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Many cities, counties, and states have source reduction and recycling goals for their areas. The President has mandated that the Department of Defense and other Federal agencies promote cost-effective waste reduction and recycling of reusable materials. The Commandant of the Marine Corps has set a goal of a 50% reduction by weight in the amount of solid waste disposed of over the FY90 to FY95 period. The policy of Marine Corps Base Camp Pendleton is that all tenant organizations actively engage in materials recycling. Naval Hospital Camp Pendleton generates a huge amount of waste but has no active program to recycle non-infectious resuable material. As a result the hospital is not in compliance with current Navy, Marine Corps, and DoD directives; is spending too much on trash disposal; is contributing to the depletion of the base landfill; and is not taking advantage of the additional MWR funds that could be made available through the sale of recycable material. The methods and procedures used in developing the recycling program followed the techniques of team management and strategic planning in a five step process.

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PLANNING AND IMPLEMENTING A HOSPITAL RECYCLING PROGRAM AT NAVAL HOSPITAL, CAMP PENDLETON, CALIFORNIA

A Graduate Management Project

Submitted to the Faculty of

Baylor University

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Health Administration

by

LT Jack A. Frost, MSC, USN

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Running Head: HOSPITAL RECYCLING

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ABSTRACT

The purpose of this project was to develop a comprehensive plan and begin the implementation of a recycling program at Naval Hospital Camp Pendleton.

Many cities, counties, and states, have source reduction and recycling goals for their areas. The President has mandated that the Department of Defense and other Federal agencies promote cost-effective waste reduction and recycling of reusable materials. The Commandant of the Marine Corps has set a goal of a 50% reduction by weight in the amount of solid waste disposed of over the FY 90 to FY 95 period. The policy of Marine Corps Base Camp Pendleton is that all tenant organizations actively engage in materials recycling.

Naval Hospital Camp Pendleton generates a huge amount of waste but has no active program to recycle non-infectious reusable material. As a result the hospital is not in compliance with current Navy, Marine Corps, and DOD directives; is spending too much on trash disposal; is contributing to the depletion of the base landfill; and is not taking advantage of the additional MWR funds that could be made available through the sale of recyclable material.

The methods and procedures used in developing the recycling program followed the techniques of team

management and strategic planning in a five step process:

Step 1: Assess Command Climate and Build a Team

Determine Need/Level of Support

Obtain Command Approval and Support

Designate a Recycling Coordinator

Recruit a Committee and Conduct Meetings

Step 2: Analysis and Design

Conduct Hospital-Wide Waste Audit

Identify Potentially Recyclable Materials

Estimate Generation Rates

Conduct a Market Analysis

Conduct an Economic Analysis

Developed an Implementation Plan

Establish a Collection System

Step 3: Implementation

Publicize the Program

Implement the Program

Step 4: Monitor and Evaluate Results

Step 5: Expand the Program

The immediate and expected result was achieved. The hospital implemented a recycling program and is now in compliance with current directives. The long-term benefits are expected to be lower waste disposal costs, energy conservation and environmental protection. Revenue was not found to be a significant benefit.

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I. INTRODUCTION

The slogan "REDUCE, REUSE, RECYCLE" has become the battle cry for waste management for the 1990's. Throughout the country, landfill space is disappearing and opposition to waste-to-energy incineration facilities is increasing due to environmental concerns. This leaves reduction and recycling as the only practical waste management alternatives for the rest of this century. The Environmental Protection Agency, along with many cities, counties, and states, has established source reduction and recycling goals of 25% by 1995 and 50% by the year 2000. Whether it is voluntary or mandatory, recycling is quickly becoming a part of our lives both at home and at work.

Conditions Which Prompted the Project

On October 31, 1991, President George Bush signed Executive Order 12780 mandating that the Department of Defense (DOD) and other Federal agencies "promote cost-effective waste reduction and recycling of reusable materials from waste generated by Federal Government activities" (Bush, 1991, p. 56289).

The Office of the Chief of Naval Operations and the Commandant of the Marine Corps have both published instructions (OPNAVINST 5090.1A and MCO P5090.2) that require all Navy and Marine Corps activities to

implement source separation for recycling and to develop a Qualified Recycling Program to (a) comply with regulatory requirements; (b) obtain proceeds from recyclable material sales; (c) avoid disposal costs; (d) reduce volume of wastes disposed in landfills; and (e) reuse readily available resources. Further, the Commandant of the Marine Corps has set a goal of "a 50% reduction (by weight) in the amount of solid waste disposed of over the FY (fiscal year) 1990 to FY 1995 period" (HQ, USMC, 1992, p. 1).

Background Information

History

Marine Corps Base Camp Joseph H. Pendleton is the Corp's largest amphibious training base, encompassing 17 miles of prime Southern California coastline and 125,000 acres of land just 30 miles north of San Diego. "The area...was first scouted by Europeans when Spanish explorer Don Gaspar de Portola traveled up the coast from his landing site in Baja California in 1769. Through Spanish land grants, the region now covered by Camp Pendleton emerged as Rancho Santa Margarita y Las Flores y San Onofre. Custody of these lands was originally held by the Mission San Luis Rey de Francia, built on its present site southeast of Pendleton and dedicated on June 13, 1879" (Camp Pendleton, 1990,

p. 1). In 1942, after a succession of owners, the government purchased the area at a cost of $4.2 million. Today Camp Pendleton is the DOD's busiest installation with more than 200,000 training exercises annually (Camp Pendleton, 1990, p. 1).

Because of the area's rich history, extensive land use, and the fact that Camp Pendleton remains the only stretch of undeveloped coastline between Los Angeles and San Diego, the DOD and the Marine Corps have adopted rigid guidelines for environmental protection and the conservation of natural resources. Limitations have been placed on the amount and types of training activity that can take place in various areas to prevent destruction of habitat for endangered species. Federal, state, and county regulations concerning pollution and hazardous waste management are strictly enforced to prevent air, water, soil and ground water contamination.

Recycling aboard Camp Pendleton

The Environmental and Natural Resources Management Office (ENRMO) administers the Qualified Recycling Program (QRP) aboard Camp Pendleton. "A QRP is an organized and command designated recycling program in which an installation may receive up to 100% of the proceeds from recyclable material sales if specific

criteria are met" (NEESA, 1991, p. vii). The ENRMO is responsible for the management of the base recycling program, assisting tenant activities with their recycling efforts, collecting and holding recyclable materials, and the operation of the Base Recycling Center. Under Public Law 97-214, proceeds from the sale of recyclable materials at installations having a QRP are first used to amortize the program's overhead. Once these costs are covered, up to 50% of the balance may be used for pollution abatement, energy conservation, and occupational safety and health activities. The remaining balance may then be transferred to the installation's *non-appropriated* Morale, Welfare, and Recreation (MWR) account.

The local Defense Reutilization and Marketing Office (DRMO) is the Federal office responsible for the disposal of excess property and material generated by appropriated funds. DRMO contracts with various local civilian recyclers for the sale and pickup of this material. What this means to tenant activities is that even if they could get a better price than DRMO from a local market, they must sell it to DRMO <u>if</u> the material was purchased with funds appropriated by the federal government.

It is the policy of Marine Corps Base Camp Pendleton that all tenant activities actively engage in materials recycling. Specifically, Base Order 6280.5 (1986, p. 3) says that units and activities will:

1. Adopt the policy by enacting unit orders for implementation by unit personnel.

2. Assign an officer, by name, as unit or activity resource conservation coordinator.

3. Implement a sound program to ensure recyclable materials are not illegally disposed.

4. Establish a safety training program for all personnel involved in source segregation.

5. Rotate stock to ensure that materials are properly circulated to other units.

6. Properly segregate, containerize, and label recyclable materials.

7. Properly account for all materials transferred to the Defense Reutilization and Marketing Office (DRMO) for recycling. The results have been revenues of $1 million from recycled material in fiscal year 1991 with estimated revenues of $1.17 million in 1992. It is hoped that an additional benefit of the base program will be to increase the useful life of Camp Pendleton's three remaining landfills.

Naval Hospital Camp Pendleton

The hospital is located on the eastern edge of the base. It was built as a 600 bed facility in 1974, serves a patient population of 105,500, has 156 active beds, and an average daily inpatient census of 100. Twelve outpatient clinics are operated within the facility itself including Family Practice, Internal Medicine, OB/GYN, Orthopedics, Pediatrics, ENT, and Emergency Care. Although much of the eight-story building has been converted to clinical and administrative use it still supports nine active wards including Alcohol Rehabilitation, Psychiatry, Labor and Delivery, and Same-day Surgery. In addition, the hospital staffs or supports 12 branch medical clinics throughout the base primarily for active duty personnel and maintains a base-wide paramedic ambulance service and flight-line emergency support.

As might be expected, all of this activity generates a huge amount of waste. While the hospital has a program in place to collect, store, and dispose of bio-hazardous waste, it has no active program to recycle other types of material. Almost everything is thrown away to be hauled to the base landfill by private contractor. The exceptions are small amounts of scrap metal, some shredded computer paper, and

aluminum cans that are recycled by individuals or departments for their own personal financial gain. A recycling program was attempted two years ago but was discontinued when problems arose in transporting the material to the Base Recycling Center and when a contractor defaulted because material was being improperly separated making it unprofitable for him to continue.

Statement of the Management Problem

The problem is that Naval Hospital Camp Pendleton does not have a functioning comprehensive recycling program. As a result the hospital is: (a) not in compliance with current directives and subject to possible reprimand; (b) spending an excessive amount on trash disposal; (c) visibly contributing to the accelerating depletion of the base landfill; and (d) not taking advantage of the additional MWR funds that could be made available through the sale of recyclable material.

Review of the Literature

In recent years there has been an abundance of information published about why individuals and businesses need to recycle, the benefits associated with recycling, and the steps involved in starting a recycling program. Much of this information is in the

form of books, pamphlets, and information papers published by cities, government, industry, and environmental groups. Many are similar in content but several important definitions' are prominant (see Appendix A).

Hospitals have been slow to embrace recycling. Although they share similar types of waste disposal problems with business and industry--such as office waste, chemical waste, and other types of solid wastes--they also have to contend with bio-hazardous waste and the perception that everything coming out of a hospital is somehow contaminated. Much of the literature published to date indicates that most hospitals recycling programs have been content with simply recycling the "big three"--cans, cardboard, and paper--only a few have tackled other issues.

In 1991, the Minnesota Hospital Association published a comprehensive Recycling and Conservation Guide that features proven recycling and conservation efforts based on actual programs developed and used by hospitals in the state. The guide covers a range of subjects from diapers to dish ware and such issues as managing the general waste stream and controlling electrical power loads. Hospitals in Ohio and California are experimenting with a densifier process

for recycling polystyrene cups, plates, and other foam products that are cheaper to use than paper products.

The National Library of Medicine in Bethesda, Maryland publishes an 18 page bibliography of more than 600 selected citations to books, journal articles, audiovisuals, and editorials that overview the environmental and economic impact of medical waste, as well as equipment, methods, and standards for disposal.

Why Recycle

According to The Recycler's Handbook (1990) published by the Berkeley, California-based Earthworks Group, the reasons for recycling are simple. We have traditionally buried most of our garbage in landfills, but all over the country many landfills are filling up and closing. Those that remain open often pose health and safety problems. The City of San Diego estimates that its business and industry generate over 55% of the city's waste, or 1,800 tons of landfill daily (City of San Diego, 1991, p. 1).

Burning garbage isn't the answer either. According to the group Environmental Action,

> Even with pollution controls, incinerators are the largest new source of air pollution in most communities. They spew out gasses that contribute to acid rain, toxic heavy metals, and dioxins.

> And incinerators produce millions of tons of toxic ash, which still have to go to landfill (Earthworks Group, 1990, pp. 13-14).

Many communities have refused to license incinerators, saying "not in my back yard!" Recycling is quick, it's economical, it can save natural resources, and the benefits can be rewarding, especially for hospitals.

Recycling Benefits

The immediate benefits, depending on the size of the organization, are often lower waste disposal costs and revenue generated from the sale of recycled material. The long-term benefits can include energy conservation and protection of the environment. Workplace recycling programs also give employees a rallying point and a common activity to share, thus boosting morale.

