Restrict junk mail by removing your company's name from mailing lists
- ❑ Order a limited number of commercial telephone books instead of one for each employee
- ❑ Other. Please list:

_____

_____

_____

_____

2.3 Method: Take Advantage of Computer Networks

Check all boxes that apply:

- ❑ Use electronic versions of forms instead of hardcopy forms
- ❑ Give employees electronic access to disk copies of files rather than distributing hard copies
- ❑ Use electronic mail (e-mail) to communicate and send copies of documents
  How many employees have e-mail capabilities? _____
  Please estimate the percentage of these employees that actually use their e-mail capabilities: _____
- ❑ Other ways to take advantage of computer networks that minimize office paper waste. Please list:

_____

_____

_____

_____

2.4 Method: Electronic Forms

Skip to question 2.5 if you do not use electronic forms.

2.4.1 What kinds of documents or forms do you have in electronic versions instead of paper versions? (Check all that apply.)

- ❑ Employee records
- ❑ Employee evaluations
- ❑ Manuals
- ❑ Material Safety Data Sheets
- ❑ Procedures
- ❑ Job postings
- ❑ Regulations

Continued on the next page

2.4 **Method: Electronic Forms, continued**

- ❑ Newsletters
- ❑ Time cards
- ❑ Employee Phone Directories
- ❑ Other. Please list:

_____
_____
_____
_____

2.5. **Method: Internal White Paper Controls**

Check all boxes that apply:

- ❑ Use double-sided copy option on reports, manuals, and other documents
- ❑ Share training materials instead of issuing individual manuals
- ❑ Use bulletin board for announcements instead of individual distribution
- ❑ Route memos with distribution lists
- ❑ Restrict distribution lists
- ❑ Use Reprint Orders-Circulate one copy of a document with an attached reprint order. Employees may request a copy, but do not receive copies automatically.
- ❑ Other. Please list:

_____
_____
_____
_____

2.6 **Method: Internal Assorted Non-White Paper Controls**

Check all boxes that apply:

- ❑ Use of non-disposable containers, such as washable coffee cups in conference rooms
- ❑ Use of reusable eating and drinking utensils in cafeteria
- ❑ Use of voice mail instead of message slips
- ❑ Other. Please list:

_____
_____
_____
_____

3.0 Recycling

3.1 Is recycling part of your office paper waste minimization/pollution prevention program?

- ❑ Yes. Go to 3.2
- ❑ No. Go to question 4.0

3.2 What do you recycle? Please check all that apply and supply volume data.

	Waste Stream	**Volume/annual**
❑	White paper	_____ tons/year
❑	Assorted non-white paper	_____ tons/year

Remember: **Definitions** are on Page 2.

3.3 **Optional: Other Office Waste Streams**

Although we are concentrating on assorted non-white paper, we are also interested in recycling efforts for other office waste streams. Please check all that apply and supply volume data.

❑	Laser printer cartridges	_____ #/year
❑	Aluminum cans	_____ lb./year
❑	Cardboard	_____ lb./year
❑	Other. Please list:	
	_____	_____ /year
	_____	_____ /year
	_____	_____ /year
	_____	_____ /year

4.0 Reuse

4.1 Are reuse strategies part of your waste minimization program?

❑ Yes. Go to 4.2
❑ No. Go to question 5.0.

4.2 What methods do you use to reuse office paper? Please check all that apply.

❑ Make message slips/notepads out of scrap paper
❑ Use both sides of paper in laser printers
❑ Other. Please list:

_____
_____
_____
_____

5.0 Tracking

5.1 Did you establish a baseline of paper purchases, paper usage, and paper waste before implementation of your paper waste minimization plan?

- ❑ Yes.
- ❑ No.

5.2 Paper Purchases

5.2.a Instructions:

- Please supply information about the **volume of paper purchased** by your company before and after implementation of your paper waste minimization/pollution prevention program.
- If you do not have complete "before implementation" figures, please supply the figures that you do have available.
- If you do not have the information in terms of pounds, please cross out the "lb.." and supply your own unit of measure.

Category	Annual Volume Purchased Before Implementation	Annual Volume Purchased After Implementation (Current Figures)
White Paper	lb.	lb.
Colored Paper	lb.	lb.
Other Paper	lb.	lb.

5.3 Paper Usage

5.3.a Instructions:

- Please supply information about the **volume of copies** made by your company before and after implementation of your paper waste minimization/pollution prevention program.
- If you do not have complete "before implementation" figures, please supply the figures that you do have available.
- The unit of measure is simply the number of copies. If you use another unit of measure, please write it in the column.

Category	Annual Volume of Copies Made Before Implementation	Annual Volume of Copies Made After Implementation (Current Figures)
White Paper		
Colored Paper		
Other Paper		

5.3.b How many copiers do you have on site? _____

5.3.c Does your company use off-site contractors to perform major copying jobs?

- ❑ Yes.
- ❑ No.

5.4 Paper Waste

5.4.a Before Implementation

Please supply information about the **volume of your facility's waste before** implementing your waste minimization/pollution prevention program. Please supply whatever information is available. (Please supply unit of measure if different from lb.)

Category	Volume sent to a landfill	Volume that was recycled
All Office Waste	lb.	lb.
All Paper Waste	lb.	lb.
White Paper	lb.	lb.
Assorted Non-white Paper	lb.	lb.

5.4.b After Implementation

Please supply information about the **volume of your facility's waste after** implementing your waste minimization/pollution prevention program. Please supply whatever information is available. (Please supply unit of measure if different from lb.)