Recent headlines about syringes and infectious waste washing-up on community beaches have focused unwanted attention on hospital waste streams--recycling programs make for good public relations. Rather than simply providing quality healthcare, hospitals can take the lead in promoting a healthy environment by making conservation of resources a critical element in their overall business strategy.

What to Recycle

The most common items that individuals and organizations collect and recycle are aluminum cans, cardboard, glass, mixed paper, newspaper, plastic, and white office paper. But recycling doesn't end with merely collecting recyclables. It is a continuing process that starts with a commitment to buy recycled products and buy fewer and more durable products. It continues with efforts to reduce the amount of material that needs to be recycled and finding new and innovative ways to recycle, such as:

- Issuing employees ceramic coffee mugs to reduce the amount of styrofoam cups.
- Using two sided copies and electronic mail to reduce paper use.
- Persuading vendors to use less material in their packaging.
- Selling used copier toner cartridges to "rechargers" and turning old linen into rags.

How to Recycle

The Naval Energy and Environmental Support Activity (NEESA), the City of San Diego, and other organizations have published recommendations on the steps necessary to establish a successful recycling program. These recommendations have been adapted to

fit the conditions at Naval Hospital Camp Pendleton and can be found in the Methods and Procedures section that follows. In addition, the following organizations have provided information and/or direct assistance:

- American Paper Institute
- California Department of Conservation, Division of Recycling
- California Glass Recycling Corporation
- Camp Pendleton Environmental and Natural Resources Office
- City of San Diego, Waste Management Department
- National Association for Plastic Container Recovery
- Steel Can Recycling Institute
- Various local federal and civilian hospitals
- Waste Management of North America, Inc.

Purpose Statement

The purpose of this project was to develop a comprehensive plan and begin the implementation of a recycling program at Naval Hospital Camp Pendleton that will put the hospital in compliance with current directives, reduce the amount of trash going into the base landfill thereby lowering disposal costs, and provide recyclable material to generate additional revenue in support of MWR activities at the hospital.

II. METHODS AND PROCEDURES

Subjects

The subjects of this project are the occupants of Naval Hospital Camp Pendleton. Specifically the main hospital (bldg. H-100), the warehouse (bldg. H-135), and the maintenance/motor pool section (bldg. H136). The twelve branch medical clinics were not included in this portion of the project.

Project Design

Step One: Assess Command Climate and Build a Team

Determine if a Need Exists and the Relative Support for the Project. Through direct observation, informal interviews and assistance from experts, determine if (a) the project is related to key business issues; (b) the project will have a direct impact on the organization's external customers; (c) the project will have high visibility within the organization; (d) all managers concerned with the project--at all levels of the organization--agree that it is important to study and improve this process; (e) enough managers, supervisors and operators will cooperate to make this project a success; (f) any recycling is now taking place within the organization; and (g) potentially recyclable materials exist. (Adapted from: Scholtes, 1988, p. 3-4)

Obtain Command Approval and Support. To be successful, the decision to institute a recycling program must come from the hospital commander and have the support of influential, high profile organization members such as the Resource Management Council.

Formally Designate a Recycling Coordinator. To run a successful recycling program, a competent and enthusiastic coordinator is required to act as liaison between management, staff, custodial personnel, and the Recycling Center. This person can be either a military member or a civilian employee. But he or she must have the time, enthusiasm, and attention to detail necessary to coordinate the organization's recycling efforts.

Recruit a Committee. To develop and sustain a successful recycling program, a team of committed volunteers representing a cross section of the hospital with representation from top management is recommended. They will oversee the analysis and design, implementation, and monitoring of the program and be responsible for developing new ideas and expanding the program. At first, the committee may have to invest two or three hours a week but later the program will be largely self-sustaining; only a few hours should be required on an occasional basis.

Conduct Preliminary Meetings. Using the principles of Total Quality Management (TQM) begin holding regularly scheduled meetings following the procedures outlined in The Team Handbook:

- Review the written mission statement from management and discuss the project in general.
- Clarify each member's role.
- Draft an improvement plan.
- Identify pertinent existing information
- Set meeting logistics.
- Set an agenda.
- Set goals and objectives.
- Plan for improving meetings.

(Adapted from: Scholtes, 1988, p. 4-25)

Step Two: Analysis and Design

Conduct a Hospital-Wide Waste Audit. A waste audit is an analysis of the type and quantity of material in an organization's waste stream and an estimate of the amount of that material that can feasibly be recycled. According to the Community Environmental Council, "A waste audit usually begins with a check list of recyclable materials. A common methodology used in conducting a waste audit is to record the amount generated of each recyclable material over a given period of time. From there you can identify high volumes and break down the recyclable waste stream into percentages to determine the most valuable commodities" (Outerbridge, Melcher, & Relis, 1987, p. 4).

Other methods and procedures considered for this project included:

- Establishing liaison with hospital custodial services and determine if any "informal" recycling programs are now in place.
- Developing a survey to distribute to each department to assess the recycling climate, identify current waste logistics, potential recyclables, and storage space constraints.

- If informal recycling is occurring, determining whether it can be incorporated into a formal recycling program.
- Seeking the ideas, suggestions, and observations of management, custodial workers, and other hospital staff in helping plan the recycling program.
- Analyzing waste disposal bills and weight slips for seasonal variation, proper billing, and the proper number and size of disposal containers.
- Tabulating the data and using it as a baseline for assessing the feasibility of increasing recycled tonnage/revenue and lowering disposal costs.
- Reviewing purchasing records to try to predict the types and volumes of waste that might be generated and comparing that data to the actual contents of the disposal containers.
- Recording the flow of materials through the facility and note points of material contamination for use in designing a recovery method.
- Observing the custodial staff's normal cleaning and maintenance operations, noting labor patterns and options or methods for preventing the mixing of clean recyclables and contaminants.
- Identify special wastes, explore market development.

(Adapted from: O'Toole, 1987, pp. 1 & 2)

Conduct a Market Analysis. After determining the type and quantity of material in the organization's waste stream it will be necessary to ensure that a market for the those recyclable materials exists--possibly even negotiating terms with area recyclers to include prices paid, containers provided, frequency of pickup, and duration of contract. When choosing a recycler to work with, the Community Environmental Council recommends that businesses consider what commodities will be accepted, the price that is being offered, the level of service provided, and the dealer's references. (Outerbridge, et. al., 1987, p. 5)

Develop a Time-Phased Implementation Plan. Using the results of the waste audit and information obtained from recycling companies, develop a plan that can be implemented in phases. Start with the material that is either easiest to collect and recycle, or will have the greatest impact on the hospital. Proceed to other materials as time and resources permit. For each phase of the plan consider the following:

- The type of equipment or supplies needed for handling the projected volume of materials.
- The locations of any collection/holding areas and/or processing equipment.

- If adequate storage space is available.
- The amount and source of funds required for each phase of the program; if the hospital's equipment budget can absorb the dollar outlay during the present fiscal year or will it be necessary to defer the project; and what, if any, specific return on investment the equipment would need to earn.
- If the volume of material produced could allow for the provision of equipment by secondary material dealers/recyclers.
- Develop a management and staff education program.
- Determine who is responsible for what at each step of the process and in each phase of the project; plan to use underutilized employees where possible; give everyone a stake in the program.
- Develop a hospital recycling instruction or policy letter and amend it for each phase of the program.
- Combine equipment recommendations, facility layout, program design, etc., into an implementation document for approval by upper management.
- Present each phase of the plan to the hospital commander and the Resource Management Council for approval or revision.

(Adapted from: O'Toole, 1987, pp. 2 & 3)

Establish a Collection System. A well thought out collection system must be developed for each type of recyclable material and the system must be ready to operate before the start of each phase of the recycling program. There are three basic parts to any collection system: containers, collection, and a main storage area.

A wide variety of container systems are available for different types of materials and for different work settings. Suppliers and recyclers are an excellent source of information regarding the different options.

Several options exist for collecting recyclable material from the central containers and transporting it to a main storage area for pickup. The custodial staff must be involved in designing a suitable collection system so the program will run smoothly.

The main storage area should be organized to minimize accidental mixing of trash and recyclables. The site should be easily accessible from the building and from the street, large enough to accommodate the number of storage bins required, and some measure of security should be provided to prevent unwanted tampering with the equipment or materials stored there. Remember, the object is to make recycling as simple and convenient as possible.

Step Three. Implementation

Publicize the Program. "Employee awareness and cooperation are essential for a successful recycling program. Several weeks before the recycling operation comes on-line, begin an education campaign that explains to employees the goals and methods of the program" (Outerbridge, et. al., 1987, p. 5). This education campaign should consist of a "kickoff" letter from the hospital commander and brief 15-20 orientation sessions to explain how the program works and the benefits associated with recycling. Special training should be conducted for employees directly involved in the collection of waste and recyclables.

Implement the Program. On the day specified, set-up the central collection points and distribute the collection equipment based upon the specific needs of each department.

Step Four: Monitor and Evaluate Results

Monitoring and continued promotion are essential to a successful recycling program. The most important part of the program will be keeping track of which departments are recycling, what and how much they are recycling, and who is doing what for the program. The central container locations and main storage area should be monitored frequently to make certain that

(a) they are kept neat and clean; (b) the accumulation of material does not exceed container capacity; (c) the frequency with which they are being emptied is sufficient; and (d) there is no contamination from trash or improper materials.

Another important task will be monitoring what and how much material goes to the Base Recycling Center. This information will be used to evaluate hospital compliance with current directives, determining what percentage of solid waste is being diverted from the landfill, and for estimating the cost of the program or the revenue that is being generated from recycling.

Continued promotion in the form of memos, news letters and announcements will be needed on a regular basis to (a) familiarize new employees with the program; (b) give reminders on separation and collection procedures; (c) reinforce good recycling habits and change bad ones; and (d) supply information on the amount of paper being recycled, natural resources being conserved and money being generated by the program. It will also be necessary to develop a system of incentives and rewards for recycling to build morale and keep employees interested. It will be up to the recycling committee to determine how best to accomplish this task.

Step Five: Expand the Program

Once the initial phases of the program is underway

1. Export the Program to the Branch Clinics.
   - Camp Pendleton
   - El Toro
   - Yuma
2. Include Other Types of Recycling.
   - Source Reduction
   - Purchasing Recycled Products
   - Energy Conservation
   - Car Pooling
   - Water Conservation
   - Other Innovative Ideas

Data Collection

Sample Department Waste Survey

Designed to assess the recycling climate of each department and identify current waste logistics.

Dear Department Head/Division Officer;

The NHCP Recycling Council is designing a recycling program for the hospital and we need your help. Please take a few minutes to fill-out this survey; someone will stop by to pick it up soon.

~ ~

Department:_____ Floor No._____

Contact Person:_____ Phone No._____

1. How many personnel in your department? _____

2. Number of shifts _____

3. Number of desk/clerical areas _____

4. How many copiers do you have? _____ Location _____

5. Any food service/nutrition areas? Yes _____ No _____

6. Does your department currently do any recycling? _____

   What type? _____

7. Indicate the approximate volume of paper waste based on the following formula:

_____	x	.5 lbs.	=	lbs.
No. Personnel		*Avg.lbs.recyclable paper/employee/day*		*Recyclable paper/day*

   (paper waste can be any combination of white ledger, colored ledger, or computer print-out)

8. Does your department shred or otherwise destroy confidential materials? Yes _____ No _____

   If yes, number of shreders? _____ Location _____

9. Does your department currently collect aluminum cans for recycling? Yes _____ No _____

   Estimated volume in pounds _____, % of total waste _____

over

10. Do you dispose of any cardboard? Yes _____ No _____

    Estimated volume in pounds _____, % of total waste _____

11. Do you dispose of any plastic? Yes _____ No _____

    Estimated volume in pounds _____, % of total waste _____

12. Do you dispose of any glass? Yes _____ No _____

    Estimated volume in pounds _____, % of total waste _____

13. Please note any special requirements your department may have relative to recycling collection. _____

    _____

    _____

    _____

14. What do you like best about the idea of recycling in your department? _____

    _____

    _____

    _____

15. What do you suggest can be done to motivate total hospital involvement in recycling? _____

    _____

    _____

    _____

16. Please indicate any questions or concerns you may have about recycling. _____

    _____

    _____

    _____

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Waste Evaluation Worksheet

1. Waste Evaluation:

Total Waste Generation

# Employees (a)	x	Avg. lbs. waste/ employee/day	=	Waste/day (b)
_____	x	1.5 lbs.	=	_____ lbs.

Waste/ day (b)	x	Working days/year	÷	12 months	÷	Lbs/ton	=	Tons/month
_____ lbs.	x	240 days	÷	12 months	÷	2000 lbs	=	_____

Recyclable Paper Generation

# Employees (a)	x	Avg. lbs. recyclable paper/employee/day	=	Waste/day (c)
_____	x	.50 lbs.	=	_____ lbs.

Recyclable paper/day (c)	x	Working days/year	÷	12 months	÷	*Lbs/ton*	=	*Tons/month* recyclable paper (d)
_____ lbs.	x	240 days	÷	12 months	÷	2000 lbs	=	_____

Potential Paper Recovery Rates

Tons/month recyclable paper (d)	x	Avg. Employee participation rate (conservative rate)	=	lbs./month recyclable paper recovered (e)
_____	x	25%	=	_____ lbs.

2. Visual Survey: Look through a random sample of trash cans on each floor. List the most common types of material found.

3. Sensitive Material Destruction: Determine the method, number and type of shredders, and classification of material being shredded (sensitive, confidential, or secret). If the hospital is currently paying to have its sensitive material destroyed, try to integrate these services with an office paper recycling program.

4. Waste Hauling Operations:

Waste disposal company: _____

Size and number of container(s): _____

Frequency of pickups: _____

Is waste compacted? ____ Size of compactor: ____

Owned? _____ Leased? _____

Waste disposal costs per cubic yard:

Flat fee: _____ Per month: _____ Other: _____

Ensure that the waste disposal bills reflect the actual service required. You may be paying for more service that is needed. Determine if the hospital could get by with less frequent service and/or smaller waste bins.

The information gathered is this section will provide baseline information about the hospital's disposal needs. After the recycling program has been in operation for a few months and the material is no longer ending-up in the waste bins, you will be able to reassess your disposal needs.

(Adapted from City of San Diego, p. 4)

Cost/Benefit Worksheet

1. Present Disposal Costs:

	Monthly
Waste disposal costs	_____
Confidential destruction costs	_____
Equipment costs	_____
Labor costs (custodial)*	_____
Revenue from any current recycling	_____
TOTAL DISPOSAL COSTS	_____

2. Disposal Costs After Implementation of New Recycling Program:

	Monthly
Disposal costs adjusted downward to reflect reduced service**	_____
Reduced confidential destruction costs, if any	_____
Coordinator's time	_____
Recycling containers, if purchased	_____
Promotional Materials	_____
Labor (extra custodial or collection costs, if any	_____
Compactor & related equipment, if any	_____
Installation costs (one time)	_____
TOTAL COSTS	_____

3. Expected Revenue From Material Sales:

	Price per ton	Tons per month	Monthly
Computer Paper	_____	_____	_____
White Paper	_____	_____	_____
Mixed Paper	_____	_____	_____
Cardboard	_____	_____	_____
Aluminum	_____	_____	_____
Steel Cans	_____	_____	_____
Glass	_____	_____	_____
Plastic	_____	_____	_____
Other Waste	_____	_____	_____
TOTAL CREDITS			_____

NET RECYCLING PROGRAM COSTS (total costs - total credits)		_____	_____

4. Net Savings <Costs>:

_____	–	_____	=	_____
Present disposal costs		Net recycling program costs		Net savings <costs>

* Assign only a percentage of custodial costs since the custodians provide other services in addition to waste removal.

** Estimate how much the recycling program will reduce the waste stream, then contact the disposal company to determine the cost of less frequent service or smaller bins.

(Adapted from City of San Diego, pp. 5 & 6)

III. RESULTS

Command Climate Assessment and Team Building

Through direct observation of hospital activities it was determined that a large amount of potentially recyclable materials were simply being thrown away. These materials included cardboard from the supply department, plastics from the operating room and pharmacy, glass from the pediatrics ward and kitchen, steel cans from the kitchen and snack bar, and all grades of paper from throughout the hospital.

A tour of the facility established that some informal recycling was taking place. Aluminum cans were being recycled by individuals or departments as noted before. In addition, many departments were still separating-out their paper—a carry-over from the first failed recycling program. Most of this paper was thrown away when the offices were cleaned but some of it was being collected by the custodial staff and taken to church or community recycling programs.

Based upon interviews with department heads, division officers and key staff members, it was agreed that (a) lower waste disposal costs, revenue generated from the sale of recycled material, and energy conservation were all key business issues that should be addressed; (b) this would be a high visibility

project in which all employees could participate; and (c) the program would have a significant impact outside of the organization in terms of conservation of natural resources and in promoting a healthy environment. Some of the management personnel contacted were more enthusiastic than others, but all agreed that they would cooperate to make the project a success.

From the beginning the project had the support of senior management. The hospital Executive Officer originally proposed the idea and offered his funds to help finance for the program. The new Commanding Officer put recycling on his list of "special interest items" for the Resource Management Council and provided some pre-program publicity in the form of an article in the hospital's newsletter (Figure 1) to make it clear that the program had his support.

A recycling "council" was recruited from both junior and senior members of areas that appeared to be the largest consumers of recyclable materials and/or could provide support to the program. This included:

- Operating Management (manpower/coordination)
- Nursing Services (consumer)
- Materials Management (consumer/procurer)
- Facilities Management (consumer/support)
- Food Management (consumer)

- Administration (consumer/support)
- Morale, Welfare, & Recreation (beneficiary)

This "Green Team" was made-up of representatives from these seven areas, a team leader who acted as Recycling Coordinator, and an additional volunteer with recycling experience. Team members were appointed in writing by the Commanding Officer (Figure 2) and a command TQM Process Action Team Facilitator attended many of the initial meetings to keep the sessions focused and moving. The team reviewed the purpose statement, set initial program goals, and developed the objectives that formed the basis for the Methods and Procedures chapter of this paper.

Analysis and Design

Market Analysis

All recyclable material that is collected must be turned-in to the Base Recycling Center if they were generated by appropriated funds. The Center will take any material whether a market exists or not, and will store it until one develops or until a price can be negotiated to have it hauled away. With this in mind, the Council elected to forego all but a cursory market analysis and send all potentially recyclable material to the Base Recycling Center as soon as each phase of the program could be implemented.

Hospital-Wide Waste Audit

1. Results of Waste Survey/Evaluation:

Number of personnel.....	984
Desks/clerical areas.....	452
Food service/Nutrition areas.....	28
Departments shredding or destroying sensitive materials.....	25
Number of shredders.....	7
Number of copiers.....	34
Waste generated per day.....	1,476 lbs.
Waste generated per month.....	14.76 tons
Recyclable paper generated/day.....	492 lbs.
Recyclable paper generated/mo.....	4.92 tons
Potential paper recovery rate/mo...	1.23 tons
Potential cardboard recovery/mo....	0.50 tons

2. Results of Visual Survey: Based upon a random sample of trash cans on each floor and a visual inspection of the trash compacter contents, the following materials were commonly found:

White ledger paper	Aluminum cans
Computer paper	Steel cans
Colored paper	Assorted glass
Newspaper	Cardboard
Shredded paper	Scrap lumber

Multi-resin plastics

3. Results of Sensitive Material Destruction Survey: As noted above, twenty-five departments report that they routinely shred sensitive material using seven shredders located throughout the command that shred paper to 0.5 centimeters wide. One department uses a pulverizer-shredder to destroy "classified material" (top secret, secret, and confidential). No contract is in-place to shred paper for the hospital.

4. Results of Waste Hauling Analysis:

Waste disposal company: Professional Waste ~~Systems~~

Contract number: N68711-87C-2833

Size and number of containers: See Table 1.

Frequency of pickups: See Table 1.

Waste disposal costs: See Tables 1 and 2.

Amount of waste generated: See Table 2.

The trash containers are owned by the base and are provided at no charge to the activities. The waste hauling contract does not provide for the weighing of loads before disposal at the landfill. Weights are based upon estimates provided by Waste Management Inc. The 6 cu. yd. container at bldg. H-100 is used for bulky items that cannot be easily compacted. The 25 cu. yd. "drag-on" container at bldg. H-135 is used for trash, cardboard and some bulky items.

Cost/Benefit Analysis

1. Present Disposal Costs:

	Monthly
Waste disposal costs (Table 2)	$ 817
Confidential destruction costs	- 0 -
Equipment/materials costs	200
Labor costs (custodial)	8,270
Revenue from any current recycling	- 0 -
TOTAL DISPOSAL COSTS	$ 9,287

2. Disposal Costs After Implementation of New Recycling Program:

	Monthly
Adjusted waste disposal costs	$ 584
Adjusted confidential destruction costs, if any	- 0 -
Equipment/supply costs	265
Labor (extra custodial or collection costs, if any	8,722
Coordinator's time	260
Recycling containers, if purchased (prorated over five years)	45
Promotional Materials (prorated over 12 months)	13
Bailer & related equipment, if any	- 0 -
TOTAL COSTS	$ 9,889

3. Expected Revenue From Material Sales*:

	Price per ton**	Tons per month	Monthly
Computer Paper	$225	0.41	$ 92
White Paper	80	0.41	33
Mixed Paper	10	0.41	4
Cardboard	35	0.50	18
Aluminum	400	- 0 -	-0-
Steel Cans	10	0.10	1
Glass	10	0.20	2
Plastic, mixed	1	0.05	-0-
TOTAL CREDITS			$150

NET RECYCLING PROGRAM COSTS (total costs - total credits) $ 9,739

4. Net Savings <Costs>:

$ 9,287	-	$ 9,739	=	$ <452>
Present disposal costs		Net recycling program costs		Net savings <costs>

* For planning purposes only. No actual revenue is expected because all monies generated from the sale of recyclable materials is put into the MWR fund with an option of up to 50% going to environmental or occupational health and safety activities.

** From Table 3.

Other Factors

1. Waste Disposal Bill Analysis: This information was not available because the waste hauler's contract does not specify that he account for the contents of his loads. He simply picks-up the containers on the specified days and takes them to the landfill.

2. Purchasing Records Review: With the huge amount of material that this hospital receives and distributes each day, this procedure was abandoned as too labor intensive. Other methods of predicting the types and volumes of waste and comparing those data to the actual contents of the disposal containers were used instead.

3. Special Waste Identification and Market Development: The largest special waste that the hospital generates is bio-hazardous waste. Infectious or contaminated material is "red bagged" and stored for pickup and disposal by a contractor licensed to dispose of this material.

4. Staff Observations: For safety reasons trash cans are lined with plastic bags and emptied by removing the plastic bag and not by reaching in to remove the contents by hand. Trash collected throughout the day is either temporarily held in a

soiled utility room for later removal or taken directly to the trash compactor. In the kitchen, snack bar, pharmacy, laboratory, and central sterile processing room, trash is held in place and removed by the work area staff at the end of each shift.

Implementation Plan/Collection System

Using the results of the waste audit, the market analysis, information from outside experts, and other factors, the Council decided to start with material that would be the easiest to collect and recycle, and would have the greatest impact on the program in terms of an early success. Plans were formulated, flow charts were constructed and a time line was developed for each phase of the project:

Highgrade and/or Mixed Paper. (See Figure 3).

1. Process: Recyclable paper is initially segregated from waste and sorted by grade into either desktop or deskside containers, or into small bins near other points of generation such as copiers. Initial containers are emptied into temporary internal "recycling centers" located at strategic points throughout the hospital. The "recycling centers" are emptied as required into larger bins located in an external storage area for removal (Figure 4).