Category	Volume sent to a landfill	Volume that is recycled
All Office Waste	lb.	lb.
All Paper Waste	lb.	lb.
White Paper	lb.	lb.
Assorted Non-white Paper	lb.	lb.

6.0 Organizational

6.1 How many office employees (including contractors on-site) do you have?

- ❑ 0 - 100
- ❑ 101 - 500
- ❑ 501 - 1000
- ❑ 1001 - 2000
- ❑ over 2000

6.2 Does your office waste minimization program apply to:

- ❑ One building
- ❑ Multiple buildings in one complex or facility in one self-contained geographical location. If you checked this box, please provide the number of buildings in the complex or facility:
  - ❑ 2 - 5
  - ❑ 6 - 10
  - ❑ 11 - 20
  - ❑ over 20
- ❑ More than one building or complex separated geographically within one city
- ❑ Locations in more than one city
- ❑ Locations in more than one state
- ❑ Other. Please describe:

_____

_____

_____

_____

7.0 Miscellaneous

7.1 Interest in Continuing Participation:

7.1.1 Are you willing to let some of our team members visit your site to learn more about your program? ❑ Yes ❑ No

7.1.2 Would you be interested in visiting one of our sites? ❑ Yes ❑ No

7.1.3 May we publish the data we gather from your company?

- ❑ No, not at all.
- ❑ Yes, with the understanding that the information will be circulated through a Sandia National Laboratories report. (This report is available to the public through the Freedom of Information Act.) **This report will be available for your review prior to publication. The sections pertaining to your company will be subject to your approval.**

8.0 Additional Comments You May Have:

Appendix B
Interview Question Set

Preface: The following list of questions was used by the interview team during site visits.

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Interview Questions for Office Waste Site Visit

Team Member: _____

Interviewee(s): _____

1.0 POLICY/MANAGEMENT ISSUES

1.0 Policy/Mgmt. Issues	
1.1 What are the drivers for you waste minimization policy? (Cost savings only or reduction of waste streams?)	
1.2 Do you have a specific department dedicated to WMin? How many employees? How is it funded?	
1.3 What kind of upper level management support do you have? How does management demonstrate support?	
1.4 Do employees have input into WMin/recycling programs?	
1.5 What kind of employee education do you conduct for WMin?	
1.6 What kind of WMin awards/incentives do you have for employees?	
1.7 Is your program mandatory? What are the penalties for employees if they don't participate?	
1.8 Is your program company-wide?	

1.9 What is the management structure of your company?	
1.10 How has worker productivity and product quality been affected by your WMin efforts?	

2.0 SITE DETAILS

2.0 Site Details	
2.1 How many fax machines do you have on site?	
2.2 How do you control paper production?	
2.3 What are you controls for copier usage?	
2.4 Do employees have company-wide access to e-mail?	
2.5 Do you promote telecommuting instead of on-site jobs? If yes, does this contribute to your waste minimization efforts?	
2.6 Other	

3.0 WASTE

3.0 Waste	
3.1 What is your biggest concern in office waste?	
3.2 How do you dispose of your office waste? Where does it go?	
3.3 Who is responsible for waste disposal?	

3.4 Have you baselined your waste quantities?	
3.5 What obstacles did you have to overcome to do the baseline?	
3.6 Other	

4.0 MAIL

4.0 Mail	
4.1 How much mail do you receive on site?	
4.2 How much mail do you send off site?	
4.3 What have you done to reduce the volume of mail sent and received?	
4.4 Other	

5.0 REDUCTION, REUSE, RECYCLE

5.0 Reduction, reuse, recycle	
5.1 What source reduction methods do you use for office paper waste?	
5.2 Describe your recycling program, e.g. • mandatory vs. voluntary • what is recycled • effectiveness • based on ROI • etc.	
5.3 What materials have you been able to reuse?	
5.4 Future plans for waste minimization?	

5.5 What would you do if there were no money restrictions--what would be an ideal setup for your site?	
5.6 When is the work (recycling, source reduction, etc.) performed? Day or night? In-house, or contracted out?	
5.7 Describe the availability of nearby recyclers.	
5.8 What are the benefits of your office waste reduction program?	
5.9 Other	

6.0 BEST PRACTICES

6.0 Best Practices	
6.1 What do you consider the **three** most important Best Management Practices that have contributed to the success of your office waste minimization efforts?	
6.2 What is the most effective waste **recycling** program for office waste that you have implemented?	
6.3 What is the most effective waste **reduction** program for office waste that you have implemented?	
6.4 What is the most effective waste **reuse** program for office waste that you have implemented?	

6.5 How do you measure success? What metrics do you used to measure the program?	
6.6 How did you get you successful WMin ideas? Research from other companies, employee input, management ideas?	

7.0 ENABLERS

7.0 Enablers	
7.1 What allows you to put your best practices in place? (e.g. culture, training,technology, management support, etc.)	
7.2 Other	

8.0 BARRIERS

8.0 Barriers	
8.1 What barriers have you encountered in your waste minimization efforts? (e.g. culture, regulations, employee resistance, lack of support, etc.)	
8.2 What was your experience with employee resistance? If any, how did you overcome resistance?	

9.0 COST INFORMATION

9.0 Cost Details	
9.1 Landfill and disposal costs?	
9.2 Recycling program costs?	
9.3 Any return on investment?	
9.4 do you have documentation on how much money was saved?	
9.5 Do you charge back paper to different departments?	
9.6 Do you do Affirmative procurement (e.g. buying recycled materials)?	
9.7 How do you show a cost savings or payback for the implementation of a pollution prevention opportunity?	
9.8 Other	

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