2. Responsibility: The work area generating the paper is responsible for collecting and separating it into the internal "recycling centers." A person assigned to Housekeeping takes the separated paper to external bins for later transport to the Base Recycling Center by Materials Management Department.

3. Equipment:

250 cardboard desktop trays

250 cardboard desktop files

97 plastic containers (15"x20"x13")

3 standard embarkation boxes, 54 cu. yd. (48"x48"x40")

1 tilt utility truck, 1 cu. yd.

Assorted logos, graphic decals, and snipes.

Note: Small plastic containers were used because the housekeepers' job description set a lifting limit of 50 lbs. The small containers weigh 43 lbs. when filled.

4. Locations: The choice for the "recycling centers" is based upon their proximity to work areas, the availability of space, high visibility to both staff and patients, and fire and safety codes. The typical "center" consists of three plastic containers (Figure 5). Fifteen sites were chosen--one each on floors 2 through 8; five on the first floor where most of the clinical, diagnostic, and administrative spaces

are located; two on the ground floor; and one for the warehouse/maintenance buildings. Later one was added to the first floor, the ground floor, and the CHAMPUS Service Center building. Additional containers were placed by each copier and in other areas with a high volume of paper generation.

The choice for the external storage bins is based upon the availability of space, weather protection, fire code regulations, security, and their proximity to the hospital loading dock (Figure 6).

5. Funds: The source of funds for this phase of the project was the Executive Officer's account. The funds were immediately available and sufficient to cover the required amount of $2,282.

6. Education: A program for both management and staff was developed. It consisted of an introductory or "kickoff" letter from the C.O. (Figure 7) to all department heads announcing the start of the program, and a video presentation and orientation conducted at various times during the week preceding implementation to explain how the program worked. A brochure was developed and distributed (Figure 8) to give the employees something to refer to once they returned to their work areas. Special training was planned for employees directly involved in the collection process.

7. Approval: Prior to implementation and the purchase of materials, a presentation was made to the hospital commander and the Resource Management Council. A copy of the proposed "kickoff" letter was given to each member along with the information described above. This phase of the project was approved as presented and paper recycling was started at Naval Hospital Camp Pendleton on May 18, 1992.

8. Policy Letter: About three weeks after paper recycling was begun--time enough to workout any problems with the system--a policy letter was issued by the Commanding Officer (Figure 9). The letter gave authority to this phase of the program and formalized the duties and responsibilities of everyone involved.

Dry Cell Batteries. At the same time that paper recycling was initiated, dry cell battery recycling was begun. There was not much planning required for this phase. The containers (empty five gallon paint buckets with special decals on them) were located at the Quarterdeck and in Security where the majority of the batteries are used. A policy letter was published and when (and if) the containers are filled they will be turned-in to the Base hazardous waste disposal area.

Multi-resin Plastics. (See Figure 10).

1. Process: Non-contaminated used plastic is drained of fluid, rinsed clean if necessary, and held near the work area in suspended clear plastic bags (similar to existing hamper systems). Initial plastic bags are taken to a temporary internal storage area for later transfer to external storage and removal.

2. Responsibility: The work area generating the plastic is responsible for collecting, cleaning, bagging, and transfer to the temporary internal storage area. A person assigned to Housekeeping takes the bagged plastic to external bins for later transport to the Base Recycling Center by Materials Management Department. In areas such as the pharmacy, laboratory, and central sterile processing, material can be held and taken to the external area with the regular trash by work area personnel.

3. Equipment:

10 Winfield mini hamper systems

5 Winfield deluxe hamper systems

5 used rollaway laundry/trash hampers

1 standard embarkation box, 54 cu. yd. (48"x48"x40")

Assorted logos, and graphic decals.

Clear plastic bags with green recycling logo.

4. Locations: The choice for the temporary storage areas is based upon their proximity to work areas, the availability of space, the need to isolate dirty materials, and fire and safety codes. On floors 2 through 8, old rollaway laundry/trash hampers located in the soiled utility rooms across from the elevators will serve as temporary internal storage.

The choice for external storage bins is based upon the availability of space, fire code regulations, security, and proximity to the hospital loading dock. Weather protection is not a major factor (Figure 6).

5. Funds: The source of funds for this phase of the project has not been determined. The amount required is projected to be $870.

6. Education: A program is currently being developed and lessons learned in the paper phase will be incorporated into this and future phases.

7. Approval: This phase of the implementation plan has not yet been submitted for approval. The projected date of implementation is August 1992.

8. Policy Letter: It is the intention of the council to publish a policy letter <u>before</u> implementation to avoid some of the problems associated with the paper phase as discussed in the next chapter.

Steel Cans and Glass. (See Figure 10).

1. Process: Steel cans from the kitchen and snack bar are rinsed clean, flattened, and held near the work area in wheeled plastic trash cans. Non-contaminated glass bottles and jars from all areas are drained of fluid, rinsed clean if necessary, and held near the work area in either wheeled plastic trash cans (kitchen and snack bar) or in suspended clear plastic bags (similar to existing hamper systems). The glass must not be broken. Plastic trash cans are taken directly to external storage containers and initial plastic bags are taken to a temporary internal storage area for later transfer to external storage and removal.

2. Responsibility: The work area generating the steel cans and glass is responsible for collecting, cleaning, bagging, and transfer to the temporary internal storage area. A person assigned to Housekeeping takes the bagged glass to external bins for later transport to the Base Recycling Center by Materials Management Department. In areas such as the kitchen, snack bar, pharmacy, laboratory, and central sterile processing, material can be held and taken to the external area with the regular trash by work area personnel.

3. Equipment:

10 Winfield mini hamper systems

5 Winfield deluxe hamper systems

6 large wheeled plastic trash cans

2 standard embarkation box, 54 cu. yd. (48"x48"x40")

Assorted logos, and graphic decals.

Clear plastic bags with green recycling logo.

4. Locations: The choice for the temporary storage areas is based upon their proximity to work areas, the availability of space, the need to isolate dirty materials, and fire and safety codes. On floors 2 through 8, the same location and the same rollaway laundry/trash hampers that are used for temporary internal plastic storage can be used for glass (located in the soiled utility rooms across from the elevators). In the kitchen and snack bar it should be located away from food preparation areas near regular trash cans.

The choice for external storage bins is based upon the availability of space, fire code regulations, security, and proximity to the hospital loading dock. Weather protection is not a major factor (Figure 6).

5. Funds: The source of funds for this phase of the project and the amount required has not yet been determined but it is projected to be about $1,200.

6. Education: A program similar to those described above will be developed before the start of this phase of the project.

7. Approval: This phase of the implementation plan has not yet been submitted for approval. The projected date of implementation is September 1992.

Corrugated Paper (cardboard). (Figure 11).

1. Process: Cardboard boxes are flattened and either held near the work area or taken to a temporary internal storage area for later transfer. Once removed from the warehouse or hospital building, the flattened cardboard is either put into wire bins for later removal or taken to a staging area to be bailed. After bailing, the 800 lb. cardboard bundles are moved by forklift to an external storage area for later removal.

2. Responsibility: The work area generating the cardboard is responsible for flattening it and taking it to the temporary internal storage area. A person assigned to Housekeeping takes the flattened cardboard to either the staging area to be processed or to external bins for later transport to the Base Recycling Center. In areas such as the kitchen, snack bar, pharmacy, laboratory, and central sterile processing, the cardboard can be held and taken to the external area with the regular trash by work area personnel.

If cardboard is to be bailed, the work could be performed by casual laborers, medical hold personnel, brig personnel, or hospital employees. The movement of the 800 lb. cardboard bundles from the bailer to the storage area should be done by Materials Management Department personnel with their forklift. The bundles could be hauled to the Base Recycling Center by either hospital personnel or Base Recycling Center personnel. If enough cardboard is produced, the hospital could be designated a secondary pickup site and the contractor would remove it directly to his processing center.

3. Equipment:

Vertical cardboard bailer

Banding material

Wooden pallets

Plastic tarps

4 wire storage containers

Assorted logos, and graphic decals.

The Base Recycling Center is scheduled to receive a new horizontal bailer during the first part of FY 1992. The hospital has been promised that they will receive their old vertical bailer after it has been serviced. Hookup and maintenance will be provided by a contract paid-for and maintained by the Base Recycling Center.

4. Locations: The choice for the temporary storage areas is based upon their proximity to work areas, the availability of space, the need to isolate dirty materials, and fire and safety codes. On floors 2 through 8, the same location and the same rollaway laundry/trash hampers that are used for plastic and glass could be used for cardboard (located in the soiled utility rooms across from the elevators).

The choice for the external storage bins is based upon the availability of space, weather protection, fire code regulations, security, and their proximity to the hospital loading dock. Since there is not enough covered storage available, plastic tarps could be used to cover the cardboard bins/bails. The location of the bailer would depend upon which building produced the greatest volume of cardboard, the warehouse or the hospital. Some type of temporary external storage would have to be provided at either building so that the cardboard could be held until it was transferred to the bailer to be processed.

5. Funds: The source and amount of funds for this phase of the project have not yet been determined.

6. Education: A program similar to those described above will be developed before the start of this phase of the project.

IV. DISCUSSION

Based upon the results of the command climate analysis, the Council decided that aluminum can recycling should not be a part of the program since the drinks are purchased with personal money and not with appropriated funds. The Council also decided not to explore market development or otherwise get involved in bio-hazardous waste due to the special handling requirements and regulations involved. In addition, the Council elected not to get involved with materials recycled or disposed of under special programs or directives such as the silver recovery program, waste oil disposal, and automotive battery recycling. Since most of the paper that was being separated under the old program was thrown away, it was decided that the old "postal-type" recycling boxes would be collected and reused in the new recycling program.

During the initial interviews with department heads and key staff members the Head of Housekeeping was strongly in favor of the project and even offered to provide space and manpower to support the program. It was originally intended to recommend his representative to the Recycling Council for the position of Recycling Coordinator--an additional duty that could lead to job step increase. The individual

that he appointed holds the position of Housekeeping Materials Handler (WG-04), he seemed enthusiastic and knowledgeable, and he serves on the City of Oceanside's recycling board. He also works directly with the people who ultimately would be responsible for collecting the segregated materials from throughout the building--the housekeepers.

This man was to have been a key player on the Council, providing essential input for decision-making, training the staff, and acting as liaison between the team and his department head. But, as the project progressed it became apparent that he could not devote as much time to recycling as either he or Head of Housekeeping had promised that he would. Special projects would frequently prevent his attendance at meetings and other duties would often interrupt work he was supposed to be doing for the Council. As a result, other team members became resentful, the project was delayed, and another person, an officer, took-over the job as a collateral duty.

Another problem that occurred was an objection to one of the sites selected for a "recycling center." Among the criteria used in determining the location of these sites were fire and safety code regulations; high visibility for both the staff and the patients who

would see that "Naval Hospital Camp Pendleton cares...we recycle!" (Figure 5); and that they should be in the same location on floors 2 through 8. After a "recycling centers" was setup on the second floor, a variance report was turned-in to Quality Assurance by the Head of Operating Room Nursing. It seems that the bins had displaced three of her chairs four feet farther down the hall which negatively impacted on patient care. It didn't matter that this was a common area, that the bins were in the same location on the other six floors, or that her patient waiting area was not supposed to be in the hall--we had not received her permission to put a "recycling center" on her turf! The result was that "center" was moved.

Monitoring and Evaluation

Three things became immediately apparent as a result of monitoring the contents of the paper "recycling centers" located throughout the hospital.

First, the word was not getting-out about what to recycle, where to recycle it, and how recycling process works. Department heads and division officers were not passing this information down to their workers. Although the education campaign that had been conducted appeared adequate and the brochures that had been widely distributed were very informative, things were

still showing-up in the containers that should not have been there. This included mixed grades of paper, fax paper, carbon paper, post-it notes, etc. The solution was to recruit "area recycling coordinators" from each department or from each floor to assist the Council in spreading the word and in monitoring the program.

Second, sensitive material was being found in the recycling containers. These items included copies of inpatient records, results of psychiatric examinations, recall rosters with staff names and phone numbers on them, etc. The conclusion was that these items had always been thrown away with the trash to be buried in the landfill and never seen again. But now the material was going into the "recycling centers" that were easily accessible to everyone including patients and something had to be done. The solution was to recycle the old postal-type containers that had been used in the previous recycling program and attach bumper stickers printed in bold letters that said:
"SENSITIVE MATERIAL To Be Shredded"
These boxes were distributed to every nurses' station, clinic, and administrative space. A policy letter was published (Figure 9) that spelled-out how the boxes were to be used and who was responsible for disposing of the sensitive material and where.

Finally, during the first two weeks of the paper recycling phase the "recycling center" boxes were not being emptied as often as they should have been. Some of them were literally overflowing. The problem was that only one housekeeper had been designated to collect the recycled paper and he had been off during the startup. None of the other housekeepers had even been told anything about the program. The solution was to make each evening housekeeper responsible for the "recycling center" in his area and conduct special training for those employees directly involved in the collection of waste and recyclables.

Monitoring of the exterior storage containers, on the other hand, yielded more rewarding results. Looking at the contents of the boxes it was apparent that people were making an effort to ensure that the proper materials were going in the proper containers. There was some contamination from carbon paper or otherwise improperly separated paper, but this was screened-out when the containers were emptied at the Base Recycling Center. What was important was that people were not throwing garbage in the containers. Also, based upon an evaluation of eight weeks of paper collection and three trips to the Base Recycling Center, the following results were obtained:

Total amount recovered.....	3.6 tons*
Estimated value of material.....	$ 189.00
Average amount per month.....	1.8 tons
Employee participation rate.....	36.6%
(based on 4.92 tons/mo)	

* Estimate based on 400 lbs. per cu. yd. of paper. (Estimate supplied by Waste Management Inc.)

By monitoring the trash containers throughout the hospital compound it was determined that (a) an 8 cu. yd. container with additional pickups would be more economical than the 25 cu. yd. "drag-on" now used at the warehouse; (b) the number of pickups at the Scouting Hut could be reduced from once a week to once a month; and (c) when the cardboard recycling phase is implemented, the number of compactor pickups could be cutback from three times per week to two times per week for an estimated cost saving of $2,400 per year.

Expanding the Program

When the project started the original intention was to confine the program to the main hospital complex until the initial phases were established. But the Council under estimated the interest and the enthusiasm that would be generated. When the branch clinics saw that recycling was finally occurring, they wanted to get in on the action too! As a result, the five

clinics staffed by the hospital were each given their own "recycling center" and a supply of desktop and deskside containers. Now, whenever the containers are full they are taken either to the hospital or to one of the Base Recycling Centers, whichever is closer.

Since the program began several other materials have been identified by the hospital staff as being potentially recyclable. These include plastic syringe containers, laser printer cartridges, sterile wraps, isolation gowns, and more. One day the Executive Officer noticed a large stack of X-ray film jackets heading for the compactor. Films are kept for a specified time then turned-in for recycling. The jackets with patient information on them are thrown away. The X.O.'s solution was to have printed labels placed over the old information and the jackets reused.

Of course, recycling is not the only way to expand the program. Precycling means considering the waste implications of products before they are bought. It includes buying products made from recycled or recyclable materials; buying items in bulk to reduce the amount of packaging required; using products that can be reused and repaired rather than disposed of; even using landscape with shrubs and plants that require less water and less pruning.

V. CONCLUSIONS AND RECOMMENDATIONS

Before this project began Naval Hospital Camp Pendleton did not have a functioning comprehensive recycling program. As a result the hospital was: (a) not in compliance with current directives and subject to possible reprimand; (b) spending an excessive amount on trash disposal; (c) visibly contributing to the accelerating depletion of the base landfill; and (d) not taking advantage of additional MWR funds that could be made available through the sale of recyclable material.

Today, the hospital has implemented a recycling program, is now in compliance with current directives, and has developed a comprehensive plan to expand that program in the future. While the initial results seem promising, there is still a long way to go towards meeting the Commandant of the Marine Corps' goal of a 50 percent reduction by weight in the amount of solid waste disposed of over the FY 1990 to FY 1995 period.

With regard to obtaining revenue from recycling. At a Base Recycling Material Board meeting held on March 13, 1992, the Assistant Chief-of-Staff for Facilities, Colonel J. H. Robertus, USMC, stated that money was not the objective of the program. The objective was to recycle material and keep it out of

the landfill. With this in mind, the Council decided to de-emphasize recycling material to generate additional revenue in support of MWR activities. Instead they are playing-up the lower expected waste disposal costs and the long-term benefits of energy conservation and environmental protection.

The most important components of any recycling program, beside the support of powerful, high profile organization members, are a highly motivated recycling committee and a designated recycling coordinator who can oversee the preparation, implementation and monitoring steps of the program. It was a mistake was not to formally appoint a recycling coordinator early in the process. The outcome was a lack of communication, some bad feelings between the team members, and a delay in implementing the program.

Another important component is a good education and promotion program, particularly at startup. Although the Council thought they had done an effective job educating the staff, the results of monitoring the containers made it apparent that they had not. Incentives and awards were another part of the program that was never sufficiently addressed. There needs to be a method to keep interest going and motivate the staff towards a goal. These two issues have been

addressed and will be corrected when future phases of the program are implemented.

A third ingredient necessary to successful program is awareness of local resources such as free waste audits, technical assistance, grants, and hospital volunteers. A local waste management company provided valuable assistance in conducting the waste audit, in designing the survey form, and in arranging presentations and tours with other hospitals to observe their recycling programs. A considerable cost saving was realized when the Base Recycling Center was able to provide 77 plastic recycling containers free of charge and a local vendor was found who was closing-out his inventory for one-fifth of the market price.

Finally, an article was written recently that sought to disprove several myths associated with recycling such as plastics, excessive packaging, and disposables are always bad and recycing is always good. It was pointed-out that some recycling efforts consume more energy and produce more waste than they save. Whatever the answer, landfill space is still disappearing and other alternatives are still a long way off. It is up to everyone to REDUCE the amount of material they consume, REUSE that material whenever possible, and RECYCLE whatever cannot be reused.

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Table 1

Waste Hauling Operations

Bldg.	Description	CU	PU	$/PU	$/CY
H-100	Compactor	33	3/wk	$50.00	$1.52
H-100	Hospital	6	5/wk	5.56	.93
H-135	Med Whse	25	2/mo	50.00	2.00
H-136	Med Maint	8	1/mo	5.56	.70

Table 2

Waste Generation Estimates (tons) and Disposal Costs

Bldg.	Description	Weight per mo.	Cost per mo.	Cost per ton
H-100	Compactor	54.5[1]	$600.00	$11.00
H-100	Hospital	6.0[2]	111.20	18.53
H-135	Med Whse	2.5[2]	100.00	40.00
H-136	Med Maint	0.4[2]	5.56	11.12
TOTAL		63.4	$816.76	

[1]Based on 300 lbs./cubic yard (compacted).

[2]Based on 100 lbs./cubic yard (un-compacted).

(Estimate supplied by Waste Management Inc.)

Table 3

Recyclable Materials Market Prices

Description	Western U.S. (6/20/92)	Los Angeles (July 1992)
PAPER	($/Ton)[1]	($/Ton)[2]
Computer Paper	131 - 190	225
White Ledger Paper	38 - 95	80
Mixed Paper	-25 - 0	10
Cardboard	15 - 30	35
METAL		
Aluminum	400 - 480	
Steel cans	0 - 15	
GLASS		
Clear	0 - 14	
Brown	0 - 14	
Green	0	
Mixed	0	
PLASTIC		
Clear PET[3]	120 - 160	
Mixed, Color PET	80 - 160	
Clear, HDPE[4] (milk jugs)	0 - 100	
Mixed, Color HDPE	0 - 60	
Mixed, PET & HDPE	0 - 2	

[1](Source: Misner, 1992, p. 5)

[2](Source: DRMO data)

[3]Polyethylene Terephthalate (i.e., 2-liter beverage bottles)

[4]High Density Polyethylene (i.e., motor oil bottles)

Newsletter Article

Figure 1. An article written by the hospital commander appearing in the organization's newsletter can make it clear the program has the support of senior management.

The Skipper

CAPT WILLIAM R. ROWLEY
COMMANDING OFFICER

RECYLING

Recycling is one of our obligations as members of the modern world community. It saves natural resources, decreases energy consumption, reduces air and water pollution and lowers waste disposal costs. The benefits can be impressive. Recycling one ton of office paper spares 17 trees and saves the energy equivalent of nearly 700 gallons of oil. Recycling one glass bottle saves enough energy to light a 100 watt bulb for four hours. Southern California is rapidly running out of landfill space and recycling is required in San Diego County. The Department of Defense has mandated a 50% reduction in waste by 1995.

Recycling could have a significant impact at our hospital. Corrugated boxes are our largest single source of waste paper. We throw away 3 to 4 tons a month with a current recycle value of $40 a ton. We generate about one-half pound of recyclable office paper per person per day which equals at least 5 tons a month. Our large trash bin is hauled three times a week at $50 per pickup. Recycling cardboard and office paper would reduce our garbage by at least one load per week with a savings of $200 a month in hauling costs and income generated could be another few hundred dollars per month.

Our present goals are to extend the life of the base landfill, earn enough money for the program to pay for itself and support conservation. Recycling is a base-wide program and future profits would go to benefit the entire base. Fifty percent would go into pollution abatement, energy conservation and occupational safety projects. The remaining 50 % of net proceeds would support MWR activities.

A paper recycling progam was undertaken in the past, but it failed due to loss of the contract hauler. In January 1992 we created a Recycling Council ("Green Team") which is developing a comprehensive recycling plan in conjunction with the base recycling plan. We hope to start recycling office paper (reports, computer paper, photocopies, etc.) in May of this year. The base will be giving us a used compactor in about four months to start recyling cardboard boxes. Many departments are already recycling aluminum cans.

I hope you will support our recycling efforts by putting office paper in special containers in your workspace once the program starts. The battle cry for the '90s is "REDUCE, REUSE, RECYCLE." Join the fight! □

Letter of Appointment

Figure 2. An appointing letter from the Commanding Officer can also serve to reinforce senior management's commitment to the program.

DEPARTMENT OF THE NAVY
NAVAL HOSPITAL
CAMP PENDLETON, CALIFORNIA 92055-5008

IN REPLY REFER TO:
6280
7 Jan 92

From: Commanding Officer, Naval Hospital, Camp Pendleton
To: LT Jack A. Frost, MSC, USN

Subj: APPOINTMENT TO RECYCLING COUNCIL

Ref: (a) OPNAVINST 5090.1A
(b) Base Order 6280.5

1. Congratulations! You have been appointed to the Naval Hospital Camp Pendleton Recycling Council. We generate a huge amount of waste every day but have no active program to recycle non-infectious reusable material. As a result the hospital is not in compliance with references (a) and (b); is spending too much on trash disposal; is contributing to the depletion of the base landfill; and is not taking advantage of the additional MWR funds that could be made available through the sale of recyclable material.

2. As a member of our "Green Team" you have an excellent opportunity to design a program that will continue long into the future and benefit not only the hospital but the environment as well. Your major responsibilities as a member of the council include:

- Making an initial assessment of the recycling climate, identifying problems, and determining needs.
- Conducting analyses of the various factors involved in recycling and designing a program.
- Making recommendations on implementation of the program to the Resource Management Council.
- Monitoring and evaluating the results of the program and planning for future expansion.

3. This will be an ongoing process. Your full and active participation is essential to success. You have my full support and the support of the Resource Management Council in your efforts. In designing this program you may elect to use some of the tools employed by Process Action Teams in Total Quality Leadership (TQL). Resources and guidance for your quality improvements efforts will be provided by your team leader LT Frost and by your facilitator LT Medina.

W R Rowley

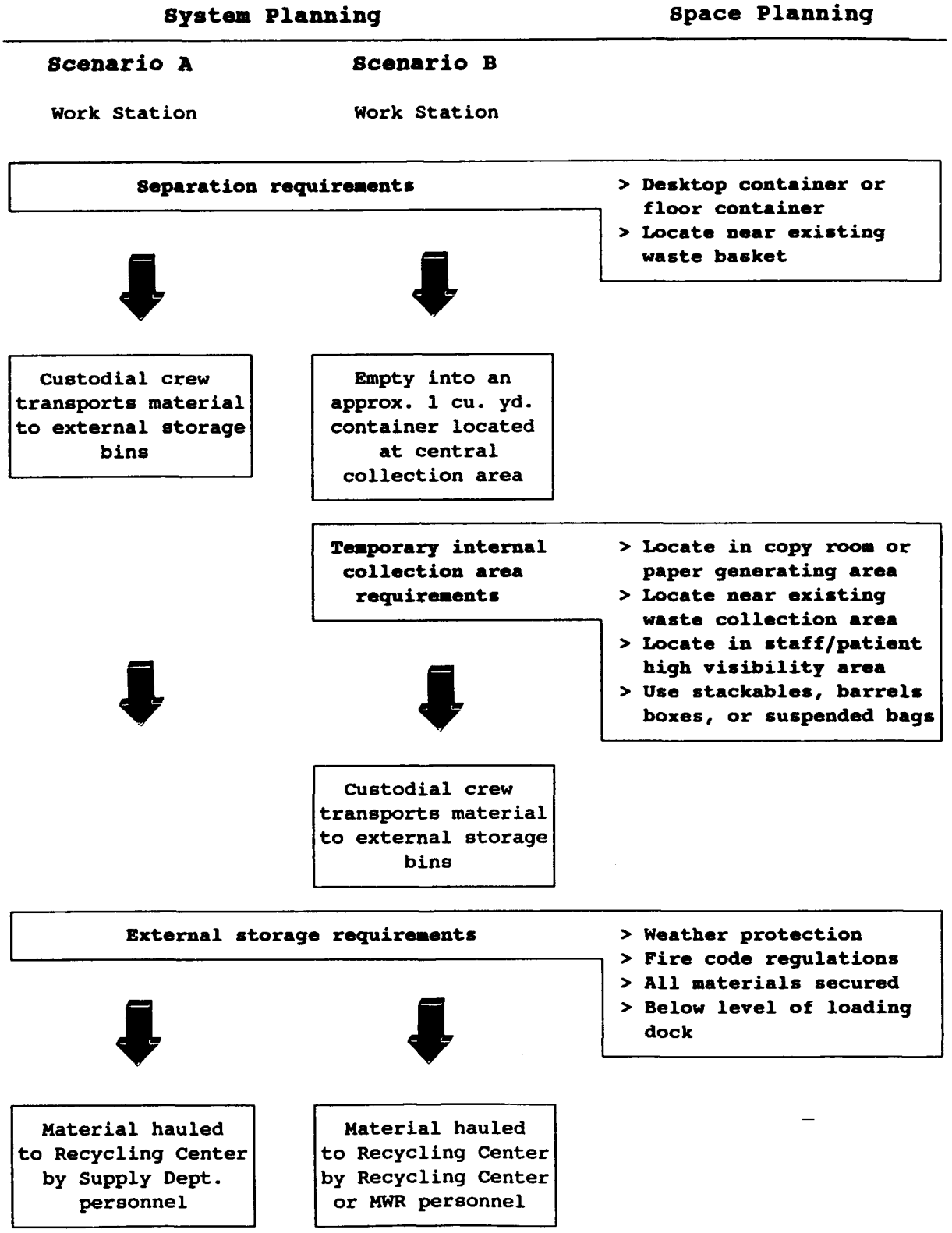
W. R. ROWLEY

Copy to:
DFA
Head, HRM

NAVMED 5600/1 (REV. 10-85)

Flow Chart

Figure 3. Highgrade and/or mixed paper.



Paper Recycling Process

Figure 4.

STEP 1

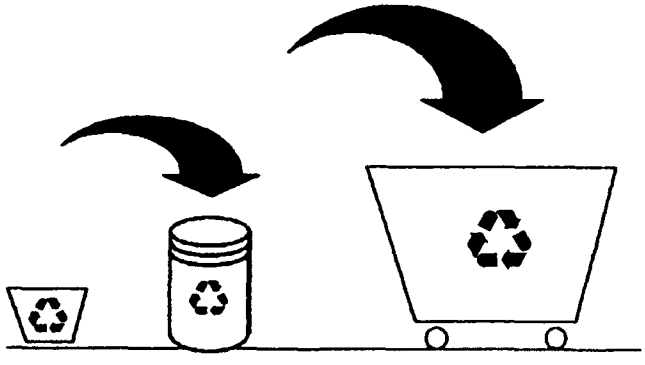
Locate personal desktop or deskside containers NEAR each paper generator.

STEP 2

Empty personal containers into internal "Recycling Centers" located throughout the hospital, separating paper by grade.

STEP 3

Internal bin will be empties as needed into external storage containers by custodial crew.

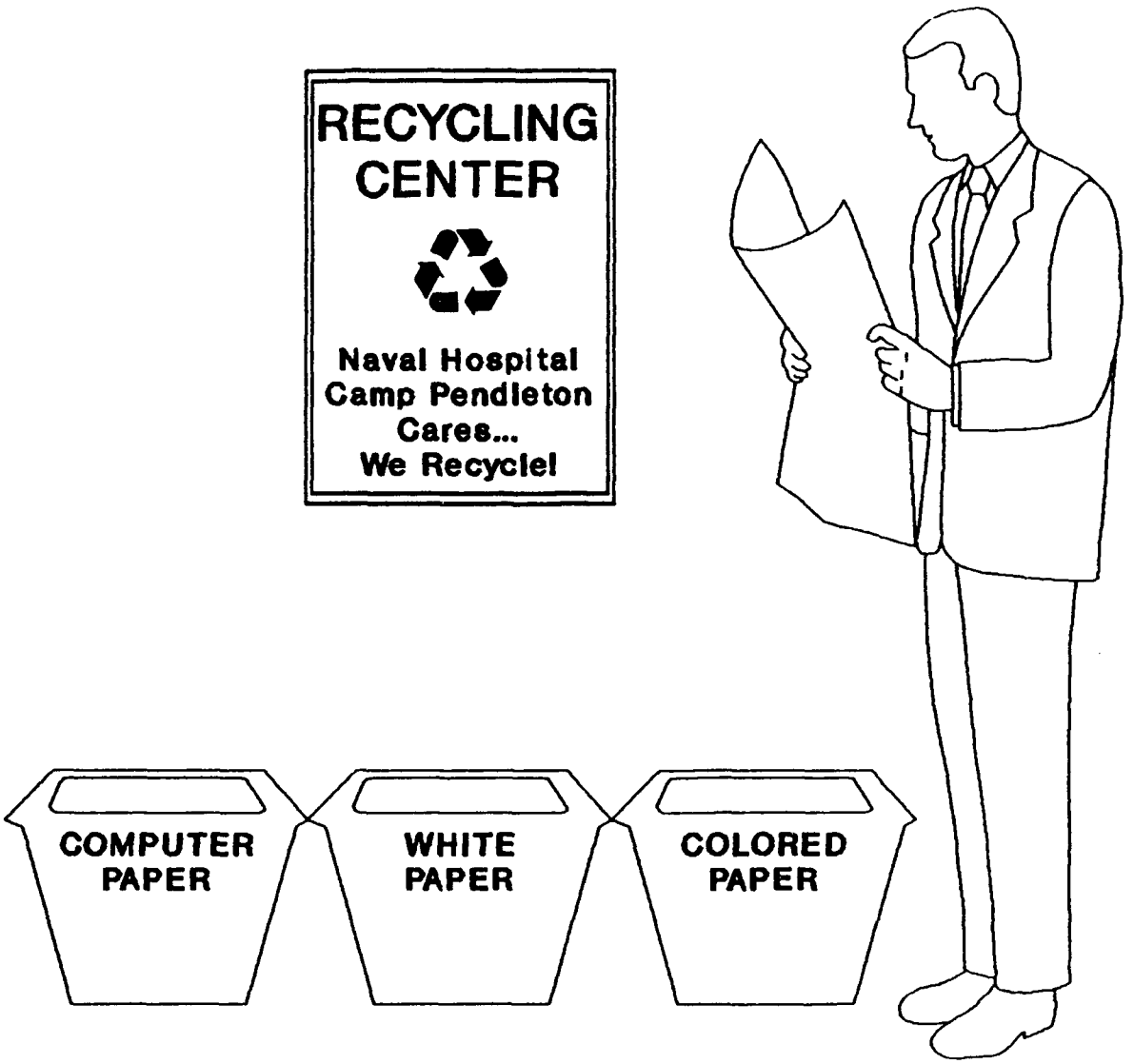


STEP 4

External storage containers taken by truck to Base Recycling Center and returned.

Typical Recycling Center

Figure 5. A typical representation of the 18 recycling centers located throughout the hospital.



"KickOff" Letter

Figure 7. Distribute an introductory letter signed by the hospital commander announcing the implementation of the recycling program.

DEPARTMENT OF THE NAVY
NAVAL HOSPITAL
CAMP PENDLETON, CALIFORNIA 92055-5008

IN REPLY REFER TO:
6820
5 May 92

From: Commanding Officer, Naval Hospital, Camp Pendleton
To: Department Heads/Division Officers

Subj: OFFICE PAPER RECYCLING

1. Studies show that each office worker throws away an average of a half-pound of recyclable paper every day. That's the equivalent of 70 TONS a year from this building alone. This means that over 1190 trees and 47,775 gallons of oil are needed each year just to keep this hospital afloat in paper. On May 18th we're starting a recycling program to put this paper to better use. By recycling, we will lower our garbage disposal costs, earn revenue for MWR from the sale of our paper, and do our part to improve the environment.

2. Participation in this program will require only small changes in your daily habits. On or about May 18th, depending upon your needs, each office will be given either a desk top or a desk side container for storing white paper, computer paper, and/or mixed paper. Areas with special needs, such as MID, Reprographics, the library, etc., will be given additional containers. When the container is full, simply empty the contents into the central "Recycling Center" nearest to your department. The locations of these Recycling Centers will be:

NEAR THE ENTRANCES TO WARDS 2 THRU 8 NORTH,
BETWEEN THE COMMAND SUITE AND HRM,
PCC/ORTHOPEDIC WAITING ROOM,
PHARMACY/FAMILY PRACTICE WAITING ROOM,
OB/GYN CORRIDOR BETWEEN PEDS AND EENT,
LABORATORY WAITING ROOM,
NEAR THE ENTRANCE TO DENTAL,
CORRIDOR BETWEEN MID AND THE WELLNESS CENTER,
BUILDING H-136.

3. To help with coordination and dissemination of information about the program it is recommended that each department nominate one person to act as a recycling coordinator. Names can be provided to one of the "Green Team" members listed below. In addition, during National Hospital Week, May 11 - 15, a short video presentation will be given on ward 2SE, room 2034 at 1000, 1200, and 1500, on Monday, Wednesday, and Friday. All personnel are encouraged to attend.

4. Everyone's participation in this program does make a difference! For every piece of paper we recycle, we will:

- Protect the environment and save natural resources;
- Conserve scarce landfill space; and
- Raise money for Morale, Welfare, and Recreation.

(Adapted from: City of San Diego, 1991, p. 12).pa

NH/CP 5600/1 (REV 10-85)

"How To" Brochure

Figure 8. An information sheet will give employees something to refer to in their work areas.

RECYCLE

Computer print-out paper such as:
- Green bar
- All white

White ledger paper such as:
- Typing paper
- Letterhead & stationery (colored ink is okay)
- Bond paper
- Photocopy paper

Mixed/colored paper such as:
- Newspapers
- Magazines
- Phone books
- Manilla envelopes
- Manilla file folders
- Calendars
- Paper bags

DON'T RECYCLE

(Materials not acceptable in this program)

- Carbon paper
- Post-it notes
- Tissue paper
- Fax paper
- Gummed labels
- Rubber bands
- Plastic report covers
- Window envelopes
- Adhesives, glue binding, cellophane
- Photographic or blueprint paper
- Paper cups

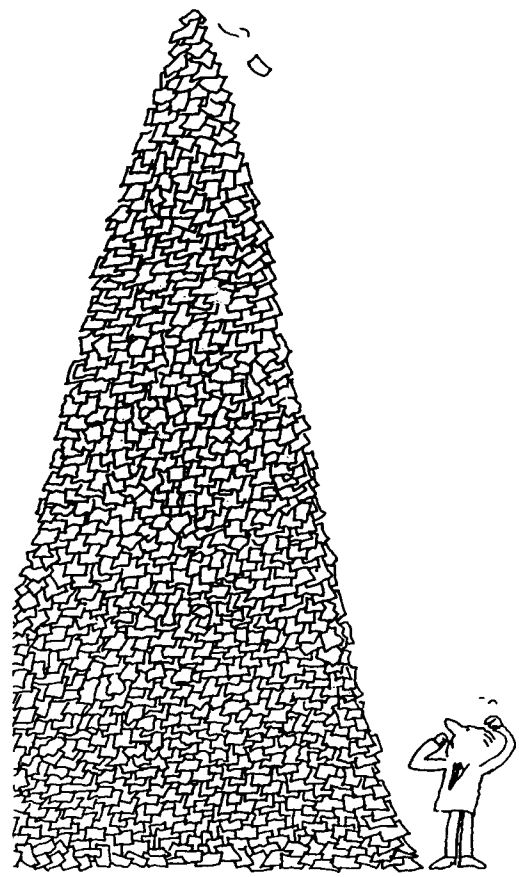
For Information Contact:

Joe Gallagher
Recycling Coordinator
Naval Hospital
Camp Pendleton, CA 92055
(619) 725-1214

Printed on recycled paper

PLEASE *HELP* US

Help the Environment



NAVAL HOSPITAL CAMP PENDLETON

CARES...

We Recycle!

OFFICE PAPER RECYCLING HELPS...

Office paper recycling offers us the opportunity to contribute positively toward solving some of our environmental problems. Office paper recycling reduces solid waste, conserves energy helps alleviate air and water pollution, and saves a natural resource...trees. That's how you help when you participate in our new office paper recycling program.

In the same time it takes to throw office paper away in the trash can, you can deposit it in a recycle container and contribute to a better environment for you and future generations.

HOW RECYCLING HELPS US...

- *Recycling Saves Trees.*

  Each time we recycle a ton of paper we save 17 trees! And three tons of trees are required to produce one ton of paper.

- *Recycling Reduces Solid Waste.*

  On the average, during our regular business day, we generate over one-half pound of recyclable office paper. Each pound of office paper we recycle helps save valuable landfill space.

- *Recycling Conserves Energy.*

  If we use recycled office paper to make new paper we can save up to 70% of the energy required to make paper from virgin wood fiber.

- *Recycling Reduces Pollution*

  Paper manufactured from recycled pulp creates 74% less air pollution than paper made from whole trees.

HOW DOES THE OFFICE PAPER RECYCLING PROGRAM WORK?

How to Participate

Most wastepaper generated is a high grade paper that is valuable as a recycling material. Statistics indicate that nearly 70% of the paper currently being thrown away can be recycled, and our program is designed to do just that.

We want to capture the recyclable paper before it goes into the wastebasket, and we want to do this in the easiest, most convenient way for you.

You will receive a special container for your desk. As you work through your normal business day, put your recyclable paper in the recycle container instead of the wastebasket.

Intermediate storage containers will be located throughout the office and near photocopy areas. When your desk container is full, simply take it to the nearest intermediate storage container and empty the contents.

PLEASE MAKE SURE YOU PUT ONLY THE TARGETED PAPER INTO THESE CONTAINERS.

THANKS FOR YOUR INTEREST!

As you begin to participate in our office paper recycling program you will gain the satisfaction of knowing that not only are you performing an important function for the company, but also helping conserve a natural resource, reducing air and water pollution and saving valuable landfill space. Congratulations on a job well done.

(Layout: Tri-City Community Hospital)
(Text: Waste Management of North America, Inc.)
(Graphic: Larry Green, San Francisco Recycling Program)

Policy Letters

Figure 9. A Hospital instruction or policy letter should be developed for each phase of the recycling program.

DEPARTMENT OF THE NAVY
NAVAL HOSPITAL
CAMP PENDLETON, CALIFORNIA 92055-5008

IN REPLY REFER TO:
09 June 1991

MEMORANDUM FROM THE COMMANDING OFFICER

To: All Personnel

Subj: PROPOSAL FOR WASTE PAPER RECYCLING

1. All departments, offices, work spaces, nursing units, clinics, etc. will be responsible for getting all sorted paper from their desk top, desk side, copier bin out to the nearest central collection station. The central collection stations are designated for the following areas:

WORK CENTERS	CENTRAL COLLECTION LOCATIONS
8N and 8S	8th floor outside ED&TRN
7N and Int Med	7th floor outside 7N
6N and PPA,QA,RLO,CPO	6th floor outside 6N
OCC HLTH, Safety, Counseling, Watch rooms	5th floor outside 5N
4N, ICU, Derm, Audiology, Nursing Admin	4th floor outside 4N
3N, Neuropsychiatry, 3C, 3S, ARD, Med Library	3rd floor outside 3N
2SW, 2SE, Nursery, L&D, OR, Surg Clin, Resp Therapy, Anesthesia,	2nd floor outside 2N
FIRST FLOOR	
Laboratory, Pharmacy, Red Cross	Laboratory waiting room
EENT, Optometry, OB/GYN, Peds	OB/GYN Hallway
Family Practice, ER, Out-Patient records	Pharmacy waiting area
PCC, Ortho, Podiatry, Physical Therapy, Xray, Urology Transportation, PSD,	Ortho/PCC waiting area
Central Files, Legal, HRM, Command Suite	Command Suite hallway
Patient Admin, Transcription, Quarterdeck	Quarter Deck/Patient Admin hallway

(over)

NH/CP 5600/1 (REV 10-85)

GROUND FLOOR

Dental, Medical Mobilization, Med Repair, MID	Dental/MedMob hallway
Library, Security, Opman, Exchange, Credit Union, Barber Shop, Visiting Nurses, Marine Liaison, Pastoral Care	Outside Security office
Reprographics, Mail Room	Inside Reprographics
CPD, Linen Room, Med Photo, Housekeeping, Food Services	Inside warehouse space
PSD, RLO, Fiscal, Supply, Facilities	Stairwell access hallway

2. All departments that have a copier, will make sure that their copier has a red plastic bin that is used for all copier paper that may be wasted at the copier. This copier paper is then placed into one of the central collection bins for white paper.

3. All the central collection stations will be collected on an as-necessary basis (when the bins are full) and sorted into one of the three wooden boxes at the edge of the loading dock by Housekeeping staff.

4. Whenever the three wooden boxes become full it is the responsibility of hospital supply department to transport the full boxes to base recycling, dump the boxes and return them to the area of the loading dock.

5. AT NO TIME SHALL ANY PLASTIC GARBAGE BAGS BE PLACED INTO THE THREE WOODEN BOXES WITH THE RECYCLED PAPER!!!

6. Naval Hospital Camp Pendleton's (NHCP) goal is to reduce the haul away garbage by 50 percent. This is not an ideal situation, rather this is mandated by federal and local governmental agencies. The Command needs your assistance to make this program work.

7. This is only the first step in the recycling program, and yes, the Recycling Council is already looking at other recyclable materials and studying methods of implementing those plans.

8. All constructive comments should be directed to a member of the NHCP Recycling Council through your departmental recycling coordinator.

W.R. Rowley

W.R. ROWLEY

DEPARTMENT OF THE NAVY
NAVAL HOSPITAL
CAMP PENDLETON, CALIFORNIA 92055-5008

IN REPLY REFER TO:

09 June 1991

MEMORANDUM FROM THE COMMANDING OFFICER

To: All Personnel

Subj: PROPOSAL FOR USED BATTERY RECYCLING

1. All departments, offices, work spaces, nursing units, clinics, etc. will be responsible for getting all expended batteries to either the quarterdeck or the operating management office.

2. While only some of these batteries may be of a recyclable type all of them are a hazardous waste and should not be disposed of in the landfill.

3. Naval Hospital Camp Pendleton's (NHCP) goal is to reduce the haul away garbage by 50 percent. This is not an ideal situation, rather this is mandated by federal and local governmental agencies. The Command needs your assistance to make this program work.

4. This is only one of the first steps in the recycling program, and yes, the Recycling Council is already looking at other recyclable materials and studying methods of implementing those plans.

5. All constructive comments should be directed to a member of the NHCP Recycling Council through your departmental recycling coordinator.

W. R. ROWLEY

DEPARTMENT OF THE NAVY
NAVAL HOSPITAL
CAMP PENDLETON, CALIFORNIA 92055-5008

IN REPLY REFER TO:

09 June 1991

MEMORANDUM FROM THE COMMANDING OFFICER

To: All Personnel

Subj: PROPOSAL FOR SENSITIVE WASTE MATERIALS RECYCLING

1. All departments, offices, work spaces, nursing units, clinics, etc. will be responsible for getting all SENSITIVE MATERIALS into a sensitive materials recycling container. These are materials that need to be shredded prior to disposal (ie., patient charts, laboratory chits with names and social security numbers on them, command alpha rosters, documents indicating social security number with the members name on it, any document showing the patients name with a diagnosis on it).

2. All departments, offices, work spaces, nursing units, clinics, etc. will then be responsible for getting these materials shredded. The shredded materials will then be placed in plastic bags for disposal.

3. Housekeeping for each area will be responsible for removing these materials to the loading dock from the clinic, office, nursing unit areas.

4. Naval Hospital Camp Pendleton's (NHCP) goal is to reduce the haul away garbage by 50 percent. This is not an ideal situation, rather this is mandated by federal and local governmental agencies. The Command needs your assistance to make this program work.

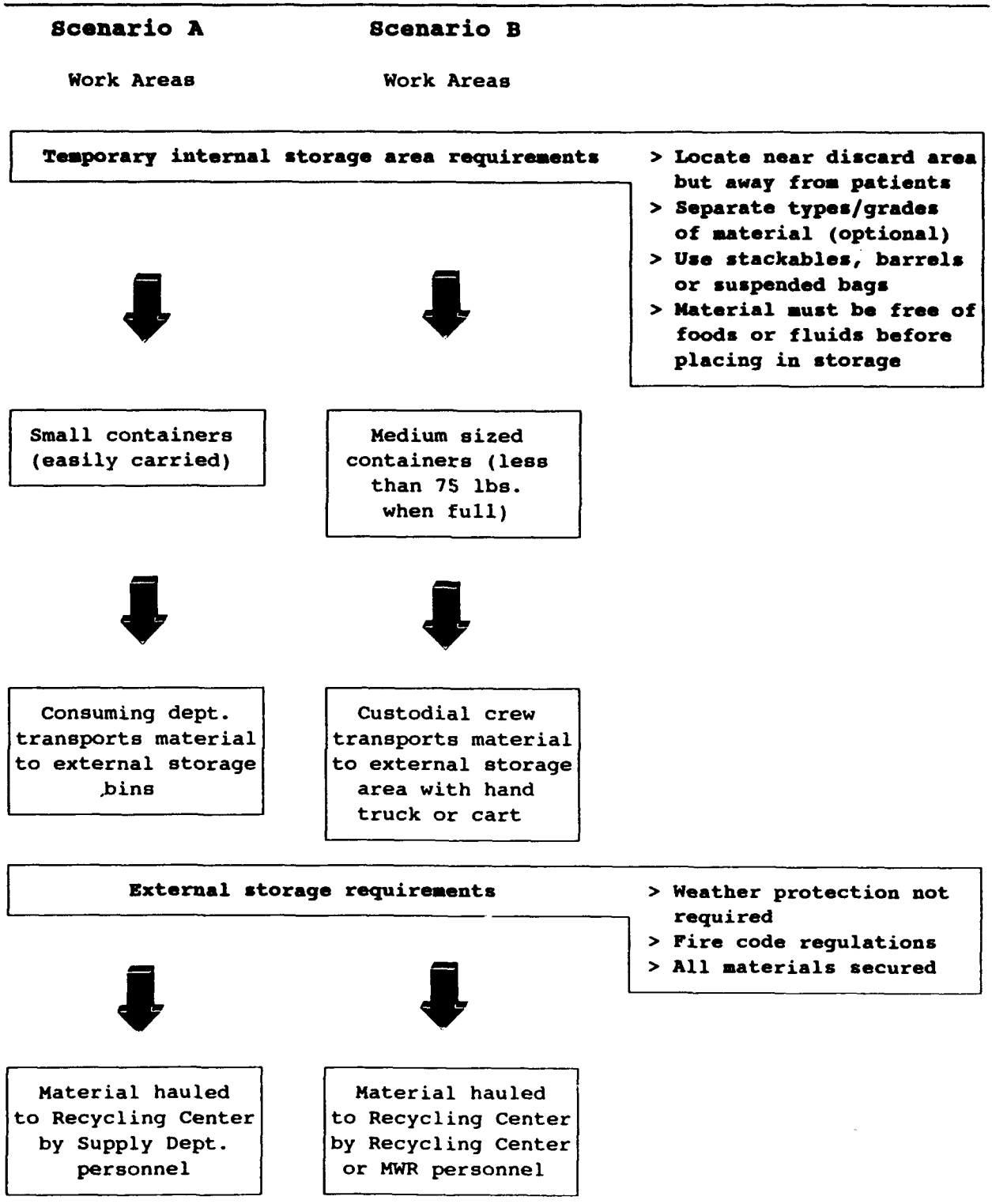
5. This is only the second step in the recycling program, and yes, the Recycling Council is already looking at other recyclable materials and studying methods of implementing those plans.

6. All constructive comments should be directed to a member of the NHCP Recycling Council through your departmental recycling coordinator.

W R Rowley
W. R. ROWLEY

Flow Chart

Figure 10. Multi-resin plastics, steel cans, and glass.



Flow Chart

Figure 11. Corrugated Paper (cardboard).

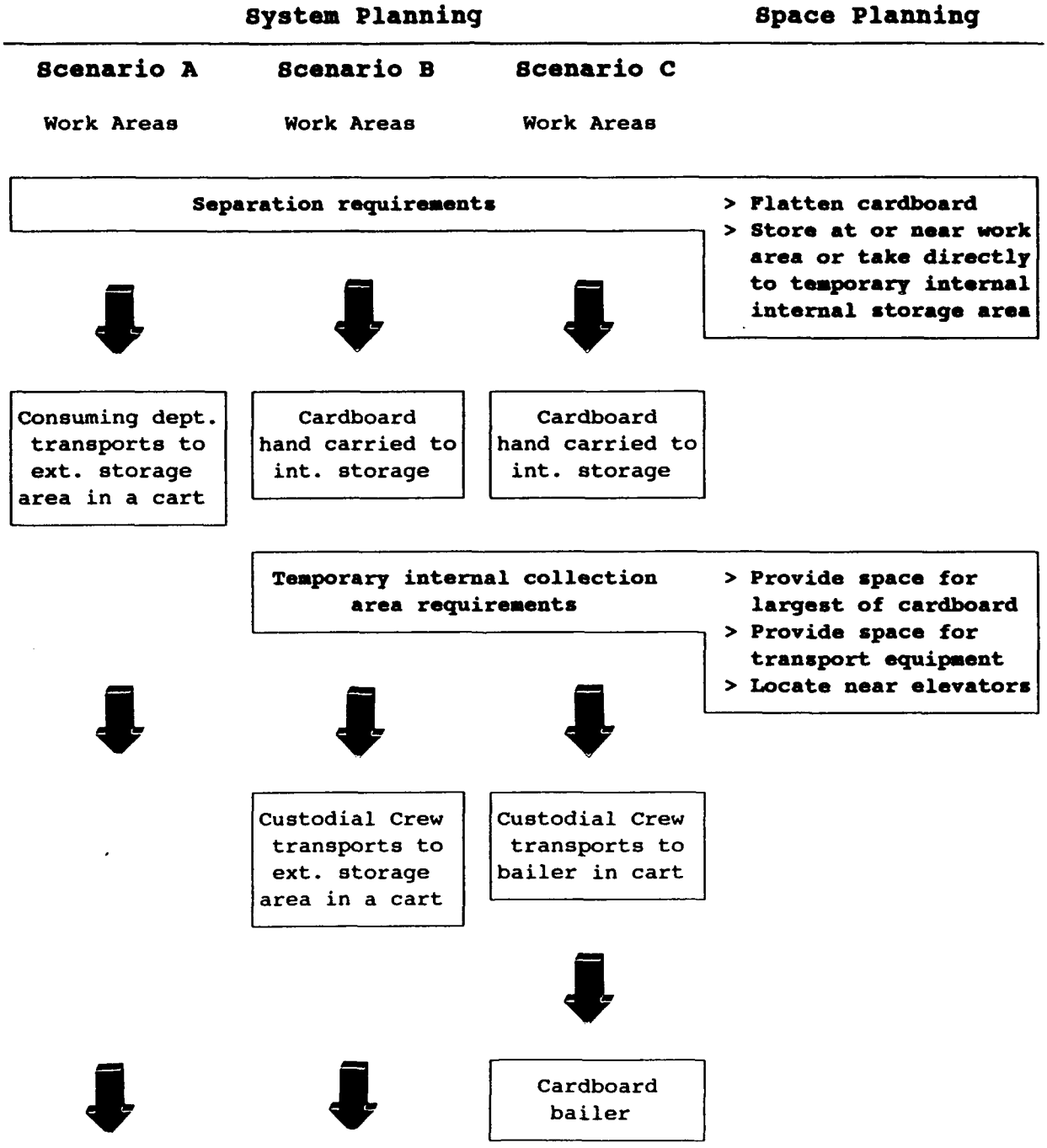
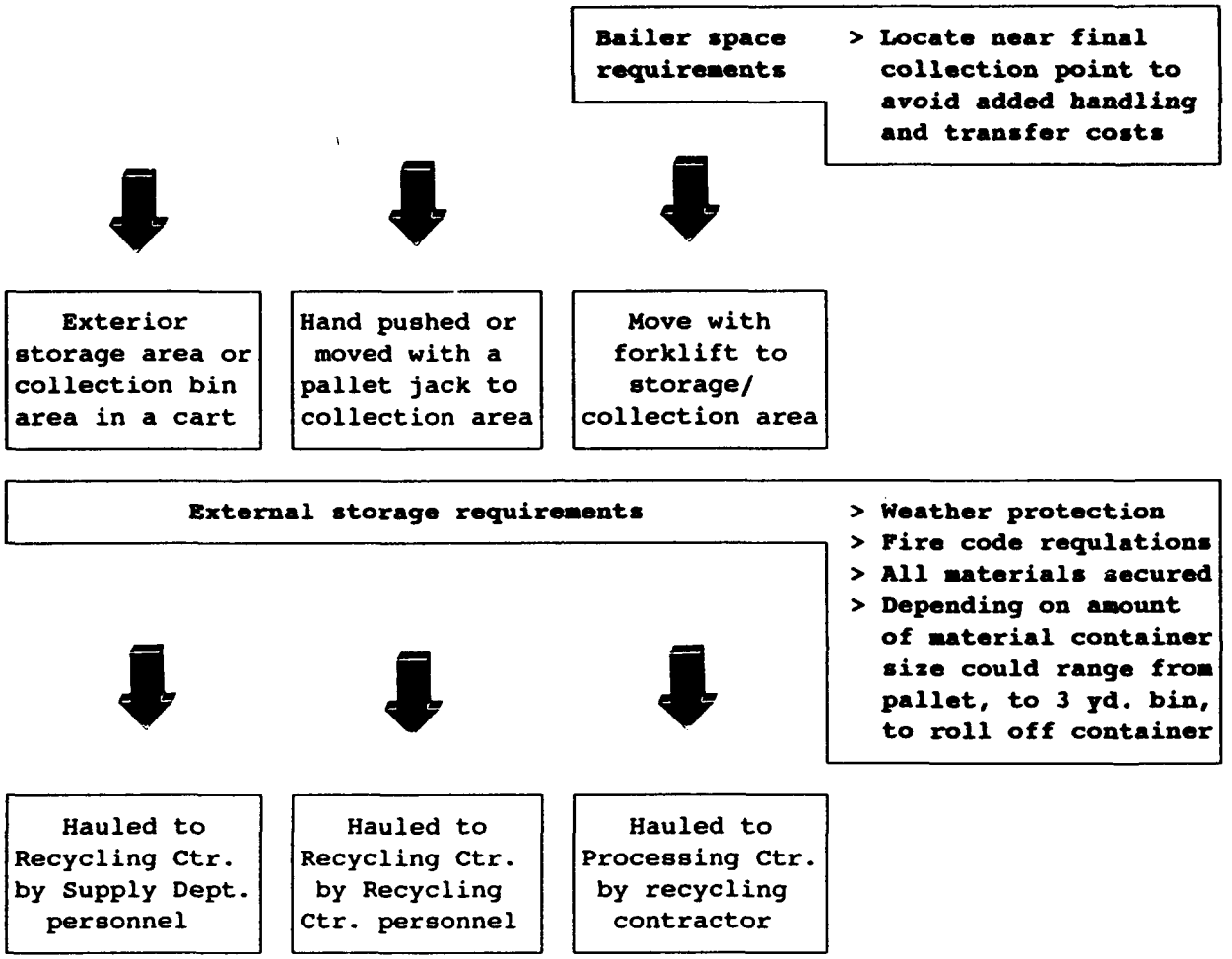


Figure 11. Corrugated Paper (cont'd).



APPENDIX

Definitions

Activity: "An independent Navy or Marine Corps command performing a specific mission" (NEESA, 1991, p. A-1).

Bio-hazardous Waste: Any material which may contain infectious agents and may pose a substantial threat to health. Examples include specimens sent to a laboratory for microbiological analysis; recognizable fluid blood element and regulated body fluids; discarded live and attenuated vaccines; laboratory waste such as specimen cultures; stocks of infectious agents; and devices used to mix or transfer infectious material.

Hazardous Waste: Any materials that are corrosive, ignitable, toxic or reactive, that is beyond its shelf life, or has become contaminated.

Installation: "A Navy or Marine Corps base of operations composed of a number of Navy or Marine Corps activities, units and commands, located on the property of the host activity. Installations typically provide utilities, security and trash collection to the tenant activities" (NEESA, 1991, p. A-1).

Recyclable Materials: those materials "that normally have been or would be discarded (i.e., scrap and waste) that may be reused after undergoing some type of

physical or chemical processing. Recyclable materials do not include precious metal bearing scrap and those items which may be used again for their original purposes or functions without any special processing; e.g. vehicles or machine parts" (MCB CAMPEN, 1986, enclosure (1), p. 1).

Recycling: "the process by which recovered materials are transformed into new, usable products. Recycling consists of three main steps: (1) segregation and collection of materials; (2) physical or chemical processing of materials into usable products; and (3) purchasing products made from recycled materials such as paper, in order to create a market for those materials" (NEESA, 1991, p. A-2).

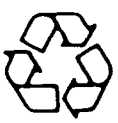
Sensitive Material: Documents that contain Privacy Act information--social security numbers, home telephone numbers, etc.--clinical records, test results, or other information that might breech patient/doctor confidentiality.

Source Reduction: "reducing, at the point of production, the volume or toxicity of materials used before the products are purchased, used or discarded. This includes reuse of materials, items, or products prior to recycling and extension of shelf life" (NEESA, 1991, p. A-2).

Source Segregation: "the placement of like materials in appropriate containers at or near the job site while reflecting no significant change in manpower requirements" (MCB CAMPEN, 1986, p. 2).

Source Separation: the "separation of recyclable materials at their point of generation by the generator" (NEESA, 1991, p. A-3). It "denotes the act of moving materials from existing containers holding mixed materials, thereby requiring multiple handling and increased manpower requirements" (MCB CAMPEN, 1986, p. 2).

Tenant Activity: A organization or unit that occupies space at a host installation.



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